CANADIAN ACADEMIC HEALTH SCIENCE CENTRES: DEVELOPING A FRAMEWORK TO ADDRESS COMPENSATION, ACADEMIC PRODUCTIVITY, PERFORMANCE AND QUALITY

by

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy
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Abstract

Academic leaders and policymakers are faced with a series of difficult and complex decisions around methods of assessing and compensating academic physicians with regards to their performance. Despite the introduction of Alternative Funding Plans by many provincial governments, concerns around the reliance on clinical revenues to fund components of the medical school's academic mission, increased competition for research grants, physician compensation costs coupled with the rising costs of education and health care delivery, the prevalence of institutional ranking systems and pressures to demonstrate accountability, have all endured. While anecdotal evidence on the types of compensation and academic productivity frameworks exists, studies or literature on the prevalence of these models and their effectiveness within Canadian Academic Health Science Centres (AHSCs) are limited.

This dissertation uses an emergent, multi-phase, mixed methods research methodology to explore the methods used to compensate and assess Canadian academic physicians. This dissertation provides methodological, empirical and theoretical contributions to knowledge. Empirically, the phase 1 national survey of academic leaders achieved a 61% response rate (39 respondents), and confirmed that AHSCs use various systems to compensate, assess and incentivize academic physicians. Phase 2 consisted of three mixed methods case studies (three institutions, three provinces, four clinical academic departments and five different compensation models) to analyze the academic productivity of 150 academic physicians over a five-year period between 2006
Qualitative data were gleaned from the interviews of academic leaders. Methodologically, a new quantitative and bibliometric assessment model – the K-MAAP© – was developed to analyze the research outputs and impact of those included in the sample, calculate research return-on-investment and efficiency. Theoretically, elements of contract theory, incentives, and behavioural economics were utilized. Behavioural economics is an emergent, hybrid field that seeks to reconcile the gap between standard economic theories and cognitive theories by showing how people actually do behave, and not just how they are expected to behave. A new type of incentive which emerged during the case study research – called a “placebo incentive” – was also described.

Several policy implications are presented including methods to fund AHSCs; methods to fund academic physicians; the use of incentives in academic medicine; accountability, metrics and productivity assessments; and systems-level issues related to the alignment of incentives and compensation programs. This information is important for policy makers, AHSCs, hospitals, physician associations, practice plans and academic leaders as they seek research addressed at understanding the efficacy of the models used to compensate, assess, motivate and reward academic physicians for scholarly tasks.
Acknowledgements

As a first generation university graduate, it did not occur to me that I would one day pursue a Master’s degree, let alone a Doctorate. Professor Dan Lang inspired me to do so. As my dissertation supervisor, his intelligence, quiet persistence, encouragement and support for the past six years have provided me with an opportunity that I never dreamt that I would have. Professor Lang’s approach to teaching and his encyclopedic knowledge of the higher education sector has had a profound impact on my life. I am forever thankful to him for his endless reviews of my work, as well as his kindness, support and patience.

I am also very grateful to Professors Brian Hodges and Angela Hildyard, the other members of my dissertation committee, for their support, advice and encouragement. I would also like to take this opportunity to thank my other professors at the Ontario Institute for Studies in Education (OISE) at the University of Toronto: Professors Katharine Janzen, Glen Jones and Creso Sá, as well as the very helpful staff in the Department of Leadership, Higher and Adult Education and the Registrar’s Office at OISE. My experience at OISE has been nothing short of amazing.

Dr. Brian Kavanagh has provided me with endless support and the gentle but firm “push” that we all need from time-to-time. His approach to leadership in academic medicine provided the inspiration to further explore compensation and assessment models for academic physicians. I would also like to thank Drs. Sarita Verma, Cathy Whiteside, Gerald O’Leary and Ms. Jean Robertson for their feedback and support, as well as the institutions, departments and academic leaders across Canada who generously provided me
with advice, access to networks/connections or information on their own models.

Regrettably, I cannot acknowledge all of them by name.

I owe my deepest gratitude to my family and friends for supporting me on this journey. Ultimately, this dissertation would not have been possible without the patience, nurturance and wise counsel of my family, and especially my son Maximilian Mataija, husband Steve Mataija, mother and father, Ursel and Franz Kubasik and my brother, Oliver Kubasik. I hope that this dissertation will inspire Maximilian to pursue his own dreams, academic and otherwise.

Conducting this research and writing this dissertation has had a major impact on me. As my committee members have reminded me, this dissertation is just the beginning of my research, not the end!
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<tbody>
<tr>
<td>AAMC</td>
<td>American Association of Medical Colleges</td>
</tr>
<tr>
<td>A-ARP</td>
<td>Academic Alternative Relationship Plan (Albert)</td>
</tr>
<tr>
<td>ACAHO</td>
<td>Association of Canadian Academic Healthcare Organizations</td>
</tr>
<tr>
<td>AFMC</td>
<td>Association of Faculties of Medicine Canada</td>
</tr>
<tr>
<td>AFP</td>
<td>Alternative Funding Plan</td>
</tr>
<tr>
<td>AHF</td>
<td>Alberta Heritage Foundation</td>
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<tr>
<td>AHC</td>
<td>Academic Health Centre</td>
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<tr>
<td>AHFMR</td>
<td>Alberta Heritage Foundation for Medical Research</td>
</tr>
<tr>
<td>AHSC</td>
<td>Academic Health Sciences Centre</td>
</tr>
<tr>
<td>AHS</td>
<td>Alberta Health Services</td>
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<tr>
<td>AMA</td>
<td>Alberta Medical Association</td>
</tr>
<tr>
<td>AMC</td>
<td>Academic Medical Center</td>
</tr>
<tr>
<td>APP</td>
<td>Alternative Payment Program</td>
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<tr>
<td>APS</td>
<td>Academic Points System (Surgery, Toronto)</td>
</tr>
<tr>
<td>ARP</td>
<td>Alternative Relationship Plan (Alberta)</td>
</tr>
<tr>
<td>aRVU</td>
<td>Academic Relative Value Unit</td>
</tr>
<tr>
<td>CAC</td>
<td>Clinical Academic Colleague (Alberta)</td>
</tr>
<tr>
<td>CAUT</td>
<td>Canadian Association of University Teachers</td>
</tr>
<tr>
<td>CDCP</td>
<td>Career Development and Compensation Program</td>
</tr>
<tr>
<td>CIHI</td>
<td>Canadian Institute for Health Information</td>
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<tr>
<td>CIHR</td>
<td>Canadian Institutes for Health Research</td>
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<tr>
<td>CMA</td>
<td>Canadian Medical Association</td>
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<tr>
<td>CMAJ</td>
<td>Canadian Medical Association Journal</td>
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<tr>
<td>CMG</td>
<td>Canadian Medical Graduate</td>
</tr>
<tr>
<td>CNPS</td>
<td>Canadian National Physician Survey</td>
</tr>
<tr>
<td>COU</td>
<td>Council of Ontario Universities</td>
</tr>
<tr>
<td>CV</td>
<td>Curriculum Vitae</td>
</tr>
<tr>
<td>FFS</td>
<td>Fee-for-Service</td>
</tr>
<tr>
<td>FMSQ</td>
<td>Fédération des médecins spécialistes du Québec</td>
</tr>
<tr>
<td>FTE</td>
<td>Full-Time Equivalent</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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</tr>
<tr>
<td>GFT</td>
<td>Geographical Full-Time</td>
</tr>
<tr>
<td>HHMI</td>
<td>Howard Hughes Medical Institute</td>
</tr>
<tr>
<td>IBSS</td>
<td>International Bibliography of the Social Sciences</td>
</tr>
<tr>
<td>ICES</td>
<td>Institute for Clinical Evaluative Sciences</td>
</tr>
<tr>
<td>IMG</td>
<td>International Medical Graduate</td>
</tr>
<tr>
<td>K-MAAP©</td>
<td>Kubasik Method to Assess Academic Productivity</td>
</tr>
<tr>
<td>MBMM</td>
<td>Mission Based Management Model</td>
</tr>
<tr>
<td>MCT</td>
<td>Motivation Crowding Theory</td>
</tr>
<tr>
<td>MOHLTC</td>
<td>Ministry of Health and Long-Term Care (Ontario)</td>
</tr>
<tr>
<td>NIH</td>
<td>National Institutes of Health</td>
</tr>
<tr>
<td>NOSM</td>
<td>Northern Ontario School of Medicine</td>
</tr>
<tr>
<td>NSERC</td>
<td>Natural Sciences and Engineering Research Council of Canada</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
</tr>
<tr>
<td>OMA</td>
<td>Ontario Medical Association</td>
</tr>
<tr>
<td>P4P</td>
<td>Pay for Performance</td>
</tr>
<tr>
<td>PBIC</td>
<td>Performance-Based Incentive Compensation</td>
</tr>
<tr>
<td>PCCCAR</td>
<td>Provincial Coordinating Committee on Community and Academic Health Science Relations</td>
</tr>
<tr>
<td>PI</td>
<td>Principal Investigator</td>
</tr>
<tr>
<td>PSI</td>
<td>Physicians Services Incorporated Foundation</td>
</tr>
<tr>
<td>RAMQ</td>
<td>Régie de l'assurance maladie du Québec</td>
</tr>
<tr>
<td>RCPSC</td>
<td>Royal College of Physicians and Surgeons of Canada</td>
</tr>
<tr>
<td>RVU</td>
<td>Relative Value Unit</td>
</tr>
<tr>
<td>SEAMO</td>
<td>Southeastern Ontario Academic Medical Organization</td>
</tr>
<tr>
<td>SQL</td>
<td>Structured Query Language</td>
</tr>
<tr>
<td>SRA</td>
<td>Senior Responsible Author</td>
</tr>
<tr>
<td>SSHRC</td>
<td>Social Sciences and Humanities Research Council (Canada)</td>
</tr>
<tr>
<td>TAHSN</td>
<td>Toronto Academic Health Science Network</td>
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Dedication

To my Mom, who inspired me to “do”;

To my Mom and Dad, who loved me even when I didn’t;

To my son Maximilian, who understood, supported and loved me when I “had to”;

And to my husband Steve, who for 20 years has given me unconditional support and love.

This dissertation is gratefully dedicated to all of you. I hope that you will have as much fun and pride in reading this as I’ve had in the writing!
Chapter One: Introduction

Overview

Academic leaders and policymakers are faced with a series of difficult and complex decisions around methods of assessing, compensating and promoting the performance of academic physicians. Despite the introduction of Alternative Funding Plans (AFPs) or Alternative Relationship Plans (ARPs) by several provincial governments, concerns around the reliance on clinical revenues to fund components of medical schools academic mission (Jones & Gold, 2001; Miller et al. 2012; Ludmerer, 2002; Lozon & Fox, 2002; Krakower et al., 2000; Reuter, 1997), increased competition for research grants (Canadian Institutes for Health Research 2013; Howard & Laird, 2013), salary costs for physicians coupled with the increasing costs of education and health care delivery (Canadian Institutes for Health Information, 2011, Smith, 2002), and recruitment and retention issues in academic medicine (Bridges et al., 2007; Bickel et al., 2005; Straus et al., 2006), have all endured.

The popularity of institutional ranking systems (Arimoto, 2011; Longden, 2011; Toutkoushian & Webber, 2011; Diem & Wolter, 2013; van Raan, 1996) and the emergence of bibliometrics to measure academic productivity have also contributed to increasing pressure for academic leaders to demonstrate accountability, and “return-on-investment” given the substantial public investments that have been made in research and higher education. Harman notes that, “Quality assurance, accountability and rankings can be viewed as different forms of assessment of organizational effectiveness” (Harman, 2011: 35). Accordingly, the development of methods to assess scholarly productivity and performance has become an increasingly important topic as many universities with academic health science centres (AHSCs) seek to develop methodologies to evaluate the teaching and research outputs of academic physicians, and further devise models of compensation that may enhance those outputs.
While anecdotal evidence on the types of compensation and academic productivity frameworks exists, studies or literature on the prevalence and effectiveness of these models is very limited, particularly within the Canadian context. Given the sparse literature on this topic, an exploratory national survey of Canadian academic leaders of departments of Anesthesia, Medicine, Pediatrics and Surgery was conducted in 2011 to provide baseline data for this dissertation study. The study yielded a response rate of 61% (39 departments), and demonstrated that 85% of university departments who responded (33) provide some form of financial compensation to their academic physicians - over and above their clinical earnings – to recognize their academic activities. Of note however, only 7% (3 departments) have formally assessed physician satisfaction with their systems, and even fewer have assessed the efficacy of their assessment and compensation programs.

Further, the systems used to compensate or evaluate academic physicians vary from province to province, institution to institution, and even amongst departments within institutions. In 2012, Akl *et al* published a systematic review of the literature on the effects of assessing academic productivity in academic medical centres in the Canadian Medical Association Journal (CMAJ). This review supports the findings of my national survey and literature review: these authors found only nine articles reporting on eight different studies which used eight different assessment strategies (*Akl et al* 2012: E603). All of the studies were conducted in the United States. In reviewing these articles, the authors concluded that the “studies did not report on all of the outcomes of interest, or they reported on one but not all of the relevant aspects of an outcome... Consequently, we judged the overall quality of evidence to be low” (*Ibid*: E604).

My project here is to understand and assess the efficacy of the compensation and assessment models that are used in terms of the outputs and impact of research on both an individual, and a group level. Academic physicians are expensive to compensate and difficult to
assess given the multiple principals and stakeholders to which they are accountable. This notion has been supported with data from three case studies, involving three provinces, three institutions, and four clinical specialties (Anesthesia, Medicine, Pediatrics and Surgery). To test the outputs of each department – and their impact – a new analytical and predictive typology, the K-MAAP©, was developed. For the purposes of this study, academic productivity was defined in terms of the products (outputs) of research (peer-reviewed publications, peer-reviewed grants and invited lectures) as well as the effectiveness of teaching. This definition can be expressed with the following metric:

$$\text{AP} = \text{AP publications} + \text{AP grants} + \text{AP invited lectures} + \text{T effectiveness}$$

In the case of those universities who do not generate an aggregated teaching effectiveness score, the definition was conveyed using the following metric:

$$\text{AP} = \text{AP publications} + \text{AP grants} + \text{AP invited lectures}$$

The findings of this study provided information on the impact of the compensation and assessment models that were studied in regards to academic productivity, and also confirmed the need to support peer review-based assessment models with quantitative or bibliometric data. This study postulates that the strategy or goals that underpin financial incentive-type systems in academic medicine should be carefully considered in terms of increasing financial, social, technological and systems-related pressures within the AHSC context, as well as the available literature within the field of behavioural economics. Finally, this study suggests that academic leaders should develop accountability measures -- and governments need to reconsider how academic medicine is funded.
Outline of this Chapter

This chapter begins with a statement of my position as a researcher within this dissertation. The chapter is then organized into ten sections as follows: background, purpose of the research, research problem, research methods and questions, theoretical framework, the K-MAAP© assessment model, scope and limitations of the research, contribution to knowledge, chapter summary, and definition of terms. The chapter focuses on describing the challenges which academic leaders face around the compensation and assessment of academic physicians and the lack of evidence on the effectiveness of existing payment mechanisms. The research methods section describes the mixed methods, emergent model that has been chosen for this study and states the research questions that have been employed for each of the case studies. This section also briefly describes the K-MAAP©, a new bibliometric and quantitative model specifically developed to assess and rank the productivity and impact of research outputs. The theoretical framework section includes a brief outline of the emerging field of behavioural economics, including its utility in terms of intrinsic motivation, external monetary incentives, and potential productivity-related impacts, as they may apply to academic physicians. The academic mission and organizational culture-related challenges of implementing group versus individually focused compensation systems is touched upon, as well as the application of economic rewards for academic or research tasks that are inherently creative, and undertaken by professionals. The parameters of the study as well as the epistemological stance are illustrated in the section on the scope and limitations of the study. Finally, the chapter briefly describes the contributions of this study to knowledge, outlines the other chapters in this dissertation, and concludes with definitions of various key terms.

Situating Myself within the Research

Burgess notes, “While some [researchers] become interested in an area of study through reading others people’s work, this is only one part of the story, for the biography of the individual
researcher has a part to play” (Burgess, 1984: 210 quoted in Allies, 1999). My interest in this research stems from my full-time work in an AHSC for the past fifteen years. As a business manager in a faculty of medicine and a graduate student, I was aware that each department uses a different compensation model but none of the models had been tested empirically, only one seemed to be grounded in theory, and none of the models demonstrated the impact of their models other than to list volumes of publications or grants that were produced. My position within the university provided me with in-depth knowledge of many of these models, and also allowed me to have access to information, documents and contacts that most researchers would not have access to. As a researcher, this access was beneficial, but also provided opportunities for personal biases. While complete objectivity cannot be my goal, I was cognizant of my epistemological position within the research, and consulted with colleagues at my university as well as at other universities. I also presented the preliminary research findings at workshops, conferences and invited lectures, inviting feedback and suggestions.

Background: Compensating and Assessing Academic Physicians

1. Methods to Fund Academic Health Science Centres

The methods used to fund AHSCs and academic physicians are incredibly complex. Medical schools typically derive funding from government ministries of health and higher education. These two areas typically account for a significant proportion of overall governmental spending. Over time however, multiple agreements were entered into with AHSCs, for multiple portfolios spanning research, education, clinical and operating activities. The portfolios and accompanying agreements emerged in an iterative manner as new public priorities for health or education emerged, however, the funding streams were rarely linked together. The diverse methods used to fund AHSCs – and by dint, to facilitate the production of doctors and research – has resulted in poor systems integration

11 Available online at http://www.leeds.ac.uk/educol/documents/00001204.htm
and poorly aligned incentives. Portfolios are often managed by several different government departments and ministries, integration of accountability metrics and reporting functionalities has not occurred in most areas, the technology needed to develop and monitor sophisticated quality measures is lacking, and thus, oversight has been a challenge (Ontario Auditor General’s Report 2011). The complexity of these funding arrangements on the health side in Ontario is depicted in Figure 1.1.

**FIGURE 1.1: ONTARIO MINISTRY OF HEALTH SPENDING ON MEDICAL EDUCATION: 2012-13**

Recognizing the complexity that have been built into these models, the possibility for duplication in funding areas, and perhaps as a result of poor audit results (Ontario Auditor General’s Report 2011), the Ontario Ministry of Health and Long-Term Care hired KPMG Consulting in 2013 to review the flow of funds to AHSCs and produce recommendations on streamlined funding models and
accountability. In 2014, Alberta Health Services contracted Deloitte Canada to complete a similar review of funding models for AHSCs. Of note, Figure 1.1 does not include monies provided by the education ministry to medical schools (e.g., grants or basic income units for undergraduate learners), nor does it account for limited-term research projects funded by the provincial or federal governments. While data could not be located from Canada, it should be noted that tuition fees and services accounted for only 3.6% of medical school revenues in publically funded institutions in the United States in 2010 (AAMC, June 2011). The American Association of Medical Colleges (AAMC) reports that physician practice plans, followed by federal research grants and contracts, constitute the major source of revenue for AHSCs.²

2. Compensation Models for Academic Physicians

Academic physicians do not derive the majority of their gross income from an AHSC. The 2007 Canadian National Physician Survey (CNPS) indicated that academic physicians derive roughly 5.64% of their gross income from an AHSC/university. How then are academic physicians compensated, and why do AHSCs seem to rely on clinical revenues to fund their academic mission? While my project here is not to analyze the complex and changing contractual arrangements of physician payments for clinical activities, it is important to highlight a few key points in the current environment.

First, most Canadian academic physicians operate as autonomous professionals (agents) within the milieu of the university. The vast majority of physicians’ income has historically been generated through fee-for-service (FFS) compensation programs whereby academic physicians or practice plans bill the provincial government for clinical services rendered. Fee-for-service is based on billing codes for procedures or consultations which have fee schedules assigned to them (dollar figures), and are paid for separately. The revenues typically flow directly to the academic physician

or their practice plan, not the university or clinical department. The FFS system does however engender several issues for academic medicine. FFS provides monetary incentivizes (stratified piece rates) to induce physicians to see more patients. This can work well in under-served areas, clinical specialties or populations, and may have helped governments to meet health care targets (Robinson, 2001, Bridges et al, 2007). But FFS is also believed to raise health care costs by encouraging resource consumption (Robinson, 2001), discourage integrated or interprofessional, team-based care, and incentivize over-utilization (Gosden et al 1999, Gosden et al 2000).

Additionally, academic physicians receive no incentive under FFS to spend time on academic activities; thus, time spent out of the clinic resulted in income levels for academic physicians which were significantly lower than physicians practicing in community-based, non-teaching settings (Ontario Academic Health Sciences Alternative Funding Information Guide 2013, Alberta Health Services website)³.

This led to recruitment and retention issues in academic medicine (Bridges et al, 2007, Straus et al, 2006, Commonwealth Fund Task Force on Academic Health Centers, 2000)⁴, concerns around the stability of AHSCs and confusion about “paths of accountability and responsibility” (Academic Health Sciences Task Force, 2008: 6). To stabilize income levels, and thus ensure the recruitment and retention of academic physicians, some university departments assign specific faculty members or clinical fellows to focus on clinical activities, thereby providing time out of the clinic for others to undertake academic activities. In this way, clinical revenues generated by practice plans subsidize the academic mission of the university by providing salary support to clinical teachers, researchers and administrators (Bridges et al, 2007, Cohen & Fox, 2003, D’Alessandri et al, 2000, Holmes et al, 2000). In the United States, the AAMC reports that 37.2% of “revenues

³ See http://www.health.alberta.ca/professionals/ARP-Academic.html
⁴ Bridges et al note that clinical earnings were 50-75% lower than community-based physicians. This number is not widely agreed upon however; anecdotal data suggests that the variation in earnings differs by site, province, hospital and clinical specialty.
supporting programs and activities at accredited medical schools” are provided by practice plans (AAMC: June 2011). In turn, the practice plans determine the inputs of research (e.g., academic time out of the clinic, other resources). This weakens and competes with the university’s role as a principal, and intensifies the information asymmetry that exists in the principal-agent relationship.

Second, universities compensate some academic physicians, but the models vary greatly. At the University of Toronto for example, academic physicians are governed by the Policy for Clinical Faculty, and are treated as independent contractors with no access to tenure, benefits or a university-derived salary (with the exception of a few academic leaders with limited-term administrative appointments)\(^5\). Most of the clinical departments at the University of Toronto do not offer “salaries”, but may provide stipends for leadership roles or bonuses for specific academic activities. These comprise a small percentage of overall compensation with the majority of income derived through the practice plan. Pediatrics is different in that they are on an academic comprehensive AFP which includes both clinical and academic deliverables. Compensation is however derived through the practice plan, not the university.

There is also some variation at the University of Alberta where a small proportion of academic physicians have tenure, salary and benefits (geographical full-time faculty). They are part of an Alberta-wide collective bargaining agreement for all types of faculty members, in addition to the contracts negotiated by the Alberta Medical Association (AMA) for clinical deliverables. Only Pediatrics and Neurosurgery have negotiated an A-ARP with Albert Health Services. Further, the University of Alberta has three different types of academic appointment streams, one of which has no compensation or benefits attached. These differing arrangements create complex principal-agent relationships at this institution; the dean or chairs are responsible for the outputs of the academic physicians, but that responsibility is complicated by the relative absence of money as a device of

\(^5\) The UofT’s Policy for Clinical Faculty can be found at http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppjul012005.pdf
motivation, influence or accountability. Canadian academic physicians are typically required to have an academic appointment to practice in an AHSC, but oftentimes, their relationship with the university is peripheral, at best.

3. Health Care and Physician Compensation Costs

Because clinical faculty, by definition, provide health care as well as teach, conduct research and oftentimes act as administrators, their performance, productivity, and compensation levels affect the delivery of health care and post-secondary education, thus causing the problem to span what for most national governments are their two largest areas of expense. The Canadian Institute for Health Information (CIHI) reports,

When general inflation and population growth are accounted for, health spending still grew at an annual average rate of 3.4% from 1998 to 2008, more than double the rate of the revenue growth of the provincial, territorial and federal governments. (CIHI, 2012: 10).

The CIHI reports that Canada spent $211 billion on health care in 2013 or $5,988 per person. Health spending constitutes 11.2% of GDP. Rising costs in health care are attributed, at least in part, to new technological innovations, demographics (aging populations), price inflation, and changing service utilization patterns (CIHI, 2012). Physician compensation costs are however a contributing factor. The expense is not insignificant: the CIHI
indicates that physician spending accounts for 15% or $31.3 billion of total health spending in Canada. To put this into perspective, hospitals constitute the highest expense at 30% of overall spending ($62.6 billion in 2013), followed by drugs at 16% of overall spending ($34.5 billion). Only 1% of health dollars are spent on all other health professionals put together. The Institute for Clinical and Evaluative Sciences (ICES) estimates physician spending to be higher, at 20% of overall health care spending (Institute for Clinical and Evaluative Sciences, 2012: 2). Over 65% of this spending is funded by provincial or federal governments, but provincial/territorial governments spend an average of 40% of their budgets on health care (CIHI, 2012). Figure 1.2 depicts the rise in health care spending since 2003.

Spending on physicians also grew significantly from 1998 to 2014. The CIHI indicates:

Physician spending has been among the fastest-growing health categories in recent years, increasing at an annual rate of 6.8% per year from 1998 to 2008. More than one-half of this growth, 3.6% per year, is attributable to increases in physician fee schedules. The remuneration that doctors received grew faster than the average weekly wages of other health and social services workers during the past decade, although physician compensation grew more slowly than the prices of other public goods and services from 1975 until 1998. (Ibid: vi)

Echoing the CIHI report, ICES reported that physicians in Canada were paid $8 billion in 2009/2010, which is more than twice what they were paid in 1992/1993 in unadjusted dollars. In Alberta, physician compensation and development accounted for 22% of health care spending and rose 78% between 2007-2008 and 2013-2014 (Health and Wellness Annual Report 2007-2008: 1, Alberta Health Annual Report 2013: 37). Actual spending in Alberta was higher than projected in 2013-2014 due to “higher physician compensation and benefit costs related to the new agreement with the Alberta Medical Association (AMA)” (Ibid: 37). It should be emphasized that spending has not increased because there are significantly more doctors; spending increased because income levels (mean payments per FTE) have grown significantly, as demonstrated in Table 1.1:

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6 Source: Ministry of Health and Long-Term Care, 2012 presentation at the University of Toronto, Faculty of Medicine, Clinical Chairs Committee meeting. Figure 1.2 not to be reproduced.
Table 1.1 shows that the increase in Pediatrics’ average salaries is just slightly higher than the CPI inflation rate for the same period (2000 to 2010). The increases for Anesthesia and Surgery were however higher.

Higher total spending on physician compensation has not however increased clinical productivity or service levels. Reporting on clinical data from Quebec for the period 2007 to 2011, Contandriopoulos and Perroux note,

While total physician compensation costs, average physician compensation and average unit cost per service all rose extremely fast, the total number of services, number of service per capita, and average number of services per physician either stagnated or declined.
(Contandriopoulos & Perroux, 2013: 30)

Recently, the Ontario and Alberta provincial governments have implemented across-the-board cuts to physician compensation programs. Negotiations that were underway with the Ontario Medical Association (OMA) were halted, and the OMA has called for binding arbitration. The impact on clinical or academic productivity, if any, is unknown at this time.

4. Alternative Funding Plans: The Saviour of Academic Medicine?

In response to rising health care costs, payment challenges engendered by the use of fee-for-service (FFS) for academic physicians, and the mission-related challenges identified by AHSCs,
AFPs, alternative payment programs (APPs) and ARPs emerged in several Canadian provinces in the late 1990s (Haslam et al, 2004, Bridges et al, 2007, Rosenbaum, Shortt & Walker, 2004). One of the goals of these programs was to remediate the income-related inequities between academic physicians and community-based physicians through the provision of block payments, with less reliance on FFS. Governments also emphasize the role of AFPs in “providing citizens with timely access to specialist physicians in a cost-effective manner, effectively training new physicians, and remediating physician supply and distribution challenges” (Ontario Auditor General’s Report, 2011: 172).

It must however be emphasized that provincial medical associations negotiate these agreements on behalf of the physicians. At the University of Toronto, the Faculty of Medicine elected not to manage the AFP academic funds which comprised 30% of the total available. In Toronto, the funds flow directly to hospital-based physician governance bodies or practice plans. As a result, the university has little direct control over the alignment of incentives with the academic mission of the university.

The outputs produced by parties to the AFP and ARP agreements are unclear. In Ontario, there are two main arrangements: AHSCs where 3,700 physicians receive $242 million under this arrangement; and, academic comprehensive contracts. In late 2011, the Auditor General of Ontario released a report on “Funding Alternatives for Specialist Physicians” including the AHSC alternative funding plans⁹. This report states,

Payments made under alternate funding arrangements for specialists and emergency department physicians increased by more than 30% from the 2006/07 fiscal year, or more than 10% per year, similar to the increase in payments to all specialists during this time. However, the Ministry has conducted little formal analysis of funding arrangements, such as improving patient access, have materialized or been cost effective. (AGR, 2011: 172)

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This report also asserts that the Ministry of Health and Long-Term Care (MOHLTC) was unable to provide any evidence that a cost-benefit analysis was conducted prior to implementation of the AFPs. The complexities embedded within physician payment contracts are also highlighted:

There are numerous types of payments and various premiums that specialists can earn, making contract and payment-monitoring difficult for the Ministry. For example, for academic services (including training new physicians and conducting research), there were up to 9 different categories of payments under AHSC contracts and up to 14 categories under academic comprehensive contracts. (Ibid: 173)

Further, the report commented on the lack of signed contracts for 28% of physician who were funded under the AFP; overpayments to physicians that were not returned to the Ministry stemming from specialty areas that did not meet their contracted service requirements; a lack of information on how targeted funds were actually spent (e.g., recruitment funds); technological/IT systems which do not inter-digitate and therefore cannot support accountability requirements; and poor monitoring of the contract on the part of the Ministry. Perhaps most importantly,

The Ministry does not know the total amounts paid to physicians under these arrangements. In addition, because a considerable portion of the payments under the AHSC contracts goes to the governing group for distribution to the physicians, instead of directly to individual physicians, the Ministry does not know the total amount of compensation received by each physician participating in the AHSC and therefore the reasonableness of the amounts cannot be periodically assessed. (Ibid: 183)

This problem is perhaps felt most acutely by academic leaders who are neither agents nor principals in this arrangement, which further leads to accountability, management, and human resources issues.

5. Research: Decreased Funding, Increased Competition

Increased competition for research grants, and dwindling funding for research programs, has added to the challenges that academic leaders face. In the 1990s, federal and provincial governments sharply increased the amount of available research funding based on the idea that research drives economic growth and international competitiveness through commercialization. These ideas were not necessarily consistent with the primary mission of most universities: discovery, autonomy, the
communication and preservation of knowledge, academic freedom in teaching and research\textsuperscript{10}. Adjusted for inflation though, granting council funding (CIHR, SSHRC, NSERC) has been declined since 2007-2008. Overall funding support for grant council funding is down 7.5\% since 2007-2008. Funding for CIHR has fallen 7.5\% in real dollars since that time. Figure 1.3 demonstrates this decline. From 2007 to 2012, support for the indirect costs of research also declined by 7.9\%. But, the number of university-based researchers in Canada grew 9.5\% from 2007-2008 to 2010-2011. As a result, funding for basic research available per faculty member fell 5.5\% between 2007 and 2011 (CAUT Education Review, 2013). In Alberta, AHSCs have relied heavily on the funding provided through the Alberta Heritage Foundation for Medical Research Endowment Fund (AHF). In 2014-2015, this fund provided $86 million to support basic and clinical researchers. However, the funding will be withdrawn effective 2017, at which time the researchers funded through the Alberta Heritage Foundation will compete for CIHR or NSERC funding. In 2016, the Alberta government also announced cuts of $22 million to the Alberta Innovates health research funding program\textsuperscript{11}. 

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure1.3.png}
\caption{CIHR Base Funding, 2007-2012}
\end{figure}

\textit{Source: CIHR Departmental Performance Reports, Budget 2012 and Budget 2013. Canadian Association of University Teachers (CAUT) Education Review, Vol 13, No. 1, October 2013.}

\textsuperscript{10} These ideas are noted in the mission statements of most universities. Mission statements that have been reviewed include those of the University of Toronto, McMaster University, York University, the University of Alberta, and the University of Manitoba.

6. The Principal-Agent Dilemma: Too many cooks in the kitchen?

Figure 1.4 is important because it summarizes one of the fundamental difficulties which academic leaders face in compensating and assessing academic physician: the complexity of the principal-agent relationships. As I have shown above, it is not as one might first expect a simple matter of a contract between an employer (the university) and an employee (the academic physician). Instead, it is multiple agreements, multiple principals and multiple stakeholders, each with competing interests. Academic physicians occupy multiple roles (clinician, researcher, teacher and administrator) and are compensated from multiple sources through the organization of contemporary AHSCs or by “principals” all of whom have an interest in their performance as agents. Further, they are accountable to multiple stakeholders in both the education and health care sectors. Unlike other faculties, most Canadian faculties of medicine do not typically offer tenure – or the accompanying guarantee of salary, benefits, continuing academic appointment or permanence – to the majority of clinical faculty members. Thus, academic physicians constitute a class of faculty and health providers to whom the conventional compensation, assessment, engagement and organizational commitment models and theories in higher education often do not apply.
7. Metrics, Measures and Grades: Institutional Rankings and Bibliometrics

Many AHSCs are developing methodologies to measure the teaching, research and sometimes, the administrative outputs of faculty members. The results of the national survey conducted for this dissertation indicate that 80% of respondents (31 departments) have metrics to measure teaching or research performance. Bibliometrics (publication-related data) and institutional rankings are closely related, and occupy the same problematized space on a sociopolitical level; in essence, they both rank either individuals or institutions, ostensibly, to provide objective, independent, signals of institutional quality or effectiveness and benchmarks for improvement. In referencing bibliometrics, the Council of Canadian Academies reports,

Public funding organizations like NSERC often struggle with how to best allocate funding across research fields and programs. Once these allocation decisions are made, funding organizations must determine how to best communicate and justify them to the research community, policy-makers, and the public at large. Thus, funding organizations are increasingly looking to science assessment tools and quantitative science indicators for guidance in informing these decisions. (Council of Canadian Academies, 2012: xi)

Bibliometrics provide researchers with a tool to “prove” their value and document research productivity in an increasingly marketized academic environment.

On a global level, the merits and flaws of various methods to rank institutional and individual academic productivity are debated within the literature. These include bibliometric systems such as the h-index (Hirsch index), the Brazilian Lattes system, and the citation index, as well as institutional rankings such as the Times Higher Education World Rankings (Thomson Reuters), QS Top Universities, Academic Rankings of World Universities (Shanghai Jiao Tao University), and many others. Critics of the rankings such as Toutkoushian & Webber (2011), Diem & Wolter (2013) and Bornmann (2011) contend that rankings are shaped by limited, comparable data sets; many important outputs are not included in the data sets which inform the rankings; the weights assigned to different indicators are arbitrary; some indicators are prone to subjectivity (e.g., reputation); not enough methodological data is provided on the surveys; and, the “volatility of the
rankings reflects their lack of statistical reliability, arising from poor aggregation, without prior standardization, of different performance indicators for the rankings” (Group of Eight, 2012: 3).

Notions around academic productivity and bibliometric measurement of outputs may be attractive to academic leaders, particularly in light of increased calls for accountability and fiscal responsibility. However, the current focus on volumes of “outputs”, as opposed to impact, is not without problems. Words such as “outputs”, “productivity”, “value”, and “standardized measures” all have strong economic and industrial production-related connotations. Indeed, when one looks at the etymological definition of the term “productivity”, the tone of this dialogue is set. In an 1809 dictionary, “productivity” was defined as “the quality of being productive”. By 1899 however, the term referred to a “rate of output per unit”. The common use of these terms within our social and historical context originated around the time of the Industrial Revolution, however, they were not applied to the work of university academics or academic physicians until fairly recently. Van den Brink notes,

Universities have been transforming from a collegial system, backed by an ideology that led professors to expect and to enjoy high levels of independence and autonomy, relatively free from any sense of management and accountability (Egginton, 2010) to a managerial model in which management practices are adopted from the private sector (Deem, 2001; Smeenk et al, 2006). It is evident that individual performance systems have entered academia and that ‘excellence’ and ‘talent’ are predominantly linked to matters such as productivity, peer review, citation indexes, and international refereed publications (Tjissen et al, 2002; van Raan, 2005; Basu, 2006). (van den Brink, 2013: 192)

The word “accountability” is repeatedly used in relation to AHSCs, AFPs and institutional rankings, and often refers to being accountable to others (e.g., taxpayers, students, governments, etc.), for monies that have been granted to the institution. It follows then that the concepts co-produced by

12 Bibliometric indicators such as the Hirsch Index (h-index) assess publications and citation counts. One could be a collaborator on large numbers of publications in low impact journals, and still achieve a high h-index. Because bibliometrics privilege senior investigators, the rankings do not give an accurate picture of the ability of junior investigators. This is discussed further in Chapters 2 and 3.

13 Source: http://www.etymonline.com/
notions around accountability construct academic activities as “products” and the academic physician as a commodity.

While there may be skepticism about institutional rankings or the value of measuring academic productivity in academic medicine, it is a concept nonetheless that is being taken-up in the Canadian context, even at this nascent stage. Thus, it is particularly important to develop analytics (not just measures focused on volumes) that truly assess the impact of research outputs, and support other assessment models (e.g., peer review). Assessment models should support the academic mission as defined, and link to compensation models which complement, develop or enhance performance and engagement.

**Research Problem**

This dissertation study pursues two inter-related lines of questioning. First, how are Canadian academic physicians compensated and assessed and what is the relationship of that system to academic productivity, recruitment and retention? The objective here is to examine the distinct features and impact of these systems over a five-year period (2006 to 2011) through a comparison of research outputs (quantitative measures), and leadership-related challenges (qualitative features). A typology has been developed to measure which department is the most academically productive and impactful in terms of research outputs (the K-MAAP©). Thus, the results produced by the K-MAAP© are compared here against peer review and existing bibliometric measurement systems, including the Hirsch Index (h-index) and citation index.

Second, how do institutions, departments or academic leaders make choices around the allocation of scarce resources? How is policy designed when it comes to academic physicians? Are there specific social, political or economic trends that underpin the management decisions that are made? Further, how do hospitals, professional organizations, and physician-based practice plans fit
into the academic productivity equation? Here, I wish to explore how the production of medical knowledge is promoted and incentivized within the context of the contemporary medical school\(^{14}\).

**Theoretical Approach**

As this study unfolded, it became clear that no one theory could explain the current landscape or how choices are made. Theories of interest included the principal-agent problem or agency dilemma (e.g., theory of incentives, compensation principles, asymmetric information), the new managerialism or theories on engagement or institutional commitment. However, a personal experience provided the grounding for my theoretical approach. My son excels at math and science, but he avoids reading books. As the “principal”, I decided to provide my son (the “agent”) with a monetary incentive to read more (i.e., a cash “incentive” for every book he reads). Classical economic theory postulates that a monetary incentive, or a piece rate, provided by the principal should induce higher productivity from the agent. Under rational choice theory, an agent is expected to act out of self-interest, ranking their choice alternatives, and picking the choice that will maximize their happiness. Certainly, fee-for-service payment program were founded on this theory. I too assumed that my son would read as many books as possible to earn spending money. But I observed the exact opposite: he actually read a whole lot less. The monetary incentive seemed to quash his intrinsic motivation to read; now reading seemed to be a chore, and it became more difficult to motivate him to read.

Behavioural economics is an emergent field which studies the impact of psychological or social factors on the economic decisions or market choices that individuals or institutions make, and the attendant results in terms of resource allocations, and choices that are made. Standard

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\(^{14}\) As an example, the Faculty of Medicine at the UofT’s strategic plan for 2011-2016 includes the development of performance indicators for research: “New measures will assess the overall performance in achieving our vision and mission. For instance, in addition to overall research publication rate, we will track citation rates and the “h-index across departments and institutes”. The plan does not however indicate how the data will be used. Source: [http://www.facmed.utoronto.ca/Assets/FacMed+Digital+Assets/Leadership/SAP-RSP-SI.pdf](http://www.facmed.utoronto.ca/Assets/FacMed+Digital+Assets/Leadership/SAP-RSP-SI.pdf).
economics starts from the belief that individuals are rational; behavioural economics starts with the belief that some choices may seem “irrational”. While several, oft-quoted studies have been completed on topics such as the effect of external incentives on motivation, intrinsic and extrinsic motivation and “crowding out/crowding in” effects (Benabou & Tirole, 2003, Frey & Jejen, 2001, Swarananathan, 2013, Carmichael, 1988), the problems of paying too little or paying too much (Gneezy & Rustichini, 2000, Pokorny, 2006) and the effects of monetary rewards or incentives for interesting or creative tasks such as the academic life sciences (Azoulay, Zivin and Manso, 2009), the results of these experiments are often contradictory. While few studies in this field have been situated within academia at this time (let alone academic medicine), this study has made a contribution to the literature by linking data on real-life choices gleaned through the case studies presented in this dissertation (peer review rankings, compensation schemes attached to those rankings) to models which show the impact of those choices (K-MAAP© outcomes and predictive analytics) in terms of productivity, competitiveness, and effectiveness.

Research Methods and Questions

Given the limited studies or literature in this field, an emergent (flexible), exploratory, multi-phase, mixed methods research methodology was developed. As a first step towards framing the problem, a national survey of chairs of university departments of Anesthesia, Medicine, Pediatrics and Surgery for sixteen Canadian medical schools was administered. The survey garnered an overall response rate of 61%, and the data collected was used to design the next phase of research. In phase two of the emergent research model, the case studies were completed. The purpose of these case studies was to understand the systems used to compensate and assess academic physicians, and to explore the views of academic leaders with regards to the efficacy of these systems through qualitative interviews of academic leaders.
The research questions for the three case studies share common features which are linked to the two inter-related lines of questioning noted within the research problem above, but also recognize the intricacies of each compensation and assessment system as well as the contexts within which the systems are operationalized.

**The K-MAAP©: A New Analytic and Predictive Model**

The majority of the departments described in the case studies use a peer review ranking process, and then compensation (salary, bonus, or incentive) is attached to those rankings. However, do peer reviewers always “get it right”? Peer review processes can be fraught with biases (Edwards 2011, Lee et al 2013, van Raan 1996), and so I decided to compare the peer review rankings that were produced as part of the case studies against rankings produced for the same sample by the h-index, the citation index and the new K-MAAP©.

The K-MAAP© is a new bibliometric and quantitative analytical model which assigns points to research outputs (e.g., peer-reviewed publications) to derive scores, rankings, maps of academic productivity, impact and efficiency ratings over a specific period of time (in this case, from 2006 to 2011) and not over a career (as is the case with the h-index). Where available, I also compared the research rankings against teaching effectiveness rankings.

**Scope of the Research**

This research focuses on research outputs produced by Canadian academic physicians, in particular, those full-time clinical faculty medicine classified by their organization as Clinician Scientists or Clinician Investigators. It should be emphasized that “full-time” academic appointees may have tenure, compensation and benefits, but that is not always the case. In some cases, such as at the University of Toronto, “full-time” refers to the amount of time spent on academic activities, which could simply include having a learner at the bedside. The amount of time is typically 80-100%
for 1.0 (FTE). Part-time and adjunct clinical faculty members have not been included in this study as their academic appointments are rarely focused on research, they typically receive only stipends for teaching (oftentimes, from provincial ministries of health and not from the university) and the majority do not practice in an AHSC.

For the purposes of this study, research outputs refer to peer-reviewed publications, peer-reviewed grants, and invited lectures. The publication of abstracts, books, or chapters is also a research activity, however, these outputs are typically given less weight in most assessment models, and are not usually included in publically available annual reports.

Three institutions and four clinical departments are included in the case studies: The departments of Anesthesia, Pediatrics and Surgery at the University of Toronto, the Department of Internal Medicine at the University of Manitoba, and the Departments of Anesthesia, Pediatrics and Surgery at the University of Alberta. These departments were chosen to provide a sampling of data across various clinical specialties, the approaches used were well-documented and had been in place for some time, data were available and accessible for the period 2006 to 2011, and the academic leaders were open to sharing their knowledge and experiences. Further, each department used a different approach to assessing and compensating/incentivizing academic physicians. Quantitative or performance-related data, metrics or reviews were not available from the University of Alberta, but the academic leaders were keen to participate in qualitative interviews\textsuperscript{15}. This study also attempts to compare research productivity and teaching effectiveness. While teaching scores – and thus rankings – were available for the University of Toronto, the other universities included do not produce similar scores.

\textsuperscript{15} Other universities or departments also expressed an interest to participate in the study including Dalhousie University, Western University, the University of British Columbia, McGill University, and the Department of Medicine at the University of Toronto.
Limitations

As this research focuses on the research outputs of Canadian academic physicians within specific clinical specialties, institutions and provinces, there are a few limitations to the study. First, the findings are specific to Canadian academic physicians, within specific provinces, and specific institutions. Given the variance amongst the systems used to compensate and assess academic physicians, the types of academic appointments available to clinical faculty members, and the purpose of this study (i.e., to explore the efficacy of the systems described in the case studies), the findings may not apply to physicians in other jurisdictions.

Second, four clinical specialties have been included in this study. Physicians (MDs) representing various clinical sub-specialties or research fields have also been included (e.g., Cardiology, Hematology, Gastroenterology, Neurology, Neurosurgery, etc.). The findings may not be generalizable to other clinical specialties. It should also be noted that non-MD PhD scientists as well as clinical faculty from nursing, pharmacology or dentistry are not included here.

Third, the study focuses on the systems used by universities to compensate and assess academic physicians. As noted however, the practice plans and practice plan leaders play a major role in determining research outputs given that they control clinical productivity, funding available through clinical revenues from AFPs/APPs/ARPs (which constitute the majority of gross income), protected academic time, academic resources, administrative duties, etc. This is not an issue for Pediatrics at the University of Toronto or Internal Medicine in Manitoba; both of these departments have fully integrated clinical and academic enterprises. Anesthesia and Surgery at the University of Toronto were chosen because the clinical departments are not integrated, and the relationship between the academic leaders and practice plan leaders is collaborative in nature. For this reason, salary-related details were not available.
Fourth, this dissertation explores the relationship of compensation and assessment systems to academic productivity. It would however be overly simplistic to say that the compensation method alone is the direct cause of academic productivity. Certainly, my goal here is to look for a relationship between productivity and the compensation and assessment model that is used and to document the features of a truly comprehensive system. Indeed, it should be acknowledged that certain individuals or groups may be more sensitive to the compensation model that is used, or the context within which it has been implemented.

Finally, information on clinical productivity or the quality of clinical work quality has not been included in this study. While these data sets were not available, it would be important to link academic and clinical productivity together in a future study.

**Contribution to Knowledge**

This study had made three contributions to knowledge: empirical, theoretical and methodological.

First, this study has added to the body of literature and provides new empirical knowledge on compensation and assessment models for academic physicians. Data from the case studies are used to explore the effectiveness of the compensation and assessment models using both quantitative and qualitative methods. This dissertation has also contributed to the dialogue on AFPs, APPs and ARPs as provincial governments explore existing methods to fund AHSCs. In this way, the analyses that are provided are of interest to academic leaders in AHSCs, hospitals, practice plans, non-medicine academic departments, as well as policymakers and other stakeholders.

Second, this study has added insight into the application of behavioural economics theories on incentives (paying too little, paying too much), intrinsic and extrinsic motivation to real-world data sets (a limitation of behavioural economics thus far). Further, this study explored an area in the
behavioural economics literature which has not yet been widely studied: rewarding highly paid professionals monetarily for inherently interesting and creative tasks such as research.

Third, the K-MAAP© constitutes a novel bibliometric and quantitative research methodology which could be put into practice. The K-MAAP© assesses academic productivity, return-on-investment, replacement value and impact for a given period of time, but also has potential in terms of predictive analytics. These features provide academic leaders with a tool to assess, rank and compare peers, for specific periods of time, and develop strategies to support teaching and research (e.g., mentorship, faculty development programs).

Outline of the Rest of the Chapters

This dissertation is comprised of ten chapters. Chapter 2 reviews the literature on compensation for academic physicians, alternative funding plans, the assessment of productivity, performance and quality, AHSCs and the field of behavioural economics. It also explores key areas of research on bibliometrics and scientometrics. Chapter 3 provides a detailed description of the research design and methodology for the national survey and case studies, as well as the new K-MAAP© methodology. Chapter 4 reports on the findings of the national survey. Chapters 5 to 9 report on the individual case studies, as follows:

- Chapter 5: University of Toronto (Departments of Anesthesia, Pediatrics and Surgery)
- Chapter 6: Department of Internal Medicine, University of Manitoba
- Chapter 7: University of Alberta (all departments)

In Chapter 8, the results are analyzed and compared based on the research categories, and data from the qualitative interviews from Toronto and Manitoba are reported on and summarized (these data sets were included in a separate chapter to ensure the privacy of the individuals who were interviewed). Chapter 9 includes a theoretical discussion, organized around the research questions.
for each case study. Chapter 10 concludes the dissertation, highlighting the implications and findings of the study, as well as areas for future research.

**Terms and Definitions**

**Academic Health Science Centre (AHSC):** An AHSC is a university-based medical school, which together with various hospital partners or affiliates, forms an enterprise designed to teach medical learners (medical students, residents, and other health professions learners) and conduct research (basic and clinical sciences). The Commonwealth Fund Task Force on Academic Health Centers defines an Academic Health Centres (AHC) as ‘interrelated entities comprising a medical school, its affiliated hospitals, and outpatient centers, and a faculty practice plan (FPP). Their unique missions are to provide undergraduate and graduate medical education and training, conduct basic science research and clinical research on new medical practices and technologies, furnish state-of-the-art medical care for patients with complex illnesses, and care for the poor and medically indigent. Traditionally, AHCs have been leaders in their communities and the health care delivery system” (Reuter report, Commonwealth Fund, August 1997, pp. v).

**Academic Physician:** Following Williams, 2008, an academic physician is defined as a Medical Doctor (MD) with a university-based academic appointment which is understood to have teaching and research within the medical school, in addition to the provision of clinical services, as a core function.

**Academic Productivity (AP):** Following Akl et al, 2012, academic productivity is defined as the measurable output of a faculty member. For the purposes of this study, academic productivity refers to research outputs (peer-reviewed grants, peer-reviewed publications and invited lectures), plus, teaching effectiveness. Teaching effectiveness is included where it can be measured, and documented.

**Alternative Funding Plans:** Also referred to in the literature as “AFPs” and occasionally, as APPs (alternative payment programs): “Alternative funding arrangements are contractual agreements between the Ministry, a group of physicians, and in most cases the Ontario Medical Association (the organization that bargains on behalf of physicians in Ontario) and may include other organizations such as hospitals and universities. Alternate funding arrangements for specialists are also subject to provisions in the physician services agreements between the Ministry and the Ontario Medical Association, which have been negotiated every four years since 2000.” (2011 Annual Report of the Auditor General of Ontario, Chapter 3, VFM Section 3.07: 171)

**Bibliometrics:** “The term ‘metrics’ includes both bibliometrics and other quantitative data, such as total external research income or the number of higher degree completions. Bibliometrics are
indicators of research performance based on citations in leading academic journals by other scholars” (Harman, 2011: 49)

**K-MAAP©:** The K-MAAP© is a quantitative typology which uses “points” to derive patterns of productivity – and to determine impact level -- on the basis of peer-reviewed publications, invited lectures, and peer-reviewed grants.

**Practice Plan:** Cohen and Fox define as practice plan as “an organized structure within an academic medical center that provides such services as billings, collections, revenue distribution, and financial services to the full-time teaching faculty” (Cohen and Fox, 2003: 120).

**Relative Value Units (RVUs):** As articulated by Akl *et al*, “The relative-value unit is a nonmonetary standard unit of measure used to indicate the value of services provided; for a specific service, the unit is multiplied by a conversion factor to calculate the total dollar amount assigned to that service” (Akl *et al*, 2012: E604).
Chapter Two: Literature Review

Overview

Chapter 2 presents a thematic review and critical analysis of the literature on compensation and assessment models for academic physicians. Four core themes emerged from the literature review: academic health science centres (AHSCs); compensation models for academic physicians; Alternative Funding Plans (AFPs); and, methods to assess the academic productivity, performance, and quality of academic physicians (including bibliometrics and scientometrics as a sub-theme). The goals of this literature review are to rationalize the significance of the research problem in terms of the existing body of literature; identify central issues; explicate areas of controversy within the research field; and, critically analyze the research to identify weaknesses, strengths, and to propose methods to remedy identified gaps. Where available, research outcomes, the application of theories, actual practices or applications are highlighted.

It should be emphasized that very few articles on the compensation or assessment of academic physicians were identified during the literature searches, particularly within the Canadian context. As noted in Chapter 1, this finding is echoed by Akl et al. who published a systematic review of the literature on assessment models for academic physicians (2012). Thus, this chapter includes a section on studies, research and theory on compensation models (incentives, bonuses) within behavioural economics. While behavioural economics is an emergent discipline, and none of the studies which have been cited were conducted on academics or academic physicians, critical concepts within the literature, key research findings and areas of disagreement are highlighted here. The chapter concludes with a discussion of the literature review results and areas for future research.
Approach to the Literature Review

Adopting some of the methods recommended by Randolph (2009), the following key steps were undertaken in the literature review: formulate the questions which guide the review; search for relevant literature; classify documents; create an annotated bibliography and electronic database; and, identify the focus, results, key outcomes, impact of each article, theoretical perspective or approach, and items for future research as gleaned from relevant articles. For articles focused in the behavioural economics literature, a search for contrary findings and interpretations was also conducted for each article.

Search Methods

Six databases were searched from their date of inception to 2014: Education Resources Information Centre (ERIC); Web of Knowledge; PubMed; International Bibliography of the Social Sciences (IBSS); Sociological Abstracts; and, ProQuest Dissertation and Theses (PQDT). In 2010, an initial search and literature review was conducted and an annotated bibliography was created. In 2014, the original search was repeated. The search initially focused on journal articles but was expanded to include abstracts, reports, and conference proceedings given the limited number of relevant articles that were found. Additional articles were found using the snowball method that is often utilized in systematic reviews: that is, following screening of each relevant publication, the reference lists were further screened and additional articles were identified and reviewed until the point of saturation was reached (Greenalgh & Peacock, 2005)16. Google Scholar and Google were also used, and various websites were scanned or contacted directly for reports (e.g., governments, universities, accreditation councils, research organizations such as ICES, non-governmental groups such as CIHI and physician associations).

16 In PubMed, the “related articles” feature was utilized to facilitate the snowball method.
Core Themes and Sub-Themes

Various search terms were used to navigate the literature within the four core themes identified above. As the searches were conducted, sub-themes and critical concepts emerged which were then explored further. These sub-themes show how “compensation” can be conceptualized differently depending on the context or source, as “pay”, “remuneration”, “incentives”, “bonuses”, etc. Table 2.1 demonstrates the core themes and relevant sub-themes that were explored in both 2010 and 2014.

<table>
<thead>
<tr>
<th>Core Theme</th>
<th>AHSCs</th>
<th>Compensation: Academic Physicians</th>
<th>Alternative Funding Plans</th>
<th>Assessment: Academic Physicians</th>
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<td>Sub-Themes</td>
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<td>• Budget Models</td>
<td>• Academic Alternative Relationship Plans</td>
<td>• Bibliometrics &amp; Scientometrics</td>
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Inclusion Criteria

Very few articles specific to academic physicians, compensation or assessment models were identified during the literature searches; therefore, articles, reports or other documents were reviewed in detail if they were directly or indirectly related to academic compensation or assessment models for academic physicians regardless of the context in which the study took place. If study focused on physician compensation only (e.g., fee-for-service, pay-for-performance, capitation) the article was reviewed, but has not been reported on. Studies on assessment or productivity models were included if the focus was academic (and not clinical productivity). Many of the studies reported on emanate from the United States given the dearth of published articles from Canada. Special care was taken not to omit too many articles given the sparse literature on this topic. This inclusion criteria was re-evaluated during phase two of the literature search.
Data Collection and Analysis

Once the articles were selected, an annotated bibliography and electronic database were created. The annotated bibliography includes over 226 articles, reports and documents organized by the core themes, sub-themes and theoretical perspective noted above. The bibliography summarized articles by the focus of the publication, results, key outcomes or impact, and theory or practice. Future research questions and a commentary were also included in the bibliography.

Core Theme 1: Academic Health Sciences Centres

The Commonwealth Fund Task Force on Academic Health Centers (AHC) defines an AHC as,

Academic health centers (AHCs) are interrelated entities comprising a medical school, its affiliated hospitals, and outpatient centers, and a faculty practice plan (FPP). Their unique missions are to provide undergraduate and graduate medical education and training, conduct basic science research and clinical research on new medical practices and technologies, furnish state-of-the-art medical care for patients with complex illnesses, and care for the poor and medically indigent. Traditionally, AHCs have been leaders in their communities and the health care delivery system. (Reuter report, Commonwealth Fund Task Force, August 1997, pp. v)

By definition, an AHSC is constrained by a diffuse, imprecise, and oftentimes conflicting mission(s). AHSCs are challenged by the complexities embedded within their organizational structures and concomitant relationships between principals, agents, internal/external stakeholders and partners (Shugart, 2002, Lomas, 2002, Lozon & Fox, 2002; and, illustrated in Figure 1.4). There is significant discussion and much agreement within the literature on the challenges faced by the contemporary AHSC although there is a dearth of literature which evaluates the efficacy of solutions that have been implemented. Issues addressed within the discussion on AHSCs include the challenges engendered by the diffuse mission of an AHSC; overly-complicated budget models and divergent revenue streams that have emerged over time and which are misaligned with accountability frameworks, compensation models, incentives or available resources; and recruitment and retention issues in academic medicine. The relationships between the various stakeholders,
principals and agents involved in an AHSC can also be complex, making the management of performance perplexing (Lozon & Fox, 2002).

In Canada, an AHSC comprises a university-based medical school and one or more local teaching hospitals. Within an academic teaching hospital, academic physicians (faculty) frequently form business partnerships called practice plans. Cohen and Fox define a faculty practice plan as “an organized structure within an academic medical center that provides such services as billings, collections, revenue distribution, and financial services to the full-time teaching faculty” (2003: 120). Krakower et al note that practice plans and the clinical earnings they generate are the single largest source of revenue in an American AHSC (Krakower et al, 2000). As of 2013, the American Association of Medical Colleges (AAMC) reported that practice plan revenues constitute 39.1% of revenues ($39,309 million) supporting programs and activities at fully accredited medical schools (in 2011, practice plans provided 37.3% of all revenues)\(^\text{17}\).

Ferris, Singer and Naylor (2004) note that in Toronto, only 7% “of the average earnings of clinical faculty come directly from the university” (Ferris et al, 2004: 26). Figure 1.1 depicts the education-related funds which flow into an AHSC; the complicated funding model is further exacerbated by the monies which flow separately to the practice plans, hospitals, universities, research institutes, etc. for clinical revenues, research funding, operating funding, etc. From a policy perspective, these authors argue for the need to develop “good governance” in the health science complex – that is, effective and accountable institutional actions based on appropriate shared ethical intentions” (Ibid: 25). While not directly related to compensation or assessment models, this article demonstrates the challenges that most AHSCs face around the integration and alignment of their respective missions despite institutional autonomy, as well as the need for joint accountability.

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frameworks, collaboration, and oversight. Indeed, while the existing literature highlights pieces of the funding problem, the literature does not go far enough in clearly articulating the interconnected nature of the funding challenges, system-related complexities, or the concomitant issues in measuring and enhancing performance that Canadian AHSCs face.

Lozon and Fox (2002) provide a pivotal article on the challenges faced by Canadian AHSCs. They contend that relationships between the academic teaching hospitals and universities in Canada are poorly defined, misaligned, and require integration through a systems model. These authors argue that forces such as resource reductions, notions on accountability, human resources shortages, new organizational structures, funding relationships and research renewal shape the AHSC. In particular, Lozon and Fox note that the resources and “products” spread between the university and the academic teaching hospital are very hard to define or measure, while the clinical role of the AHSC causes competition with community hospitals as they are increasingly able to offer highly specialized clinical care as well. Disagreeing with Fyffe et al (2002), Lozon and Fox state, “To be part of the shared mission of the AHSC, physicians relinquish their autonomy and take on opportunity costs that their community peers do not” (Lozon and Fox, 2002: 19). This challenge to professional autonomy is not insignificant. Lozon and Fox also note that the fee-for-service plan provides incentives for physicians to do large patient volumes (a model that is utilized in community hospitals but does not contribute to the sustainability of the academic mission). These authors also state that a publically funded system is not sustainable, and new funding formulas are desperately needed.

Lozon and Fox also lament the state of research funding in Canada, and report that the research return-on-investment in Canada is 25 cents for every dollar invested, while in the United States, it is $30 for every dollar invested. Noting that low funding for research is particularly problematic for AHSCs, they attribute the problem to the poor relationships that AHSCs have with
government, suggesting that the government knows little about the culture and decision-making in an AHSC – and vice versa. Lozon and Fox blame this on the lack of systems-level thinking, and contend that AHSCs should be considered “national resources” and funded as such (Ibid: 25). With regards to performance data and accountability, these authors assert that AHSCs should manage by the data, or manage to optimize the data. While this article provided a strong overview of the issues that Canadian AHSCs grapple with, it did not provide empirical evidence on the magnitude of the issues. Written in 2002, there is little indication in the subsequent literature that any suggestions have been implemented or evaluated.

Lomas (2002) provides an overview of health care issues in AHSCs. He too advocates for better relations between the federal and provincial governments in funding health care and education; the need for integrated health care systems; greater investments in the health care workforce; and the organization of a national forum to clarify national values on health care. Although this article provides background information on health care in Canada, it did not address the academic mission of AHSCs or provide substantive evidence of the challenges faced.

Shugart (2002) echoes Lomas, and argues for a closer relationship between Canadian AHSCs and the government. Unfortunately, the author does not articulate any changes that should be made even though he suggests that research, knowledge production and human resources in health care are a national problem. At the time this article was solicited, Shugart was the Assistant Deputy Minister of Health Policy and Communications, Health Canada, therefore, it was not surprising to hear this. It was surprising – given the rich history and relative autonomy that Canadian universities have enjoyed -- that it was implied that the government alone should set research and teaching agendas, or measure performance. In short, this article acts as a policy-focused commentary on AHSCs.
In keeping with Lozon and Fox, Schneller (2002) suggests that while American AHSCs are threatened by the US health care market, Canadian AHSCs are threatened by the lack of “clarity of purpose” (Schneller, 2002: 77). Schneller states that Canadian AHSCs are beginning to “look like community hospitals” as academic physicians need to spend similar amounts of time in the clinic to meet “financial demands”, and thus, time spent on their education and research “products” has decreased (resulting in lower quality research and education “products”). Here, “financial demands” refer to the desire of academic physicians to achieve equity in gross income levels with their community-based peers. Further, Schneller argues that AHSCs are no longer the leaders they once were, partly because of the unrelenting changes that take place in health care. However, no empirical data is provided to support either statement. Schneller posits that AHSCs should carve out distinct niches for themselves; design and develop new practice models; and redefine their roles using skilled, creative leadership, flexible governance structures, improved information systems, and an appropriate balance of centralization/decentralization.

Echoing Schneller, Lozon and Fox, and Lomas, Smith (2002) argues that Canadian AHSCs should clarify their roles, develop distinct governance structures, and agree with governments on an accountability framework and deliverables. He puts forth several important points for consideration. First, the faculties of medicine are part of one budgetary formula (the university formula) and a partner to another funding formula (health care), however, they have no real influence over either. As an example, Smith states that medical schools attract roughly 50% of research dollars received by the university, but global funding models are structured such that medical schools do not receive an equitable share. In this way, Smith maintains that faculties of medicine support lesser departments, thereby advancing the notion that budget models in academic medicine require revision. In combination with governance structures, Smith believes that existing budget models result in competition, financial issues and duplication, and a separation between medical schools and
hospitals. Second, there is a fundamental clash between both the organizational cultures and the governance structures of the university versus the academic teaching hospitals. In many ways, the hospital mission and services provided dictate the education that can be provided which can have major implications for the university partner. This applies to the existence of hospital-based research institutes as well; Smith states that research institutes “challenge the relationship between the partners in an academic health science centre” because of the organization and governance of those institutes (Smith, 2002: 40). Within the research institutes, tensions revolve around competition, protected time and salaries. Third, Smith believes that the fee-for-service (FFS) method of payment for physicians is a huge barrier to change though he does not comment on the early AFPs. Finally, Smith argues for the creation of an “Academic Health Science Network” for each province as opposed to centres in different locations around the province. In short, he too feels a systems approach is needed. While his ideas are visionary, he does not present any practical suggestions on the implementation of an AHS-Network, nor does he suggest how barriers to the network concept could be mitigated. Given the professional, educational, research and disciplinary tribalism that occurs in academic medicine, this is a very real issue (Carlisle, Cooper & Watkins, 2004).

Focused on the United States, Ludmerer (2002) advances the notion that the core educational mission and the quality of education provided by American AHSCs are in jeopardy due to financial issues and free market demands. Ludmerer provides a good historical overview of the American AHSC and a strong discussion of the effect of free markets on health care and education. As an example, he states that insurance plans in the United States refuse to reimburse AHSCs for their higher costs in delivering patient care; the higher costs don’t necessarily arise from inefficiencies, but are tied to the delivery of education in the health care setting. He also notes that profound tensions continue to exist between the university and hospitals, and most conflicts result
due to separate missions, the attitude of the university to hospital costs and expenses, and the fact that clinical revenues continue to be the major source of educational funding for the medical school. Ludmerer maintains that medical school ties to the university have weakened significantly since 2000, and currently, medical schools have stronger mission-related and cultural linkages to the health care system. While the article is set within the United States, Canada shares some of these issues. The article also raises important questions around “loyalties” within the principal-agent relationship in Canada: to whom are academic physicians principally responsible given their dual responsibilities within the education and health care sectors? This issue remains a gap in the existing literature.

The Commonwealth Fund Task Force (2000) concentrated on patient care management issues in the US, with extensive suggestions provided on how to reform the clinical enterprise. The Task Force did however recommend strategies that may be effective in the Canadian context. First, the authors contend that the leadership of an AHSC should be consolidated under a single academic head. The Commonwealth report also recommends a unified clinical and academic governance structure; reforms in faculty governance such as more accountability, less tenure, and a formalized approach to the management of faculty through the university; mission management designed to capitalize on distinct niches or “markets” within each AHSC; more clinical autonomy; improved information systems; more succession planning in leadership; and, a reformed research enterprise. These authors also recommend that AHSCs should not provide primary care as it is expensive and not mission-sensitive.

Miller et al (2012) examine how American medical schools are funded, noting that clinical revenues still “subsidize the money-losing research and education mission at every medical school” (Miller et al, 2012). This comprehensive article highlights the issues around the funding of medical schools, and provides a series of recommendations on the need to understand economic drivers;
reward desired behaviours; enable every unit to generate a positive margin; communicate budget priorities, financial performance and the use of institutional resources; and, establish a set of resource and expense sharing within institutions. These authors emphasize transparency and flow-through funding models (i.e., socialist vs. capitalist units within any AHSC). While many of the articles do not specifically reference academic productivity for clinical faculty members, this one did. Miller et al posit that the financial and academic contributions of each faculty member should be calculated to change the culture of the school, thereby embracing productivity without sacrificing academic freedom. Perhaps more provocatively, they also suggest that the contributions of the university to the medical schools – and vice versa – should be clearly outlined and publically stated. Indeed, this recommendation has the most potential to impact on the culture of academic medicine. However, no follow-on studies, experiments or data could be located on any of the suggestions presented.

Bernstein (2002) argues that AHSCs should focus on developing research niches and strategic partnerships to facilitate research. Bernstein, who was the President of the CIHR at the time this commissioned article was written, pays little attention to the already confused mission of the teaching hospitals, nor does he provide any suggestions on how to overcome the tensions and competition that exist between the two. Fyffe et al (2002) notes that research institutes create unnecessary competition and decrease attempts at coordination. Smith (2002) also states that the hospital research institutes in Canada create competition and tension around protected academic time, salaries and research funding packages. For Smith, the fundamental issue is the organization and governance of the research institutes (Smith, 2002: 40). Howard and Laird (2013) suggest that on a broader level, the mechanisms used to fund and incentivize research must be revisited as “demand for research money greatly exceeds supply” (Howard & Laird, 2013).
Fyffe et al. (2002) argue for greater involvement of the community hospitals in the AHSC mission of teaching and research, but provide weak examples in support of their argument. They note that the current FFS billing system in Ontario is divisive, creates conflicts, and rewards procedures-oriented specialties at the expense of more cognitive groups. In essence, they are arguing for an AFP with “enhanced” productivity measures for clinical, educational and research work evaluated through an academic points-like system. However, these authors make no mention of whether this would dilute the mission of all AHSCs, or how academic physicians with appropriate scholarly training and skills would be recruited. This is a serious shortcoming in this article. Further, the authors seem almost unaware that “to be part of the shared mission of the academic health science centre, physicians relinquish their autonomy and take on opportunity costs that their community peers do not” (Lozon and Fox, 2002: 19). Ward also argues that AHSCs have been slow to respond to regional health and community-based programs, suggesting that the training of new physicians should be better integrated with emerging practice models (Ward, 2002). Unlike many other authors, Ward argues strongly for more cost-benefit analyses, but focuses on health interventions, not academic medicine. Since this article was published in 2002, community hospitals have become integral to the education mission of medical schools as the schools seek capacity to accommodate clinical placements and teaching. The need to change medical education models to include non-AHSCs – where most health professionals are more likely to practice – was addressed in both the Future of Medical Education in Canada (FMEC) Postgraduate report (2012), as well as the Lancet’s Commission on medical education for the 21st century (2010).

Academic recruitment and retention issues are another issue identified in the literature that AHSCs must grapple with. The report of the Provincial Coordinating Committee on Community and Academic Health Science Relations (PCCCAR, 1995) argues that system-wide efforts to coordinate planning for physicians, nurses, etc. has never been done, and in fact, too much responsibility for
planning has been left with the hospitals and individual physicians which has led to shortages. The authors contend that this is a public question; shortages should never take place given the huge public investment in health care and education. They argue for a system-wide approach to health human resources planning stating that AHSCs need to become comprehensive, integrated organizations (albeit without providing steps on how to achieve this). Ward (2002) also states, “Governments will no longer be comfortable with academic institutions and professional groups as the sole adjudicators of training and standards for the healthcare workforce” (Ward, 2002: 88). Stoddart (1999) also addresses the issue of physician shortages, and concludes that increased enrolments in medical schools alone will not solve the problem. Other authors have also highlighted recruitment and retention issues in academic medicine including financial sacrifices in academic medicine, competition to secure grant-funding and publish in high-quality journals, and changing social demands (Ries et al 2012), deterioration of the hospital working environment (Bridges et al, 2007), the need to recognize clinical academic scholarship (Grigsby & Thorndyke, 2011) and, the emerging, inter-generational needs of new recruits to academic medicine (Bickel & Brown, 2005).

The literature suggests that major reforms in AHSCS are needed. However, as the literature has not evolved significantly over time, few practical solutions have been reported on, nor has evidence been provided with regards to the efficacy of solutions which have been implemented. Many authors argue for a systems-level approach to the overall AHSC, budgeting formulas, and health human resources planning, but this remains a significant gap in the literature. It is also apparent that the relationship between the various AHSC partners and the government should be maximized, and the respective cultures of each group should be better understood, but no studies could be found which report on any strategies that have been implemented.
Core Theme 2: Compensation Models for Academic Physicians

In 2010 and 2014, multiple databases were searched to learn how academic physicians are compensated. Terms included academic physicians and salaries, academic physician payments, remuneration for academic physicians, medical school salaries, academic physicians and compensation, incentives, bonuses, pay-for-performance, fee-for-service, etc. I also narrowed the search to include Canada, the United States or North America. Very few articles that were directly related to my topic were found. I found some general information on AFPS, APPs and ARPs on the Ontario Medical Association (OMA), and the Ontario and Alberta government websites for AFPs/ARPs, however, there were very few publications or references listed, and many could not be located. More importantly, I could not locate any literature which tied compensation systems or budgeting methodologies to performance or quality measurement, let alone improvement. This highlights the need for further research to inform health and education policy. There is however some literature on compensation methodologies for academic physicians within the United States, although articles of direct relevance are also quite sparse. The results of this review are summarized in this section.

In the United States and Canada, many universities provide some academic physicians (but not all clinical faculty members) with tenure, however, the definition of tenure has increasingly become focused around academic freedom, not financial stability or support. White (2000) provides an excellent legal-historical overview on academic physicians and tenure in the USA, noting that approximately 95% of medical schools there provide some form of tenure, most of which does not carry with it a salary guarantee for clinical faculty (White, 2000). He also argues that the precise meaning of tenure is not clear, especially in medical schools, mostly because fiscal flexibility and

18 As an example, a few publications emanating from the Queen’s Health Policy Research Unit could not be found. A respondent to my emails and phone calls indicated that the unit has been disbanded.
economic security are seemingly at odds within the AHSC sector. Further, White argues that while tenure is a university-based notion, medical schools are highly corporatized, and the two cultures don’t always mesh well. Nutter et al (2000), for example, report that Northwestern University in Chicago defended their position on tenure in an American courtroom (Kirschenbaum vs. Northwestern University). Northwestern successfully argued that tenure need not be associated with a specific level or form of compensation, and in fact, tenure need not be associated with a salary at all (Nutter et al, 2000). Northwestern University won their case, which has likely had an impact on how physicians are paid by universities in the United States. In Canada, some universities provide some clinical faculty with tenure or “geographical full-time” positions (tenure equivalent), however, compensation methodologies vary, and I have not been able to find data on the efficacy of these programs within the academic literature.

Andreae et al (2006) reviewed the literature to find studies that have been done with regards to incentive-based compensation systems within AHSCs in the United States, a central issue in this dialogue. They searched four databases and found 306 articles, 62 of which were relevant to their review. Of these 62 articles, only 10 articles focused on incentive-based systems for individual faculty members. They found the goal of 93% of these systems was to improve financial accountability, not performance, though they did note that the intent of some systems was to shift financial risks to the physicians in the hope that performance will be maintained or perhaps even increased. The outcomes measured included professional productivity, quality of educational service, and faculty satisfaction. While this article confirmed the findings of my own literature search, I would suggest that the authors may have focused on clinical productivity and measures of clinical quality, not academic, and that it would be difficult to link some of the measures used to gauge satisfaction (i.e., retention rates) to the university-faculty member/principal-agent
relationship, as opposed to the hospital-physician/principal-agent relationship. No similar review or studies could be found in the Canadian context.

It is possible that the literature on clinical valuation and weighting of clinical work may have some application for valuing academic activities. Abouleish et al (2005) conducted a survey of methods used to determine clinical pay for academic Anesthesiologists within the USA. The six main methodologies used within anesthesia are: charges model; time model; shifts-worked model; late/call system; straight salary - % of overall earnings; and, hybrid models. These authors also focused on clinical productivity, and how this can be maintained or enhanced through the use of different compensation methodologies. Their description of relative-value-units (RVUs) was thorough. In short, relative value units (points) are assigned to a list of anesthesia-related activities, and then faculty are compensated on the basis of the value of the accumulated RVUs. This system is widely used in the United States, and some articles indicated that some centres have adopted this system in an attempt to value academic activities as well. Abouleish et al show that 95% of groups survey use some form of incentive to determine 25% of the overall pay of any given physician, a significant amount. These authors conclude that incentive-based systems to determine clinical pay for Anesthesiologists produce only minor changes because the productivity of this specialty is closely linked to what others on the perioperative team do (i.e., surgeons).

Reich et al (2008) also describe an academic points-like system to measure academic productivity (and therefore determine pay) in an academic Anesthesiology department in New York City. Similarly, their points system is based on a combination of clinical activity, education, research and administration, which is linked to a mission-based management model. Of interest, 70% of each faculty member’s salary is based on a supplement (bonus pay) that is derived from the points accumulated. Unfortunately, these authors do not describe academic productivity in any way except
to say that it “remained stable”. For this reason, this article was not particularly relevant to my own research although the very large percentage of salary determined by the points system is of interest.

The articles by Cohen and Fox (2003), Cramer and Ramalingam (2000), and Stewart and Jones (2001) are not reviewed extensively here as they all focused on clinical productivity within American AHSCs. It was however noted by Cohen and Fox that the dean of their medical school levies a “dean’s tax” against the clinical earnings generated by the individual practice plans within the hospitals. Indeed, I came across references to a dean’s tax in several articles emanating from the USA, and I have since learned that many Canadian medical schools tithe the clinical earnings of practice plans as well (Western University, McGill University, University of Manitoba and others).

Jones and Gold (2001) provide a review of appointment, tenure and compensation practices within American medical schools. These authors note that only 20% of funding for medical schools in the United States is derived from tuition, the state and endowments; the remaining 80% comes from hospitals and practice plan earnings (i.e., clinical revenues). Krakower et al (2000) also note that revenues in American medical schools are derived from three sources: practice plans and professional earnings, research and grants, and hospitals and medical school programs. These authors note that tuition fees provide only 3.2% of revenues to medical schools, and the United States government provides 8.2% of revenues. The Krakower et al article is very descriptive, but they note that their data were derived from the Annual Medical School Questionnaire done by the AAMC. I was unable to locate similar data from the Association of Canadian Academic Healthcare Organizations (ACAHO) or the AFMC, and thus, this presents a focus for further research.

O’Brodovich et al (2007) report on the development and implementation of a novel career development and compensation program (the CDCP) for academic physicians in the Department of Pediatrics at the Hospital for Sick Children\(^\text{19}\). In 1990, the Pediatrics Consultants Partnership entered

\(^{19}\) The Department of Pediatrics’ CDCP program is also featured as a case study in this dissertation.
into an academic comprehensive AFP with the Government of Ontario. The department functions much like a single-payer universal health care system, with the majority of funds flowing through the AFP, and some funds derived from the hospital and university. Of note, this department and the CDCP are featured in the case studies for this dissertation, therefore, the features of the system are not elaborated on here. The 2007 study looked at whether the CDCP’s triennial review equally recognizes sustained achievement across education, clinical care and research, regardless of academic rank or gender. No detectable differences were noted. The CDCP is unique in that remuneration is tied to academic and clinical achievement; career development, mentorship and assessment are clearly tied to deliverables; and, academic physicians are regularly consulted with regards to their satisfaction with the program. One of the major strengths of this publication is that it clearly outlines how the program itself is evaluated. In fact, O’Brodvich et al (2003) also published on the outcomes of an evaluation of the CDCP which included an anonymous questionnaire and facilitated focus group sessions (O’Brodvich et al, 2003). The 2003 study noted the amount of work required by academic physicians to participate in the CDCP program, but concluded that the program has improved significantly over time, and the benefits of participation outweigh the negative aspects.

Reece et al (2008) – in an article based on an Arkansas medical school -- argue for the adoption of a business-like, performance-based, incentivized model to determine a portion of academic physicians’ compensation package. They are proponents of a system of performance-based incentive compensation (PBIC) which they state is used by 80 of 125 medical schools in the United States (albeit in various forms). These authors argue that such a system of pay can increase teaching effectiveness scores; increase research funding and NIH rankings; and, increase and enhance clinical productivity. Reece et al describe four components to be considered in determining the incentives: clinical productivity; research; overall academic performance; and, academic
“citizenship”. These authors note that the PBIC system implemented at their medical school ensures that goals, performance and rewards were closely aligned. They assert that salaries and revenues increased, but they do not articulate how productivity is defined or measured, and they make no attempt to reconcile the cultural differences between the hospital setting they describe, and an academic one. Because the authors don’t describe the measures they used, I found the article too descriptive to be of any value to my research questions. I would also question what proportion of productivity measurements should be based on subjective judgments, versus those that can be quantified; it seemed that their system was largely based on subjective measures.

Ridley and Skochelak (2002) describe a mission-aligned budget model used at the University of Wisconsin to determine a medical school’s budgetary allocations to departments based on the department’s contributions in education, research, service and contributions to the medical school. The funds were split as follows: 60% for education and teaching, 20% for research, based on grants and salaries received from grants, 10% based on academic service, 10% dean’s discretionary funding, and 2% on leadership activities. This system struck me as quite innovative, and rather controversial. The authors report that no faculty self-reporting is used, and so it is unclear how such a system could be implemented within a larger Faculty. Further, the authors describe a detailed “formula limit” which was quite interesting. On an annual basis, a department can lose the lesser of two amounts in their budgetary allocation; either one third of the formula driven-reduction (where a reduction is warranted) or 3% of their budget. I was not completely certain how this would work if most of the departments were productive on the same level as in the previous year, or if some departments were exceptionally productive. The authors also describe the outcomes of this system, however, they seem highly subjective (e.g., “higher energy in faculty for education program”) and the data collection methods are not articulated. Thus, while the system described seemed to have
some good points, this article did not go far enough in answering the multitude of questions that arise in considering such a system further.

Tarquino et al (2003) conducted a three-year long study to measure changes in performance within a US-based AHSC where a compensation system linked to performance and faculty appointment track had recently been established. The productivity measurements included research portfolio; clinical activity; faculty satisfaction; teaching; and, salary. To begin, the AHSC had placed all faculty members into one of five academic “tracks”. One track included basic and clinical scientists on a tenure-track, another track focuses exclusively on the provision of quality clinical care, considered to be a key component in the “department’s service mission”. Career objectives relevant to each track were then developed. As a result of this new system, Tarquino et al note that salaries grew by 7.8%, 66% of faculty received a bonus in the first year, and the percentage of funding per faculty member grew for physician scientists. I would suggest that this last outcome was largely due to the fact that the authors were now comparing apples with apples; the metrics were based on comparing only those faculty on the same career track with one another. The authors do a good job of addressing the issue of competition, and how funds from organizations such as the NIH can be effectively competed for. The method this institution used to develop metrics – by starting with job classifications and then comparing only those in the same career track – is a highly effective undertaking. Some of the departments featured in the case study in this dissertation look at individuals across all career tracks or streams. The system which Tarquino et al describe was also designed to pay for work done (i.e., to reward productivity) and not time spent. In reading this article, it seemed that the NIH somehow rewards institutions for productivity, but I was not clear on this. This may be a focus of further research. The fundamental issue with this article – in terms of trying to apply it to the Canadian context – is that medical schools often own hospitals in the United States, and thus, clinical earnings are combined with other sources of revenue derived from the
university medical schools that are specifically for teaching and research. In many cases, university funds, practice plan income and hospitals revenues are separated in Canada, and so incentivizing academic physicians through the university/medical school in Canada is difficult given the relatively small pools of money that are available in comparison with the value of clinical earnings. This issue has been explored further in this dissertation’s case studies.

There are several gaps in the literature on compensation for academic physicians which represent areas for future research. First, there is very little published data or literature which can be found, and most of the articles that can be found emanate from the United States. Nevertheless, some features may be transferrable to Canada. Second, the existing body of literature – particularly the literature which can be found through governmental AFP websites – is of low quality. The methodologies employed tend to address only one component of the overall issue, and very little data is provided to support the efficacy of the systems that are put forth. Third, Holmes et al (2000) note that approximately 10% of practice plan earnings are used to subsidize the research mission of the university department, within the United States context. My speculation is that this figure is much higher, and while it is widely accepted that the university subsidizes the indirect (and even some direct) costs of doing research, I would propose that more data is needed on the extent to which practice plan earnings subsidize the cost of teaching and research. Fourth, the interconnected relationship of the principals and agents involved in compensating academic physicians should be acknowledged in future research efforts in a more fulsome manner. The current body of literature merely alludes to a problem. Finally, the research presented on the compensation of academic physicians is not situated within any theoretical framework, such as behavioural economics. This represents an opportunity for both the field of behavioural economics and academic medicine.

In summarizing this section, academic physicians (agents) are expensive to compensate and difficult to assess given the multiple principals and stakeholders to which they are accountable. Prior
to my literature search, anecdotal data suggested that Canadian academic physicians receive compensation from multiple sources, many of which have evolved over time, and with little evidence to support their efficacy. The literature indicated that most incentives, bonuses, pay-for-performance schemes and compensation models are focused on the clinical realm, with academic compensation simply “added on”, and often based on the limited resources that are available to the university or academic department. Literature on the various models that are used within the United States can be found, however, there is very little literature set within the Canadian context.

**Core Theme 3: Alternative Funding Plans**

Physicians in Canada have historically been paid on a fee-for-service (FFS) basis by the respective provincial health ministries. Physicians billed the provincial health insurance plans for clinical services provided, and were remunerated on the basis of the pre-determined value of the clinical service. This was also the case for academic physicians who are also members of practice plans within AHSCs. A practice plan is defined as, “an organized structure within an academic medical center that provides such services as billings, collections, revenue distribution, and financial services to the full-time teaching faculty” (Cohen & Fox, 2003: 120).

Over time, multiple issues related to the fee-for-service payment method emerged. In academic medicine, physicians’ bargaining associations noted an income deferential between academic physicians and community-based physicians in the same specialty which resulted because physicians are not remunerated for the time spent on teaching or research activities under the fee-for-service programs (resulting in lost clinical income) (Robinson 2001, Bridges et al 2007). AFPs were implemented as an alternative to the fee-for-service program. Swift states, “Medicine is the only profession in Canada with a history of making university clinicians themselves pay to teach the next generation of doctors,” and physicians “have been taxed for the ‘privilege’ of doing training and
research at universities, and this has been done on the back of their fee-for-service earnings.” (Swift 2004: 38). This author also states,

At stake is redressing the longstanding under-compensation of university-based consultants and recognizing economically the varied and complex duties performed by academic clinicians relative to their community-based peers. Those responsibilities range from the ‘clinical coalface’ of patient care to scientific research, undergraduate teaching, resident training and participation in leadership, planning and administration. (Ibid: 36)

In Ontario, The Hospital for Sick Children in Toronto entered into an academic comprehensive AFP in 1990, and the Southeastern Ontario Medical Association (SEAMO)/Queens University in July 1994. An AHSC, an AFP is defined by the Ontario Ministry of Health and Long-Term Care as,

A contract between academic physicians, teaching hospitals, universities, the Ontario Medical Association (OMA) and the Ministry of Health and Long-Term Care (MOHLTC) that sets out non-fee-for-service funding for a range of services and which aligns the interests of the parties by merging multiple funding sources for the remuneration of involved medical staff for clinical service, education, research and associated administration.20

Other provinces in Canada – but not all provinces – have similar arrangements with academic physicians. In the late 1990s, Alberta Health Services implemented the Academic Alternative Relationship Plans (A-ARPs) which are defined as “a funding arrangement with physicians who teach or research at Alberta universities or medical facilities”21. In Quebec, no AFPs exist as defined in Ontario or Alberta. However, in 2008, the Quebec Ministry of Health and Social Services negotiated with the Fédération des médecins spécialistes du Québec (FMSQ) to compensate academic physicians for teaching and research through the use of a provincial billing code teaching-related for activities. In British Columbia, the Ministry of Health has implemented alternative payments programs (APPs) for teaching hospitals, as well as other types of physicians’ services (e.g., rural

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medicine). To date, no data or studies on the efficacy or outcomes of the Quebec billing codes or A-ARPs could be located.

Haslam notes that the primary goal of an AFP is to “fund a package of service and academic deliverables (outputs), rather than on the basis of payment for physician clinical activity (inputs)” (Haslam et al, 2004: 197). Further, Haslam notes that there is a distinction to be made between an Alternate Payment Plan (APP) and an AFP. The former focuses on the physician and a payment method that is simply other than fee-for-service (the input), while the latter is a method for “funding a basket of outputs, or deliverables…. Such deliverables do not depend on the amount of physician service required to produce them” (Ibid: 198). These authors note that an AFP is far more complex for the Ministry to negotiate than an APP because of the issues involved in defining deliverables.

From March to June 2010 and again in 2014, I conducted literature searches using various terms related to AFPs. Very few relevant documents were found. In 2010, 419 articles were found in peer-reviewed journals, but the articles were unrelated. Most articles which were found were commentaries which included quotes from senior administrators on the value of the AFPs (Parent 1999, Shortt et al 1999, Shortt & Parent 1999, Stanton & Shortt 2003, Swift 2004) who spoke to the success of the SEAMO AFP and physician satisfaction. The data presented was mostly anecdotal, with little empirical data of either a qualitative or quantitative nature. The majority of references found on the Government of Ontario’s AFP website were quite vague.

The Association of Canadian Academic Healthcare Organizations (ACCAHO) conducted a study of its members in June 2005 to determine which organizations participate in AFPs. The results of a survey are reported on, with tables provided. Of note, the AAMC website provided a wealth of

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23 Government of Ontario website on Academic Health Science Centres and AFPs: http://www.health.gov.on.ca/english/providers/project/ahsc/ahsc_mn.html
resources, but no comparable reports, surveys or publications could be located on the ACAHO or AFMC websites. Steve Slade, Vice President of Data and Analysis at the Association of Faculties of Medicine Canada (AFMC) confirmed in 2011 that the AFMC has not done any work on academic physicians, compensation or assessment models.

Bridges et al. (2007) conducted national survey of academic pediatricians regarding the impact of the phase I AFPs (introduced in the 1980s) on their academic and clinical practices. These authors argue that the core academic mission across Canada is seriously threatened because fee-for-service revenues are dwindling, and the Royal College of Physicians and Surgeons of Canada (RCPSC) educational requirements are ever-increasing. Bridges et al. note that the RCPSC has increased standards for medical education, including the number of faculty members required, but seemingly, has done so without any real planning between the AHSCs, government, universities, or the Canadian Medical Association (CMA). As noted in the literature review on AHSCs, the lack of integration between the various bodies providing health care and health-related education is an enduring theme. Bridges et al. cite the various arguments put forth by proponents of an AFP system such as enhanced academic productivity and increased protected time for academic activities, however, these authors show that the administrative requirements of the required shadow billing systems have eroded many of these possible benefits; recruitment of scientists continues to be an issue; and, the hospital working environment continues to decline. These authors also state that academic physicians’ earnings equal roughly 50-75% of physicians in private (community-based) practice, despite the AFP. They note that the AFPs required renegotiation, rather than the government simply extending the length of current contracts. The authors also cite parity across all provinces as a serious issue.

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24 Conversation with Steve Slade, Research Director, Association of Faculties of Medicine Canada during the Canadian Conference on Medical Education, Banff, Alberta, April 2012.
Haslam and Walker (1993) provide an overview of the negotiations process leading up to the implementation of the Pediatrics AFP at the Hospital for Sick Children in 1990. This article presented the AFP process well, and confirms that 70% of their academic budget was provided through clinical earnings prior to the implementation of the AFP. They note that the results of the AFP are positive: increased financial stability; an increase of 3-3.5% in clinical productivity in the first 2-3 years of the AFP; and more grants and publications “than ever before” (Haslam and Walker, 1993: 1145). The impact on the quality of clinical care was not addressed, nor did the authors present data demonstrating the increase in academic productivity.

In 2002, Orovan and Aberman published the Government of Ontario’s “Report of the Provincial Working Group: Alternative Funding Plans for Academic Health Science Centres” (2002). This report looked at the phase I AFP in Ontario. The short and simplistic report provides a series of recommendations on how to implement an AFP in an AHSC. The authors cite goals such as quality patient care, appropriate physician incomes, enhancing teaching and research, recruiting and retaining academic physicians, enhancing and defining the AHSC mission, and creating an attractive AHSC environment. While this report provides eight key recommendations, suggestions on how to implement the recommendations are not provided. As an example, Orovan and Aberman suggest that “appropriate physician incomes are required”, however, “appropriate” is not defined or quantified. There is no data provided on the range of incomes in AHSCs across provinces, practice plans, hospitals, specialties, etc., and understandably, there are no comparisons of physician incomes in AHSCs versus the community hospitals. The authors also note that “physician resources must be stabilized” however, they provide no suggestions on how this can be done (Orovan and Aberman 2002: 19). Finally, this report also makes no mention of quality (health care, teaching or research).
The Ontario Ministry of Health and Long-Term Care’s AFP website provides several citations by authors Shortt et al and Parent et al. These are not peer-reviewed articles, but rather, are reports generated by the Queen’s Health Policy Research Unit. Presumably, the data relates to the SEAMO AFP. There are several issues with these reports. First, none of the articles were peer-reviewed or have been published in the format listed on the AFP website. Second, the MOHLTC’s website suggests that the reports can be found through Queens’ University, but the email addresses listed on the website are invalid, and most of the web links in the reports are broken. Third, the Shortt et al 2001 report was funded by the Canadian Health Services Research Centre and it was noted that the MOHLTC was a “decision-maker partner” in the production of the report. The report would have been more significant if the MOHLTC had not been a partner; indeed, the authors argued that there was no significant change in practice patterns in a surgical practice (an unnamed surgical practice) in Kingston, Ontario following the introduction of global funding at an unnamed AHSC. This document is a report based on a survey, however, no data is presented and the research methodology is not articulated. Shortt and Parent’s 1990 article also suggests there are no significant differences in clinical outcomes and the number of procedures done in the SEAMO AFP, but data to support this assertion was not presented.

Rosenbaum, Shortt and Walker (2004) provide a review of the SEAMO AFP at Queen’s University. While the article provides a good review of the SEAMO plan, it focuses almost exclusively on clinical issues, and so it was of limited value for the purpose of my own research. There was no mention of academic deliverables. Nonetheless, it was interesting to note that the governance structures of the AHSC (hospital) and medical school at Queen’s University are closely intertwined in that the dean of the medical school is also the Chief Executive Officer of SEAMO. In this way, the

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25 I wrote to those email addresses and made several calls to Queens. The original research unit was disbanded, and no forwarding information was available for the authors. The unit is now called the Centre for Health Services and Policy Research, Queen’s University but they do not provide reprints of the publications on their website.
dean has an opportunity to integrate clinical and academic activities across the AHSC, align incentives with those activities, and then measure performance across the systems or domains. It is unclear whether this has happened, and therefore, this presents a future area of research.

Similar to the Rosenbaum et al article, Stanton and Shortt (2003) presented a study which reviewed changes in surgical practice patterns as a result of the SEAMO’s move from fee-for-service to an AFP. This article does not examine academic productivity. Several challenges were noted in reviewing this article. First, the authors note “there were no significant changes” in clinical practices, however, the data they present show that there were changes, especially in gynecology, obstetrics, and urology. The authors note that the number of gynecological D&C alone dropped from 6,818 to 5,823 in one year – a reduction of 17%. No analysis was provided on these numbers, other than to say that some physicians changed their practice based on new scientific evidence. Second, Stanton and Shortt do not address the impact on quality of care; the level of physician satisfaction with the AFP; or the impact on average earnings of surgeons in this AFP. General data on whether the average salary increased or decreased would have been impactful. Third, the outcomes described in their study – that clinical practice patterns did not change significantly – were also verified through a survey of surgeons they conducted. They note that 22% of respondents did change their practice, but for reasons noted as “other” or changes in science. Ideally, real clinical data sets could be used to supplement the self-reporting methodology used in the survey. Fourth, Stanton and Shortt justify their survey findings by noting that the “American literature does suggest that responses often occur rapidly when economic incentives are changed” (Stanton & Shortt, 2003: 54). However, the reference to the “American literature” is unclear. Finally, research is mentioned only notionally; Stanton and Shortt note that in a previous survey, 61% of surgeons indicated that they would like to spend more time on research, however, they note that after the introduction of the AFP, time spent
on research activities could not have increased because clinical volumes did not decrease significantly.

AFPs were first introduced in Nova Scotia in the mid-1990s. In 2000, the Auditor General of Nova Scotia published a report on the Department of Medicine’s (Dalhousie University) AFP. Implemented in 1998, the Auditor General identified several issues around weak financial controls. In 2005, Nova Scotia’s Department of Health Physician Services published a commissioned report on the AFPs for specialist, academic physicians. The purpose was to perform a financial audit; value-for-money audit; and, analyze contract management and performance evaluation, especially given the “financial increases [to the AFP] greater than had been requested by the Department of Medicine” (North South Group Inc. 2004: 21). The report noted that,

The Department of Medicine AFP has provided some important benefits for the province’s health care system, notably in terms of recruitment and retention of academic physician specialists; in redefining delivery of specialist services; and in promoting more integrated interdisciplinary care (North South Group Inc. 2004: iii)

Sixty-four percent of physicians in Nova Scotia were on an AFP in 2004-2005, valued at $160 million per annum. However, the report was overall quite critical, citing issues such as,

The lack of an accountability framework against which to measure performance and productivity of AFP-funded physicians. The lack of specific deliverables and performance targets has precluded the capacity of the auditors to measure the economy, efficiency and effectiveness of the AFP system” (Ibid: vi)

The report notes that despite the fact that the AFP contract required both parties to develop deliverables, this failed to happen (Ibid: xiv). From a financial perspective, the report expresses concern about the “intermingling” of health and education funding and overhead support provided by the AFP. This speaks to the general complexity involved in funding AHSCs, teaching and research in many districts. In particular, the “Value for Money Audit raised many issues which require immediate attention as to make AFPs more accountable” (Ibid: vi). Specific issues included the financial formula for AFPs; systems to determine FTE requirements; and, provisions to deal with
vacancies, absences, shadow billing, clinical workload indicators, information systems, overhead formulas, etc. The report notes that the negotiation process was nothing more than “one-on-one closed and undocumented sessions leading to a fragmented outcome” and the roles of those at both the government and university levels were unclear. From a clinical perspective, the report notes,

From the perspective of those outside of the AFP system, concerns were expressed. The majority of family doctors surveyed, as well as specialists not included in the AFP, when asked to compare access to clinical care provided by DOM physicians pre- and post-AFP, described access as being “moderately” to “significantly” reduced. Communications, access, and professional relationships were described as “poor” to “very poor”, and it was emphasized that continuity of care between the family doctors and specialists was being compromised. (Ibid: xvi)

The divergence of those involved inside the AFP – and those outside the AFP – is highlighted in several parts of the report, as well as the need for more resources and personnel to manage the AFPs and a clear accountability/evaluation report. This report is comprehensive, even providing a cross-Canada evaluation of various provincial AFPs.

In 2012, the Auditor General of Ontario also published a report on AFPs for specialist physicians, including academic physicians. The report noted that academic physicians represent over 50% of those participating in AFPs, and that there are two main arrangements: “Academic Health Science Centres (AHSCs) where 3,700 physicians receive $242 million under this arrangement; academic comprehensive which pre-date the AFPs and involve three hospitals and universities.” (Auditor General 2011: 178). This report was critical of the MOHLTC’s implementation of the AFP citing multiple issues such as a radical increase in the value of payments to specialist physicians (30% increase or $1.1 billion from 2006/07 to 2009/10 alone) coupled with poor accountability and little accounting or performance monitoring on the Ministry side based on funds spent. As an example, physicians are required to self-evaluate using a checklist provided by the Ministry, but the MOHLTC does not require the results; they only monitor to ensure that minimum clinical service levels are
provided. The AHSC contracts also require the submission of multiple reports which were in fact received (business plan, audited financial statements, financial and human resources reports), however, the Ministry did not review or analyze them. Physicians were often overpaid, but the Ministry did not request the money back as it feared that the clinical services provided might be compromised. The Auditor General’s report also could find not find evidence that a cost-benefit analysis was completed prior to the implementation of the AFP:

We also noted that although the Ministry indicated that it performed cost/benefit analysis before it entered into any alternate funding arrangements, it was unable to provide us with any such analysis relating to the arrangements that most of the physicians participated in. Additionally, the relative complexity of the different arrangements and the relative scarcity of performance measures in the contracts have made it difficult for the Ministry to effectively monitor both the accuracy of payments made and the extent to which physicians have actually provided the services in their contracts. (Auditor General 2011: 172)

The audit contained only few references to academic deliverables, and confirmed that AFPs are not monitored carefully, and that data on their efficacy – particularly in the academic realm – is not available at this time.

Thus, there are several gaps in the literature on AFPs. First, I was able to find very little on how AFPs actually work. If one of the rationales of a publically-funded AFP is to increase accountability, data on their efficacy should be more readily available. This is a job for academics as well as the AHSCs, medical associations, and government ministries. Second, I was not able to locate a document which indicates the compensation methodologies used by different Canadian medical schools, let alone departments within those medical schools. It would appear there are huge variations, and I would think this is of significance in the formulation of any AFP. Data on the types of compensation methods that are used by clinical academic departments – and their rationale – is needed. Third, more data is needed on academic productivity; most of the report and audits focus on clinical productivity. If an AFP is focused in an AHSC, academic deliverables should be incorporated into the accountability framework. From there, academic leaders can consider the
development of integrated programs to incentive, motivate or reward high performance, recruitment and retention. Finally, research on methods to address the lack of coordination amongst all stakeholders involved in an AFP is currently lacking.

**Core Theme 4: Assessing Performance, Productivity, and Quality**

The development of various metrics to assess productivity amongst academic physicians in Canada has become an increasingly important topic. Medical schools or AHSCs have developed various methodologies to measure the teaching, research and sometimes, administrative outputs of faculty members\(^\text{26}\). In 2010, the University of Toronto’s Faculty of Medicine – Toronto Academic Health Science Network (TAHSN) struck a Task Force on Valuing Academic Performance. Reporting on the local state, the report found,

> The current measures of performance across the academic units and institutions comprising TAHSN are heterogeneous rendering collective analysis difficult. Standardized measures of academic outcomes relevant to key performance indicators are not uniformly established broadly across TAHSN members. Available measures are often believed to be inadequate to capture the vast array of achievement among our faculty members, the university academic units (Departments, Faculties) and hospitals/research institutes. (Toronto Academic Health Sciences Network Task Force Report, 2010: 1)

The practice of measuring and valuing academic performance is a fairly recent theme within the clinical academic/medical school literature. However, the introduction of different types of funding mechanisms across Canada, and especially given the large amounts of money at stake, requires that AHSCs, academic departments and practice plans demonstrate their clinical and academic outputs. The trend towards measuring and quantifying academic performance to secure stable funding also figures prominently in the American literature. Appendix 2.1 demonstrates the results of the literature review. Indeed, several considerations are generated by the literature on measuring and assessing academic performance, productivity, and quality.

\(^{26}\) The term “outputs” is one that has a distinctly economic or business-like connotation (I often think of the manufacturing industry); a connotation which has been challenged in the sociological discourse on “managerialism” in higher education. These concepts are reviewed in the pages that follow.
Akl et al (2012) performed a systematic review of the effects of strategies implemented in academic medical centres to assess faculty productivity, compensation, promotions processes and “satisfaction”. These authors note,

Strategies for productivity assessment help in identifying highly productive faculty, determining areas for faculty and departmental improvement, and implementing processes for promotion and tenure. When coupled with reward schemes, these strategies may improve productivity and compensation at both individual and departmental levels. In the long-term, they may enhance the ability to recruit and retain high-quality faculty and achieve the academic mission of the department (Akl et al, 2012: E602)

Akl et al looked at the effects of interventions on productivity in the clinical, research, teaching and administrations realms, and defined productivity as a “measurable activity or a measurable output of an activity of a faculty member” (Ibid: E602). Methodologically, and in keeping with the framework which I had adopted for my own literature review, Akl et al searched multiple databases, institutional websites, and used the “related articles” feature in PubMed to identify additional papers. However, they excluded articles which identified a strategy but did not report on its effects, or articles which reported on payment schemes that were not tied to productivity. Statistical analyses were completed to assess agreement between reviewers, and the GRADE approach was used to assess each paper. Significantly, these authors found only “nine articles which reported on eight studies that evaluated eight different productivity assessment strategies” (Akl et al, 2012: E603). None of the studies used validated outcomes measures, and many of the studies did not report on the relevant aspects of an outcome. Consequently, Akl et al contacted the authors of these studies to verify their abstracted data; of note, seven strategies were still in use at the time the authors were contacted. While these authors found that strategies used to assess productivity, as part of a compensation scheme in an AHSC, appeared to improve research productivity, no improvement was noted in teaching, and the effects on clinical productivity were unclear. However, Akl et al judged the articles to be of low quality due to methodological issues and poor reporting. Further, the strategies were focused in Anesthesia or primary care, and thus, may not apply to other
specialties. This lack of available evidence is of course a limitation of my own literature review as well.

In their discussion, Akl et al also draw our attention to the possible negative consequences of assessing productivity: faculty may assume that items that have not been evaluated are not important, or might try to game the system (achieve high scores) at the expense of quality. These authors recommend that any “productivity assessment strategy and the compensation scheme should lead to proper relative compensation for the different areas to ensure the alignment of the department mission and the goals of the chair” (Ibid: E608). Akl et al also draw our attention to the difficulties of measuring productivity, noting that relative value units are the most common approach to weighting activities. This systematic review supports my finding that there is no one way of implementing relative value units at this time. Finally, Akl et al suggest that AHSCs need higher quality evidence to make informed decisions on strategies to assess productivity, and “controlled, observational or before-after studies with careful handling of confounding (through matching and adjustment) could provide higher quality evidence. Also, a central repository of strategies, processes and measurement tools would be ideal to assist academic leaders in designing their own programs” (Ibid: E611).

Bland et al (2002) present data on an academic points system to evaluate clinical faculty, provide merit dollars, and set career goals. They describe their system as a “leadership tool”, and indeed, the theoretical background of this article is in the goal-setting and merit in higher education literature. These authors note that in implementing this system at the University of Minnesota medical school, they were particularly cognizant that the “triple threat faculty member” is likely no more; triple threat faculty members are those that excel in teaching, research and administration. The system they implemented kept this in consideration, and they subsequently found that spreading merit across the seven separate domains which were assessed on an annual basis did not
lower overall scores. This was interesting as one might expect that an individual heavily focused on teaching may see their score lowered if research-related metrics are included in their assessment (e.g., publications, grants). Bland et al also discuss the issue of merit versus worth; to be sure, this may be an important distinction, particularly with regards to quality and fit with the overall mission of the department or institution. The authors note that institutions should provide alternatives to financial incentives to motivate high performers (though none were tested). The value and efficacy of cash-based performance incentives are an important area for future research.

Mezrich and Nagy (2007) from the Department of Radiology at the University of Maryland presented perhaps the most relevant article for the purposes of my own research. These authors write on the development and implementation of an “academic relative value unit (aRVU)” within their department using an online, web-based system similar to the relative value units developed by the AAMC to assess clinical outputs. These authors contend that no current system of assessing metrics can evaluate the totality of academic activities, and they especially fall short when trying to make comparisons amongst individuals. They suggest that the need for metrics systems is “urgent” (Mezrich and Nagy, 2007: 471). These authors state that the metrics were designed to allow faculty to make the most productive use of their time, but acknowledge that the weights used to assess publications, research, teaching and community/administrative service are arbitrary. Further, Mezrich and Nagy note that there is no stringent, objective or equitable way to measure effort or achievement, though the measures currently used are the focus of academic promotions or financial incentive systems (Ibid: 475).

Unlike the other publications I reviewed however, these authors did pay attention to the issue of quality, and include an assessment of teaching quality (i.e., teaching effectiveness scores) into their teaching metrics. This calculation was expressed as,

\[ aRVU = \% \text{ effort} \times \text{ academic value} \times \text{ score} \]
Here, “academic value” is also based on the level of students taught – an important distinction within the clinical realm. Mezrich and Nagy’s article includes a good discussion on teaching evaluations, noting that these scores can be problematic as they are often based on the popularity of the teacher, and not on teaching efficacy. Though they do not propose a specific methodology, they maintain that increases in knowledge would be a stronger measure of teaching efficacy (though they acknowledge that this would be difficult to assess). In reviewing this article, I wonder whether metrics systems more broadly are managerialist trends which focus too strongly on quantitative indicators and not enough on the quality of outputs. As an example, some research may take several years to complete and could result in a land-breaking publication in a very high impact journal. However, on the way to producing this research, metrics might be assessed on an annual basis, and the researcher in question may not have received credit for the work undertaken. Similar issues may arise in assessing collaborative work. I also question whether assigning weighted academic relative value units to specific outputs could stifle creativity and innovation; metrics systems should not focus on the outcomes at the expense of the development of innovative methodologies.

Decker and Debhenke (2002) write on the mission-based management model (a concept developed by AAMC and commonly referred to as “MBMM”) they have adopted in their academic emergency medicine practice to track academic contributions. They simply state that their faculty must contribute 117 hours per year to academic activities, and they use a system of self-reporting to track these contributions. No values are assigned to quality, they don’t say how often they track or how, and the categories they tracked were few and general. I did however find it interesting that these authors repeatedly referred to “good citizen” behaviours which they don’t define; I believe it is important to classify those behaviours that constitute professionalism, and are subjectively assessed.
Holmes et al (2000) provide an excellent overview of how to measure and value research contributions in the clinical academic realm. These authors argue that the financial situation in American medical schools – and the increased competition for National Institutes for Health (NIH) funding for research – require the implementation of a metrics-based system to gauge research productivity, and hopefully, quality. These authors note that approximately 10% of practice plan earnings are used to subsidize research missions, and propose various methods to measure research quality, but concede that no “gold standard” has been agreed upon. Holmes et al provide four major measures to assess research productivity: grants, publications, reputation/national service, and support to the general mission of the school. They do however state that measures are only precise if they are based on a research FTE; that not all research is efficient, though it may be very valuable in increasing knowledge, clinical efficiency or professional practices; and, valuation of research continues to be very subjective. I agree that the measurement of research productivity is somewhat subjective if based on peer review alone, and certainly, varies from specialty to specialty. Future areas for research include the use of quantitative or bibliometric indicators to assess research productivity in tandem with peer review.

Nutter et al (2000) provide a comprehensive set of metrics to measure efforts in medical education. They have broken these down into educational variables; categories of education work; and, a list of specific education activities. They then propose a set of metrics and formulas to weigh these activities in order to gauge effort (not percentage of time spent). Indeed, these authors are proponents of the mission-based management model (MBMM) proposed by the AAMC, and suggest that any metrics used must be closely linked with the overall mission of the medical school. Further, Nutter et al suggest that any medical school or department that engages in measurements of educational effort must carefully consider their own ‘units of activities’ to be used; include preparation time in the equations used; calculate the level of experience and/or academic rank of
each faculty member in the measurements; and, perhaps most importantly – measure quality. Of all articles reviewed to date, Nutter et al provided the soundest argument in favor of measuring productivity and educational outputs; that is, the organization, in the United States undermines the traditional roles of medical schools and teaching hospitals, and thus, management strategies designed to meet these challenges and ensure public accountability are key. Further, these authors argue that metrics – both for education and research – are the key to ensuring the missions of medical schools are met in future.

As noted above, the University of Toronto, Faculty of Medicine – TAHSN Task Force on “Valuing Academic Performance” reported on the state of affairs locally, and found that benchmarking across the faculty is problematic as there are no homogeneous measures of performance across the local academic units and hospitals27. In combination with the sheer size of the University and the breadth of activities undertaken, this makes implementation of a standardized system difficult. While the report provides various recommendations on how these measures can be streamlined and integrated across the AHSC, none have been successfully implemented as of 2016. An online Curriculum Vitae database program was implemented, but has recently been discontinued.

There are a few shortcomings in the TAHSN report. First, the report proposes to measure inputs and outputs, but not impact or quality. The report also states that “benchmarking excellence” is a key goal. But obtaining simple benchmarks may not be the most valuable undertaking; measuring productivity can be a time-intensive and expensive process, and ideally, should be undertaken with the goal of improving performance/ productivity and increasing quality, on multiple levels. Second, the report introduces the concept of “return on investment” but it does not define what this means. Finally, the report uses the word “excellence” without defining it; I would agree

27 This is an internal report; while the report was finalized, it has not been circulated widely.
with Williams, 2008 (citing Reading, 1996) that “excellence” is a term that is used far too often. I would suggest that excellence and productivity are terms that require careful reflection, definition, and then agreement across the TAHSN network.

The articles by Arnold (2002), Bowen (2002), Campbell and Sheaff (2002), Carraccio and Wolfsthal (2002), Garson and Strifert (1999), Howell and Hogarth (2002), Mallon and Jones (2002) and Whitcomb (2002) were not relevant to my research focus. As an example, Arnold (2002) focuses on measuring professionalism (e.g., empathy, reliability, integrity) amongst medical students, and provides various assessment tools to quantify unprofessional behaviours. Bowen (2002) articulates gaps in teaching and learning within the clinical realm. Campbell and Sheaff (2002) describe a competency-based medical education curriculum for trainees, as opposed to process-based educational structures. Carraccio and Wolfsthal (2002) also examine medical education and the development of tools to measure and assess competency – not productivity. Whitcomb (2002) focuses on educational delivery to residents using a competency-based system. Mallon and Jones (2002) concentrate on teaching evaluations; while I do believe some assessment of quality must come into play in assessing performance, this article was not helpful for my purposes. Howell and Hogarth (2002) describe the mission-based management model (MBMM) used in US medical schools (as advocated by the American Association of Medical Colleges), however, this article was very similar to others and so this has not been described here.

D’Alessandri et al (2000) present a very strong article, however, their system focused on the measurement of clinical performance within the American AHSC. Also set within the American system, Durso et al (2009) conducted semi-structured interviews with faculty across the United States, arguing for the importance of recognizing clinical excellence in the academic realm (not just excellent teaching or research). Indeed, these articles suggest that excellent clinicians in AHSCs are not recognized or incentivized in the same way that teachers or researchers are; these authors
argue that teaching will suffer if clinically proficient faculty are not acknowledged. Durso et al put forth an interesting argument using strong qualitative methodologies and organizational and motivation-based theories to back-up their argument. In conducting their study, five themes emerged regarding clinicians, which have not been reported on here. However, Durso et al’s findings also indicate that academic physicians are motivated by prestige; social status; and a secure and stable future. These may be important considerations in the formulation of any system to measure or value performance.

Scheid et al (2000) provide a good critique of the AAMC’s mission-based management model and the accompanying relative value unit scales used to measure academic productivity. These authors maintain that there are five fundamental problems with the weighting scales commonly used in an American AHSC, which may be of relevance in Canada too. First, ratings from 1-10 are typically used to weight activities. However, the weights assigned to a 1 versus a 10 are inconsistent, flawed, and poorly understood by those that perform the ratings. Second, the system is often arbitrary, particularly in the transformations from the mean versus the median; as an example, the median favors administrative tasks while the mean favors scholarly activities. Third, these authors are unsure as to who should judge the values. Should it be faculty members or administrators? They note that different groups rate the activities differently. Fourth, “gaming of the system” by both faculty members and department chairs is a serious issue, but one which is difficult to avoid. Finally, these authors express concern that rewarded, measured activities may triumph over those that are not, but are of no less value. While their commentary is very strong, Scheid et al provide little in the way of methods to avoid these issues, or an alternative system.

Kevin Williams (2008) presents a sociological examination of the profession of academe more broadly, questioning whether academics are in fact professionals, based on the current, trait-based definition. He notes,
While the underlying considerations of occupational autonomy and control, the moral values of integrity and trust may well be intended by those seeking to professionalize, the ideological agendas of state, managerial and even intra-professional hierarchies cannot be denied or ignored. Professions exist, it would appear, in the ‘inside-out/outside-in’ negotiating space between the two competing agendas of the ‘ecologies of practice’ (linked to intra-professional hierarchies) and the ‘economies of performance’ (linked to state and managerial agendas). (Williams, 2008: 535)

Further, Williams states that definitions of professionalism must emphasize “a shift of focus from the preoccupation with defining ‘profession’ to an analysis of the appeal of ‘professionalism’ as a motivator for and facilitator of occupational change” (Ibid: 536). While this article does not appear to be directly related to the measurement of academic productivity and may be more relevant in examining faculty in academic units other than medical schools, I would propose that an examination of the role of the professional is prompted when various stakeholders seek to assess their outputs, or “value”. To be sure, a shift from thinking of what a professional is towards a greater understanding of what motivates individual academic physicians may be what is required to facilitate more positive effects in an era of managerialism. In medicine especially, the decreased power, control and autonomy of academic medical professionals as a result of the proliferation of modern technologies and the concomitant spread of medical ‘knowledges’ via the Internet is a growing issue. As professional autonomy is progressively decreased, there is also an increasing emphasis on the surveillance of performance and the management of risks.

Smeenk et al (2009) present an interesting study which tested a hypothesis which asked, “Does managerialism have a negative impact on professors in Europe?” (Smeenk et al, 2009: 591). These authors define “managerialism” as, “the trend of adopting organizational characteristics, such as organizational forms, technologies, management instruments and values that originate from the private sector organizations” (Ibid: 591). Further, they note,

Osborne and Gaebler argue that public sector organizations are substantially restructured by the diffusion of ‘entrepreneurial governance’ that is by implementing the ‘private business elements’ such as competition, outcomes, redefinition of clients into customers, earnings money instead of spending it, market mechanisms instead of bureaucracy, and so
Birnbaum (2000, pp3) considers such developments to be ‘academic management fads’ which ‘follow the cycle of educational innovation in general’ (Ibid: 591).

Similarly, the managerialism contradiction reflects the current sociology of the professions discourse which claims that managerialism will lower academic productivity and quality if too much measurement, competition and market-like values are introduced into the academic realm. Thus, Smeenk et al conducted a web-based survey of six European countries which included 18 universities, and two departments per university (36 departments in total). The results of this study indicate that managerialism has a positive – albeit modest – effect on the quality of performances, and therefore, there is no evidence for a managerialism contradiction. Further, “by and large, managerialism does not work against its own intentions. To the contrary, as evidenced by the effect of department segregation, it is more likely to foster quality job performances” (Ibid: 602). While the departments studied at each university were departments of business and sociology, it is possible that their results could be translated into the medical school realm. In fact, their results may be even more relevant in this realm given the culture of an AHSC which tends to be more business-like or corporate, and places less emphasis on conventional notions of academic freedom. It should be noted that this article was the second that I located that mentions “quality” and actually studies managerialism within the University context, rather than merely commenting on the perceived negative attributes of this ideology. These authors also used strong survey methodologies, and convinced me that a move from a “control orientation” towards a “developmental orientation” is an important consideration in adopting any type of productivity measures. Further, measures of productivity are not enough; the implementation of practices to encourage and recognize quality and enhance performance, on all levels, should be the goal.

Several articles from the United States explore methods to measure clinical productivity, but a very limited number of articles explore how to measure academic productivity. The articles on the latter subject focus on academic relative value units (aRVUs) or academic points-type systems which
measure effort or time spent on academic activities. There are very few articles on how to measure impact, assess quality, or link compensation models/incentives to productivity. Smeenk et al suggest that institutions move from a control orientation (measuring productivity) to a developmental orientation (actually enhancing performance) a concept which I have expressed with the following diagrams:

**Figure 2.1: Control Orientation (Focus on Measurement of Academic Productivity)**

In contrast to:

**Figure 2.2: Developmental Orientation (Focus on Academic Performance Improvement)**

The counter-argument to management and commodification of academic/intellectual work can be found in the sociological literature on managerialism. Harley et al (2001) note,

> We are witnessing, according to Wilmott (1995), the commodification of academic knowledge production which is increasingly judged in terms of its exchange value, represented in research funding and position in league tables, rather than in terms of its intrinsic value as an organizational contribution to knowledge. We are also seeing the ‘McDonaldization’ of its dissemination.... Where delivery is increasingly judged in terms of efficiency, value for money, and ability to attract large numbers of fee-paying students, who are being duly re-constituted as customers. The result is the de-professionalization of academic work and the proleteriatianization of the academic worker. (Harley et al, 2001: 330)
The managerialist ideology is consistent with those of a market-based entity; however, one should question whether the traditional interests of a university mesh with those of a for-profit business. I wonder whether the entrepreneurial governance models adopted within academic medicine per Smeenk et al – that seemingly focus on competition, outcomes, market mechanisms, clients as customers and documented evidence of academic productivity – are effective methods to ensure that intellectual innovations flourish. How is the quality of academic outputs affected when authors republish the same basic article in multiple journals to secure the volumes of research that are needed to secure good ratings under an academic points system? Does this really serve academe well? This is a particularly acute issue when salaries or merit pay are derived from the academic points generated annually.

As noted above, medical schools in North America, Europe, and perhaps elsewhere, are under increasing pressure to measure academic productivity, set benchmarks, motivate, and then reward strong performance. Nonetheless, one must question whether the management of academic performance is a threat to the mission of the University more broadly, or the notion of academic freedom. Is it possible that the various academic points systems or calculations of aRVUs serve to concentrate efforts on those activities where rewards are imminent, perhaps at the expense of a researchers unique set of research questions and skills? If an academic physician is under pressure or is incentivized to produce on an annual basis, how does this affect a long-term, highly focused research program? It’s uncertain how quality may be impacted via the assessment of productivity, and certainly, this matter has received very little attention in the discourse on this topic.

Following on Williams’ article, I agree when he questions how treating a professional as a “neoliberal” subject, and not a professional in the “traditional” sense, will affect their academic work (I specifically did not use the term “outputs” here). Using a market-oriented approach to manage academic performance may diminish the autonomy that professionals previously enjoyed in
that the focus becomes the generation of outputs, vast quantities of easily measured activities, as opposed to creative, innovative, but perhaps more time and labour-intensive, scholarly “works”. Nonetheless, I would maintain that excessive measures of productivity may indeed threaten academic freedom within the social sciences, but perhaps less so in the natural sciences, where the subject matter does not require the same degree of protection as when someone is working in a politically or socially sensitive area.

There is much work to be done on the assessment of performance, productivity, and quality of performance of academic physicians, particularly within the Canadian AHSC context. The assessment of academic performance is a trend that is likely to endure. However, the end focus should be on facilitating greater quality and innovation – not just on measuring numbers. In the end, the numbers are of no real importance if an analysis is not performed with the goal of setting a meaningful course of action both on an individual and a departmental/institutional level. To date, this latter part of the equation has been almost completely neglected in the literature, but certainly, will need to form an important basis for future research undertaken.

**Bibliometrics and Peer Review**

An emerging sub-theme within the assessment literature explores the use of bibliometric indicators, citation metrics and “scientometrics” to assess productivity, performance and impact. The Organisation for Economic Cooperation and Development (OECD) defines bibliometrics as “the statistical analysis of books, articles or other publications”, and notes that “citation and co-citation analyses [numbers and authors of scientific papers] are used both to obtain more sensitive measures of research quality and to trace the development of fields of science and networks” (http://stats.oecd.org/glossary/detail.asp?ID=198). Scientometrics is closely related to bibliometrics; loosely, it is the study of measuring and analyzing science in particular. Commenting on the European context, Diem and Wolter state,
The practice of rating research performance on the basis of bibliometric indicators (number of publications and citation count) is ubiquitous in academic research. Ratings based on bibliometric information provide a rationale to justify the allocation of research funds and for quality assurance in research programs and projects, in that way enabling strategic planning at system level but also at the level of universities... The popularity of bibliometrics probably resides in the fact that information is highly compact, easy to handle, and likely to be objective. (Diem & Wolter 2013: 87)

The use of bibliometrics within Canadian academic medicine may be of interest to academic leaders and decision-makers. There is a robust body of highly technical literature in the bibliometric and information sciences field, but for the purposes of this literature review, the focus is on the value of using bibliometric indicators to supplement or buttress peer review efforts. Further, the h-index and citation index are a focus; while there is some work in the information sciences on the g-index, e-index, Brazilian lattes project, altmetrics, and other measures, these two are the most commonly studied and referenced bibliometric indicators in the applicable literature.

Hunt (2011) provides a short but very concise primer on bibliometrics, the h-index, and journal impact factors. Hunt suggests that journal impact factors alone (“defined as the number of citations to a journal’s articles published in the two previous years divided by the number of articles by the journal during those two years”) is a weak measure with which to measure the merit of individual papers as it is prone to publication bias (some databases favor English language paper), can be influenced by self-citations, and is based on only a short, two-year window (Hunt, 2011: 80). In an editorial, Nature (2010) also posits that “academic administrators, conversely, need to understand what the various metrics can and cannot tell them” and that the “classic ‘impact factor’ that were designed to describe a journal’s influence were not designed to assess individual scientists” independent of any other criteria (Nature, 2010: 845). Hunt notes that the Hirsch Index (h-index) is the “highest number of single or co-authored articles by a researcher that have been cited h or more times. Thus, an h-index of 20 means a researcher has at least 20 articles that have been cited at least 20 times” (Ibid: 80). In comparing individual investigators, Hunt notes that the h-
index is dependent on career length (age bias), is field dependent, and does not take into account multi-authorship. This is a particular challenge in medicine, where collaboration is an accepted practice. Hunt also notes that obtaining an accurate h-index for an individual can be problematic given database-related challenges, and for those with common names, name changes, or who publish in multiple fields. In discussing the use of the citation index to assess research performance:

No single indicator or number can provide a complete picture of a person’s research performance and there are many factors that should be considered in combination when evaluating an individual’s academic output (length of career, teaching and clinical loads and grant opportunities).... It is also important to employ multiple searching methods using more than one database to gather citations and verify authorship of the articles whenever possible (Ibid: 81)

van Raan (1996) provides an advanced review of the field of bibliometrics around a study which was conducted on the Dutch joint university-research quality assessment system. Providing data on the mathematical and statistical models that were used to unravel the “cognitive and intellectual structure of science”, he too argues that bibliometric or quantitative assessments should not be used in isolation, but rather, are a useful tool in supplementing peer review exercises; “peer review and bibliometric analyses will never be completely independent measures, ‘orthogonal vectors in evaluations space’ as they will always be related to some extend” (van Raan, 1996: 399).

Following on the work of others, van Raan notes that,

The fundamental purpose of evaluation is to promote research quality. Therefore evaluation is without any doubt a necessity. In the first place, scientists themselves are responsible for quality control of their intellectual territory. Thus, review by colleague-scientists, “peers”, is applied to research proposals, appointments of research staff, evaluation of research groups or programmes, and so on. (Ibid: 397)

van Raan notes that peer review exercises suffer from both flaws and benefits including the self-regulating capacities of the system; high intellectual level of the peer review process; and the consensus amongst scientists that peer review is the way to proceed. However, peer review is fundamentally a qualitative exercise or “vote” by scientists in favor of the work being assessed (Ibid: 399). Reporting on a study undertaken as part of the Dutch review system, van Raan notes that the
quantitative indicators showed a significant correlation between the opinions of peers, and bibliometrics indicators. However, “If bibliometric indicators show a good performance, and the peers’ judgment is negative, there is a good chance that the peers are wrong” (Ibid: 413). van Raan concludes that bibliometrics provide a “substantial improvement to the peer review process”, and are more cost effective to implement than peer review processes. From a longer-term perspective, this author also notes that once done, bibliometrics provide “a permanent strengths and weaknesses monitoring system can be realized at a very low cost” (Ibid: 414). This paper provides a very strong overview of both quantitative and qualitative methods to measure scientific performance, as well as empirical evidence from a well-constructed study.

van Leeuwen (2008) published a study on the use of the Hirsch Index at the level of an individual researcher in relation to an academic awards system for Dutch scientists from various fields. This author is very critical of the h-index at the individual level, contradicting previous studies on the h-index which indicated that it can be useful for the evaluation and ranking of scientists at this level (Ball 2005; Cronin & Meho 2006). van Leeuwen reports that “straight citation counts should better be avoided, even within one single field, as scientists tend to publish in various sub-specialties with varying publication and citations patterns, and thus, field-normalized impact measurement is the more appropriate indicators” (van Leeuwen 2008: 160). Webber also notes that “disciplinary norms are important; it is not uncommon for a professor in a biology or chemistry department to co-author 10 or more articles per year while a highly productive professor in education may author only two or three” (Webber in Shin, Toutkoushian & Teichler, 2011: 109). van Leeuwen also notes that the h-index allows authors to use self-citations for “self-enrichment” purposes as they can cite less-important publications or “parts of their total output”, to drive up the h-index (Ibid: 160). Echoing van Leeuwen, Glanzel et al (2006) note that bibliometrics alone are not a reflection of quality, especially at the micro level, in part due to the effects of self-citations (Glanzel
et al 2006: 267). Finally, the age-dependency of the h-index is problematic when assessing the performance of more junior investigators, and is only valid in assessing life-achievements.

Glanzel et al (2006) argue that the application of bibliometric citation data is a somewhat controversial practice, especially in Europe, where bibliometrics are now used to monitor national and institutional rankings, and as a component of the formulae used to fund scientific research. These authors look at the role of self-citations as “part of the framework of scientific communication” but also the role of citations in the information sciences and the sociology of science more generally. These authors present an articulate overview of the evolution of citation behaviours more generally, arguing that citation behaviours have a social component which must be better understood. For Glanzel et al, citations fall into three main categories: ‘positive’ reception (paying homage to leaders in the field; ‘neutral’ reception (background information); and, ‘negative’ reception or disclaiming/disputing the work of others. In this way, not all citations should be weighted equally – but they are, and this applies to self-citations as well. Quoting Lawan (1982), these authors describe two types of self-citations: synchronous (retrospective, share of self-citations in the total of cited work) and diachronous (prospective or share in the citing literature). The authors note that increasing self-citations are a by-product of collaborative work; in other words, self-citations are a reflection of the number of co-authors. Following on Asknes (2004) and commenting on the results of their own studies, Glanzel et al suggest that self-citations are not an issue for basic scientists if they remain in the 10-30% level of total citations, and they have no evidence to find significant deviations from this number thus far. These authors focus on basic scientists however, not clinician scientists. Given that clinician scientists rarely publish alone, this number may be applicable to Medicine as well.

van den Brink (2013) also reports on data from the Dutch context, specifically, bibliometrics as part of academic talent management and human resources practices. Reporting on a study which
explored recruitment and selection practices for junior and senior faculty members in the Netherlands, van den Brink argues from a critical perspective that the use of bibliometrics alone is “too simplistic when reflecting on the academic recruitment system” (van den Brink, 2013: 192).

Lee et al (2013) provide a sophisticated analysis of different types of peer review bias, but argue that more evidence and research on the types of bias in scientific assessments is needed. These authors provide an excellent review of the history of peer review, criticizing the “ideal notion of impartiality in peer review” (2013: 5). They note that there are five forms of peer review: Double-blind peer review; open peer review; hybrid peer review; a priori peer review (select reviewers + members of the public); and, a posteriori peer review (based on post-publication comments). Lee et al also identify thirteen types of bias in peer-review: 1. bias as deviation from the “true quality” value (i.e., errors in identifying quality); 2. bias as deviation from proxy measures for true quality; 3. bias as a low inter-rater reliability or agreement; 4. bias as a function of author characteristics (social bias); 5. prestige bias (bias due to class structures); 6. affiliation bias (formal and informal affiliations); 7. nationality bias; 8. language bias (bias towards the English language); 9. gender bias; 10. bias as a function of reviewer characteristics (a challenge to impartiality); 11. content-based bias (partiality for or against a submission based on content); 12. confirmation bias (looking at data in a way that confirms one’s own beliefs); and, 13. conservatism (bias against ground breaking or innovative research). While these authors note that peer review has raised concerns about impartiality, they argue that “the empirical and methodological limitations of research on bias raises questions about the existence, extent and normative status of many hypothesized forms of bias” (Lee et al 2013: 13). More rigorous research on the social relations which are embedded within peer review processes is needed. While the authors seem to posit that peer review should not be abandoned, they make no mention of alternative indicators.
Moed (2007), Nightingale and Scott (2007), van Leeuwen et al. (2003), Bornmann (2011) and many others also argue that bibliometric indicators should ideally be combined with peer review in evaluating research quality and productivity. Webber (2011) contends that metrics must take into account the discipline, institutional norms and mission, and link these with institutional rankings.

Citing a retrospective study which they conducted of post-doctoral fellowship applicants, Bornmann and Daniel (2005) noted that those who had received funding consistently had a higher h-index than non-successful applicants. There is also an emergent body of literature on the use of the h-index in Medicine; however, the literature tends to ignore the flaws of the h-index which is evident in the literature from the information sciences (see Pagel & Huditz 2011; Babineau et al. 2014; Svider et al. 2013 and others).

Several editorials also counsel caution around the exclusive and uncritical use of bibliometrics to assess performance. Azoulay (2012) argues that the scientific community must “turn the scientific method on ourselves” when considering research assessment and evaluation models. Azoulay notes that both philanthropic organizations and granting agencies should do this “by subjecting proposed reforms to a prospective, randomized, controlled experiment... Retrospective analyses using selected samples are little more than veiled attempts to justify past choices” (Azoulay, 2012: 32). Acknowledging the concerns he has encountered around his views but stating nonetheless that our current assessment models are outdated and poorly adapted to the needs of the 21st century, Azoulay states that the “current system already gambles with scientific careers, just in a haphazard way” (Ibid: 32). Commenting on big data and metrics more generally, Giridharadas in an article in The New York Times states quite emphatically, “Welcome to the Age of Metrics – or to the End of Instinct”. Citing Joseph Stiglitz, who won the Nobel Prize in Economics for his theory on information asymmetry, Giridharadas agrees that “you need a metric to fight a metric” however,
“sometimes metrics blind us to what we might with fewer metrics have seen” (Are Metrics Blinding our Perception? The New York Times, November 20, 2009).

Lutz Bornmann has published several papers on the h-index, quantitative models to assess the societal impact of research, and alternative bibliometric models such as the e-index, the g-index, and his own model (Bornmann 2014, Bornmann 2013, Bornmann, 2012). In 2011, Bornmann reviewed various studies on peer review and bibliometrics to assess scientific research as related to institutional rankings, ultimately concluding that the two processes should optimally be combined to maximize the value of assessment exercises (Bornmann, 2011 in J. Shin et al, 2011: 158). Bornmann does a thorough job of highlighting the strengths and weakness of peer review, noting that “despite its flaws, having scientists judge each other’s work is widely considered to be the ‘least bad way’ to weed out weak work (Enserink 2001)” (Ibid: 158). Peer review is thought to facilitate the self-regulation of science and improve the quality of the reporting of research. Bornmann notes that problems which have been identified by research on peer review include poor reliability due to inter-rater disagreement; rater biases and impact on the fairness of the process; and, the lack of predictive validity. Bornmann reviews two competing theoretical approaches to citing:

Following normative theory [Robert Merton, 1973], the reasons why scientists cite documents are that the documents are relevant to their topic and provide useful background for their research in order to acknowledge intellectual debt. The social constructive view on citing contradicts these assumptions. According to this view, citations are a social psychological process, not free of personal bias or social pressures and probably not for the same reasons (Ibid: 157)

Bornmann highlights multiple factors that influence citation counts including time-dependent factors (the more a paper is cited the more it will be in future), field-dependent factors (citing practices in academic fields), journal-dependent factors (e.g., positioning of an article within a journal and journal accessibility, visibility), article-dependent factors (review articles vs. research articles, letters and notes), author-dependent factors (language, social networks, personal ties), and literature and citation database-dependent factors (free online accessibility, citation errors).
Throughout his paper, Bornmann presents studies which both support – and refute – all of the issues involved with utilizing either peer review or citations to assess scientific outputs. He does however conclude, as many others have, that more research is needed.

**Theoretical Framework: Compensation Models for Academic Physicians**

As noted in the overview of this chapter, behavioural economics is an emergent field which studies the impact of psychological or social factors on the economic decisions or market choices that individuals or institutions make, and the attendant results in terms of resource allocations, and choices that are made. However, agency theory has made many important contributions as well, and has been reviewed in this section given the evolution of the field towards more behavioural economics approaches. Thus, this section presents key studies in these fields with a goal towards elucidating key concepts, results and outcomes that may be used to inform the theoretical perspective of this dissertation.

Eisenhardt notes that agency theory evolved during the 1960s and 1970s when economists began to explore risk-sharing issues when cooperating parties (principals and agents) have different attitudes towards risk (Eisenhardt 1989: 58). Agency theory in economics is concerned with two fundamental “problems” in the principal-agent relationship: conflicting goals – principal versus agent; and, difficulties for the principal in ensuring the agent has acted appropriately in fulfilling the terms of a contract (as economic theory indicates that the agent will likely act in a self-serving way). The principal-agent problem is further constrained due to information asymmetry: does the agent have information that the principal does not? The goal of agency theory is to build “information systems which curb agent opportunism” (Ibid: 60). The focus of the theory is at the contract level and ensuring that contracts induce the greatest level of efficiency and effort (optimize performance) and produce the outcomes that are needed. Following Eisenhardt, the contract in academic medicine is at the behavioural level (salaries, incentives, governance). Eisenhardt also notes that
“the heart of principal-agent theory is the trade-off between (a) the cost of measuring behaviour and (b) the cost of measuring outcomes and transferring risk to the agent” (Ibid: 61). This author also notes that agency theory shares some assumptions with organization theory (March and Simon, 1958), contingency theory (Chandler, 1962), political models of organizations (March, 1962) and organizational control literature (Thompson, 1967). It has however been criticized by organizational theorists as being too minimalist or overly simplistic, with little empirical research or real-life solutions which demonstrate methods to mitigate the agency problem.

Pontes (1995) describes agency theory as an “economic theory of control” (Pontes 1995: 57). Commenting on the use of agency theory to design optimal physician services contracts (clinical services), this author notes that “the agency theory concepts of incentives, outcome uncertainty, risk, and information systems are particularly germane to the discussion of compensation and control problems” (Ibid: 57). Pontes also states,

Control systems that include contracts in which compensation is contingent primarily upon specified outcomes are referred to in the agency literature as outcome-based control systems. On the other hand, control systems that include contracts in which compensation is contingent primarily upon specified behaviors are referred to in the agency literature as behavior-based control systems. (Ibid: 59)

Pontes argues that salary contracts are the best method to compensate physicians because of outcome uncertainty: he notes that outcomes in a clinical setting are influenced by “unpredictable factors that are beyond the agent’s control” (Ibid: 58). Indeed, outcomes in the clinical setting could be attributed to factors including institutional policies, processes, structures, leadership, resources, other staff members, etc. However, I would suggest that physicians are expected to exercise leadership and control. They are compensated at a very high level, and awarded a high degree of social prestige. Pontes also posits that fee-for-service payment schemes may induce/choose treatments that increase their income, thereby increasing productivity. Pontes notes that capitation contracts will “transfer the financial risk to physicians. Because individual physicians are likely to be
risk averse, they will only accept a capitation contract if the expected income is greater than that offered by other contracts” (Ibid: 63). Salary contracts, Pontes argues, will theoretically lower health care costs because they are not incentivized to prescribe unnecessary procedures (to increase their income), and compensation levels could be lower and more predictable as physicians are risk-averse agents and salary will guarantee an agreed upon level. Pontes does not however provide empirical evidence on the efficacy of salary versus fee-for-service in a real-world or experimental setting.

Salary contracts, as noted by Pontes, provide no incentive to maintain service levels (productivity) or reduce health care costs (accountability). The effect of salary contracts on quality (performance) or leadership should also be considered. Constructing a physician as an employee, and not as an autonomous, self-regulating professional, will likely have unintended consequences or externalities in terms of recruitment, retention, satisfaction, creativity and innovation.

Shapiro (2005) reviews the contributions of agency theory to economics, as well as other paradigms including management and organizational behaviour theory (e.g., empirical studies on compensation models – behaviour-oriented mechanisms such as salary vs. outcomes-oriented models such as piece rates, commissions and bonuses); political science (politics as a “complex network of principal-agent relationships” with goal conflicts, competition amongst principals and agents, problems of collective actions and incentives to mobilize them); the law of agency; and, sociology. Shapiro maintains that agency theory is actually pervasive in sociological theory, because essentially, “agency is a general social theory of relationships of ‘acting for’ or control in complex systems” and agency relationships are pervasive in sociological theories on bureaucracy, organizations, professions, markets, labour, social exchange and so on (Shapiro 2005: 275). Shapiro then reviews the central tenets of agency theory – including asymmetric information, adverse selection, goal conflict, opportunism, monitoring and agency costs – arguing for greater integration and expansion of the paradigm into the sociological texts. In the case of academic physicians,
Shapiro’s suggestions around the sociology of the professions have much to offer, especially around the classic agency problems of adverse selection and asymmetric information. Professions self-regulate and theoretically, solve adverse selection issues due to careful selection, training, credentialing, licensing, recertification, continuing education and codes of ethics which curb self-interest and opportunism. The alternative perspective in sociology however, is that self-regulation creates monopolies, a problem which Shapiro refers to in passing as an area which requires further study. Shapiro notes that goal conflict, which she defines as the departure of agents from the interests of the principal, are misunderstood in classical agency theory. For her, the real issues are the social conditions which exacerbate goal conflict, and thus, she argues that sociological theory has much to offer. Shapiro also suggests that classical agency theory in economics does not go far enough in explicating the problems created by opportunism other than to refer to shirking or exploitation. For her, a more nuanced theory which includes the interactions of principals, agents and organizations, is needed. Finally, Shapiro notes that all paradigms agree on that principal agent relationships incur agency costs, which are hard to resolve and essentially comprise a set of trade-offs. She notes,

Agency costs arise from many sources: the costs of recruitment, adverse selection, specifying and discerning preferences, providing incentives, moral hazard, shirking, stealing, self-dealing, corruption, monitoring and policing, self-regulation, bonding and insurance, agents who oversee agents, as well as failures in these costly corrective devices (Ibid: 281)

Shapiro suggests that the devices used to control the behaviour of agents often have unintended effects: “In short, because we are fearful that agents will get our preferences wrong, we construct a protective social edifice that insures that they will get them less right” (Ibid: 281). Shapiro makes a compelling argument around agency theory in sociology, but notes that classical agency theory in economics cannot explain many pragmatic issues that might benefit from an additional layer: the social milieu in which the principal-agent relationships are enacted.
Robinson (2001) draws upon agency theory to explore various methods used to compensate physicians including payment incentives. Robinson states,

The essence of incentive contracting is the effort by one individual or organization (the principal) to induce and reward certain behaviors by another (the agent). Financial rewards are only one, albeit an important one, among a variety of mechanisms for eliciting the desired behavior; other mechanisms include screening, socialization, and threats of contract termination. It is important to differentiate between the level of payment and the structure of the payment... The structure of the payment, which is the concern here, is designed to produce the highest rewards to the agent at the lowest cost to the principal. (Robinson 2001: 151)

Robinson argues that fee-for-service, even in its purest form, is a retrospective form of payment that is input-intensive, expends too many resources and places the principal open to various problems related to contract monitoring and measurement of outputs. This author notes argues that an optimal payment system blends together fee-for-service and capitation by including salaries, commissions, bonuses and profit sharing. He argues against a pay-for-performance system, in essence arguing that agents will spend an inordinate amount of time gaming the system to achieve the desired results. This is indeed a potential by-product of any performance or productivity assessment model. Robinson addresses the mixed results of various studies on this topic and limitations of each payment model arguing for non-price methods to motivate physician behaviour including “screening and selection, explicit prescription of desired behaviour, monitoring of compliance and inculcation of norms and cultural expectations” as well as credentialing, practice profiling and organizational culture (Ibid: 165). Robinson thoroughly addresses the theoretical issues but provides no empirical or experimental evidence. He does however make a case for the use of case studies, population surveys and secondary data to explore the issue further, especially given the public policy implications of methods used to pay physicians. Robinson’s suggestions helped to inform my own choice of research methodologies for this dissertation.

Indeed, agency theory in classical economics may not go far enough in explaining why compensation models, incentives, and bonuses do not always operate as predicted. In Chapter 1, I
described my son’s reaction to the monetary incentives which as the principal, I provided to induce him as the agent, to read more. In standard economic reasoning, providing my son with an incentive to read should have resulted in higher performance; as Gneezy and Rustichini note, “This prediction is a conclusion of very basic assumptions in economic theory: performance is positively related to effort; effort is unpleasant; and money is good” (Gneezy and Rustichini 2000a: 791). It appears that my son previously had a different, intrinsic motivation, to read; but, by providing him with a monetary incentive, I may have signaled that reading books is not desirable. This is where contract theory and the emerging field of behavioural economics may provide additional insights.

In their 2001 article, Frey and Jejen provide empirical evidence to support their theory that external monetary awards may “crowd out” intrinsic motivation. Frey and Jejen trace this notion back to Richard Titmuss’ work on blood donations and motivation (1970). Titmuss, a social worker and founder of social policy as a discipline at the London School of Economics, hypothesized that paying money for blood donations (an external incentive) would undermine key social values (intrinsic or internal motives) and result in less willingness to donate blood. Titmuss did not collect empirical or field evidence to support this hypothesis, but the theory was of interest to social psychologists and economists nonetheless. Researchers in the field of cognitive social psychology developed theories, based on empirical evidence gathered in the laboratory setting, on the “hidden costs of rewards” (Lepper and Greene 1978), the “corruption effect” (Deci 1975), and the “cognitive evaluation theory” (Deci, Koestner & Ryan 1999). More recently, work on the “crowding out effect” has been integrated into economic theory, particularly labour economics. Frey and Jejen argue that standard economic models do not typically differentiate between sources of motivation. From their perspective, extrinsic motivators such as monetary incentives or punishments address only half the problem:

Arguably, the “crowding out effect” is one of the most important anomalies in economics as it suggests the opposite of the most fundamental ‘law’, that raising monetary incentives
increases supply. If the crowding out effect holds, raising monetary incentives reduces, rather than increases, supply. Under relevant circumstances, it is therefore not advisable to use the price mechanism to elicit a higher supply, and one should moreover rely on a quite different type of incentive, namely intrinsic motivation. (Frey & Jejen 2001: 590)

Motivation crowding theory (MCT) seeks to understand how external or internal incentives can best be used to maximize productivity or outputs. MCT also “tries to mediate between standard economic models and the psychological theories by stipulating a systematic interaction between extrinsic and intrinsic motivation” (Ibid: 591). In this way, MCT can be represented as a continuum where at one end, motivation is driven exclusively by the price effect or another external motivator or punishment (crowding out effect) while at the other side, the focus is on intrinsic motivation (crowding-in of motivation effect):

**FIGURE 2.3: THE CONTINUUM OF MOTIVATION CROWDING THEORY**

Thus, an agent’s motivation can be accounted for by: a) changes in preferences; or b) changes in the perceived nature of the tasks (in the task environment or in the actor’s self-perception). How then can intrinsic motivation be modeled or assessed? This challenge has not yet been addressed within the existing body of literature. Further, how can an academic leader understand how to maximize the productivity or motivation of an individual or group? Are there specific circumstances that would point to one source of motivation over another? While Frey and Jejen provide multiple empirical examples of motivation crowding theory at work, none of these examples involve
academics, academic physicians, or professionals of any sort. Yet, practical examples of the use of monetary incentives abound within Canadian academic medicine.

Bénabou and Tirole (2003) analyze the “hidden costs” of rewards and punishments from an economic and cognitive perspective. They seek to reconcile/resolve the economist’s central tenet that incentives motivate with the idea from psychology and sociology that incentive schemes can sometimes be counterproductive and demotivate. Bénabou and Tirole develop a framework for understanding interactions between motives, incentives and prior conditions in which these incentives are deployed. Focusing on extrinsic incentives (contingent rewards) versus intrinsic motivation (the individual’s desire to perform the task for its own sake), they show how performance incentives offered by an informed principal (manager, teacher, parent) can adversely impact an agent’s (worker, child) perception of the task, or of his own abilities. From stimulus to response, they model the interactions between an agent with imperfect self-knowledge and a principal who chooses an incentive structure, such as offering rewards and threatening punishments, and giving encouragement, praise, or criticism. Bénabou and Tirole indicate that incentives/rewards may be only weak reinforcers in the short term and may have hidden costs, in that they become negative reinforcers once they are withdrawn. The idea is that by offering “low-powered” incentives, the principal signals that they trust the agent. Conversely, rewards (extrinsic motivation) have a limited impact on current performance, and reduce the agent’s motivation to undertake similar tasks in the future.

Gneezy and Rustichini (2000a) conduct three controlled laboratory experiments to test the assertion in standard economic reasoning that increasing financial incentives will improve performance. The authors note that psychologists have debated for over four decades the effects of rewards on behaviour, and shared the opinion of standard economics, albeit for different reasons. Under behaviourist theory on instrumental conditioning, “reward offered for an activity which is in
itself neutral of even mildly unpleasant, will eventually associate a positive valence to that activity. So in the long run a past reward has a positive effect on the performance of that activity” (Gneezy and Rustichini 2000a: 792). In the 1970s however, the cognitive psychology schools suggested that monetary awards in particular may displace intrinsic motivation, and the net effect is a reduction in overall motivation as well as a decline in performance. Working with this hypothesis, Gneezy and Rustichini implemented two controlled laboratory experiments (involving 213 high school subjects) and a field study (involving 160 students from the University of Haifa, Israel) to test the effects of the introduction of a monetary award and an increase in the award. While I have not discussed the three experiments in detail, I note that the authors present a well-detailed, easy reproducible methodology, a fulsome discussion on the limitation of the experiment versus real-life situations, and various interpretations of the results. Gneezy and Rustichini note that the results of the experiments show that small amounts of monetary incentives can be detrimental to performance. In fact, it may be better to offer no award at all as participants who were not paid at all performed better than those paid with a very low piece rate. In their field studies involving the university students, once larger incentives were introduced, the higher payments resulted in higher efforts. Gneezy and Rustichini posit that perceptions are important: “A certain amount of monetary compensation may be perceived as too small when compared with other relevant factors, even if it is not too small in itself” (Ibid: 805). In this case, the authors note that health or reputation may be more important than money. Gneezy and Rustichini do not attribute these results to reduced intrinsic motivation in itself (Frey’s notion of motivation crowding theory), but rather, refer to the notion of incomplete contracts: “The most convincing explanation to us seems to be based on cognitive arguments: contracts, social or private, are usually incomplete, and regular an interaction in a situation of incomplete information. The introduction of a reward modifies some of the terms of the contract, but also provides information” (Ibid: 805). They argue that further research,
experiments, and theory-building are needed. Gneezy and Rustichini followed these experiments with a field study investigating the impact of fines on the behaviour of late arriving parents in an Israeli day care. In this study, fines were levied against late-arriving parents, but were found to be viewed as a price – and a very low price at that. The fines actually had a reverse impact on parents’ behaviour, seemingly encouraging increasing lateness along with the cognitive belief that arriving late was now acceptable (Gneezy & Rustichini, 2000b).

Pokorny (2006) also notes that most principal-agent models in standard economic theory predict that increasing incentives will result in higher performance. The results of more recent real effort and abstract effort choice economics experiments have however “shown what psychologists have been claiming for some time, namely that the introduction of incentives does not inevitably stimulate higher effort choices” (Pokorny, 2006: 251). Pokorny points to “motivation crowding out theory” as articulated by Frey (1997) and Benabou and Tirole (2003), but notes that this theory has also been disputed by psychologists and meta studies have provided ambiguous results. Thus, Pokorny uses experiments conducted at the Universities of Bonn and Cologne, involving four different compensation schemes, to further test the value of varying piece rates on performance. She notes that the results of her studies contradict those of experiments run by Gneezy and Rustichini (2000a) which demonstrated a V-shaped relationship between effort and the intensity of incentives. In contrast to Gneezy and Rustichini, Pokorny’s experiments found that very low incentives induce higher performance than no incentives; that high piece rates reduce performance compared to very low incentives; and, those who were paid a fixed wage performed worse than those paid a low piece rate. Pokorny explains the results using a simple principal-agent theoretical model to account for the agent’s loss aversion and reference dependent preferences. Pokorny does not conclude that incentives don’t work, but rather, the results of her own experiments suggest that incentives may work if the agent’s income level is below the individual’s reference income (known
as the “target income hypothesis” or “economic target income hypothesis”). Above that reference income level, incentives may not increase effort. In other words, pay an incentive – but not too much. Certainly, more research into reference points/income levels is necessary, and Pokorny does not address the issue of how to determine the reference income for specific individuals or groups (e.g., academic physicians). This publication also features the result of a controlled experiment, not a field study. The subjects were not academic physicians or professionals, and so the results cannot necessarily be extrapolated to that group. The question then is “how much is too much”? Certainly, Pokorny’s study opens up new lines of questioning, especially given the contradictions between her results and those of Gneezy and Rustichini.

Pokorny’s results are echoed by Contandriopoulos and Perroux (2013) in their empirical study of the total number of clinical services, number of services per capita and average number of services per physician following Quebec’s increased investment in physician compensation levels in 2007. The authors note that physician compensation is among the largest cost drivers for the Canadian healthcare system. In 2007, the Quebec government signed agreements with the physician federations which allowed for significant increases to the fee-for-service billing schedules over the next five years (an additional $1.5 billion from 2007 to 2012 which amounts to a 7% annual increase). Of note, billing codes for teaching and research undertaken by academic physicians were added to the negotiations. This is unique to Quebec in Canada. The authors used data on expenditures and service volumes obtained from RAMQ (Quebec’s provincial health insurance system) and CIHI to show that “while total physician compensation and average unit cost per service all rose extremely fast, the total number of services, number of services per capita and average number of services per physician either stagnated or declined” (Contandriopoulos and Perroux 2913: 33). The authors hypothesize as follows:

In economic theory, the target income hypothesis posits that people aim for a given level of income and will adjust their work practice to reach it. This implies, among other things, that
when the rate paid for a given amount of work increases, workers might choose to work less rather than to increase their revenues... It is commonly suggested that workers with incomes in the highest deciles are more likely to choose quality of life and additional leisure over income increases. (Ibid: 31)

In other words, more money does not necessarily equal more work or effort. The marginal value of more money is not perceived to equal the opportunity costs of earning that money (e.g., time to spend with family). From a public policy perspective, Contandriopoulos and Perroux note that arguments which support increasing fee-for-service schedules – or the use of FFS more generally – should be carefully examined in light of these results. The authors do not provide any definitive suggestions or solutions, but they do open an important line of questioning around the Quebec system. The authors also did not address academic productivity, or the effects of removing the payment for academic activities from the university context. This would be an important layer to add to any future inquiries.

Drawing on behavioural economics, Ederer and Manso (2012) conducted two controlled laboratory experiments, involving 379 subjects, which attempted to reconcile the contrasting views in the economics (principal agent theory) and research in psychology fields on the effects of performance-based compensation in inducing higher levels of productivity and effort. These author note that in economics, pay-for-performance has been constructed as an effective tool to induce higher productivity, especially when tasks are routine and don’t require creativity. In psychology however, it is argued that performance-based compensation inhibits creativity and innovation. Two electronic experiments with groups of managers were conducted: the lemonade stand experiment and the gold prospecting experiment. The subjects were then placed into three treatment groups: 1. fixed wage compensation; 2. pay-for-performance (profit sharing) compensation; and 3. contract designed to motivate exploration. Ederer and Manso provided a detailed description and analysis of both experiments as well as the treatment group, and hypothesized that treatment group 3 would explore more. Indeed, group 1 proved to be risk (or loss) averse, while group 3 consistently proved
to be the most exploratory and creative, based on the criteria set by the researchers. The authors conclude that the combination of tolerance for early failure and rewards for long-term success is effective in motivating innovation, not pay-for-performance. Of note, the focus of these experiments was on managers and executives, and thus, the authors state that the methods may be useful to study other issues in the entrepreneurial literature. I would suggest that future research could focus on academic physicians as their work requires entrepreneurship, creativity and innovation. Further, I would suggest that the use of pay-for-performance in academic medicine might also undermine collegiality and collaboration. Overall, this research provides an important contribution in considering the potential impact of different types of compensation models that can be used in academic medicine.

Kamenica (2012) provides an empirical review of the literature on the use of monetary incentives versus an intervention rooted within the research in psychology field, framing. Seemingly irrelevant factors, such as the way the options are framed, can be quite effective in inducing people to take particular actions. Kamenica examines how paying for inherently interesting tasks, paying for prosocial behaviour, paying too much, paying too little, and providing too many options can all be counterproductive. At the same time, proper design of the decision-making environment can be a potent way to induce certain behaviours. Kamenica provides empirical evidence that illustrates how nonstandard interventions/incentives can work.

In identifying the underlying mechanisms for the anomalies in incentives, Kamenica argues that there are three main explanations behind the data: 1. contextual inference; 2. loss aversion and dynamic inconsistency; and 3. choking. The idea behind contextual inference is that people are often unsure about what the best course of action is and consequently seek clues from the environment. An example is if you are unsure whether solving puzzles is fun and someone offers you $5 per puzzle solved, you might reasonably infer that this activity is not enjoyable and thus forgo it, even though
you might have previously enjoyed solving puzzles in the absence of a monetary incentive (Benabou & Tirole 2003a)( Kamenica, 2012, 13.3). Other anomalies are driven by loss aversion and other nonstandard preferences (e.g., certain outcomes may be impacted by preferences through a reference point the individual holds). Choking refers to instances where an agents’ effort might become less productive when the incentives provided by the principal are too steep; the incentive creates a setting where avoiding stress and keeping a clear head is problematic.

Azoulay et al (2010) suggest that certain types of research funding -- which provide more freedom and focus less on near-term results -- lead to more innovative and influential research. Specifically, they study the careers of investigators (biologists in particular) of the Howard Hughes Medical Institute (HHMI), a scientific granting body which tolerates early failure, rewards long-term success, and gives its appointees great freedom to experiment, in contract to grantees from the National Institutes of Health, who are subject to short review cycles, predefined deliverables, and renewal policies unforgiving of failure. They find that scientists are much more likely to produce innovative research when using long-term grants that allow them exceptional freedom in the lab. Specifically, Azoulay et al’s work shows that biologists whose funding encourages them to take risks and tolerates initial research failures wind up producing about twice as many highly influential papers as peers whose funding is dependent upon meeting closely defined, short-term research targets. The researchers believe their evidence shows it is possible to manage lab work in a way that increases the chances that scientists will produce breakthrough findings, not just incremental advances within an established paradigm. While this study did not address academic physicians in particular, the results may have implications for both granting agencies and academic leaders in terms of how the clinical sciences are funded.
Scope and Limitations of the Literature Reviewed

This literature review analyzes a pivotal set of relevant articles. Where multiple studies reported the same outcomes as others, only the central articles or studies were included. The issue however was not narrowing down an extensive body of literature on compensation or performance assessment models for Canadian academic physicians; rather, the challenge here was finding any articles that were at all relevant. Additionally, there is a considerable body of literature on faculty compensation, tenure, engagement and organizational commitment; however, these items were reviewed but excluded from this analysis given that very few academic physicians have tenure, are employees of a university, or receive compensation from a university. As articulated in Chapter 1, conventional analyses cannot apply to them.

Chapter Summary

Chapter 2 reviewed the literature on compensating and assessing academic physicians using the four core themes and sub-themes identified in Table 2.1. This literature review demonstrates a dearth of literature on: compensation models for academic physicians; the impact of AFPs or A-ARPs in ensuring access to sustainable health care for the population as well as the impact of incentives on the behaviour and productivity of academic physicians; and, the impact of local incentives or bonus-type systems in increasing academic performance or quality. Certainly, the literature review has explored various methods used to assess performance, productivity and quality locally, however, as both my own analysis and the systematic review completed by Akl et al confirmed, the evidence provided thus far is of low quality, tends to miss significant pieces of the overall picture, and is only rarely linked to theory.

While this chapter has highlighted potentially key theoretical contributions from behavioural economics, it is emphasized that there is very little research – either controlled...
experiments, field studies or theory-building – that explores the impact of assessment models, notions around academic productivity or research outputs, and the use of incentives or bonuses on the behaviour of academic physicians (or professionals more generally). This may be in part due to the idea that academic physicians have historically operated within an AHSC as an independent professional. Very few academic physicians, at very few Canadian universities, are funded through geographical full-time positions, awarded tenure, or are given significant bonuses or performance incentives. This also represents a significant weakness or gap in the literature.
Chapter Three: Research Design and Methodology

As noted in Chapter 1, the issue of academic productivity, performance and quality in relation to compensation within AHSCs is a growing area of interest for university management and policy for several inter-related reasons. As shown in Chapter 2, there is however a paucity of literature or research studies on this subject, particular within the Canadian context.

Research Problem

As expressed in Chapter 1, this dissertation pursues two inter-related lines of questioning. First, how do Canadian clinical academic departments compensate academic physicians, and how do specific compensation and assessment systems impact on the department in terms of overall productivity, recruitment and retention? Second, how do institutions, departments or academic leaders make choices around the allocation of scarce resources, and how is policy designed when it comes to academic physicians.

Research Design

To explore this research problem, a mixed methods, emergent, sequential research design was used. In this section, I highlight the benefits and limitations of this type of approach, and how the term “mixed methods” was used in this study.

Mixed methods approaches are utilized to provide a deeper understanding of a subject than either quantitative or qualitative methods alone would allow. Creswell suggests that mixed methods research is,

An approach to inquiry that combines or associates both qualitative and quantitative forms. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. Thus, it is more than simply collecting and analyzing both kinds of data it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either the qualitative or quantitative research. (Creswell, 2009: 5)
Yin notes, “Mixed methods research can permit investigators to address more complicated research questions and collect a richer and stronger array of evidence than can be accomplished by any single method alone” (Yin, 2009: 63). More recent methodological research suggests that mixed methods research is more than simply combining qualitative and quantitative approaches; authors such as Doyle, Brady and Byrne suggest that mixed methods research is an evolving field for which no one definition can consistently be applied (Doyle, Brady & Byrne, 2009: 176).

Following others, Doyle et al propose six benefits for using a mixed methods research model including triangulation, completeness, offsetting weaknesses and providing stronger inferences, answering different research questions, explanation of findings, and illustration of data (Ibid: 178). Mixed methods research is a particularly appropriate method given the complex, emergent and somewhat sensitive nature of the subject to be studied in this dissertation, the quantitative and qualitative nature of the research problem (i.e., the methods used to assess academic performance), the lack of an existing body of literature on this topic and the research paradigm which I have adopted. In this study, triangulation through the use of multiple research methods has helped to ensure the validity of the results.

While mixed methods research has many proponents, there are some that suggest that quantitative and qualitative methods are fundamentally incompatible because “they have different ontological and epistemological origins” (Ibid: 183). I adopted a pragmatic approach, which focuses on the actions, situations and consequences of inquiry, seeking to develop solutions to real-world problems (Creswell, 2009). Thus, the strengths of mixed methods should outweigh the limitations. Others suggest that the quantitative and qualitative components cannot successfully be undertaken by any one researcher; in this case, a team is needed (Johnson & Owuegbuzie, 2004). This study incorporates a sequential research design, and took a considerable amount of time to complete.
Finally, it would be erroneous to suggest that my own professional, social and economic location can be separated from the research methods that have been undertaken. I have been a Manager in the Faculty of Medicine, University of Toronto for fifteen years, and my interest in this subject stems from a compensation and academic assessment program for academic physicians which I helped to implement. Wherever possible, I have attempted to identify my own subjectivity and potential biases in order to engage in a responsible research practice as the study progresses.

Thus, for the purposes of this dissertation, I have adopted the following understanding of mixed methods research:

Mixed methods research is the type of research in which a researcher or teams of researchers combine elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purposes of breadth and depth of understanding and corroboration” (Johnson, 2007: 123)

Research Methods

The research methods incorporate two sequential phases and four sub-phases – each with its own distinct methodological features - as depicted in Figure 3.1:
Phase 1: National Survey

As a first step towards dissecting and explaining the research problem, a national, cross-sectional, anonymous, non-randomized, descriptive survey of academic leaders (chairs) of departments of Anesthesia, Medicine, Pediatrics and Surgery in sixteen Canadian medical schools was administered in late 2011 (n=64)\(^{28}\). These four departments were chosen because the departments tend to be large (the mean department size was 161), they include a broad sample of sub-specialty areas, therefore, they comprise a surrogate for the entire population. The objective of this survey was to build an initial repository of data on compensation and academic productivity-related practices for academic physicians within Canadian medical schools. The survey was designed to answer the question: What are the methods that you use to compensate academic physicians, measure and assess academic productivity, and recruit and retain academic physicians? Approval for the study was obtained from the Research Ethics Board of the University of Toronto (ethics protocol # 25870).

Survey Design

The survey was constructed as a self-reported, anonymous questionnaire with forty questions. Different question formats were used (open-ended, multiple choice and ordinal scales). Survey responses were anonymous in order to increase the response rate and accuracy of responses given the sensitive nature of the questions asked. The survey defined an “academic physician” as any clinician (MDs) with a full-time academic appointment in the respective university department. Researchers or educators in clinical departments who do not hold an MD degree were excluded. An internet-based commercial software program was used to operationalize the survey instrument (SurveyMonkey).

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\(^{28}\) The Northern Ontario School of Medicine, the seventeenth medical school in Canada, was excluded from the national survey. Details on the rationale underpinning this decision can be found in the section on “Sample” below.
Reliability and Validity

The survey was pilot tested with chairs, practice plan leaders, and human resources managers from three universities which represented different Canadian provinces and specialty departments (n=5). Yin defines construct validity as “identifying correct operational measures for the concepts being studied” (Yin, 2009: 40). Respondents to the pilots were asked to identify any issues with regards to content or construct validity, unclear or redundant questions, potentially “leading” questions, and ease of use of the survey tool. Based on verbal feedback given, only very minor changes were made. Overall, the pilot testing demonstrated good content validity (i.e., the right questions were asked), good construct validity (the flow of the survey and order of the questions worked well), and technical reliability of the survey instrument (SurveyMonkey).

Yin defines reliability as “demonstrating that the operations of a study – such as the data collection procedures – can be repeated, with the same results” (Ibid: 40). While there may be some minor variations in the responses achieved if the survey were to be repeated in the next few years due to changes in the leadership in the university departments studied or the practices used, the survey should yield the same results as the questions were specific, and were set within a specific timeframe (i.e., departmental data as of 2011).

Sample

A purposeful sample of 64 University chairs from these departments was chosen because these individuals were believed to possess strong knowledge of the types of compensation and academic assessment models that are used within both the academic and clinical realms. These 64 chairs in the study comprise 100% of all Canadian clinical academic departments of Anesthesia, Medicine, Pediatrics and Surgery as all Canadian universities with medical schools were included (see Figure 3.2), with the exception of the Northern Ontario School of Medicine (NOSM). Established in 2005, NOSM was excluded because it does not have traditional clinical academic departments
organized around medical specialties, but rather, utilizes a wide range of “preceptors” to implement its distributed model of education. Preceptors are paid stipends linked to clinical rotations undertaken by medical learners. The data produced by this sampling technique was not generalized to other clinical departments, but rather, was intended to be representative of the departments studied.

**Survey Procedure**

In 2011, specific respondents were identified via the websites for each university department. A cover letter which included the purpose of the survey, estimated length of time to complete the survey, categories of analysis (compensation, academic productivity, recruitment and retention techniques), and a link to the online instrument was sent to each potential respondent in a personalized email. Potential respondents were also assured that their responses would be anonymous. The survey was constructed to control for duplicate responses from the same respondent (internal analysis of log file/IP address). The internal consistency of the questions was enforced using a SurveyMonkey server-side technique (i.e., alerts were displayed if questions were completed incorrectly). Respondents were able to review and revise their answers through the use of a “back” button. The survey was distributed on three occasions (over the course of several months in 2011 and 2012) to increase the overall response rate and to ensure representation from all provinces, clinical specialties and departments of varying sizes. No payment or incentive to complete the survey was provided. An overall response rate of 61% was achieved.

---

**FIGURE 3.2: PHASE 1 CANADIAN MEDICAL SCHOOLS SURVEYED**

- Dalhousie University
- McGill University
- McMaster University
- Memorial University
- Queens University
- Université de Montreal
- Université de Sherbrooke
- Université Laval
- University of Alberta
- University of British Columbia
- University of Calgary
- University of Manitoba
- University of Ottawa
- University of Saskatchewan
- University of Toronto
- Western University
Survey Analysis

Responses to the questionnaire were downloaded for analysis into Excel. Numbers and percentages of survey responses were then recorded, and the data were examined for irregularities. Descriptive statistics were used to summarize the responses to questions (mean, median and mode). Responses to the open-ended questions were coded into themes. The frequency of these themes, and common patterns were recorded. The responses to the survey questions were then used to inform phase two of the research design, the case studies. The survey results have been reported on in Chapter 4.

Phase 2: Case Studies

The objective of the national survey was to generate an initial repository of data on compensation and academic productivity-related practices for Canadian academic physicians given the sparse body of literature on this subject. The results of the national survey were then used to design the second phase of research, the case studies. Ethics approval for this phase of research was also obtained through the University of Toronto Research Ethics Board (REB approval # 28936).

Site Selection

The universities included in the case study were selected on the basis of the uniqueness and differences of the compensation or academic productivity assessment models used, the availability of data, and the willingness to fully participate.

Three case studies were conducted across three institutions (sites): the University of Toronto, the University of Alberta and the University of Manitoba. For Toronto and Alberta, the Departments of Anesthesia, Pediatrics and Surgery were studied.

Of note, McGill University had initially expressed a strong interest in participating in the case studies. However, academic leaders at McGill subsequently expressed concern around the comparability of institutions included in the dissertation as McGill and Quebec do not have AFP-type
agreements. The McGill system would not have been of interest for comparability purposes, but rather, because the system used to fund teaching and research in Quebec is unique, has been in operation for only a few years, and because its impact on teaching effectiveness or research outputs has not been assessed by either the university or the government. In 2008, the province of Quebec implemented a new compensation program for academic physicians. Unlike the AFP in Ontario which operates in partnership between the university, hospitals, the Ontario Medical Association and physician-led practice plans, McGill has effectively been eliminated from the funding equation as the province has implemented a fee-for-service type billing arrangement between individual physicians and the provincially funded health care insurance system. Physicians are given codes through which they bill the province directly for time spent teaching, and research awards designed to offset lost clinical earnings can be accessed through a provincial granting body.

Academic leaders at McGill did however make mention of the innovative compensation and assessment model that was being used by the Department of Internal Medicine at the University of Manitoba. The academic leaders there subsequently agreed to participate as a third case study.

The University of Toronto

The University of Toronto (UofT) medical school is the largest in Canada and the third largest in North America, with 4,000 faculty members, 3,000 medical learners, and 28 full and partially affiliated teaching hospitals. It is a research intensive university which prides itself on the partnerships it has built with the affiliated hospitals and research institutes (and all of which are distinct corporate structures). The departments of Anesthesia, Pediatrics and Surgery are the largest in Canada, each comprising several hundred full and part-time clinical faculty members. Academic physicians at the UofT are governed by a policy on clinical faculty, but are not eligible for tenure, and are not categorized as university employees. As such, they are not entitled to compensation or
benefits from the university. For historical reasons, some departments provide stipends to some faculty, or even small amounts of payroll, with benefits (or without), through the university.

The University of Toronto was chosen partly as a convenience sample. I was aware that the data sets required exist, have existed since before 2006, and can be accessed mostly through publically available sources (e.g., websites). Nevertheless, these departments also have distinctive, locally developed, compensation, merit awards, or incentivization systems for academic physicians, and were chosen precisely because of the different systems that have been implemented. All four sub-phases of research depicted in Figure 3.1 were utilized for this case study.

As I report later, the Department of Anesthesia implemented a biennial "merit awards program" in 2009, discontinuing any historical payroll arrangements with all clinical faculty members. A competitive program, the focus is on developing individual academics through the provision of a fairly substantial stipend paid to the practice plan, designed to encourage research productivity by replacing lost clinical income (an individually focused program). In contrast, Pediatrics has been on a comprehensive AFP with the Government of Ontario since the mid-1990s. Pediatrics has developed a broad career development, compensation, bonus and assessment model which has been in place since the mid-1990s. Following a triennial peer assessment process, all full-time academic physicians in the plan receive a base salary plus an annual bonus for strong academic performance which comprises a significant proportion of gross income (a group level program). Surgery has implemented an “academic points system” which also recognizes academic performance, however, all clinical faculty receive a fairly small annual bonus (in comparison with gross income). As such, the “academic points system” also comprises a group-level system.

The Department of Surgery, together with the relevant practice plans, independently manages a benefits plan for clinical faculty members. The benefits are not provided through the university.
The University of Alberta

The University of Alberta is also a research intensive University with a burgeoning medical school. The medical school has 1,900 undergraduate and postgraduate medical learners, as well as 643 tenure-track faculty members and 1,688 “clinical academic colleagues”. It is one of only two medical schools in the province. The University of Alberta offers tenure to clinical faculty members under specific circumstances, a feature quite unique from many other Canadian medical schools.

In 2002, Alberta Health Services implemented an Academic Alternative Relationship Plan (A-ARP) for specific specialties. Operationalized through the universities, it is proposed that this plan is an alternative to clinical fee-for-service programs, and has “been successful in attracting and retaining needed specialists to the province; supporting innovative clinical care; and, enhancing the quality of Alberta’s medical education and research”.30 The A-ARP programs recognize contributions made by academic physicians along four pillars: clinical services and innovation; research; education; and, administration. The A-ARP is however limited to Pediatrics and Neurosurgery.

Preliminary research however indicated a dearth of data which supports the claim that the A-ARP “recognizes” research-related contributions through funding, given that the University of Alberta provides no direct funding for research deliverables or productivity. Rather, the university offers a few geographic full-time (GFT) positions in each department which provide tenure-like benefits to the incumbents. In addition, Alberta does not publish annual report data (e.g., publication, grants and invited lectures). Accordingly, the research model depicted in Figure 3.1 was not transferrable to the University of Alberta’s context as the data needed for the quantitative analyses or predictive analytics was not available. Thus, this case study comprises two sub-phases: document analysis and qualitative interviews of academic leaders.

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The University of Manitoba

Established in 1883, the College of Medicine at the University of Manitoba is the province’s only medical school. Recently, the Faculty of Health Sciences, comprising medicine, dentistry, nursing, pharmacy and schools of public health and rehabilitation, was established to provide a more interprofessional focus to the education programs that are delivered. The medical school currently has 1,550 undergraduate and postgraduate medical learners, as well as 600 full-time and 1,025 part-time faculty.

The university offers tenured appointments through geographic full-time funding (GFT) to a small proportion of academic physicians through their “professorial stream” of appointments, as well as salaried appointments. Academic physicians may be party to the University of Manitoba Faculty Association (UMFA) collective agreement if they are in GFT positions. However, the majority of academic appointments for MDs fall under the “instructor stream” (i.e., community-based, non-academic physicians)31.

In 2013, a new “Career Development and Performance Feedback” policy was implemented by the Medical College. For the purposes of this case study, I focused on the Department of Internal Medicine’s Research Performance Review policy dated June 2005 (the new policy was in fact based on this system)32. This internal peer review process is undertaken every three years for all full-time academic physicians in the department, and focuses on research activities. The results of the review are linked to the amount of protected time that is given for academic activities (in consultation with the Regional Health Authority), career development and mentorship programs, and remuneration (a

31 Details can be found on the College of Medicine’s website at http://umanitoba.ca/faculties/medicine/alumni/media/RevisedNIL_Salaried_Academic_Appointment_Guidelines_May_2012.pdf.
32 The new system (2013) provides specific, written guidelines for teaching, scholarly activity or scholarship (research), administration/service and clinical activities. An appeals process – in the event that both parties do not agree with the performance assessment provided – is under development for tenured faculty in particular. The new performance assessment model uses a “relative workload evaluation scale” that includes clinical and academic activities.
A good deal of quantitative data is available for this case study, and the model is unique to those implemented in other medical schools. As such, the University of Manitoba also comprises four sub-phases operationalized in a sequential model as per the University of Toronto case studies, and as depicted in Figure 3.1. The period 2006/07 to 2010/11 was also utilized.

**Phase 2, Sub-Phase 1: Document Analysis**

In the first sub-phase of phase two, a content analysis of documents was conducted to ground the study in the context surrounding the diverse types of compensation and assessment systems used by each university, department or provincial government. Documents included in this research sub-phase included terms of reference for internal compensation programs; policies or processes around assessments or compensation models; agreements with provincial governments related to AFPs or ARPs; merit, bonus or incentives systems; collective agreements; academic points systems; departmental or institutional annual reports; websites (universities, departments, human resources departments, hospitals, research institutes); faculty satisfaction surveys; peer-review committee meeting minutes and rankings; and, tenure or promotions requirements. For each document reviewed, the type of document, date, author, source, audience, and key information for the document was recorded in an Excel spreadsheet. Results from the document analysis were then used to plan the next three sub-phases of case study research.

**Phase 2, Sub-Phase 2: Bibliometric/Quantitative Analyses**

This sub-phase of research explored the research contributions of individual academic physicians over a five-year period between 2006/07 and 2010/11. Academic productivity was expressed using the following metrics:

\[
AP = AP_{\text{publications}} + AP_{\text{grants}} + AP_{\text{invited lectures}} + T_{\text{effectiveness}}
\]

\[
AP = AP_{\text{publications}} + AP_{\text{grants}} + AP_{\text{invited lectures}} \text{ (if no teaching scores)}
\]

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Sample Selection: Individual Academic Physicians

A sample of 40 academic physicians per department for the University of Toronto (120) plus 30 academic physicians for the University of Manitoba was constructed (n=150). The academic physicians are classified by their university position descriptions as Clinician Investigators or Clinician Scientists. A purposeful sample of academic physicians was chosen, representing different academic ranks (Assistant, Associate and Full Professors), as well as a mix of sub-specialty clinical fields with attention paid to gender and IMG/CMG status. This mix was created to examine patterns across academic ranks in terms of research outputs (volumes) and bibliometric indicators (outcomes), as well as differences amongst various sub-specialties. The method used to select individuals at each site varied depending on the type of compensation and assessment models used. Table 3.1 outlines the sampling technique for the three University of Toronto samples:

<table>
<thead>
<tr>
<th>Department</th>
<th>Compensation Program</th>
<th>Assessment Model</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia</td>
<td>Competitive, biennial merit awards</td>
<td>Peer review</td>
<td>Those who received a merit award (30), those who remained on payroll (3), and top 10% who did not receive a merit award (total sample = 40)</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>Base salary + bonus for high performance</td>
<td>Peer review (every three years)</td>
<td>Purposeful sample: 40 Clinician Investigators and/or Clinician Scientists, mix of academic rank, sub-specialties, gender</td>
</tr>
<tr>
<td>Surgery</td>
<td>Academic Points + small annual bonus based on outputs</td>
<td>Peer review (annual)</td>
<td>Purposeful sample: 40 Clinician Investigators and/or Clinician Scientists, mix of academic rank, sub-specialties, gender</td>
</tr>
</tbody>
</table>

The availability of data for each faculty member impacted the final sample selection (some changes were made due to a lack of data on specific metrics, for example, invited lectures or teaching scores). The sample size for Manitoba was smaller based on the overall size of the department, the total number of physicians who had a research commitment and data availability for the period 2006 to 2011. Manitoba does not collect teaching effectiveness scores or rankings.
Data Collection and Recording

Data were collected on a retrospective basis for a five-year period (July 1, 2006 to June 30, 2011); this allowed for bibliometric and quantitative analyses as well as pattern-match constructs (which graphically depict the academic productivity cycles of each academic physician, as well as departments, and clinical sub-specialties). A five-year period was chosen to measure the impact of compensation or bonus program in relation to research outputs over a sufficient interval.

The data collected for the bibliometric/quantitative analyses was the same for the Manitoba and Toronto case studies. For the most part, data were provided by the chair’s office, but was also sourced through departmental websites, annual reports, and in some cases, the curriculum vitae of faculty members. These data sets were then verified against records produced by bibliometric or library databases (e.g., Web of Science, PubMed) or the CVs. Academic physicians were not contacted directly, and all data sets were de-identified once the analyses were completed. Appendix 3.1 lists the data sets that were collected for each year, between July 1, 2006 to June 30, 2011.

The data collected was entered into Excel spreadsheets. The faculty members in each department were then ranked. The rankings for each type of metric were recorded using the following format:

<table>
<thead>
<tr>
<th>Rank: Gross Salary</th>
<th>Rank: Value of Bonus</th>
<th>Rank: Department Assessment</th>
<th>Rank: Citation Index</th>
<th>Rank: h-index</th>
<th>Rank: K-MAAP© Method</th>
<th>Rank: Teaching scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative</td>
<td>Quantitative</td>
<td>Peer-review method</td>
<td>Bibliometric method</td>
<td>Bibliometric method</td>
<td>Quantitative method</td>
<td>Quantitative/Qualitative method</td>
</tr>
</tbody>
</table>

Data Management

All data collected, including electronic files, survey results, paper files and recordings of interviews, were managed per Appendix 3.2: File Storage and Data Encryption Protocol.
Data Analysis

The K-MAAP® Typology

Various quantitative and bibliometric (citations-based) models have been used to assess the productivity and impact of scientists and academics, none of which are perfect. In assessing the outputs of the 150 academic physicians included in the sample though, I needed to find a method to assess productivity cycles (pattern outcomes matching), compare physicians within a given sample against one another (a ranking), look only at research outputs during a given period of time (2006 to 2011), and then, link the compensation model or bonus/incentive scheme to the rankings produced for the period studied. To put it simply, I needed to create my own quantitative and bibliometric technique to determine whether the peer review systems “got it right” in terms of the departmental rankings produced.

The K-MAAP® assigns points to each academic activity undertaken by each academic physician included in the study. Although peer-reviewed publications, peer-reviewed grants and invited lectures were reviewed here, the K-MAAP® can be tailored to examine other academic outputs or outcomes (e.g., graduate student supervision, copyrights, awards, etc.).

The K-MAAP® assigns points to each output, for each year between 2006/07 to 2010/11 (five years). The K-MAAP® comprises several steps, as follows:

Step 1: Data Preparation

Raw data on publications, grants and invited lectures were manually extracted from the department’s online annual reports or individual Curriculum Vitae. Detailed Excel spreadsheets were created. The publications for each academic physician included in the sample were then compared against those found in online bibliometric databases (e.g., Web of Science or PubMed), to enhance the reliability of the data. Gaps such as missing publications or the ordering of author names on the publication were manually corrected.
Step 2: Journal Impact Factors

An extensive listing of the journals published in was then compiled – journal names were cut from journal articles published, organized in an Excel spreadsheet, with duplicates removed. The journal impact factor ratings were obtained through the Journal Citation Indices on the Web of Knowledge. Each journal was then categorized as low, moderate, high, or super high impact using the following protocol:

<table>
<thead>
<tr>
<th>K-MAAP© Category</th>
<th>5-Year Impact Factor Rating</th>
<th>Super High</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Factor Rating</td>
<td>20+</td>
<td>10.01-20.0</td>
<td>5.01-10.0</td>
<td>0.01-5.0</td>
<td>Assigned to “low” category</td>
<td></td>
</tr>
<tr>
<td>Examples</td>
<td>Nature, JAMA</td>
<td>Lancet Oncology</td>
<td>Critical Care Medicine</td>
<td>Clinical Pediatrics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Total Journals</td>
<td>1.8%</td>
<td>3.4%</td>
<td>12.4%</td>
<td>66.2%</td>
<td>16.2%</td>
<td></td>
</tr>
</tbody>
</table>

Journal impact factors could not be found for some journals on the Web of Knowledge. When this occurred, I searched Google Scholar as well as the journal’s own website. If the journal’s impact factor continued to be “unknown’, the journal was categorized as low impact per my protocol. Table 3.4 demonstrates the distribution of journals impact factors and K-MAAP© categories across the four clinical departments/medical specialties:

<table>
<thead>
<tr>
<th>Department</th>
<th>Super High</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%Total</td>
<td>#</td>
<td>%Total</td>
<td>#</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>1</td>
<td>0.7%</td>
<td>8</td>
<td>5.7%</td>
<td>21</td>
</tr>
<tr>
<td>Medicine</td>
<td>5</td>
<td>2.4%</td>
<td>9</td>
<td>4.3%</td>
<td>153</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>5</td>
<td>2.4%</td>
<td>9</td>
<td>4.4%</td>
<td>34</td>
</tr>
<tr>
<td>Surgery</td>
<td>5</td>
<td>2.3%</td>
<td>10</td>
<td>4.5%</td>
<td>21</td>
</tr>
<tr>
<td>TOTALS:</td>
<td>16</td>
<td>36%</td>
<td>229</td>
<td>400%</td>
<td>97</td>
</tr>
</tbody>
</table>

33 Journal Citation Indices: Web of Knowledge. See http://admin-apps.webofknowledge.com.myaccess.library.utoronto.ca/JCR/JCR?PointOfEntry=Home&SID=2BKAa1OdloiffaEn7A/
34 The journal may not be peer-reviewed, though they had been recorded as such in the documentation provided to me. Alternatively, the journal may be relatively new or somewhat obscure.
This process was undertaken for a total of 778 journals across the four medical specialties. Once duplicates were removed across the specialties, journal impact factors were recorded for hundreds of journals.

**Step 3: K-MAAP® Points**

K-MAAP® “points” were assigned to each activity. The number of outputs were also counted but do not factor into the K-MAAP® typology. Publications, grants and invited lectures were weighted equally under the K-MAAP® but points were assigned to each output (each publication, lecture or grant) on the basis of both effort (e.g., author placement on the paper) as well as the impact of the journal based on the ISI journal impact factor rating35. In this way, an individual who is first author on a publication in a high impact factor rated journal will garner more points than an individual who is a collaborator on a paper in a low impact-factor journal. Likewise, an invited lecture at an international conference will garner more K-MAAP® points than a faculty member presenting at grand rounds at his/her own institution. Invited lectures were included as they are a testament to both the research reputation of an individual, as well as their teaching abilities. As such, the K-MAAP® typology definition of academic productivity includes an assessment of teaching as well as quality and effort. Though not the purpose of this case study, further details on the merit of points-type systems to evaluate faculty have documented by authors such as Bland et al (2002) and Fyffe, Cha and Srigley (2002). Appendix 3.4 outlines the K-MAAP® methodology.

Once the points for each activity were assigned, a composite score per activity, per individual, per year was derived. A total score for all activities over the course of the five years was then used to derive each individual’s departmental ranking on the basis of K-MAAP® points (K-MAAP®). Thus, the K-MAAP® metric can be expressed as:

\[
\text{K-MAAP Points (K-MAAP)} = \text{Publications (Pub) + Grants (GR) + Invited Lectures (IL)}
\]

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35 The journal impact factor ratings were obtained from the online Thomson Reuters tool, Web of Knowledge, version 5.5.
Bibliometric and Quantitative Data Analysis

Once rankings were produced on the basis of the K-MAAP© points, each individual’s overall departmental ranking was compared with the peer-reviewed rankings for departmental reviews which took place between 2006/07 and 2010/11, as well as the individual bibliometric rankings based on the h-index, citation index, and teaching effectiveness scores. Appendix 3.3 provides a snapshot of some of the measures included in the quantitative analysis performed.

On completion of the rankings, statistical analyses were performed to determine if there are any correlations between the rankings. The correlation coefficient is a basic statistical measure that gauges the relatedness of two sets of numbers. This dissertation employed the most common type, called the Pearson correlation coefficient, simply called "the correlation coefficient". Correlation coefficients were determined to measure the strength of relationship between ranks. Once the correlation coefficient was computed, a significance test was performed to determine the probability that the correlation was a real one and not a chance occurrence. A t-test was done to see whether these relationships were statistically significant. A two-tailed test was employed -- a two-tailed test is a statistical measurement indicating whether the data shows strong evidence that the corresponding correlation is different from zero. It should be noted that sample size is a component that will influence the conclusions one might reach from any statistical test in a research project. In these cases, the sample size is fairly small, and more studies should be considered to make any attempt to generalize the results. It is understood that correlation cannot be used to infer a causal relationship between the variables -- establishing a correlation between two variables is not a sufficient condition to establish a causal relationship.

Features and Benefits of the K-MAAP©

K-MAAP© points are used to derive patterns of productivity -- and to determine impact -- on the basis of peer-reviewed publications, peer-reviewed grants and invited lectures. Achievements
over a specific period of time can be assessed; and academic outputs other than publications are used. This allows for a fairer quantitative assessment of productivity for new vs. more seasoned Clinician Scientists or Clinician Investigators, but also provides academic leaders with a tool to discuss productivity and performance.

**K-MAAP© Predictive**

Mining historical data can provide a reliable basis for accurate forecasting (Finlay, 2014). Predictive analytics is a branch of data mining that helps forecast probabilities and trends. By applying data mining algorithms to K-MAAP© data, you can forecast trends and identify patterns. SQL Server predictive analysis software was employed to build a time series analytical model for an individual’s productivity. Though not the focus of this dissertation, I used the Curriculum Vitae of a small group of individuals to analyze their research outputs for the first five years after their academic appointment using the K-MAAP© assessment method. The K-MAAP© Predictive tool was then run to attempt to predict future productivity patterns or outputs.

**K-MAAP© Research Investment and Return-on-Cost**

For the Manitoba case study (Chapter 6), the K-MAAP© methodology was used to derive the return-on-cost (ROC) per K-MAAP© point. This department provided the annual research salary and percentage full time equivalent (FTE) of protected academic time (total days per week) that had been allocated to each academic physician in the sample, for the period 2006/07 to 2010/11 (n=30). For that case study, protected academic time was defined as release time from all clinical activities to dedicate to research endeavors (non-teaching). Both the research salary and protected academic time are inputs. Here, research productivity and impact were determined using the K-MAAP© assessment methodology (outputs). The Contribution-Deployment-Results Model was developed (see Figure 6.4) to demonstrate the process of inputs-to-outputs. A simple equation was then used to determine the research investment, denoted as the return on cost (ROC), or cost per K-MAAP©
point. The return on cost is derived from the gross annual research salary only. The equation is as follows:

\[
\text{RETURN ON COST (ROC)} = \frac{\text{GROSS ANNUAL RESEARCH SALARY}}{\text{TOTAL ANNUAL K-MAAP© POINTS}}
\]

**K-MAAP© Efficiency**

In Chapter 6, the utility of the K-MAAP© methodology was taken even further; K-MAAP© points were used as a basis to derive academic productivity efficiency ratings.

In economics, “efficiency” refers to a condition whereby every resource is optimally allocated to each person, thus minimizing waste and inefficiency. In the case of academic productivity, efficiency refers to how much of a particular output (as represented by K-MAAP© points) can be obtained from a given input (academic resources provided to individual academics including research salary and protected academic time) with as little wastage as possible. Efficiency is a measurable concept, quantitatively determined by the ratio of useful output to total input. Given that we know the inputs which can be quantified (research salary, protected academic time), and we have a quantitative indicator of productivity (K-MAAP© points), efficiency was calculated for the Internal Medicine sample using the following equation:

\[
\text{EFFICIENCY} = \frac{\text{OUTCOME (PRODUCTIVITY AS REPRESENTED BY K-MAAP© POINTS)}}{\text{INPUT (ACADEMIC RESOURCES TO INDIVIDUALS - RESEARCH SALARY, TIME)}} \times 100\%
\]

**K-MAAP© Efficiency Scores and Research Productivity-Replacement Value**

This method was also developed based on the data sets available for the Internal Medicine sample in Chapter 6. As noted, academic leaders are challenged to find ways to efficiently and effectively allocate academic time given the resources that are available. In baseball, the “Wins Above Replacement (WAR)” statistic is defined as,

The idea behind the WAR framework is that we want to know how much better a player is than a player that would typically be available to replace that player. We start by comparing the player to average in a variety of venues, then compare our theoretical replacement
player to the average player and add the two results together. There is no one way to
determine WAR. There are hundreds of steps to make this calculation, and dozens of places
where reasonable people can disagree on the best way to implement a particular part of the
framework. But WAR is necessarily an approximation and will never be as precise or
accurate as one would like.\textsuperscript{36}

One metric alone cannot evaluate all factors which contribute to academic performance, or
determine the optimal allocation of resources and time. But when combined with the K-MAAP©
efficiency rating as well as K-MAAP© assessments, and using the amount of protected academic
time and the research salary that is provided, a WAR-type calculation may help to estimate the
potential or estimated contribution of each individual academic physician to the academic
productivity of the department as a whole. In turn, and based on at least a few years of data, this
could help determine whether resources should be reallocated. For our purposes, this statistic has
been called the “Research Productivity-Replacement Value” (RP-RV).

\textbf{Phase Two, Sub-Phase 3: Pattern Matches}

The points per year were also used to devise a pattern-matching construct, on both an
individual and a departmental level. Outcomes-based pattern matching (as a research method and
theory) was used to test and illustrate the research question (\textit{i.e.}, what was the impact of the merit
awards system on individual and group-level academic productivity?). Patterns are graphically
depicted using a variety of charts, to show academic productivity trends and patterns.

\textbf{Methodological Assumptions and Limitations: Bibliometrics}

The citation index counts the number of publications over a two-year period. Bornmann
notes that two theories around citation practices have emerged; the normative theory (based on
Merton’s sociological theory of science), states that, “scientists give credit to colleagues whose work
they use by citing that work... the reference serves both instrumental and symbolic functions in the
transmission and enlargement of knowledge” (Bornmann, 2011: 153). In contrast, the social

\textsuperscript{36} From Baseball-Reference.com: See http://www.baseball-reference.com/about/war_explained.shtml
constructive view on citing “casts doubt on the assumptions of normative theory and questions the validity of evaluative citation analysis” and, “scientific knowledge is socially constructed through the manipulation of political and financial resources, and the use of rhetorical devices” (Ibid: 153). Webber noted that the number of citations may be negatively impacted if an author changes their name or institutional affiliation; citation practices vary from discipline to discipline; and, different disciplines may have varying practices around authorship and the ordering of names on publications (Webber, 2011). Bornmann indicates that the more frequently a publication is cited, the more frequently it will be cited in future (Bornmann, 2011: 153). Sandstrom et al (2005) also demonstrate that citations are influenced by social networks, and authors tend to cite works of those they know personally. Finally, the citation index does not measure quality.

The h-index (Hirsch Index) is a bibliometric method which reflects the number of publications and citations per publication for individual researchers, or groups of researchers. However, only the most highly cited publications contribute to the h-index, which is comprised of a two-digit number\(^{37}\). A high h-index requires continued production of well-cited papers. However, the h-index does not account for the number of authors on a paper; quality is measured only through the number of citations. Additionally, the total numbers of publications are counted and therefore, more junior investigators will likely have a low rating. For the purposes of this study, the h-index resulted in several tied rankings amongst investigators as well; it would be a difficult measure to use to allocate scarce financial resources amongst a pool of fairly equal investigators. The h-index and citation index were included in this study as the dean of Medicine, University of Toronto indicated that these ranking systems will be used to measure faculty performance as part of the faculty’s 2011-2016 strategic plan.

\(^{37}\) For the purposes of this dissertation, the automatic calculator available through the ISI was used; conferences are not used in this calculation.
Quoting Langfeldt 2006, Bornmann states, “By defining losers and winners in the competition for positions, grants, publications of results, and all kinds of awards, peer review is a central social control institution in the research community” (Bornmann, 2011: 145). The peer review processes reflected in this dissertation contain a predictive function (future productivity and quality of the academic physician in question) as well as an evaluation of an individual’s outputs, impact, and quality as demonstrated by a Curriculum Vitae. Authors such as Bacchetti have however identified limitations in the peer review process including overvaluation of criticism for its own sake, inappropriate understanding of the material presented (due to disciplinary differences), time pressures, lack of rewards for good peer-reviewing, and reviewer biases (Bacchetti, 2002). Authors such as van Raan have suggested that bibliometric methods could be used to assist with peer review in research evaluation procedures (van Raan, 1996).

Reliability and Validity

For the bibliometric/quantitative analyses, the reliability and validity of data was ensured through the use of multiple data collection point and methods, as well as the cross-checking and comparison of data across several different databases and bibliometric indices. For academic physicians with common names, additional parameters were used to extract the bibliometric data, such as the location of practice, clinical sub-specialty, and author name variants (e.g., if it was possible that the academic physician had published under more than one name).

Phase 2, Sub-Phase 4: Interviews of Academic Leaders

In sub-phase four of the case studies, department chairs or comparable academic leaders (e.g., practice plan leaders, Deans or Provosts) were interviewed using a semi-structured format. The qualitative interviews were designed to elicit additional data in follow-up to the phase one national survey, the phase two document analysis, and the phase two bibliometric and quantitative analyses of academic productivity. The interviews explored these findings, confirmed and expanded
understandings about the compensation and assessment systems that are used, the rationale which underpins their use, and how choices are made in allocating resources to support the research mission of each unit.

**Interview Sample**

The chairs presented a rich and credible source of data for this study. As insiders, they possess knowledge with regards to the compensation and assessment systems that are used, and in many cases, helped design the systems used. Comparable academic leaders (e.g., deans, provosts, practice plan leaders) were included if the compensation or assessment model used warranted their inclusion.

The method used to recruit academic leaders for this study varied. Some chairs had indicated their willingness to participate in an interview during the phase 1 national survey. In other cases, individuals were located through departmental websites and then contacted directly via email to request their participation. Details on the objectives of the study, as well as the informed consent form and the interview guide, were sent in the initial email. Informed consent was obtained prior to the interview using the attached form (see Appendix 3.6: Informed Consent).

Interview participants received no payment for their contributions. Given the income differential between myself and the participants, suggestion of a payment would have created an unnecessary awkwardness between the interviewer and the interviewee.

Some of the interview participants were known to me prior to the interviews, through my role at the University of Toronto. No significant power relationship existed between the interviewer and interviewee. Certainly, if power came into play, it would be in favor of the interviewees.

**Interview Methods**

Semi-structured, confidential interviews of academic leaders were conducted. This method was chosen to allow for the interviews to take place in an informal, conversational tone. The
interviews took place at the university in question with the exception of one individual with the University of Alberta (this interview took place via teleconference). Appendix 3.6 contains the interview guide, however, the follow-up questions and probes varied based on the responses, as well as the compensation and assessment model used by the department in question. Care was taken not to construct artificial categories for analysis through the use of overly specific or leading questions.

Each interview took roughly one hour to complete. With the consent of each participant, the interviews were recorded, and a semi-verbatim transcript was produced for each interview (see section on “Interview Analysis” below for more details on the transcription methodology). Notes were also taken, and include details on the interviewer-interviewee communications that took place (e.g., silences, pauses, laughter, frustration) which may have influenced the underlying meaning of the text that was produced.

Participants were assured that their privacy would be protected through confidentiality. To maintain confidentiality, all participants were given a case log number, and corresponding documents were numbered accordingly, along with any notes taken and the audio tape from the interview. When the participant named specific institutions or persons in the interview, these were given a fictitious name or title in the final analysis of the data where warranted. Additionally, the interview results are reported in a separate chapter to help preserve anonymity.

**Interview Analysis**

Grounded theory – an iterative, inductive, comparative method – was used to collect and analyze the data. Theory was developed based on these data.

Bucholtz argues that “Transcription involves both interpretive decisions (What is transcribed?) and representational decisions (How is it transcribed?)” and,
Transcription involves both decisions about content (what does the transcriber hear on the recording and include on the transcript?) and, decisions about form (how does the transcriber write down what she or he hears?) (Bucholtz, 1999: 1441)

Following on Bucholtz, I paid careful attention to these issues by transcribing the interviews myself using a semi-verbatim transcription methodology. A semi-verbatim transcription process records phrasing and sentence structure verbatim, but does not record “extraneous utterances and words that appear to serve no meaningful purpose” (Tilley, 32003: 760). I decided to transcribe the interviews myself because,

It is not just the transcription product – those verbatim words written down – that is important; it is the process that is valuable. Analysis takes place and understandings are derived through the process of constructing a transcript by listening and re-listening, viewing and re-viewing…. Transcription facilitates the close attention and the interpretive thinking that is needed to make sense of the data. (Lapadat and Lindsay, 1999: 82).

In addition, I was careful to acknowledge my own location in the interview and transcription process for as Bucholtz notes,

It is, moreover, undesirable to purge all traces of the transcriber from the transcript. We are not machines, but interpreters of texts and our transcripts must necessarily select out the details most important for our analysis. Our goal should not be neutrality but responsibility. Ultimately, what is needed is a reflexive discourse analysis in which the researcher strives not for unattainable self-effacement, but for vigilant self-awareness. (Bucholtz, 1999: 1461)

Finally, the transcripts were checked with the interviewees where needed to clarify that my interpretations of our discourse were what the interviewee intended to communicate.

The interview transcripts (the “text”) that were produced were then coded to identify recurring patterns and categories of analysis. Meaning was generated through these transcripts (texts). The texts were analyzed for both manifest (the visible, obvious themes and patterns that emerge from the text) and latent content (the hidden, emerging themes embedded within the text).

**Methodological Assumptions and Limitations: Interviews**

Given my position at the University of Toronto, I needed to take extra care not to impose any of my own assumptions, experience, or biases regarding compensation or assessment models.
for academic physicians into the interviews, the transcription or the final analysis. Morgan suggests that a pragmatic paradigm requires that the researcher rely on abductive reasoning (moving back and forth from induction to deduction), an intersubjective approach (with an emphasis on the process of communication and the development of shared meanings), and the transferability of knowledge. The latter refers to research results that are neither “so unique that they have no implications whatsoever for other actors in other settings or so generalized that they apply in every possible historical and cultural setting” (Morgan 2007: 72). In addition, I needed to establish a relationship of trust and rapport with the interviewees, especially given my role at the university, to mitigate any perceived conflicts or concerns around confidentiality which may have impacted on the results.

Chapter Summary

This chapter described the emergent, mixed methods, multi-phase research methodology to be used in this dissertation. The chapter also explained the methodological details, sampling technique, instrument design, and data collection, preparation and analysis for the national survey and five case studies. The statistical procedures used to analyze the data were also outlined. Finally, in response to concerns around the validity, reliability and applicability of bibliometric tools for the purposes of these case studies in particular, a new bibliometric method, the K-MAAP©, was developed and described. The statistical models which underpin the predictive component of the K-MAAP© were also explained.
Chapter Four: National Survey

Chapter 4 reports on phase one of the research protocol, the national survey.

Findings

The survey was piloted with chairs, practice plan leaders, and human resources managers from three universities which represented different Canadian provinces and specialty departments (n=5). The pilot demonstrated good content validity and technical reliability of the survey instrument, and only very minor modifications were made to the questions asked.

The national survey achieved an overall response rate of 61% (39 chairs participated in the survey). Respondents represented all medical specialties and provinces in Canada; twelve respondents were in Anesthesia, ten were in Surgery, nine were in Medicine, and eight were in Pediatrics. Forty-one percent of respondents volunteered to participate in a phase two, in-depth interviews on compensation models and academic productivity. This was perceived to demonstrate an interest in the subject matter.

The survey asked for details on the size of each department; respondents were asked to identify the total number of full-time academic physicians within each chair’s department. Because the definition of “full time” varies by institution, respondents were asked to apply their institution’s definition of full-time in answering the survey questions. The covering note also emphasized that non-MD faculty members were excluded. Accordingly, the mean (average) department size was 166 full-time clinical faculty members. Table 4.1 provides descriptive statistics on the distribution of respondents by department size:
TABLE 4.1: SURVEY RESPONDENTS AND NUMBER OF ACADEMIC PHYSICIANS PER DEPARTMENT

<table>
<thead>
<tr>
<th></th>
<th>1 – 50</th>
<th>51 – 100</th>
<th>100 - 250</th>
<th>251 – 400</th>
<th>400+</th>
<th>No response</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Respondents</td>
<td>5</td>
<td>8</td>
<td>17</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>37</td>
</tr>
<tr>
<td>% of Respondents</td>
<td>13%</td>
<td>21%</td>
<td>44%</td>
<td>13%</td>
<td>5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Mid-point (x)</td>
<td>26</td>
<td>75.5</td>
<td>175</td>
<td>325.5</td>
<td>400</td>
<td></td>
<td>1002</td>
</tr>
<tr>
<td>Frequency x Mid-point</td>
<td>130</td>
<td>604</td>
<td>2975</td>
<td>1627.5</td>
<td>800</td>
<td></td>
<td>6,136</td>
</tr>
<tr>
<td>MEAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>166</td>
</tr>
</tbody>
</table>

Compensation Models for Academic Physicians

There is a large variation in the compensation practices that are used across Canada to remunerate academic physicians, with further variances in specific medical schools or academic departments.

Thirty-one percent of survey respondents indicated that none of the faculty members in their department are members of an AFP (12 departments); 15.5% of respondents indicated that a minority of their academic physicians (less than 20%) are members of an AFP, APP or ARP; and, 35% (14 departments) indicated that 80% or more of their faculty are members of an AFP. With respect to the latter group, the format of the AFP can vary considerably, from those faculty members who are on a full AFP (clinical and academic activities are included), to those who are funded only partially by an AFP (i.e., a blended model which combines an AFP with fee-for-service activities). In Ontario, 80% of respondents indicated that their academic physicians are on some form of an AFP, while 100% of respondents from Alberta noted that 80% or more of their faculty are on an ARP.

Survey respondents estimated that most academic physicians’ gross income continues to be derived through clinical earnings with some variations amongst clinical specialties. In Anesthesia, an average of 74% of income is derived through clinical activities; 80% in Surgery; 69% in Pediatrics; and, 62% in Medicine. On average, 84% of departments provide some form of university-derived financial compensation (bonus, incentive, salary increase) to academic physicians (92% in Anesthesia, 89% in Medicine, 75% in Pediatrics and 80% in Surgery). Of particular interest, 18% (11
departments) reported that they have implemented cuts to university compensation based on an internal assessment of academic productivity. This is an indication of compensation linked to academic activities, however, the impact on gross income varies (38% of income for Medicine respondents, 20% for Surgery respondents).

Survey respondents were also asked about clinical billings for practice plans or clinical earnings. Overall, 38.5% (15 departments) are exclusively on a fee-for-service plan; 10.3% (4 departments) are exclusively on an AFP, ARP or APP; and 41% (16 departments) are on a mix of fee-for-service and an AFP. One department (2.6%) responded that they are on salary arrangements, and three respondents did not answer the question (7.7%). Table 4.2 depicts the distribution across the different clinical specialties:

<table>
<thead>
<tr>
<th>TABLE 4.2: CLINICAL BILLINGS METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation Methodology</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td><strong>FFS</strong></td>
</tr>
<tr>
<td><strong>AFP/APP/ARP</strong></td>
</tr>
<tr>
<td><strong>Mix FFS/AFP</strong></td>
</tr>
<tr>
<td><strong>Other</strong></td>
</tr>
<tr>
<td><strong>No response</strong></td>
</tr>
</tbody>
</table>

AFPs or fee-for-service (FFS) are not the only compensation models that are used in academic medicine. The survey asked chairs about their familiarity with various compensation methodologies versus their actual use of that methodology (respondents were asked to check all that apply):

<table>
<thead>
<tr>
<th>TABLE 4.3: ACADEMIC CHAIRS FAMILIARITY WITH COMPENSATION METHODS VS. ACTUAL USE OF THAT METHOD:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation Methodology</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>University salary only</td>
</tr>
<tr>
<td>University stipend only (no benefits)</td>
</tr>
<tr>
<td>AFP, APP or ARP</td>
</tr>
<tr>
<td>Pay based on Relative Value Units (clinical + academic work)</td>
</tr>
<tr>
<td>University pay + bonus (supplement, incentive)</td>
</tr>
</tbody>
</table>
Respondents indicated that “other” compensation methodologies include fee-for-service, hourly teaching supplements, and in Quebec, protected time for research activities paid for by the government. It must however be noted that with the exception of Quebec, where the FMSQ has negotiated a billing protocol for teaching activities with the Quebec Ministry of Health and Social Services, fee-for-service is usually focused on the clinical – not the academic – realm.

The responses to this survey indicate that non-clinical, academic time is funded using a variety of different sources (note: respondents were asked to check all sources that may apply):

<table>
<thead>
<tr>
<th>Sources</th>
<th>Overall</th>
<th>Anesthesia</th>
<th>Medicine</th>
<th>Pediatrics</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Budgets (pay, bonuses, stipends)</td>
<td>74% (29)</td>
<td>92% (11)</td>
<td>78% (7)</td>
<td>38% (3)</td>
<td>80% (8)</td>
</tr>
<tr>
<td>Practice Plan earnings</td>
<td>33% (13)</td>
<td>42% (5)</td>
<td>56% (5)</td>
<td>13% (1)</td>
<td>20% (2)</td>
</tr>
<tr>
<td>Internal grants or awards (hospital)</td>
<td>23% (9)</td>
<td>42% (5)</td>
<td>11% (1)</td>
<td>0%</td>
<td>30% (3)</td>
</tr>
<tr>
<td>Internal grants or awards (university)</td>
<td>28% (11)</td>
<td>42% (5)</td>
<td>11% (1)</td>
<td>0%</td>
<td>50% (5)</td>
</tr>
<tr>
<td>External grants (salary awards)</td>
<td>51% (20)</td>
<td>50% (6)</td>
<td>56% (5)</td>
<td>50% (4)</td>
<td>50% (5)</td>
</tr>
<tr>
<td>AFP, APP or ARP (full or partial)</td>
<td>59% (23)</td>
<td>67% (8)</td>
<td>44% (4)</td>
<td>63% (5)</td>
<td>60% (6)</td>
</tr>
<tr>
<td>Academic time is funded by other sources</td>
<td>15% (6)</td>
<td>25% (3)</td>
<td>0%</td>
<td>0%</td>
<td>30% (3)</td>
</tr>
<tr>
<td>No response</td>
<td>5% (2)</td>
<td>0%</td>
<td>05</td>
<td>13% (1)</td>
<td>10% (1)</td>
</tr>
</tbody>
</table>

Moreover, 54% of respondents (21 departments) indicated that there are additional sources of income for their academic physicians including endowed chairs, stipends for administrative activities, locums, and consulting fees. 44% (17 departments) indicated there are no other sources (3% or one respondent did not answer).

Sixty-nine percent of respondents (27 departments) indicated that the goal of their compensation program is to augment teaching or research activities. Two respondents (6%
indicated the goal is “to increase an individual’s income” while five respondents (13%) stated that the goal is to ensure protected academic time, away from clinical activities.

**Tenure and Academic Rank**

The model that universities use to engage and compensate academic physicians, and the relationship of these models to tenure and academic rank, varies by institution and province.

Overall, only 28% of respondents (11) indicated that tenure or equivalent is available for academic physicians, 20% indicated tenure is not available, and 44% indicated that tenure is sometimes available (three respondents or 8% did not respond). For those that do provide tenure, tenure is linked to pay for only 15% of survey respondents (6 departments), which suggests that tenure is largely an independent factor.

Just over 53% of respondents (21 departments) reported that academic rank is linked to compensation; this was not a surprising finding, but bears reporting nonetheless. However, 7 departments (18%) do not link compensation to academic rank and 6 departments (15.4%) sometimes link rank to compensation. One department (2%) noted that their university provides no compensation to their clinical faculty and 10% (4 respondents) did not answer the question. Interestingly though, not all departments who link academic rank to compensation do this for all of their academic physicians; 20.5% (8 departments) link rank to compensation for fewer than 10% of their academic physicians (likely as a result of tenure) while 28.2% (11 departments) link rank and pay together for over 75% of their academic physicians.

**The Academic Chair: Influence on Compensation Models**

Who decides how the university components of compensation for academic physicians are disbursed – or the methodology used to disburse them – may be a significant factor in determining the composition and implementation of compensation programs. Nineteen departments (49%) indicated that the chair decides how university funds are disbursed to compensate academic
physicians. However, only 17% of respondents (6 departments) indicated that the chair always makes this decision on his/her own authority while 31% of respondents (11 departments) indicated that they rarely have any influence (in less than 30% of cases). 11% of chairs (4 departments) indicted that they can never influence compensation decisions. For those who noted that they have no influence or authority to make decisions, respondents indicated that decisions are made by: a peer review committees (1); an Executive Committee (1); the head of the practice plan (1); or the University Dean (1).

**Academic Productivity**

As noted above, the terms of most AFPs or similar arrangements include accountability requirements or performance-based metrics. Eighty-five percent (33 respondents) indicated that regular, formal reviews of academic performance (teaching and research) are performed; 8% (three respondents) reported that reviews are not done; and three participants did not respond (8%). 36% of respondents (14) have tracked performance for 1-5 years; 18% (7) for 6-10 years; and 33% (13 departments) for more than eleven years. Three departments reported that performance is not tracked (8%) and three departments did not respond (8%).

Eighty percent of departments (31) noted that they also have metrics or systems to measure academic performance (teaching and research). 15% (6 respondents) noted that they do not have metrics, while 5% did not respond (2). A variety of methods are used with the most common method being annual activity reports (59% or 23 departments). Table 4.5 summarizes these methods (note: respondents were asked to check all methods that may apply):
Responses in the “other” category included “informal measures of grant success and publication record” and internally developed career and compensation programs with distinct metrics focused on each individual’s job stream (e.g., teaching, education or administration). Two departments (5%) noted that they measure teaching impact only using an ordinal scale. A fairly high percentage of respondents (28%) skipped the question or did not respond. This may indicate that measurements of academic performance are not being done, or that the question was poorly understood, but further study is needed.

Academic points-type systems are also used in departments of Anesthesia (42%), Surgery (40%), Medicine (33%) and Pediatrics (25%) respectively. Eighty percent of respondents noted that their “metrics” measure both teaching and research performance (31 departments); one department indicated that their metrics focus on teaching (3%), three respondents (8%) noted that they do not measure performance, and 10% (4) did not respond.

Sixty-two percent of chairs (24) reported that they have rewarded above average levels of academic performance. A variety of approaches are used depending on the circumstances, with the most common comprising an increase to University pay (54% or 21 departments). Forty-nine percent % of departments (19) indicated that they offer a merit award (no pay attached) while 26% (10) offer a one-time-only bonus. 18% of departments (7) also offer additional time for academic activities, with no pay attached.
Respondents were asked who provided the impetus to measure academic performance amongst their academic physicians. Fifty-six percent reported that their University was the driver, while 39% noted that their “own department” initiated the program. The question also provided “faculty members” as an option, and 13% noted that faculty provided the impetus to measure academic performance.

**Familiarity with Bibliometrics**

Respondents were asked about their familiarity with “various measures or indices of academic productivity”, and were asked to indicate all answers that may apply. Options included the h-index, citation index, Thomson Reuters web of knowledge, MESUR, or other. Twenty-one percent of respondents reported that they were not familiar with any of these indices. The majority of respondents were however familiar with the citation index (67% or 26 respondents) with 39% (15 respondents) indicating familiarity with the h-index.

**Participation and Perceptions**

Respondents were asked about the percentage of faculty members who submit accurate information to the department’s academic productivity data collection process. Table 4.6 summarizes these results:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Overall</th>
<th>Anesthesia</th>
<th>Medicine</th>
<th>Pediatrics</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>95 – 100%</td>
<td>39% (15)</td>
<td>42% (5)</td>
<td>44% (4)</td>
<td>38% (3)</td>
<td>30% (3)</td>
</tr>
<tr>
<td>80 – 95%</td>
<td>18% (7)</td>
<td>0%</td>
<td>11% (1)</td>
<td>38% (3)</td>
<td>30% (3)</td>
</tr>
<tr>
<td>60 – 80%</td>
<td>23% (9)</td>
<td>33% (4)</td>
<td>44% (4)</td>
<td>0%</td>
<td>10% (1)</td>
</tr>
<tr>
<td>40 – 60%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Less than 40%</td>
<td>13% (5)</td>
<td>17% (2)</td>
<td>0%</td>
<td>13% (1)</td>
<td>20% (2)</td>
</tr>
<tr>
<td>No Response</td>
<td>8% (3)</td>
<td>8% (1)</td>
<td>0%</td>
<td>13% (1)</td>
<td>10% (1)</td>
</tr>
<tr>
<td><strong>MEAN</strong></td>
<td>78.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chairs were also asked how they believe that the majority of their faculty members view the system used to track academic productivity. Fifty-six percent (22) noted that they believe their faculty view the system positively; 3% said negatively (1); 13% noted “neutral” (5); 8% indicated that they are not
sure (3 respondents); 3% (1 respondent) noted that their faculty “are not aware that it exists.” The remaining respondents either did not respond, or noted that they do not measure academic productivity currently. One respondent reported, “The ones who do not do research and education are the ones most enthusiastic about the metrics. The ones who do research and education feel that they are constantly under the microscope while the ones who only do clinical work are not.”

**Additional Survey Questions**

As noted in the literature review, reports or publications on the types of questions included in the national survey could not be located. Thus, there were no existing data sets or survey tools which could be used to ground the research. As the survey results were analyzed and the study progressed, a few of the survey questions were found to be of little value in understanding the current environment, or in formulating the next steps of the emergent research methodology. Thus, questions were asked which have not been reported on extensively here, but which might be used to inform future research. Topics included: chairs’ familiarity with the compensation methods used by other departments, formal or informal assessment of physician’s satisfaction with the compensation models used, chairs’ perceptions as to whether measuring productivity is an inherently positive, negative or neutral initiative, rewards for collaborative efforts, and recruitment and retention.

**Discussion**

The complexity of the multiple principal-single agent relationships which are embedded within the models used to compensate and assess academic physicians may seem self-evident to leaders in academic medicine, policymakers, and other stakeholders. However, the interconnected, interdependent relationship of the discourses that are embedded within, and inform those
relationships, requires further exploration. Further, the results of this survey can be understood using multiple theoretical frameworks including socioeconomic theory, behavioural economics, political economy, organizational theory, the sociology of the professions, and the new managerialism to name just a few.

Regardless of the lens that is used, this survey indicates that several different compensation and academic performance assessment models are currently used by Canadian clinical academic departments to manage a problem that is common to them all. The models vary by province, institution and even department. The response rate of 61% (39 respondents) was significantly higher than expected given sensitivities around the types of questions that were asked. This indicates that the problem is real and widely recognized.

AFPs, APPs or in Alberta, A-ARPs for academic medicine were introduced by some provinces starting in the 1990s to help maintain the teaching and research activities undertaken by academic physicians; to enhance income predictability due to time spent on academic activities; and to stabilize recruitment and retention of academic physicians across Canada. However, the “contractual arrangements of APPs are much more complex than traditional fee-for-service or salary contracts” (Canadian Medical Association, http://www.cma.ca/practicemanagement/alternative-payment-plans). APPs consist of a blend of payment models (FFS, capitation funding, time-based payments for certain specialties, bonuses and contributions for administrative or IT costs) while AFPs or ARPs for academic physicians also include compensation for teaching, research, academic administrative duties, and subsidies for staff.

Not all provinces have AFPs for academic physicians (Haslam & Walker 1993, Rosenbaum et al 2004). In some cases, the AFP may be situated within a clinical specialty or sub-specialty found in a given hospital. Pediatrics departments are oftentimes on academic comprehensive or “full” AFPs which include both academic and clinical deliverables. In Ontario alone, the Ministry of Health and
Long-Term Care indicates that “50% of the almost 13,000 specialists in the province and more than 90% of the 2,700 emergency department physicians were paid, at least in part, through a specialist alternate funding arrangement” (Auditor General Report 2011: 171).

The report also notes that the “relative complexity of the different arrangements and the relative scarcity of performance measures in the contracts have made it difficult for the Ministry to effectively monitor both the accuracy of payments being made and the extent to which physicians have actually provided the services expected in their contracts” (Ibid: 173). This survey reveals three things. First, many but not all academic physicians are on some form of AFP-type arrangement. Second, although the particular form of arrangement varies, all are very complex. Third, the variety and complexity of compensation and funding arrangements have so far made it difficult to determine the efficacy of these arrangements. Determining efficacy – what works, what doesn’t, and why - comprises an area where future research is needed.

The results of this survey also indicated a shift in the leadership models that are practiced within academic medicine across Canada, from authoritative, transactional models to more consensus-based, decentralized and collaborative leadership models. Nearly 60% of chairs who responded to this survey reported movement in this direction. The balance, however, indicated that they rarely or even never have any influence on the compensation models that are used in their departments. Additional research on emergent leadership models within academic medicine is also needed.

Sixty percent of the chairs who responded to this survey indicated that annual reports are used to measure academic performance (23 respondents). Even more - 85% or 33 respondents - indicated that regular, formal reviews of academic performance are done, while slightly fewer - 80% or 31 respondents - noted that they have “metrics” to measure academic performance. A “review” typically takes the form of a one-on-one meeting between the chair and faculty member or a peer
review in which performance is assessed primarily on the basis of an annual report or updated curriculum vitae. This finding may however highlight different understandings of the term “metric.” A true metric implies some form of quantitative measurement. The notion of measuring or tracking academic performance may constitute a managerialist technique used to manage intellectual work. Managerialism is defined by Smeenk et al (2009) “as the trend of adopting organizational characteristics, such as organizational forms, technologies, management instruments and values that originate from the private sector organizations” (Smeenk et al, 2009: 591). The trend towards managerialism seeks to increase academic productivity by measuring and then managing research “outputs”, thereby increasing productivity through competition and incentivization (e.g., salaries or bonuses linked to performance). Smeenk and colleagues conducted a study of eighteen European universities and thirty-six departments in 2009 which tested the hypothesis, “Does managerialism have a negative impact on professors in Europe?” These authors found that managerialism has a positive – albeit modest – effect on the quality of performance. While the departments studied at each university were departments of business and sociology, their results could conceivably be translated into the medical school realm. Smeenk et al argue for a transition from a “control orientation” towards a “developmental orientation”. The focus on annual reports as a means to track performance may suggest a control orientation (an accountability or monitoring-type system) rather than a developmental orientation.

The managerialist ideology may explain the interest in the productivity of academic physicians in academic health science centres, however, the central question is whether or not the managerial paradigm is applicable as a response. Managerialism, as a paradigm, assumes tight and essentially direct relationships between principals and agents: one principal to one agent, and vice versa. This is where the paradigm or at least the assumption begins to break down. Insofar as clinical faculty are concerned, and given the many different forms and sources of compensation that are
used in academic medicine, the relationship is often neither tight nor direct. There are at least three principals in the public sector: those that fund post-secondary education, those that fund health care, and those that fund basic research. To this list one can add private firms that sponsor applied research and private donors who make gifts restricted to various aspects of academic medicine. “Principals” may include government, university, practice plan, and private or public research agencies. The various roles taken on by academic physicians as “agents” include teacher, researcher, administrator, and provider of health care.

One could go on to identify universities as principals in the sense that, because clinical faculty members receive significant amounts of compensation from other parties, they engage these academic physicians as supplementary agents. But the other principals typically and reasonably regard the universities as their agents too, among whose contractual obligations in this context is to engage clinical academic faculty, hold them accountable, and ensure their productivity. Yet from this study one learns that each academic physician is in practical effect three agents: a teacher, a researcher, and a provider of health care. Each “agency” is measured differently and often by different levels of university management, and sometimes by managers outside the university.

On the one hand this complicated principal-agent relationship explains the complexity of the problem, and probably explains the wide variety of practices reported by this study. This study therefore provides a useful template for a broader investigation of all clinical medicine departments. It also provides a checklist that can be applied to assess new models. On the other hand, the principal-agent paradigm - which, significantly, has its origin within the business model of the private, for-profit firm - may explain the current interest in the productivity of clinical academic physicians as “managerial” but cannot explain how a managerial approach could be used to devise ways and means of compensating academic physicians and measuring their productivity. In fact, the paradigm and the results of this national survey explain why a purely managerial approach might
not be successful, which in turn might explain some of the movement reported away from certain practices. The developmental orientation described by Smeenk and depicted in Figure 6, which may be preferable but is not perfect, comes closer to the actual practices reported and preferred by some respondents to this study.

As noted, the survey also suggests that the chair’s role in influencing the academic enterprise might be changing. Annual peer reviews, the use of bibliometric or quantitative methods to measure performance, or other assessments paradigms, are techniques used to monitor performance extra-departmentally. Chairs are required or might be choosing to act as partners in the production of academic knowledge using tools already employed elsewhere in the university. Notions of accountability and fiscal effectiveness – combined with limited financial resources – may compel academic leaders and policymakers to implement new performance-based tools to compensate, motivate and develop academic physicians.

The survey also shows that academic leaders have an imperfect or partial understanding of their academic physician’s satisfaction in relation to their compensation system, why clinical faculty members do or do not submit accurate data for their academic productivity/ performance assessment system, or their views on the department’s method to track academic productivity. As a reminder 56% of chairs believe that their faculty members view their academic productivity tracking system positively, but only 39% of academic leaders (15 respondents) believe that more than 95% of their academic physicians submit accurate data. This number seems low. Very few departments have conducted either a formal or informal assessment of their faculty member’s satisfaction with regards to the compensation system that is used. This is where the exclusive use of classical economic theory, principal-agent models, is insufficient. Behavioural economics may provide valuable insights around intrinsic motivation vs. external incentives. This survey demonstrates that extrinsic incentives are used fairly extensively.
It is possible that non-responding departments have no systematic way of administering compensation for academic physicians, or perhaps do not assess performance. The survey results may not be generalizable to other specialties in Canada, however, the purpose was to provide a basis upon which to build future studies on this subject. The next phase of this research study utilizes a mixed-methods framework to explore the composition and efficacy of the compensation and assessment models that are used by specific Canadian medical schools.

Chapter Summary

Of the several compensation and academic assessment paradigms available to Canadian medical schools in the engagement of academic physicians, we now know which ones are the most frequently deployed in departments of Anesthesia, Medicine, Pediatrics and Surgery. We also know that these arrangements are complex, particularly because they involve multiple and sometimes competing principals, stakeholders and roles. They are used in various permutations and combinations, and at different levels within universities with medical schools. Perhaps because of the complexity, or because of changes in the respective roles of chairs and deans, or a shift from a managerial to a developmental orientation, the efficacy of the various models is problematic across Canada. The models that are effective in terms of academic performance might be less so in terms of research productivity, professional autonomy, morale, or the recruitment and retention of physicians. This survey therefore provided a useful template for a broader investigation of all clinical medicine departments, and helped inform the methodology used for the case studies which follow in Chapters 5 through 7.
Chapter Five: Case Study # 1 (University of Toronto)

Overview

Chapter 4 reported on the phase 1 national survey. The results helped inform the case study methodology. In this chapter, the University of Toronto case study is reported on. Of note, this study compares, contrasts and analyzes data collected from three clinical academic departments: Anesthesia, Pediatrics and Surgery. Each department utilizes a different compensation and assessment model, thereby providing particularly interesting data for quantitative and bibliometric analysis. The results of the qualitative interviews are however reported in Chapter 8, in part, to preserve the privacy of the respondents. Theories that attempt to explain the empirical observations are presented in Chapter 10.

Background Information: General Comparisons across the Specialties

The 2010 Canadian National Physician Survey (CNPS) indicates that there were 2,914 practicing Anesthesiologists in Canada (74% of who are male), 4,436 practicing surgeons (an average of 85.5% of respondents or 3,765 surgeons were male), and 2,210 pediatrics (50.3% were female)\(^{38}\). Just three years later, the total number of Anesthesiologists in Canada had grown by 2.3% per year to 3,118; Surgery experienced total growth of 15.5% between 2010 and 2013 (the total number of specialists was 5,126 in 2013); and Pediatrics showed growth of 37% (the total number of Pediatricians grew to 3,028 in 2013).

In Anesthesia in 2010, there were 655 were full-time faculty members in Canadian medical schools, with an additional 1,368 defined as part-time faculty; in Pediatrics, there were 1,029 (34%)

full-time faculty members in Canadian Academic Health Science Centres, with an additional 209 (6.9%) defined as part-time faculty; and in Surgery, 2,998 were full-time faculty members in Canadian AHSCs in 2013, with an additional 799 practicing in non-academic health science centre teaching hospitals. Given the growth of regional medical centres (RMCs) and community-based teaching and research since 2010, the overall percentage of physicians who engage in some form of academic work is likely higher in 201539.

It is important to compare and contrast information here across four data sets: the primary remuneration method by source, teaching payments by source, average compensation levels by specialty (including growth over time), and average gross fee-for-service clinical billings. Table 5.1 illustrates the primary remuneration method by source for the four specialties, and multiple sub-specialties, included in the case studies:

<table>
<thead>
<tr>
<th>Description</th>
<th>ANES</th>
<th>PEDS</th>
<th>SURGERY</th>
<th>ALL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cardiac</td>
<td>General</td>
</tr>
<tr>
<td>90%+ Fee for Service</td>
<td>50.5%</td>
<td>31.1%</td>
<td>48.1%</td>
<td>57.5%</td>
</tr>
<tr>
<td>90% Fee for Service (uninsured)</td>
<td>0.8%</td>
<td>0.2%</td>
<td>0.0%</td>
<td>0.4%</td>
</tr>
<tr>
<td>90%+ Salary</td>
<td>2.9%</td>
<td>15.4%</td>
<td>9.8%</td>
<td>4.2%</td>
</tr>
<tr>
<td>90%+ Capitation</td>
<td>0.0%</td>
<td>0.2%</td>
<td>0.0%</td>
<td>0.4%</td>
</tr>
<tr>
<td>90%+ Sessional/ per diem/ hourly</td>
<td>1.5%</td>
<td>4.6%</td>
<td>1.6%</td>
<td>1.5%</td>
</tr>
<tr>
<td>90%+ Service contract</td>
<td>2.9%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>90%+ Incentives and premiums</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>90%+ Other</td>
<td>1.8%</td>
<td>2.9%</td>
<td>1.0%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Blended</td>
<td>36.1%</td>
<td>37.2%</td>
<td>29.6%</td>
<td>27.3%</td>
</tr>
<tr>
<td>No Response</td>
<td>3.3%</td>
<td>6.2%</td>
<td>4.8%</td>
<td>3.7%</td>
</tr>
</tbody>
</table>

Table 5.2 provides the averages for the specialties, based on the data presented in Table 5.1 (extracted from the 2013 CNPS). Note that the column called “All Physicians/Specialties” includes data from the National Physician Survey on all specialties (i.e., those specialties which have not been

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39 The Canadian National Physician Survey results can be found online at [http://nationalphysiciansurvey.ca/](http://nationalphysiciansurvey.ca/).
identified in the tables). Note that the averages are calculated on the basis of Anesthesia, Pediatrics, Surgery and All Physicians/Specialties:

<table>
<thead>
<tr>
<th>Description</th>
<th>Anesthesia</th>
<th>Pediatrics</th>
<th>Surgery</th>
<th>All Physicians/Specialties</th>
<th>AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%+ Fee for Service</td>
<td>50.5%</td>
<td>31.1%</td>
<td>43.1%</td>
<td>37.6%</td>
<td>41.6%</td>
</tr>
<tr>
<td>90% Fee for Service (uninsured)</td>
<td>0.8%</td>
<td>0.2%</td>
<td>2.5%</td>
<td>0.8%</td>
<td>1.2%</td>
</tr>
<tr>
<td>90%+ Salary</td>
<td>2.9%</td>
<td>15.4%</td>
<td>6.2%</td>
<td>8.7%</td>
<td>8.2%</td>
</tr>
<tr>
<td>90%+ Capitation</td>
<td>0.0%</td>
<td>0.2%</td>
<td>0.1%</td>
<td>0.2%</td>
<td>0.1%</td>
</tr>
<tr>
<td>90%+ Sessional/ per diem/ hourly</td>
<td>1.5%</td>
<td>4.6%</td>
<td>0.6%</td>
<td>3.0%</td>
<td>2.2%</td>
</tr>
<tr>
<td>90%+ Service contract</td>
<td>2.9%</td>
<td>5.0%</td>
<td>5.5%</td>
<td>4.3%</td>
<td>4.5%</td>
</tr>
<tr>
<td>90%+ Incentives and premiums</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>90%+ Other</td>
<td>1.8%</td>
<td>2.9%</td>
<td>1.5%</td>
<td>1.8%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Blended</td>
<td>36.1%</td>
<td>37.2%</td>
<td>35.6%</td>
<td>39.8%</td>
<td>36.3%</td>
</tr>
<tr>
<td>No Response</td>
<td>3.3%</td>
<td>6.2%</td>
<td>4.9%</td>
<td>3.6%</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

The data demonstrates that the vast majority of Canadian physicians practicing in the specialties listed in Table 5.2 with the exception of pediatricians, are primarily remunerated through a fee-for-service type scheme, followed closely by blended models. Blended models may include AFPs (including comprehensive plans), APPs, ARPs or other models. Very few physicians listed above are remunerated through a capitation program, and no physicians are on an incentives plus a premium scheme. In Pediatrics, 15.4% of physicians are remunerated through a salary arrangement.

Unfortunately, the CNPS does not produce data which shows the primary remuneration method for academic physicians only.

Table 5.3 depicts the source of teaching payments, for specialists in Anesthesia, Pediatrics and Surgery, vs. those for “All Physicians”, based on data extracted from the 2013 CNPS. The data for all sub-specialties indicated in each case study has been included, as well as the average for the specialty as a whole:
TABLE 5.3: TEACHING PAYMENTS BY SOURCE (AVERAGES)

<table>
<thead>
<tr>
<th>Source of Remuneration</th>
<th>Anesthesia</th>
<th>Pediatrics</th>
<th>Surgery</th>
<th>All Physicians/ Specialties</th>
<th>AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid by department/Faculty</td>
<td>57.7%</td>
<td>60.2%</td>
<td>69.3%</td>
<td>60.0%</td>
<td>61.5%</td>
</tr>
<tr>
<td>Paid via an AFP or APP</td>
<td>21.9%</td>
<td>24.8%</td>
<td>15.5%</td>
<td>24.0%</td>
<td>22.3%</td>
</tr>
<tr>
<td>Paid directly by the provincial ministry of health</td>
<td>24.6%</td>
<td>20.4%</td>
<td>25.5%</td>
<td>22.7%</td>
<td>23.4%</td>
</tr>
<tr>
<td>Paid through a practice plan</td>
<td>5.9%</td>
<td>5.7%</td>
<td>0.9%</td>
<td>6.6%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Other source of remuneration</td>
<td>2.0%</td>
<td>1.7%</td>
<td>1.5%</td>
<td>2.4%</td>
<td>1.7%</td>
</tr>
<tr>
<td>No response</td>
<td>0.8%</td>
<td>1.4%</td>
<td>0.0%</td>
<td>1.0%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

Here, an average of just over 61% of academic physicians are paid to teach by their academic department or Faculty of Medicine (the lowest is Anesthesia at 57.7%), while 22.3% receive some type of teaching payment through their AFP. Just over 23% of academic physicians receive funding directly from a provincial ministry of health; these types of payments are focused on those teachers who participate in a distributed medical education-type program (DME), who teach in remote areas, or physicians in Quebec who are compensated for half-days of teaching by the health ministry.

Finally, Table 5.4 depicts data obtained from the Canadian Institute for Health Information’s Average Gross Fee-for-Service Payment Report, with detail on the specialties included in the case studies, for 2005/2006 and 2010/2011, with the percentage change calculated for each specialty. On average, fee-for-service billings increased by 24.3% between 2005/2006 and 2010/2011.

TABLE 5.4: CANADIAN INSTITUTES FOR HEALTH INFORMATION AVERAGE GROSS FEE-FOR-SERVICE CLINICAL BILLINGS COMPARISON: 2005/06 VS. 2010/11

<table>
<thead>
<tr>
<th>Specialty</th>
<th>2005/06</th>
<th>2010/11</th>
<th>% Change (2005/06 vs. 2010/11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia</td>
<td>$273,486</td>
<td>$338,355</td>
<td>23.7%</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>$195,598</td>
<td>$268,172</td>
<td>37.1%</td>
</tr>
<tr>
<td>Surgery: Cardiac</td>
<td>$432,928</td>
<td>$529,728</td>
<td>22.4%</td>
</tr>
<tr>
<td>Surgery: General</td>
<td>$315,484</td>
<td>$411,995</td>
<td>30.6%</td>
</tr>
<tr>
<td>Surgery: Neurosurgery</td>
<td>$317,744</td>
<td>$381,728</td>
<td>20.1%</td>
</tr>
<tr>
<td>Surgery: Orthopedic</td>
<td>$314,602</td>
<td>$397,784</td>
<td>26.4%</td>
</tr>
<tr>
<td>Surgery: Plastic***</td>
<td>$282,538</td>
<td>$345,747</td>
<td>22.4%</td>
</tr>
<tr>
<td>Surgery: Urology</td>
<td>$361,178</td>
<td>$434,795</td>
<td>20.4%</td>
</tr>
<tr>
<td>Average: Surgery, All</td>
<td>$337,412</td>
<td>$416,963</td>
<td>23.7%</td>
</tr>
<tr>
<td>AVERAGE: ALL</td>
<td>$315,062</td>
<td>$389,686</td>
<td>24.3%</td>
</tr>
</tbody>
</table>
Sample: University of Toronto Case Study

The departments of Anesthesia, Pediatrics and Surgery were chosen as I had knowledge of the compensation/assessment system used, access to data, and each department used a unique methodology to compensate or incentivize academic physicians. For each department, 40 full-time academic physicians were included (n=120). To ensure that academic physicians of different academic ranks, gender, clinical sub-specialty and IMG/CMG status were included, a representative sample was chosen. The sample was then verified with the academic leader to ensure data availability. For Anesthesia only, the sample included merit awards recipients from the 2007 competition (30), the three faculty members who remain on payroll (3) and 7 faculty who comprised the top 10% of faculty who applied to the 2007 merit awards competition but were unsuccessful (7). Table 5.5 illustrates the composition of the sample across all case studies by academic rank, gender and IMG/CMG status for each department:

<table>
<thead>
<tr>
<th></th>
<th>Anesthesia</th>
<th>Pediatrics</th>
<th>Surgery</th>
<th>TOTALS</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>14</td>
<td>6</td>
<td>9</td>
<td>29</td>
<td>24.2%</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>15</td>
<td>16</td>
<td>15</td>
<td>46</td>
<td>38.3%</td>
</tr>
<tr>
<td>Full Professor</td>
<td>11</td>
<td>18</td>
<td>16</td>
<td>45</td>
<td>37.5%</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>12</td>
<td>7</td>
<td>32</td>
<td>26.7%</td>
</tr>
<tr>
<td>Male</td>
<td>27</td>
<td>28</td>
<td>33</td>
<td>81</td>
<td>73.3%</td>
</tr>
<tr>
<td>Canadian Medical Graduate</td>
<td>19</td>
<td>24</td>
<td>37</td>
<td>80</td>
<td>66.7%</td>
</tr>
<tr>
<td>International Medical Graduate</td>
<td>21</td>
<td>16</td>
<td>3</td>
<td>40</td>
<td>33.3%</td>
</tr>
<tr>
<td>TOTAL SAMPLE:</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

Forty-six percent of the academic physicians included in the four case studies had achieved academic promotion between 2006/07 and 2010/11 (n=64). The breakdown is as follows: Anesthesia (18 or 28.1% of the total sample); Pediatrics (17 or 26.6% of the total); and Surgery (20 or 31.3% of the total sample across all departments). Academic promotion is one of the most
important ways in which that university can recognize the excellence, productivity and impact of its faculty in terms of teaching, research, and other professional/scholarly activities, and so this indicates an “effect” that resulted in promotion.

Research Question

This case study explored the following research question: How does each department’s compensation or incentive program impact upon the academic productivity of the department?

Department of Anesthesia: Merit Awards Program

In 2008, the Department of Anesthesia (hence forth referred to as the “department” in this chapter) implemented a biennial, peer-reviewed (external and internal), productivity and merit-based research awards program. All 260 full-time faculty members in the department were encouraged to apply to this merit awards program which replaced the previous payroll-based program. Prior to the merit awards program, 29 full-time faculty (11%) in the department received university-based payroll, and in many cases, benefits including access to the pension plan. In 2008, the chair engaged in extensive consultations with all faculty members, meeting individually with those who received payroll and offering them two options: 1. Remain on payroll; or 2. Relinquish payroll status, and compete for potentially higher amounts of funding via the new merit awards program. Only three faculty members (less than 1% of the total number of faculty members) elected to remain on university payroll. The merit awards program subsequently funded 15% of the total number of full-time academic physicians in the department.

The terms of reference for the merit awards program emphasize the intra-mural, competitive and peer-reviewed nature of the awards. The goal of the program is to reward those faculty members that are currently the most academically productive, as determined by peer-
review. Both of the review panels include one external peer review plus peers from the same university, but outside of the department.

Applicants can apply to two of three “streams”: research; research-in-education; or, creative professional activity. The chair indicated that,

We have a research panel and then a second panel that views education and creative professional activity applications. We rank research higher, because, frankly, there is generally a greater level of training and commitment with research.

The merit awards program allocates 70-75% of the funds available to research, with the remainder split between the education and creative professional activity streams. As such, the majority of applicants to the merit awards program are categorized as Clinician Scientists or Clinician Investigators in their university academic position description.

The merit award funds are transferred directly to the practice plans and are not paid to the individual. In this way, the university compensates the practice plans as business entities for any lost clinical revenues based on time spent on academic activities (teaching or research). Control over academic productivity is however given to the practice plans as the practice plan leadership decides how much academic vs. clinical time is allocated to each individual. This university reimbursement directed at the practice plans is a reasonable practice: Holmes et al (2000:92) indicate that 10% of practice plan earnings are used to subsidize the research mission of the University in the first place.

At this time, the university department does not offer a career development program for researchers, nor does it evaluate academic performance (rather, the chair works closely with the hospital research institutes on any challenges or opportunities that arise).

**Department of Pediatrics: Career Development and Compensation Program**

The Department of Pediatrics implemented a Career Development and Compensation Program (CDCP) in 1996. The chair characterizes the CDCP as “a progress-through-the ranks
approach... not pay-for-performance though we do offer an annual bonus”. The goal of the program is to,

Outline job expectations, enhance career development, and provide a peer-review process to assess performance. The Career Development and Compensation Program was founded on the principle that sustained achievement in education, clinical care, or research should be valued, supported, and rewarded in an equivalent manner and that reward for clinical work should not be limited by the focus of the university on research and education” (O’Brodovich et al 2007: e791)

Further, the program is founded on the belief that,

The absence of a formalized career development strategy can hinder the progress of many academic physicians. This may result in the loss of talented and extensively educated physicians who have not been guided in their career development as to how to best meet the expectations of their peers. (Ibid: e792).

Implementation of the CDCP commenced in 1999, and in 2001, the satisfaction of practice plan member was formally evaluated. In 2007 and 2009, the department undertook additional reviews to streamline the evaluation process, ensure equity across job profiles, delineate the functions of the triennial review process, evaluate the incentives, and enhance transparency (O’Brodovich et al 2007, Daneman, Kennedy & Coyte, 2010).

The CDCP defines six job profiles for academic physicians. Table 5.6 outlines the profiles, the major focus of the job, and the estimated percentage of time allocated to the role:

<table>
<thead>
<tr>
<th>Job Profile</th>
<th>Major Focus</th>
<th>% Time Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinician Scientist</td>
<td>Commitment to research</td>
<td>75%</td>
</tr>
<tr>
<td>Clinician Investigator</td>
<td>Significant research commitment</td>
<td>50%</td>
</tr>
<tr>
<td>Clinician Teacher</td>
<td>Major commitment to clinical care, bedside teaching</td>
<td>50-65%</td>
</tr>
<tr>
<td>Clinician Educator</td>
<td>Major commitment to education administration, educational development or research-in-education</td>
<td>≥50%</td>
</tr>
<tr>
<td>Clinician Specialist</td>
<td>Predominant commitment to clinical care</td>
<td>≥70%</td>
</tr>
<tr>
<td>Clinician Administrator</td>
<td>Major administrative responsibilities</td>
<td>≥50%</td>
</tr>
</tbody>
</table>

The design principles include: all job profiles are equally valued; excellence in each of the six job profiles is rewarded equally; development/growth opportunities are available in each job profile; compensation is influenced by, but not limited to, achievements contributing to University academic promotion. Results (what is achieved relative to expectations) and competencies (how an individual acts in the job) are recognized. Source: [http://www.sickkids.ca/pdfs/Paediatrics/6399-CDCPBooklet.pdf](http://www.sickkids.ca/pdfs/Paediatrics/6399-CDCPBooklet.pdf)
A booklet is available on the Pediatrics website which notes that several “design principles” are embedded within the program. Further, a structured performance evaluation (a written assessment of performance and progress) is provided which aims to be open, understood by the pediatricians, and valued by participants.

The department utilizes a triennial peer review process. The peer reviewers are selected from within the department, with input provided by the division head. The final results of the review are signed-off by the chair and executive committee. The chair noted that typically, 85-90% of faculty are rated as excellent, 5% are rated as below expectations, and 5-10% are rated as exceptional (occurs very rarely).

The assessments are then linked to a compensation grid. The grid has eight levels, with a base salary level attached to each grid. As the academic physician progresses-through-the-ranks every three years, they are awarded a higher base salary based on performance plus an annual bonus based on the results of the triennial review (accelerated movement through the salary grid is also possible). The chair reported that faculty should expect to move through the full grid within 21 years of the start date of their academic appointment. The salary level attached to each step on the grid are periodically assessed and revised pending any AFP contract changes. The chair noted that salary levels are competitive with other pediatrics departments in Canada, though lower than Alberta “when the economy is good” and higher than the United States.

In addition to a base salary and bonus, faculty members are offered a full benefits package plus an annual bonus. For those included in the sample, the value of the bonus between 2006/07 and 2010/11 ranged from 1% to 11% of gross income. The bonus level is linked to the rating that was achieved, as well as the pool of funds that are available in any given year (the pool of funds that are available are determined by the chair and Executive Committee). This compensation model is

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41 The other departments at the University of Toronto likely have similar expectations, but it was not explicitly stated.
unique in Canadian academic medicine; in most practice plans, partners are awarded a percentage of the partnership (expressed as net earnings) or, they keep what they have earned through the fee-for-service provincial OHIP billing plan and contribute to infrastructure costs. The chair indicated that the bonus is not automatic; if performance has been below expectations, a bonus is not necessarily provided.

For those that fall below expectations, annual meetings with the chair and division head, more intensive supervision, and possibly new mentorship arrangements are implemented. The individual is presented with a written plan which clearly indicates expectations. Of note, the chair indicated that they are not moved into a new job profile if they are unable to perform in their designated job role, but rather, are encouraged to move to a new institution.

**Department of Surgery: Academic Points System**

In approximately 2000, the Department of Surgery implemented an annual performance rating system called the “Academic Points System”. All surgeons in the department, regardless of their academic position description, must participate in the program.

The academic points system awards points (based on an evaluation of productivity and quality) under the general categories of research, teaching, creative professional activity (CPA), administration, academic rank and university citizenship. Each category is given points ranging from 0-3; the “score is then weighted in a variable fashion in each category on an individual’s academic role”. As an example, the research contributions of a Clinician Scientist or Clinician Investigator would be weighted more heavily (the points between 0-3 would be multiplied by a factor of 3), whereas their teaching contributions would be weighted less heavily (the points achieved would be multiplied by a factor of 1). Likewise, the teaching contributions of a Surgeon Teacher would be weighted more heavily than their research contributions. Table 5.7 outlines these points:
### Table 5.7: Surgery Academic Points System

<table>
<thead>
<tr>
<th>Academic role</th>
<th>Research</th>
<th>Teaching</th>
<th>CPA</th>
<th>Admin</th>
<th>Academic Rank</th>
<th>Citizenship</th>
<th>Total Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon Scientist</td>
<td>0-3 x 3</td>
<td>0-3 x 1</td>
<td>0-3 x 2</td>
<td>0-3 x 0.5</td>
<td>0-3 x 0.5</td>
<td>0-0.5</td>
<td>21.5</td>
</tr>
<tr>
<td>Surgeon Investigator</td>
<td>0-3 x 2</td>
<td>0-3 x 2</td>
<td>0-3 x 2</td>
<td>0-3 x 0.5</td>
<td>0-3 x 0.5</td>
<td>0-0.5</td>
<td>21.5</td>
</tr>
<tr>
<td>Surgeon Teacher</td>
<td>0-3 x 1</td>
<td>0-3 x 3</td>
<td>0-3 x 2</td>
<td>0-3 x 0.5</td>
<td>0-3 x 0.5</td>
<td>0-0.5</td>
<td>21.5</td>
</tr>
</tbody>
</table>

The points are attributed as follows:

- 0 points – below expectations
- 1 point – meets expectations (1 is also given if there was no activity in the category)
- 2 points – exceeds expectations
- 3 points – markedly exceeds expectations

Individuals are expected to submit a curriculum vitae and summary form on an annual basis. The reviews are peer-based, with a score produced for each individual. The reviews are typically conducted by representatives from the university department, the chair, surgeons-in-chief, and the division heads. No formal career development program is offered through Surgery, but junior faculty are informally provided with mentors.

All faculty members in this department receive an annual monetary bonus in the form of a stipend from the university. The value of the bonus is however low in comparison with gross income, ranging from $5,000 to $20,000 on average, per annum (the bonus represents 1 to 4.5 percent of average gross income).

**Case Study Rationale**

The system used by Anesthesia is very unique. The merit awards program can be characterized as an individualized system, whereby a small percentage of faculty members receive some form of university-based funding which is of a higher value in relation to gross income (but is distributed to the practice plans). In contrast, Surgery’s academic points system can be characterized as a group system, whereby everyone is provided with some form of pay, bonus, or
incentive but with a low monetary value in comparison with gross income and little differentiation amongst high and low performers (given the value of the bonus).

Pediatrics was of great interest for three reasons. First, their compensation and assessment system is different from Anesthesia and Surgery. Second, Pediatrics is on an academic comprehensive AFP which was implemented in 2003 (a block funding plan). No other department at the University of Toronto is on such a plan, and this has several implications. First, an academic comprehensive alternative funding plan (AFP) “aligns the interests of the university, the teaching hospital, and the involved medical staff by merging (notionally or actually) multiple funding sources for the remuneration of involved medical staff for clinical service, education, research and associated administration” (Ibid: 6). The practice plan, hospital, university and Ontario Medical Association are all signatories to the AFP agreement. The AFP replaced fee-for-service clinical earnings, though “shadow billings” are required42.

Second, the clinical and academic departments are fully integrated. The chair of the university academic department also functions as the chief of the clinical department. Along with the Executive Committee, he has full control over all funding sources. These include the AFP, university operating budget, education-derived funding grants (e.g., basic income units in Ontario, revenues derived through fellowship training), hospital, and other (e.g., research grants or contracts). None of the faculty members in the department receive a salary or stipend from the university per se, nor is tenure available to them. Salaries and benefits are funded by the AFP, and the chair determines the value of salary increases, bonuses and incentives. Approval is not required from the Executive Committee. The chair indicated that the AFP accounts for 85-90 percent of gross earnings.

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42 Shadow billings are also referred to as “dummy billings” or “evaluations claims”. They refer to a system whereby the clinical billings are submitted for administrative and tracking purposes only; they are not submitted for the purpose of payment as is the case in a fee-for-service billing arrangement. Shadow billings provide information about the services (and volumes of clinical activity) that physicians provide, and help the government to ensure that the signatories of the alternative funding plan are meeting the clinical service requirements established in the agreement.
revenue, the university 2-4 percent, the hospital another 2-4 percent and other, miscellaneous items 2-4 percent. Details are presented in Appendix 5.1.

Third, Pediatrics was of interest given the comprehensive nature of their system. The Career Development and Compensation Program incorporates compensation (base salary), an incentive (bonus), a well-articulated career development component, and academic/clinical assessment (using a peer review process). Thus, the CDCP can be characterized as a hybrid system; all faculty members in the department are included but the system also addresses individual needs and performance, offers varying compensation and bonus levels (differentiation amongst the group), and the level of reward is not unsubstantial.

Theoretically, the three different compensation and assessment systems may stimulate departments to behave and function differently, and may also affect the department's organizational culture, performance, ability to recruit and retain faculty, academic physicians, engagement levels, and organizational commitment differently.

Methods

As noted in Chapter 3, the time period used for all case studies was 2006/07 to 2010/11. A mixed-methods approach was used for the University of Toronto case studies including all four sub-phases of research as demonstrated in Figure 3.1: document analysis, quantitative/ bibliometric analysis, productivity/predictive models, and qualitative interviews. The K-MAAP© was used to assess overall productivity, impact and effort, and to compare performance across the three departments.
Results

Group Level Productivity

The overall, group-level outputs for the departments included in the University of Toronto case study are depicted in Figure 5.1:

In Figure 5.1, Pediatrics shows the highest level of increase in productivity over the study period, as well as high impact and volumes of outputs (as depicted by the K-MAAP© points). Table 5.8 demonstrates the percentage of growth or decline in K-MAAP© points for all three departments between 2006/07 and 2010/11:

| TABLE 5.8: % GROWTH/DECLINE IN TOTAL K-MAAP© 2006/07 TO 2010/11: ALL CASE STUDY DEPARTMENTS |
|-----------------------------------------------|---------------|---------------|---------------|
| Period                         | Anesthesia | Pediatrics | Surgery |
| 2006/07                         | 657         | 2,065       | 1,860       |
| 2007/08                         | 971         | 2,163       | 1,871       |
| % change (1 year)               | 47.8%       | 1.79%       | 0.59%       |
| 2008/09                         | 1,115       | 2,514       | 1,942       |
| % change (1 year)               | 14.8%       | 20.39%      | -1.22%      |
| 2009/10                         | 1,278       | 2,699       | 1,909       |
| % change (1 year)               | 14.6%       | -5.19%      | -1.66%      |
| 2010/11                         | 1,153       | 3,296       | 1,909       |
| % change (1 year)               | -9.8%       |            |            |
Pediatrics is distinct from Anesthesia and Surgery in several ways. First, the university chair is also the hospital chief, and has full control over an integrated clinical and academic department, as well as protected academic time, compensation and assessment programs, career development, mentorship, and engagement strategies. That’s not the case in either Anesthesia or Surgery where the practice plans control resources, compensation and protected academic time, and the hospital research institutes more directly support research. Second, Pediatrics has been on an academic comprehensive AFP (clinical and academic deliverables) since 2003. While Anesthesia and Surgery receive AFP monies, the models are not comprehensive and the funds flow directly to the practice plans (the chairs do not control the AFP funds). Third, Pediatrics’ CDCP is characterized as a hybrid model, involving both individual and group-based elements. The system is based on the notion that substantial financial incentives (extrinsic motivators) are important; indeed, the productivity levels and outputs shown in Figure 5.1 and Table 5.9 appear to support this notion.

Anesthesia also shows some growth in productivity over the five-year study period, with a small decline (9.8%) in 2010/11. In 2007/08, overall academic productivity based on K-MAAP© points demonstrated a substantial increase of 47.8%. Anesthesia introduced the new, merit-based, competitive awards program in 2008. The system is individually-focused, participation is voluntary, based on self-selection, and competition is emphasized. The system is based on the presumption that recognition and protected academic time contribute to, and motivate to research success. The new chair also emphasized an internal/external peer assessment model. Significant amounts of funding are provided (relative to gross income) from the university operating budget, but the funds flow to the practice plan not the individual. The merit awards program does not comprise a bonus.

As depicted in Figure 5.1, Surgery’s productivity remained stable, but did not increase over the five-year study period. Their overall level of productivity and impact as demonstrated by K-MAAP© points is lower than Pediatrics, but higher than Anesthesia. Unlike Anesthesia, Surgery’s
compensation and assessment model is group-based in that everyone in the department receives a small bonus, relative to income, based on the academic points awarded during the annual assessment process. The system is based on the notion that a small monetary incentive will stimulate extrinsic motivation. Surgery also does not provide a salary through the university department, and the career development and mentorship programs are not as well-developed as those offered by Pediatrics.

Comparing the Rankings: Peer Review, Bibliometrics, and the K-MAAP©

Different ranking systems produced different results. Appendix 5.4 provides a detailed listing of all of the research rankings, for all PIs included in the sample of 120 from the University of Toronto. As an example of these data sets, Table 5.9 explores the top 10% of the total sample, sorted by the K-MAAP© rankings, from highest to lowest. The academic physicians who were ranked in the top 14 according to the K-MAAP© were mostly full Professors (12 out of 14, or 85.7%), with the remaining two faculty members holding academic appointments at the rank of Associate Professor. Ten out of 14 in the top 10% are in Pediatrics (72%), with different sub-specialties included43. Additionally, 13 of the 14 are male (93%) and 50% are Canadian Medical Graduates.

43 The sub-specialty areas, gender and IMG/CMG status are not included here to preserve the anonymity of the Principal Investigator in question.
### Table 5.9: Top 10% of University of Toronto Sample, Sorted by K-MAAP©

<table>
<thead>
<tr>
<th>PI #</th>
<th>Department</th>
<th>Academic Rank</th>
<th>RANK: K-MAAP©</th>
<th>RANK: Total Citations</th>
<th>RANK: h-index</th>
<th>AVERAGE: All Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>58</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>2</td>
<td>11</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>73</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>3</td>
<td>28</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>74</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>4</td>
<td>8</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>57</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>5</td>
<td>23</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>114</td>
<td>Surgery</td>
<td>Professor</td>
<td>6</td>
<td>32</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>115</td>
<td>Surgery</td>
<td>Professor</td>
<td>7</td>
<td>6</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>43</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>8</td>
<td>15</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>44</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>9</td>
<td>26</td>
<td>26</td>
<td>21</td>
</tr>
<tr>
<td>116</td>
<td>Surgery</td>
<td>Professor</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>75</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>11</td>
<td>42</td>
<td>22</td>
<td>26</td>
</tr>
<tr>
<td>1</td>
<td>Anesthesia</td>
<td>Professor</td>
<td>12</td>
<td>36</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>42</td>
<td>Pediatrics</td>
<td>Associate</td>
<td>13</td>
<td>82</td>
<td>13</td>
<td>37</td>
</tr>
<tr>
<td>49</td>
<td>Pediatrics</td>
<td>Associate</td>
<td>14</td>
<td>7</td>
<td>36</td>
<td>33</td>
</tr>
</tbody>
</table>

The rankings for PI # 72 are homogeneous (1, 1 and 1 across all three measures), with greater variation shown amongst other PIs in the sample. As an example, PI # 1 ranks 12<sup>th</sup> in the K-MAAP©, but 36<sup>th</sup> for total citations between 2006/07 and 2010/11, and 20 for the h-index. The numbers could be attributed to the fact that that K-MAAP© measures peer-reviewed publications, invited lectures and peer-reviewed grants for a specific time period while the citation index and h-index (career length) address publication-related metrics.

The Anesthesia sample includes 30 PIs who were given funding through the merit awards program, 7 faculty who ranked just below the funding cut-off, and the 3 faculty who remained on payroll (n=40 for Anesthesia). If quantitative metrics only had been used in the internal/external peer review process during the 2009 cycle, PIs # 4, 17 and 20 may have received merit awards in that competition. PIs 17 and 20 did not reapply in 2011. This raises questions as to whether quantitative metrics should be used to supplement or enhance peer review processes.
Plotting the Rankings across the Departments: Percentiles

Once the comparison of rankings across all three departments was completed, I was keen to determine where faculty from each department tended to rank based on the K-MAAP©. In other words, are faculty members in Anesthesia, Pediatrics or Surgery more likely to be in the top 90-100th percentile, the middle, or the bottom 1-10th percentile of the K-MAAP© rankings? Figure 5.2 depicts the outcomes of this analysis visually:

Figure 5.2 shows that Pediatrics has the highest percentage of faculty in the top 10% of all faculty, followed by Surgery. Twenty-five percent of the Anesthesia sample is ranked in the bottom 1-10th percentile of the Toronto sample.

The distribution of the K-MAAP© rankings were also plotted on a curve (i.e., a visual representation of the characteristics of the scores). These results are reviewed, compared and contrasted for all quantitative data sets (Anesthesia, Internal Medicine, Pediatrics and Surgery) in Chapter 8. A similar analysis was not completed for the h-index or citation index. As demonstrated in Appendix 5.4, the h-index resulted in multiple tied rankings. Further, the h-index is heavily
dependent on career length or age, and so junior faculty are unlikely to score in the top percentiles. In this way, the K-MAAP© provides more nuanced data as it is based on specific time periods, and provides a more holistic view of academic productivity than just publications.

**Statistical Correlations: Ranking Methods**

Correlations amongst the various research ranking methods (h-index, citation Index, and the K-MAAP©) were also tested as part of the statistical model that was employed for the case studies. An in-depth analysis, comparisons and actual numbers are presented in Chapter 8. However, it should be highlighted that when the K-MAAP© was compared with the other ranking methods, the data demonstrates mostly a moderate positive relationship with the other ranking and bibliometric systems, across all three departments included in the University of Toronto case study. The data also shows that for Anesthesia, Surgery and Pediatrics, gender has no significant relationship with the K-MAAP©, the citation index, h-index or teaching effectiveness scores. There was also no statistical significance detected based on an individual’s status as an International Medical Graduate or a Canadian Medical Graduate. However, a moderate positive relationship was detected between academic rank, the K-MAAP© and the h-index; in other words, those with a higher academic rank tended to also place higher in the rankings.

**Research Rankings Methods and Teaching Effectiveness**

For the University of Toronto, we also had access to teaching evaluation scores which were compared with the rankings produced by the teaching evaluation scores. The purpose was to look for correlations between high research rankings (as denoted by high productivity and impact) and high teaching evaluation scores. Anecdotal evidence suggests that the “triple threat” clinician (one who excels in teaching, research and administration) no longer exists.

In Table 5.10, the correlation coefficients measure the strength of the relationship between two variables. When the correlation (r) equals +/-0.01 to +/-0.19, this represents no or a negligible
relationship. A weak positive relationship is denoted by values ranging when (r) equals +.20 to +.29, a moderate positive relationship is denoted by values ranging when (r) equals +0.31 to +0.70, and values between +0.71 to +1.0 indicate a strong positive relationship. The t-test was done to gauge whether the relationship between the research rankings (the K-MAAP©, citation index and h-index were all tested) and the teaching rankings are the K-MAAP© are statistically significant (this generates the t-value). Sig. (2-tailed) is a statistical measurement indicating whether the data show strong evidence that the corresponding correlation is different from zero; the smaller the value of Sig. (2-tailed) the stronger evidence that the relationship exists. The common desired threshold for Sig. (2-tailed) is 0.05 (5%), any Sig. (2-tailed) that is less than 5% indicates that the test is statistically stochastic.

| Table 5.10: Correlations: Teaching Effectiveness and Research Impact Correlations 2006/07 to 2010/11 |
|---------------------------------|---------------------------------|---------------------------------|
|                                | RANK: K-MAAP©                  | RANK: CITATION INDEX            | RANK: H-INDEX                  |
| Correlation Coefficients       | Anesthesia 0.3082              | Surgery 0.1343                  | Peds 0.0701                    |
|                                | Anesthesia 0.1026              | Surgery 0.0375                  | Peds -0.0581                   |
|                                | Anesthesia 0.0783              | Surgery -0.0582                 | Peds 0.0086                    |
| t-value                        | 1.9970                         | 0.8352                         | 0.433                         |
|                                | 0.6360                         | 0.2315                         | -0.359                        |
|                                | 0.4841                         | 0.3591                         | 0.0528                        |
| Sig. (2-tailed)                | 0.0530                         | 0.2919                         | 0.6674                        |
|                                | 0.5286                         | 0.8182                         | 0.7216                        |
|                                | 0.6311                         | 0.7215                         | 0.9581                        |
| N                              | 40                             | 40                             | 40                            |

As Table 5.11 demonstrates, none of the research-related items that were tested correlated with the teaching effectiveness scores. Only the Anesthesia K-MAAP© ranking had any relationship to teaching effectiveness, the correlation coefficient denoting a weak positive relationship (0.3082). The K-MAAP© ranking for Surgery and Pediatrics were not at all related to the teaching effectiveness scores (e.g., correlation coefficient of 0.0701 for Pediatrics and 0.1343 for Surgery). All other correlations were insignificant. In this sample, highly ranked researchers are not necessarily highly-ranked clinical teachers.
Group Level Impact, Effort and Productivity

The K-MAAP© is a tool that was primarily designed to analyze and assess academic productivity, performance and the impact of research outputs. As such, volumes of publications, grants or invited lectures are not of key importance, but rather, the impact and longer-term outcomes produced by academic outputs are key. The K-MAAP© points are awarded in relation to the role, or effort, that has been expended on specific activities. In the case of peer-review publications, points are awarded on the basis of the impact factor of the journal, plus the author’s role. Figures 5.3, 5.4 and 5.5 demonstrate the group level impact and productivity patterns of peer-reviewed publications between 2006 and 2011 for each department.

Figure 5.3 depicts peer-reviewed publications Anesthesia. The majority of impact is demonstrated as a PI on low impact journal publications, followed by work as a collaborator on low impact journal publications. While individual patterns of productivity varied, a two-year cycle of effort – for the department as a whole - emerged on these types of publications.

![Figure 5.3: Impact, Productivity and Productivity Cycles: Anesthesia Peer-Reviewed Publications, 2006/07 to 2010/11](image)

Figure 5.4 shows peer-reviewed publications for Surgery. In keeping with Anesthesia, the vast majority of effort and productivity is spent on work as a first-author, senior responsible author
(green line) or collaborator (blue line) on publications in low-impact journals. The volumes of K-MAAP® points are higher than Anesthesia overall. However, Surgery also follows a two year cycle of productivity peaks (though the fluctuations are less significant than in Anesthesia). Most of Surgery’s outputs are as collaborators on low impact journals, not as PIs as in Anesthesia and Pediatrics:

Finally, Figure 5.5 depicts the same information for Pediatrics. A two-year cycle appears to emerge for effort as a collaborator or PI low impact journals (a steady increase is shown). Again, the overall levels of productivity – as shown by K-MAAP® points - are higher than for Surgery or Anesthesia:
Similar constructs were used to depict effort, impact and productivity for peer-reviewed grants and invited lectures. These graphs are not presented here, but can be found in Appendix 5.5. For all three departments, the majority of invited lectures demonstrated national level impact, while grants showed more equal distribution (effort as co-PI on national grants, as PIs on provincial grants, and as collaborators).

**Impact, Productivity and Individual Productivity “Cycles”**

As noted in the research methods section, the individual productivity cycles for each of the academic physicians included in the University of Toronto and University of Manitoba case studies were plotted individually using a pattern-match construct and the K-MAAP© (n=150). The productivity patterns that emerged varied quite a bit, with a 2-3 year “cycle” of productivity peaks and valleys detected for most PIs. As an example, PI #A is a senior, well-established, full professor (last promoted in the early 1990s). Productivity has been very high over time despite low levels of grant funding. Table 5.11 depicts the rankings across all quantitative and bibliometric systems:

<table>
<thead>
<tr>
<th>PI# A</th>
<th>Total K-MAAP© Points</th>
<th>Rank: K-MAAP©</th>
<th>Rank: Peer-Review</th>
<th>Rank: Citation Index</th>
<th>Rank: h-index</th>
<th>Rank: Teaching Evaluations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,294</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>36</td>
</tr>
</tbody>
</table>

Figure 5.6 depicts productivity, denoted through the K-MAAP©, for 2006/07 to 2010/11:

---

44 Several of the details which might identity PI #A have been removed, and a unique identifier (“PI A”) has been created for this chapter.
Productivity for PI #A is very high, driven in large part by large volumes of publications, and thus, K-MAAP© points. Figure 5.7 demonstrates that the majority of impact is as a first or senior responsible author on peer-reviewed publications in low-impact journals:

PI # A has a moderate number of K-MAAP© points via invited lectures, with most impact at the national level:
As noted, PI A requires very little grant support to fuel productivity. The points achieved through the K-MAAP© typology are low in comparison with others in the sample. Figure 5.9 shows that the majority of effort (defined as the percentage of time) is spent as a collaborator on grants:

PI #A is clearly a highly productive, senior researcher. While not the focus of this dissertation, the K-MAAP© was also applied to the outputs of PI# A for the first five years after the academic appointment was commenced; I then applied data mining algorithms to the K-MAAP© data to attempt to forecast trends and identify possible future patterns. Indeed, mining historical
data can provide a reliable basis for accurate forecasting (Finlay, 2014). Predictive analytics is a branch of data mining that helps forecast probabilities and trends. SQL Server predictive analysis software was employed to build a time series analytical model to forecast future productivity – for the next 9 years (i.e., years 6 to 15, post academic appointment). Figure 5.10 depicts the results visually:

**Figure 5.10: PI #A K-MAAP Predictive (Years 1-9)**

As predicted in Figure 5.10, and as demonstrated through Figure 5.6, peer-reviewed publications showed a dramatic, upwards increase, grants showed some initially fluctuations, but then remained fairly low, and lectures decreased somewhat. From a statistical perspective only, future predictions could be more nuanced if a larger data set had been included (i.e., longer period of time). Of course, the K-MAAP© predictive model doesn’t capture human motivation, and all the factors that contribute to productivity such as protected academic time, resources, engagement, organizational commitment, and of course, personal factors.

From the perspective of an academic leader, the results produced by PI #A certainly helped to drive the department’s results. Unfortunately, others in the sample demonstrated significant
declines in productivity over the course of the five-year study period. In some cases, junior PIs demonstrated very low levels of productivity. In these instances, the K-MAAP© may provide academic leaders with a useful tool to consider career-development or mentorship strategies – before a formal peer-based evaluation takes place.

**Chapter Summary**

Each of the three departments featured in the University of Toronto case study use a different model to compensate, incentivize and assess academic physicians. This chapter presented and analyzed quantitative and bibliometric data sets on academic productivity, impact and performance.

As shown in Figure 5.1, the Department of Anesthesia demonstrated an overall increase in productivity during the study period with a small decline towards the end of the study period. Certainly, the merit awards program – an individually focused system -- helps the practice plans to fund academic time and recognizes the effort, impact and productivity of the Clinician Scientists and Clinician Investigators who obtained funding. This is not insignificant in a university department as large, diverse and distributed as those at the University of Toronto, and of note, several other academic departments in Canada are now looking at implementing this type of system. However, the practice plan has greater control over academic productivity than the university does given that the plan allocates academic time, contributes significant resources to the academic mission, and controls the financial compensation and benefits that academic physicians in Anesthesia receive. While there is no doubt that the sample’s productivity did increase between 2006 and 2011, it is difficult to attribute this directly to the merit awards program as other factors may have contributed to this increase as well.

In contrast, the Department of Pediatrics’ Career Development and Compensation Program is a hybrid system which includes both individual elements (triennial reviews with tailored feedback,
mentorship, individualized salary levels/movements through a salary grid) and group-level features (annual bonuses for all, triennial peer review assessments, pre-established salary grid). The chair noted that the underlying philosophy of the program is based on equity, transparency, and accountability. Pediatrics also demonstrated an increase in productivity and impact over the five-year study period, with greater volumes of K-MAAP© points than Anesthesia or Surgery. While it is difficult to ascribe this increase in academic productivity to the compensation or bonus system alone, it is very likely that this growth could be ascribed to the comprehensive nature of the CDCP. It must be emphasized that in Pediatrics, the department is on an academic comprehensive AFP and the chair is also the hospital chief; as such, he has control over recruitment and retention, protected academic time, clinical workload, salary/compensation levels, benefits, career development strategies, mentorship programs, and academic resources/ supports. That is not the case in Anesthesia or Surgery. Again, it is possible that the base salary plus a monetary incentive (bonus) is working to stimulate or encourage productivity. The difficulty is that a few other factors could have contributed to this increase as well. Certainly, the drive, motivation, talent and hard work of individual academic physicians should be taken into account. Much of this may also be attributed to the leadership of the chair. Thus, one must wonder how much of the increase in productivity can be ascribed to the personal characteristics of those included in the sample vs. the compensation/development program vs. the leadership style of the chair.

The Department of Surgery’s academic points system is a group-based program that offers a small annual bonus to all faculty members. The K-MAAP© analysis demonstrated stability but no increase in overall, group-level productivity/impact for the period 2006/07 to 2010/11 (Figure 5.1). The bonus system also represents a flat incentive of sorts, in that the bonus is expected, ongoing, and comprises a small percentage of gross income. Everyone gets a bonus – every year. Similar to Anesthesia though, the practice plans controls the allocation of academic time, the scores achieved
through the academic points system (Surgery uses internal peer review only), and ultimately, the
delay of the bonus awarded as the AFP academic funds support the academic points system. Like
Anesthesia, compensation, benefits, and mentorship programs are enacted mostly at the practice
plan level, in collaboration with the university leadership. It is worth mentioning that Surgery
recently decided to review their system with a goal towards utilizing limited financial resources in a
manner that is most efficacious for the academic goals of the department.
Chapter Six: Case Study # 2 (Internal Medicine, University of Manitoba)

Overview: Internal Medicine in Canada

Internal Medicine comprises several sub-specialties including cardiology, gastroenterology, general internal medicine (GIM), immunology, medical oncology, nephrology, respirology, and rheumatology. In this chapter, data is presented on each of these sub-specialties, where available, as these areas also correspond with the academic and clinical appointments of those academic physicians included in this case study.

The 2010 Canadian National Physician Survey (CNPS) indicates that there were 5,407 practicing physicians in the specialties noted above (an average of 67.3% or 3,638 internal medicine specialists are male). Just three years later, the total number of specialists in these specialties internal medicine had grown by 21% to 6,528 (CNPS 2013). Table 6.1 summarizes the distribution across specialties and also by gender:

<table>
<thead>
<tr>
<th></th>
<th>Cardio</th>
<th>Gastro</th>
<th>Immun</th>
<th>General Int Med</th>
<th>MedOnc</th>
<th>Nephro</th>
<th>Respir</th>
<th>Rheum</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Male</td>
<td>79.8%</td>
<td>65.1%</td>
<td>34.5%</td>
<td>62.2%</td>
<td>46.2%</td>
<td>61.4%</td>
<td>68.3%</td>
<td>52.2%</td>
</tr>
<tr>
<td>% Female</td>
<td>11.3%</td>
<td>25.0%</td>
<td>62.0%</td>
<td>28.1%</td>
<td>48.8%</td>
<td>33.5%</td>
<td>25.3%</td>
<td>37.9%</td>
</tr>
<tr>
<td>No response</td>
<td>8.9%</td>
<td>10.0%</td>
<td>3.5%</td>
<td>9.7%</td>
<td>5.0%</td>
<td>5.1%</td>
<td>6.4%</td>
<td>9.9%</td>
</tr>
<tr>
<td>Totals:</td>
<td>1,098</td>
<td>568</td>
<td>214</td>
<td>2,561</td>
<td>394</td>
<td>579</td>
<td>722</td>
<td>392</td>
</tr>
</tbody>
</table>

Fifty-eight percent (3,142) physicians who responded to the 2013 national physician survey were full-time faculty members in Canadian medical schools in 2013, with an additional 20% (1,013) defined as part-time faculty in non-AHSC teaching hospitals. In other words, over 78% of all practicing internal medicine specialists in the country were to some extent academic physicians as of 2013. Given the growth of regional medical centres and community-based teaching and research since 2010, the overall percentage of internal medicine specialists who engage in some form of
academic work is likely higher in 2015\textsuperscript{45}. This does not however explain the growth of 21% in the number of specialists described on the previous page.

The 2013 CNPS provided a fair bit of details on compensation methods for physicians (in contrast to the 2014 and previous CNPS surveys). Table 6.2 depicts the primary remuneration methods by source for internal medicine specialists in Canada vs. all physicians, per the 2013 national physician survey:

| Table 6.2: Primary Remuneration Method by Source (Internal Medicine vs. All Physicians) |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                                 | Cardio         | Gastro         | Immun          | GIM            | MedOnc         | Nephro         | Respir         | Rheum          | All Physicians |
| 90\%+ Fee for Service           | 65.2\%         | 57.8\%         | 49.6\%         | 49.6\%         | 17.8\%         | 58.5\%         | 43.9\%         | 51.6\%         | 37.6\%         |
| 90\% Fee for Service (uninsured)| 0.0\%          | 1.0\%          | 0.0\%          | 0.7\%          | 0.0\%          | 1.0\%          | 1.2\%          | 0.0\%          | 0.8\%          |
| 90\%+ Salary                    | 4.8\%          | 8.9\%          | 5.8\%          | 8.3\%          | 37.7\%         | 7.6\%          | 3.9\%          | 8.6\%          | 8.7\%          |
| 90\%+ Capitation                | 0.0\%          | 0.0\%          | 0.0\%          | 0.6\%          | 0.0\%          | 0.0\%          | 0.0\%          | 0.0\%          | 0.2\%          |
| 90\%+ Sessional/ per diem/ hourly | 0.0\%         | 0.0\%          | 0.0\%          | 1.5\%          | 3.9\%          | 0.0\%          | 0.0\%          | 0.0\%          | 3.0\%          |
| 90\%+ Service contract          | 1.2\%          | 2.8\%          | 0.0\%          | 1.7\%          | 5.3\%          | 1.0\%          | 3.2\%          | 2.7\%          | 4.3\%          |
| 90\%+ Incentives and premiums   | 0.2\%          | 0.0\%          | 0.0\%          | 0.0\%          | 0.0\%          | 0.0\%          | 0.0\%          | 0.0\%          | 0.0\%          |
| 90\%+ Other                     | 0.4\%          | 4.5\%          | 0.0\%          | 1.5\%          | 1.2\%          | 1.0\%          | 2.6\%          | 1.2\%          | 1.8\%          |
| Blended                         | 23.5\%         | 19.5\%         | 44.6\%         | 32.4\%         | 32.4\%         | 31.0\%         | 42.6\%         | 33.8\%         | 39.8\%         |
| No Response                     | 4.8\%          | 5.5\%          | 0.0\%          | 3.7\%          | 1.7\%          | 0.0\%          | 2.6\%          | 2.1\%          | 3.6\%          |

Source: Reproduced from the National Physician Survey 2013

The 2013 CNPS also indicates that an average of 48\% of respondents practicing in internal medicine receive some form of remuneration for teaching. Of that percentage, just over 56\% received payment for teaching over and above clinical earnings, with the average across all medical specialties lower at 53.7\%. The source of teaching payments is depicted in Table 6.3:

\textsuperscript{45} Source: Canadian National Physician Survey http://nationalphysicianssurvey.ca/.
Finally, the Canadian Medical Association (CMA), citing the Canadian Institute for Health Information (CIHI) Average Gross Fee-for-Service Payment Report for 2005-2006, indicates that the average gross fee-for-service billing per physician practicing in internal medicine was $319,651. Five years later, the Canadian Medical Association reported that the average gross clinical earnings for internal medicine in 2011/12 were $371,595, an increase of just over 16% (source: National Physician Database, 2010/11 Canadian Institutes for Health Research). It should be noted that Internal Medicine has also grappled with personnel shortages including the sub-specialties of general internal medicine, geriatrics, rheumatology, and neurology. These shortages may have resulted in the supply-demand effect on compensation and clinical billings.

**Research Question**

This case study explored the following research question: Does the department’s research performance review and compensation program impact upon the overall academic productivity of the department?
Overview: Department of Medicine Compensation and Assessment Program

Academic Appointments

The Department of Internal Medicine at the University of Manitoba comprises 197 full-time or geographic full-time (GFT) clinical faculty plus an additional 55 part-time clinical faculty members. Geographic full-time clinical positions are available in many medical schools in Canada, but not all.

At this university, the following definition is used,

A geographic full-time academic staff member is one whose professional activities are based at the University’s Faculty of Medicine or its affiliated teaching hospitals, who may receive income from professional practice from sources other than the university and its affiliated teaching hospitals, and who is a signatory of a Geographical Full-Time Agreement with the University (the “GFT member”) and who may only carry on a clinical practice inside University approved facilities.

“Full-time faculty” are defined here as,

An academic staff member with the rank Professor, Associate Professor, Assistant Professor or Lecturer who is appointed for an academic year with a normal work load (i.e., 1.0 FTE or 40 hours per week) and whose assigned duties include a combination of 1) research and scholarly activities, 2) teaching, and 3) service and administration.46

GFT faculty in the department have a significant role in education, research or administration. Part-time faculty have a “strong clinical load with some commitment to education”. Unlike some other universities, part-time faculty are not necessarily based in community or regional hospitals or sites; they can be situated within the academic health science centre. There are very few academic clinicians defined as “Adjunct” at this university (this role is related to those individuals who are doing research with a PI). Part-time academic appointments are renewed every two years, while full-time positions are continuing once the initial probationary period of three years has passed.

Operating Budget

Full-time faculty members are recruited into the GFT positions available through the university, but unlike other universities in Canada, only a small base salary of $5,375 is provided by the university over and above clinical earnings.

Internal Medicine does not offer a performance-based bonus. Faculty members are however moved along a salary grid every three years, following internal review. “Tenured” positions were previously available for clinical faculty in this department, however, the chair persuaded the university to convert the funding provided for those positions into the department’s operating budget (only three faculty remain in tenured positions). It is noteworthy that the previous tenure arrangement did not include a life-long guarantee of a job, but a salary guarantee was provided contingent on the academic physician maintaining a clinical position.

When the chair commenced his appointment, all academic physicians in research streams were provided with a significant base salary, plus a share of clinical earnings. For practice plan members, the revenue sharing scheme for the clinical earnings was focused around a “ceiling” or a capitation scheme of sorts. Since the 1970s, practice plan members worked up to the capitation level (to generate a specific dollar figure from clinical revenues), but above that ceiling, the department tithed the earnings at “60 cents on the dollar”. The chair noted that this was done, as a way of making sure that academics actually didn’t have a monetary incentive to encroach on their academic time... But I thought it was problematic because people will do it anyway... And of course then you have other people who worked just to their ceiling. And so the revenue coming into the department was not predictable and was actually low. The people who were generating high clinical incomes felt that they were subsidizing the department.

When the chair started, the tithe comprised 14% of gross clinical income. However, the chair revised the department’s budget model (both the clinical and the academic side), generating a surplus within one year. The tithe was then lowered to 12.5% of gross clinical earnings, and new academic supports and programs were implemented. Part-time faculty are tithed at the rate of 10%. This is
consistent with Holmes et al who indicate that 10% of practice plan earnings are used to subsidize the research mission of the university (2000:92). There is no cap or ceiling on clinical earnings, however, those in research or education-focused job streams are assessed on their academic performance. The percentage FTE of protected academic time (referred to by this department as the “research commitment”) is also strictly monitored by the chair, division heads and section heads. Additionally, a research salary is provided, and is directly connected to protected academic time and performance. This is very different from the departments included in the University of Toronto case study.

**AFP for Internal Medicine**

The department is funded through three major sources: university funding, a blended-model AFP for some clinical sub-specialties, and clinical revenues. It is important to highlight that the chair serves as both the head of the university department, the clinical department and the practice plan (his title is in fact “Department Head” not “Chair”). Clinical revenues are derived on the basis of the provinces fee-for-service payment plan, and are directed to the practice plan (not to individual physicians). There are only a few AFPs in Manitoba; those that exist provide salary directly to the physicians in question (e.g., laboratory medicine). Some AFP monies are used to support the academic mission. Here, we have an example of a department/practice plan which clearly provides direct financial contributions in support of the academic mission of the university.

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47 Protected academic time is defined as release time from clinical activities to dedicate to research endeavors, non-teaching.

48 A blended model AFP often includes a base rate per service, incentive/premium payments (e.g., for clinical call duties) and sometimes, even a fee-for-service component (or shadow billings). [http://www.healthforceontario.ca/en/Home/Physicians/Training_%26_Pracitising_in_Ontario/Physician_Roles/Specialist_Practice_Models](http://www.healthforceontario.ca/en/Home/Physicians/Training_%26_Pracitising_in_Ontario/Physician_Roles/Specialist_Practice_Models). Information for Manitoba in particular was not available online.
Research Performance Assessment Program

In 2005, Internal Medicine implemented a new, peer-reviewed (external and internal), Research Performance Assessment Program (RPAP). All 197 GFT faculty members in the department are included in the performance reviews which take place every three years on a rotating basis. The outcomes of the review then determine the research salary as well as the allocation of protected academic time for the next three years; this creates a clean method to calculate the return-on-cost for academic outputs and productivity using the K-MAAP®. Further, prior to the implementation of the research performance assessment program, the chair indicated that academic performance was highly variable, and did not always correlate with the amount of academic salary or protected academic time that was allocated.

The department’s academic performance reviews are conducted by a Review Committee consisting of department heads, senior leaders plus an external reviewer. The reviews focus on research documentation provided in the Curriculum Vitae, a statement of work, data on grants, publications, patents and research trainees, and the section head’s report49. The recommendations of the Review Committee are forwarded to the Faculty Development Committee for their recommendations, and then to the chair for action.

The terms of reference for the research performance assessment program as well as the academic job descriptions for each academic physician outline the research commitment that is required and the outputs that may be expected. The levels of research commitment are categorized as <25%, 25-50%, 50-75% and 75%+. For each level, the expectations are clearly outlined. As an example, those with a research commitment of 75%+ are expected to have grant funding from one or more national sources plus local sources, one or more full-time research trainees plus additional part-time trainees, and 3-5 publications per year with one or more in a high impact journal.

49 The chair noted that academic work undertaken by trainees (fellows, residents, graduate students) is not included in the review.
Case Study Overview

Initially, the fourth institutional case study in this dissertation was to be McGill University; however, the data that were required could not be generated. Academic leaders at McGill had knowledge of Manitoba’s Internal Medicine program, and considered it to be innovative and efficacious. The chair was contacted directly, and consented to participate. The compensation and assessment system used by this department comprises another unique methodology based on the findings of my research and the national level survey. This system is also comprehensive in that it includes compensation, a research salary that is accounted for – and allocated – separately from the total compensation package, protected academic time, a well-articulated career development component, and academic/clinical assessment (using an internal/external peer review process). The system does not include a bonus or monetary incentive. Thus, the research performance assessment program can be characterized as a hybrid system; all geographic full-time faculty members in the department are included in the system and thus it is group-based. However, the research performance assessment program also addresses individual needs and performance, allowing varying compensation levels and differentiation amongst the group.

To ensure consistency across all of the case studies, this case study focuses on those academic physicians who have been categorized as full-time academic physicians with a significant “research commitment” as defined by the university. Each PI receives at least one form of university funding. The faculty included in this case study are not explicitly defined as “Clinician Scientists” or “Clinician Investigators”, but they are considered to be the equivalent.

Sample

The total study sample of academic physicians (defined as those with a significant research commitment) for this department is 30 (n). Several faculty members with a research commitment were excluded from the initial sample of 40 if they were not an MD (clinician), if an updated CV
could not be produced, or if they commenced their academic appointment after 2006. Table 6.4 summarizes the final sample and exclusion criteria:

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total faculty with a research commitment</td>
<td>58</td>
<td>100%</td>
</tr>
<tr>
<td>Faculty with a start date after 2007</td>
<td>13</td>
<td>22%</td>
</tr>
<tr>
<td>Faculty with an incomplete CV for 2006 to 2011</td>
<td>6</td>
<td>10%</td>
</tr>
<tr>
<td>Faculty excluded: non-MD PhDs</td>
<td>9</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Total Case Study Sample:</strong></td>
<td><strong>30</strong></td>
<td></td>
</tr>
</tbody>
</table>

A purposeful sample was chosen with faculty representing various academic ranks from Lecturer to full Professor, divisions, international medical graduates/Canadian medical graduates, and a mix of males/females. The characteristics of the sample are further characterized in Table 6.5:

<table>
<thead>
<tr>
<th>Academic Rank</th>
<th>Number</th>
<th>Percentage</th>
<th>Division</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer</td>
<td>1</td>
<td>3%</td>
<td>Cardiology</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>6</td>
<td>20%</td>
<td>Critical Care</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>9</td>
<td>30%</td>
<td>Gastroenterology</td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td>Full Professor</td>
<td>13</td>
<td>43%</td>
<td>Internal Medicine</td>
<td>6</td>
<td>20%</td>
</tr>
<tr>
<td>Full Professor (tenure)</td>
<td>1</td>
<td>3%</td>
<td>Medical Oncology</td>
<td>3</td>
<td>10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Percentage</th>
<th>Division</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>9</td>
<td>30%</td>
<td>Neurology</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
<td>70%</td>
<td>Occupational Health</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Physiatry</td>
<td>1</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMG/CMG</th>
<th>Number</th>
<th>Percentage</th>
<th>Division</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMG</td>
<td>9</td>
<td>30%</td>
<td>Rheumatology</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>CMG</td>
<td>21</td>
<td>70%</td>
<td>Rheumatology/Immunology</td>
<td>1</td>
<td>3%</td>
</tr>
</tbody>
</table>

Methods

The same time period was used for all case studies, 2006/07 to 2010/11. As detailed in Chapter 3, a mixed methods approach was used. For this department, the methodology also consisted of four distinct sub-phases: document analysis, quantitative/bibliometric analyses, productivity/predictive analysis, and qualitative interviews. Again, the results of the qualitative interviews are reported on in Chapter 8.
Results

Group Level Productivity

Overall group level outputs (calculated using the K-MAAP©) increased over a two-year period between 2006/07 and 2007/08, showed a slight decrease in 2008/09 (15.5%), increased again by 8.5% in 2009/10 and then remained stable in 2010/11. Figure 6.1 depicts group-level performance for the study period:

As shown in Figure 6.1, the K-MAAP© points awarded to grants held by department members increased in 2006/07 and then remained fairly stable over the five-year study period, but overall, a slight peak was exhibited in 2007/08 due to an increase in invited lectures. Peer-reviewed grants and peer-reviewed publications demonstrated a near flat-line effect. Table 6.6 depicts these fluctuations and quantifies the percentage increase/decrease in growth in a tabular form:
<table>
<thead>
<tr>
<th>Year</th>
<th>Total K-MAAP©</th>
<th>Publications</th>
<th>Invited Lectures</th>
<th>Grants</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006/07</td>
<td>590</td>
<td>240</td>
<td>252</td>
<td>98</td>
</tr>
<tr>
<td>2007/08</td>
<td>896</td>
<td>222</td>
<td>528</td>
<td>146</td>
</tr>
<tr>
<td>2008/09</td>
<td>757</td>
<td>272</td>
<td>334</td>
<td>151</td>
</tr>
<tr>
<td>2009/10</td>
<td>822</td>
<td>241</td>
<td>415</td>
<td>163</td>
</tr>
<tr>
<td>2010/11</td>
<td>818</td>
<td>267</td>
<td>421</td>
<td>130</td>
</tr>
</tbody>
</table>

% change (1 year)

<table>
<thead>
<tr>
<th>Year</th>
<th>% change (1 year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006/07</td>
<td>51.86%</td>
</tr>
<tr>
<td>2007/08</td>
<td>-7.5%</td>
</tr>
<tr>
<td>2008/09</td>
<td>109.52%</td>
</tr>
<tr>
<td>2009/10</td>
<td>10.78%</td>
</tr>
<tr>
<td>2010/11</td>
<td>1.45%</td>
</tr>
</tbody>
</table>

It should be emphasized that the department’s overall K-MAAP© score (productivity) is in large part being driven by the contributions of three academic physicians, PIs # 122, 128, and 130. The invited lectures of PI # 30 are particularly high. This is revealed in Appendix 6.1.

Unlike the University of Toronto departments reported on thus far, the Internal Medicine program does not offer a monetary incentive or bonus. Thus, the fluctuations in productivity cannot be attributed to an incentive based on merit. Many factors could have contributed to the variable levels of productivity. First, the original sample included a significant percentage of junior faculty who commenced their academic appointment after 2006, and thus were excluded from the final sample (13 academic physicians or 30% of those with a research commitment in the department). Of the remaining 30 academic physicians, 6 (20% of the total sample for this case study) had commenced their academic appointments within the past five years. Second, of those included in the final sample, 9 individuals (30% of the final sample of 30 academic physicians) applied for promotion during the study period. One might expect some increases to productivity before or during the academic promotion cycle. Thus, the relationship between academic promotions dates and peak productivity (as determined by K-MAAP© points) was tested. No significant relationship was detected using a t-test (i.e., productivity did not increase significantly in the year immediately before/after academic promotion). Third, the model does not account for any changes to the
research environment that might have occurred or clinical issues that contributed to the provision of protected academic time. These data sets were compared and contrasted against the University of Toronto sample in Chapter 9.

**Peer-Reviewed Publications**

It should be restated that the K-MAAP© is a tool that assesses academic productivity, performance and the impacts of research outputs, but can also be used to quantify, map and illustrate academic outputs, impact and effort over time (effort is defined as the percentage of academic time spent on an activity). Figure 6.2 maps the level of productivity and impact (expressed as K-MAAP© points) for the period 2006/07 to 2010/11. As shown, an increase in productivity and impact was primarily achieved for activities as a collaborator on low impact papers, followed by effort as a PI on low impact publications. Productivity – either as a PI or a collaborator – in high or super high journals was flat.

The same K-MAAP© calculations were done for invited lectures and grants, and various graphs and charts were produced. The majority of impact on invited lectures, similar to the UofT departments, was at national level conferences and meetings. For grants, the majority of impact and
effort was as a collaborator on grants, followed by activities as PI on national level grants (see Appendix 6.1).

Results: Internal Medicine Research Performance Assessments

As noted, the department conducts peer-based, research performance assessments for all GFT clinical faculty with a research commitment. On the basis of those assessments, salary modifications are made, and protected academic time is allocated. Table 6.7 demonstrates the percentage change in research salary and protected academic time over the five-year period of this study, 2006/07 to 2010/11:

<table>
<thead>
<tr>
<th>PI #</th>
<th>Academic Rank</th>
<th>% FTE Protected Academic Time</th>
<th>% Change Protected Time</th>
<th>% Change Research Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>121</td>
<td>Professor</td>
<td>40% 40%</td>
<td>0.00%</td>
<td>20.28%</td>
</tr>
<tr>
<td>122</td>
<td>Professor</td>
<td>60% 60%</td>
<td>0.00%</td>
<td>9.68%</td>
</tr>
<tr>
<td>123</td>
<td>Professor</td>
<td>50% 50%</td>
<td>0.00%</td>
<td>6.27%</td>
</tr>
<tr>
<td>124</td>
<td>Associate</td>
<td>0.00 25%</td>
<td>2400%</td>
<td>0.00%</td>
</tr>
<tr>
<td>125</td>
<td>Assistant</td>
<td>50% 50%</td>
<td>0.00%</td>
<td>16.84%</td>
</tr>
<tr>
<td>126</td>
<td>Associate</td>
<td>40% 50%</td>
<td>25%</td>
<td>89.43%</td>
</tr>
<tr>
<td>127</td>
<td>Professor</td>
<td>50% 50%</td>
<td>0.00%</td>
<td>11.14%</td>
</tr>
<tr>
<td>128</td>
<td>Associate</td>
<td>40% 40%</td>
<td>0.00%</td>
<td>23.16%</td>
</tr>
<tr>
<td>129</td>
<td>Associate</td>
<td>30% 25%</td>
<td>-16.67%</td>
<td>33.33%</td>
</tr>
<tr>
<td>130</td>
<td>Associate</td>
<td>40% 40%</td>
<td>0.00%</td>
<td>16.93%</td>
</tr>
<tr>
<td>131</td>
<td>Professor</td>
<td>25% 25%</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>132</td>
<td>Assistant</td>
<td>50% n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>133</td>
<td>Assistant</td>
<td>30% 30%</td>
<td>0.00%</td>
<td>43.72%</td>
</tr>
<tr>
<td>134</td>
<td>Professor</td>
<td>60% 60%</td>
<td>0.00%</td>
<td>82.25%</td>
</tr>
<tr>
<td>135</td>
<td>Professor</td>
<td>60% 60%</td>
<td>0.00%</td>
<td>5.23%</td>
</tr>
<tr>
<td>136</td>
<td>Professor</td>
<td>50% 50%</td>
<td>0.00%</td>
<td>36.48%</td>
</tr>
<tr>
<td>137</td>
<td>Lecturer</td>
<td>0.00 30%</td>
<td>3000%</td>
<td>6.99%</td>
</tr>
<tr>
<td>138</td>
<td>Associate</td>
<td>0.00 25%</td>
<td>2500%</td>
<td></td>
</tr>
<tr>
<td>139</td>
<td>Professor</td>
<td>40% 40%</td>
<td>0.00%</td>
<td>26.37%</td>
</tr>
<tr>
<td>140</td>
<td>Assistant</td>
<td>75% 50%</td>
<td>-33.33%</td>
<td>-40.43%</td>
</tr>
<tr>
<td>141</td>
<td>Professor</td>
<td>30% 30%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>142</td>
<td>Professor</td>
<td>50% 25%</td>
<td>-50%</td>
<td>-63.59%</td>
</tr>
<tr>
<td>PI #</td>
<td>Academic Rank</td>
<td>% FTE Protected Academic Time</td>
<td>% Change Protected Time</td>
<td>% Change Research Salary</td>
</tr>
<tr>
<td>------</td>
<td>---------------</td>
<td>--------------------------------</td>
<td>-------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2006/07</td>
<td>2010/11</td>
<td></td>
</tr>
<tr>
<td>143</td>
<td>Professor</td>
<td>70%</td>
<td>70%</td>
<td>0.00%</td>
</tr>
<tr>
<td>144</td>
<td>Assistant</td>
<td>25%</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>145</td>
<td>Professor</td>
<td>0.00</td>
<td>50%</td>
<td>5000%</td>
</tr>
<tr>
<td>146</td>
<td>Associate</td>
<td>25%</td>
<td>25%</td>
<td>0.00%</td>
</tr>
<tr>
<td>147</td>
<td>Assistant</td>
<td>25%</td>
<td>30%</td>
<td>20%</td>
</tr>
<tr>
<td>148</td>
<td>Assistant</td>
<td>50%</td>
<td>25%</td>
<td>-50%</td>
</tr>
<tr>
<td>149</td>
<td>Associate</td>
<td>40%</td>
<td>60%</td>
<td>50%</td>
</tr>
<tr>
<td>150</td>
<td>Assistant</td>
<td>25%</td>
<td>25%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Those PIs highlighted in blue demonstrated a decrease in research salary and/or protected academic time over the five year study period. The department’s research review process rewarded those PIs highlighted in grey with an increase in salary and protected academic time. It was noted previously that PIs # 122, 128 and 130 drive a high percentage of the department’s overall productivity. PI # 122 receives 60% FTE of protected academic time, while PIs 128 and 130 receive 40%. These numbers did not change during the study period, however, all three PIs did receive increases to their research salary. Table 6.7 shows that larger increases were awarded to several others PIs in the sample.

**Productivity (K-MAAP©), Research Investment and Return-on-Cost**

For this case study, we had access to the total research salary and the percentage full time equivalent of protected academic time (total days per week of protected academic time) for each year between 2006/07 and 2010/11. Both the research salary and protected academic time are inputs. Research productivity and impact could also be determined using the K-MAAP© assessment methodology (outputs). Figure 6.3, which is similar to an input-output model, demonstrates the process of contribution-to-deployment-to-results for the Internal Medicine case study:
A simple equation was then used to determine the research investment, denoted as the return on cost (ROC), or cost per K-MAAP© point. The ROC is derived from the gross annual research salary only. The equation is as follows:

**RETURN ON COST (ROC) = GROSS ANNUAL RESEARCH SALARY / TOTAL ANNUAL K-MAAP© POINTS**

This equation could be revised slightly to determine the cost per publication, per invited lecture, etc. Outputs could also be weighted differently depending on the strategic objectives of the department or institution (e.g., publications could “count more” than invited lectures).

**Return on Cost (ROC): 2006 to 2011**

Table 6.8 demonstrates the return on cost (defined as the cost per K-MAAP© point) for the period 2006/07 to 2010/11. Data in the table has been grouped by academic rank, with the median and average return on cost provided:

---

50 Additional data sets could be added to the K-MAAP© analysis (e.g., supervision of graduate students, books, chapters in books, abstracts, conference presentations, learner achievements, etc.).
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturers and Assistant Professors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>137</td>
<td>$0</td>
<td>$0</td>
<td>$31,350</td>
<td>$3,317</td>
<td>$16,772</td>
<td>$10,288</td>
</tr>
<tr>
<td>138</td>
<td>$7,345</td>
<td>$32,432</td>
<td>$4,085</td>
<td>$4,214</td>
<td>$3,839</td>
<td>$10,383</td>
</tr>
<tr>
<td>140</td>
<td>$11,572</td>
<td>$72,698</td>
<td>$6,822</td>
<td>$6,186</td>
<td>$2,098</td>
<td>$19,875</td>
</tr>
<tr>
<td>144</td>
<td>$862</td>
<td>$962</td>
<td>$1,316</td>
<td>$1,591</td>
<td>$2,489</td>
<td>$1,444</td>
</tr>
<tr>
<td>147</td>
<td>$21,109</td>
<td>$21,903</td>
<td>$8,291</td>
<td>$24,872</td>
<td>$3,965</td>
<td>$16,028</td>
</tr>
<tr>
<td>148</td>
<td>$8,000</td>
<td>$40,000</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$5,000</td>
<td>$18,600</td>
</tr>
<tr>
<td>150</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$4,286</td>
<td>$30,000</td>
<td>$15,560</td>
<td>$21,969</td>
</tr>
<tr>
<td>AVG</td>
<td>$13,148</td>
<td>$32,999</td>
<td>$7,467</td>
<td>$14,477</td>
<td>$5,492</td>
<td>$14,717</td>
</tr>
<tr>
<td>MEDIAN</td>
<td>$9,786</td>
<td>$31,216</td>
<td>$5,554</td>
<td>$13,093</td>
<td>$3,902</td>
<td>$17,314</td>
</tr>
<tr>
<td>Associate Professors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>124</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$1,875</td>
<td>$938</td>
<td>$563</td>
</tr>
<tr>
<td>125</td>
<td>$0</td>
<td>$6,475</td>
<td>$3,074</td>
<td>$1,809</td>
<td>$2,441</td>
<td>$2,760</td>
</tr>
<tr>
<td>126</td>
<td>$4,331</td>
<td>$9,572</td>
<td>$14,358</td>
<td>$2,872</td>
<td>$9,572</td>
<td>$8,141</td>
</tr>
<tr>
<td>128</td>
<td>$667</td>
<td>$579</td>
<td>$631</td>
<td>$1,287</td>
<td>$1,616</td>
<td>$956</td>
</tr>
<tr>
<td>129</td>
<td>$15,000</td>
<td>$15,000</td>
<td>$18,359</td>
<td>$6,120</td>
<td>$20,000</td>
<td>$14,896</td>
</tr>
<tr>
<td>130</td>
<td>$551</td>
<td>$226</td>
<td>$591</td>
<td>$435</td>
<td>$603</td>
<td>$481</td>
</tr>
<tr>
<td>132</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>138</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$4,000</td>
<td>$800</td>
</tr>
<tr>
<td>146</td>
<td>$208</td>
<td>$270</td>
<td>$269</td>
<td>$202</td>
<td>$619</td>
<td>$314</td>
</tr>
<tr>
<td>149</td>
<td>$3,611</td>
<td>$5,735</td>
<td>$4,329</td>
<td>$5,245</td>
<td>$13,111</td>
<td>$6,406</td>
</tr>
<tr>
<td>AVG</td>
<td>$2,437</td>
<td>$3,786</td>
<td>$4,161</td>
<td>$1,984</td>
<td>$5,290</td>
<td>$3,532</td>
</tr>
<tr>
<td>MEDIAN</td>
<td>$878</td>
<td>$379</td>
<td>$425</td>
<td>$611</td>
<td>$1,548</td>
<td>$2,028</td>
</tr>
<tr>
<td>Full Professors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>121</td>
<td>$3,401</td>
<td>$2,224</td>
<td>$3,854</td>
<td>$5,524</td>
<td>$7,727</td>
<td>$4,546</td>
</tr>
<tr>
<td>122</td>
<td>$2,465</td>
<td>$1,027</td>
<td>$1,208</td>
<td>$1,337</td>
<td>$710</td>
<td>$1,349</td>
</tr>
<tr>
<td>123</td>
<td>$0</td>
<td>$0</td>
<td>$1,290</td>
<td>$2,222</td>
<td>$1,667</td>
<td>$1,036</td>
</tr>
<tr>
<td>127</td>
<td>$3,803</td>
<td>$4,754</td>
<td>$6,313</td>
<td>$8,396</td>
<td>$14,852</td>
<td>$7,624</td>
</tr>
<tr>
<td>131</td>
<td>$4,291</td>
<td>$4,952</td>
<td>$4,439</td>
<td>$9,677</td>
<td>$9,677</td>
<td>$6,607</td>
</tr>
<tr>
<td>134</td>
<td>$1,848</td>
<td>$2,286</td>
<td>$4,923</td>
<td>$3,762</td>
<td>$4,382</td>
<td>$3,440</td>
</tr>
<tr>
<td>135</td>
<td>$3,397</td>
<td>$3,397</td>
<td>$3,438</td>
<td>$4,208</td>
<td>$3,679</td>
<td>$3,624</td>
</tr>
<tr>
<td>136</td>
<td>$10,000</td>
<td>$5,161</td>
<td>$6,667</td>
<td>$9,444</td>
<td>$32,000</td>
<td>$12,654</td>
</tr>
<tr>
<td>139</td>
<td>$22,152</td>
<td>$1,876</td>
<td>$526</td>
<td>$374</td>
<td>$546</td>
<td>$5,095</td>
</tr>
<tr>
<td>141</td>
<td>$17,696</td>
<td>$7,451</td>
<td>$6,456</td>
<td>$4,816</td>
<td>$4,181</td>
<td>$8,120</td>
</tr>
<tr>
<td>142</td>
<td>$0</td>
<td>$0</td>
<td>$13,143</td>
<td>$13,786</td>
<td>$14,057</td>
<td>$8,197</td>
</tr>
<tr>
<td>143</td>
<td>$6,615</td>
<td>$4,141</td>
<td>$3,532</td>
<td>$4,803</td>
<td>$5,523</td>
<td>$4,923</td>
</tr>
<tr>
<td>145</td>
<td>$0</td>
<td>$2,512</td>
<td>$3,718</td>
<td>$1,795</td>
<td>$3,536</td>
<td>$2,312</td>
</tr>
<tr>
<td>AVG</td>
<td>$5,821</td>
<td>$3,060</td>
<td>$4,577</td>
<td>$5,396</td>
<td>$7,887</td>
<td>$5,348</td>
</tr>
<tr>
<td>MEDIAN</td>
<td>$3,401</td>
<td>$2,512</td>
<td>$3,854</td>
<td>$4,803</td>
<td>$4,382</td>
<td>$4,923</td>
</tr>
</tbody>
</table>
Table 6.12 demonstrates that the average return-on-cost per K-MAAP© point is significantly lower for full Professors and Associate Professors than for Assistant Professors. This is demonstrated graphically in Figure 6.4:

While the cost per K-MAAP© point is indeed consistently higher for Assistant Professors, the total research salary costs, protected academic time and K-MAAP© points are predictably higher for Associate and Full Professors included in the sample.

Return on Cost (ROC): 2010/2011

It is important to look at these data sets closer. For illustration purposes, 2010/11 was chosen. The percentage FTE of release time, number of academic days per week, the total research salary commitment, the concomitant daily research salary rate, and the research salary investment (return-on-cost) per K-MAAP© point were calculated. The daily rate was also calculated on the basis of 40 weeks per year, and 7.5 hours per day. In 2010/11, the median cost per K-MAAP© points was $3,983. The average cost per K-MAAP© point was $7,118 (high of $32,000 and low of $546). The full data set for the Internal Medicine is included in Appendix 6.2.
Table 6.9 provides the average research salary, percentage FTE of protected academic time, days per week of protected academic time, total K-MAAP© points, and cost per K-MAAP© point for 2010/2011, by academic rank:

<table>
<thead>
<tr>
<th>Academic Rank</th>
<th>Total #</th>
<th>AVERAGE: % Protected Academic Time</th>
<th>AVERAGE: # Days/Week Protected Time</th>
<th>AVERAGE: Annual Research Salary</th>
<th>AVERAGE: Total K-MAAP© Points</th>
<th>AVERAGE: ROC/K-MAAP© Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>8</td>
<td>35%</td>
<td>2</td>
<td>$ 54,659</td>
<td>14</td>
<td>$ 11,387</td>
</tr>
<tr>
<td>Associate</td>
<td>8</td>
<td>35%</td>
<td>2</td>
<td>$ 65,421</td>
<td>34</td>
<td>$ 7,849</td>
</tr>
<tr>
<td>Professor</td>
<td>13</td>
<td>45%</td>
<td>2</td>
<td>$ 98,414</td>
<td>33</td>
<td>$ 7,673</td>
</tr>
<tr>
<td>TOTALS/ AVERAGES</td>
<td>30</td>
<td>35%</td>
<td>2</td>
<td>$ 63,596</td>
<td>21</td>
<td>$ 11,214</td>
</tr>
</tbody>
</table>

The total funding allocated to research salaries for the Internal Medicine sample in 2010/11 was $2,076,621. The number of protected academic days was 2,390 (or 17,925 hours based on 40 week’s per year, 7.5 hours per day). Figure 6.5 compares the total K-MAAP© (productivity) for 2010/11 to the ROC per K-MAAP© point for each PI included in the case study sample.

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51 The Lecturer included in the sample has been excluded to preserve confidentiality.

185
FIGURE 6.5: RESEARCH INVESTMENT – RETURN ON COST 2010/2011 (COST PER K-MAAP© POINT)
K-MAAP© Efficiency Ratings

In economics, “efficiency” refers to a condition whereby every resource is optimally allocated to each person in the best way, thus minimizing waste and inefficiency. In the case of academic productivity, efficiency refers to how much of a particular outcome (as represented by K-MAAP© points) can be obtained from a given input (academic resources provided to individual academics including research salary and protected academic time) with as little wastage as possible. Efficiency is the ability to avoid wasting materials, energy, efforts, money, and time in producing a desired result. It is a measurable concept, quantitatively determined by the ratio of useful output to total input. Given that we know the inputs which can be quantified (research salary, protected academic time), and we have a quantitative indicator of productivity (K-MAAP© points), efficiency can be calculated for the Internal Medicine sample using the following equation:

\[
\text{EFFICIENCY} = \left( \frac{\text{OUTCOME (PRODUCTIVITY AS REPRESENTED BY K-MAAP POINTS)}}{\text{INPUT (ACADEMIC RESOURCES TO INDIVIDUALS - RESEARCH SALARY, TIME)}} \right) \times 100\%
\]

Table 6.10 demonstrates the academic productivity efficiency ratings – based on the daily research salary and K-MAAP© points, or protected academic time and K-MAAP© points - for all PIs included in the sample, sorted from the most efficient, to the least efficient for the five-year period between 2006/07 and 2010/11:
Here, the data shows that PIs # 146, 130, 142, 122 and 131 are the most efficient; this is based on the research salary allocated (input), the percentage FTE of protected academic time allocated (input), and the total K-MAAP© points produced (output). Of note, these PIs did not receive an
increase to either their research salary, or the amount of academic time allocated. PI # 146 in particular produced 105 K-MAAP© points between 2006 and 2011 (which also demonstrated a marked increase over the five-year study period), but was allocated just over one academic day per week, and a research salary of just $6,194 in 2010/11 (cost per K-MAAP© point was $59 in 2010/11). Likewise, PI # 130 produced 824 K-MAAP© points between 2006/07 and 2010/11, was allocated two academic days per week, a research salary of $78,881 in 2010/11 (cost per K-MAAP© point of $603).

The K-MAAP© Efficiency Rating simply indicates how well academic time was utilized in reference to academic outputs (publications, invited lectures and grants, quantified through K-MAAP© points). Measuring efficiency – particularly in this case as a snapshot taken at one point in time - is a mostly theoretical, quantitative exercise, and not all inclusive. It cannot account directly for those qualitative measures that contribute to efficiency (e.g., motivation, mentorship programs, organizational commitment, etc.). The K-MAAP© points don’t capture qualitative elements with regards to the impact of publications, or the novelty of the research area, or the clinical specialty/academic focus of the academic physician in question. Over a period of time however (2-3 years), the K-MAAP© Efficiency Rating may provide academic leaders with an additional metric as to where limited resources (time, money) could best be allocated.

Efficiency Scores and Research Productivity-Replacement Value

Given limited resources, academic leaders are challenged to find ways to efficiently and effectively allocate academic time. In baseball, the “Wins Above Replacement (WAR)” statistic is defined as,

The idea behind the WAR framework is that we want to know how much better a player is than a player that would typically be available to replace that player. We start by comparing the player to average in a variety of venues, then compare our theoretical replacement player to the average player and add the two results together. There is no one way to determine WAR. There are hundreds of steps to make this calculation, and dozens of places where reasonable people can disagree on the best way to implement a particular part of the
framework. But WAR is necessarily an approximation and will never be as precise or accurate as one would like.\textsuperscript{52}

As is the case in baseball or hockey, one metric alone cannot evaluate all aspects of academic performance, or determine the optimal allocation of resources and time. When combined with the K-MAAP© efficiency rating as well as K-MAAP© assessments, and using the amount of protected academic time and the research salary that is provided, a WAR-type calculation (not an exact replication of the WAR calculations) may help to estimate the potential contribution of each individual academic physician to the overall academic productivity of the department. In turn, and based on at least a few years of data, this could help determine where resources should be allocated. For our purposes, this statistic is called the “Research Productivity-Replacement Value” (RP-RV).

As an example, the outputs of PIs# 126 and 146 were explored further. PI# 126 has a K-MAAP© efficiency rating of 6.0%, but the academic time and research salary was increased based on the research performance assessment (43 K-MAAP© points were achieved during the study period). PI# 146 however, has a K-MAAP© efficiency rating of 135.6% and 30% FTE protected academic time (just over one day per week) with 105 K-MAAP© achieved. Both PIs are at the same academic rank. To illustrate the potential utility of the Research Productivity-Replacement Value model, the percentage FTE of academic time was swapped, for a period of three years: 2008/09 to 2010/11. In other words, the academic time for PI# 126 was reduced to 1.25 days per week, and the academic time allocated to PI# 146 was increased to 2.5 days per week for a period of three years. The actual outputs for both academic physicians were then used to calculate what the potential outputs might have been, based on the new amount of academic time that was allocated. The RP-RV assumes that all other factors that might have contributed to academic productivity remained

\textsuperscript{52} Source: Baseball-Reference.com: See http://www.baseball-reference.com/about/war_explained.shtml
the same. Based on actuals for the period 2006/07 to 2010/11, Figure 6.6 depicts the potential impact on the K-MAAP© points (research outputs) for the two PIs for the period 2008-2011.

Similar to WAR, the RP-RV framework is an approximation that will never be completely accurate given the qualitative factors that inform academic productivity, nor is it intended to replace the “intuition” of academic leaders. But the RP-RV model may provide academic leaders with another useful tool to inform planning and decision-making.

**Statistical Correlations: Ranking Methods**

Correlations amongst variables were tested as part of the statistical model employed for the case studies using Pearson’s correlation coefficient. When the correlation \(r\) equals +0.01 to +0.30, a weak positive relationship is indicated, +0.31 to +0.70 represents a moderate positive relationship, and values between +0.71 to +1.0 indicate a strong positive relationship. A value of 0.0 indicates no linear relationship.
When the K-MAAP© is compared with the other ranking methods and bibliometric systems, the data demonstrates a positive relationship with the other bibliometric methods (rank based on the amount of salary, citation index, h-index). Table 6.11 depicts these results:

<table>
<thead>
<tr>
<th>RANK based on K-MAAP©</th>
<th>RANK: Salary</th>
<th>RANK: Citations</th>
<th>RANK: H-Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation Coefficients</td>
<td>0.5340</td>
<td>0.6258</td>
<td>0.7254</td>
</tr>
<tr>
<td>t-value</td>
<td>3.3421</td>
<td>4.2459</td>
<td>5.5776</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.0024</td>
<td>0.0002</td>
<td>0.0000</td>
</tr>
<tr>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

The Sig. (2-tailed) is the chance that such results happened at random (a score of less than 0.05 is usually taken to denote statistical significance between the variables measured). Here, the K-MAAP© rankings do have at least a moderate positive relationship with salary and citations, and there is statistical significance between, the other rankings that were produced. The correlation coefficient for salary rank is 0.5340, for citations rank is 0.6258 and for h-index rank is 0.7524 (the latter denotes a strong positive relationship). However, it should be noted that the ranking produced by the K-MAAP© do not relate as strongly with the rank based on salary as with the other bibliometric systems.

The various rankings were also compared with variables including academic rank, gender, and IMG/CMG status. On the matter of academic rank, one might expect that those with a higher academic rank (e.g., Full Professor) would rank higher on the citation index and h-index. The data demonstrates a moderate positive relationship with the rankings produced by the rankings based on the h-index (correlation coefficient of +0.6204) but a moderate positive relationship with the ranks based on the K-MAAP©, salary and citations (correlation coefficients of 0.4672, 0.3789 and 0.3741 respectively). Again, a moderate positive correlation is quantified as a correlation r of +0.31 to +0.70. Predictably, those with higher academic rank tend to have higher research rankings.
The data also shows that gender has a moderate positive relationship with the ranking and bibliometric methods (rank based on salary, citations, h-index, and K-MAAP©). That is, male academic physicians tended to rank higher on this sample in terms of citations, h-index and the K-MAAP©. Males did not however rank higher in terms of salary (the correlation coefficient of 0.2025 signifies a weak positive correlation). This shown in Table 6.12:

<table>
<thead>
<tr>
<th>Correlation Coefficients</th>
<th>RANK: Salary</th>
<th>RANK: Citations</th>
<th>RANK: H-Index</th>
<th>RANK: K-MAAP©</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.2025</td>
<td>0.5588</td>
<td>0.5891</td>
<td>0.4753</td>
</tr>
<tr>
<td>t-value</td>
<td>1.0942</td>
<td>3.5661</td>
<td>3.8581</td>
<td>2.8590</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.2832</td>
<td>0.0013</td>
<td>0.0006</td>
<td>0.0079</td>
</tr>
<tr>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

Additionally, IMG or CMG status has a negligible relationship with any of the ranking or bibliometric methods (rank based on salary, h-index, and K-MAAP©) and no relationship with citations (r of -0.1974).

**Comparing the Rankings: Peer Review, Bibliometrics, and the K-MAAP©**

Similar to the University of Toronto case study, different ranking systems produced different results. A comparison of the rankings produced by research salary, the K-MAAP©, citation index, h-index and the average of all measures can be found in Appendix 6.3.

**Individual Productivity “Cycles”, Return on Cost**

As indicated previously, the protected academic time (and salaries) allocated to PIs #124, 126, and 147 was increased. However, the protected academic time allocated to PIs # 129, 140 and 148 was decreased. Of note, the salary for PI # 140 was also decreased. Further, and as indicated in Figure 42, most of the productivity was driven by three academic physicians, PIs 122, 128 and 130. This section explores the productivity cycles (patterns, maps) and research investment (return on
cost) for two PIs who are referred to as PI # B and PI # C\(^53\). The remaining data sets can be found in Appendix 6.4.

**PI # B**

PI # B is a Full Professor, not promoted between 2006 and 2011. The research salary, research commitment and level of protected time were not changed in the department’s 2011 review process. The percentage FTE of protected academic time allocated is high for this sample, at 60% (3 days per week out of the clinic with the average being 2 days per week). The research salary grew by 9.7% between 2006/07 and 2010/11 and is in the top 10% of research salaries in the department. Self-citations comprised 5.17% of total citations for the period 2006 to 2011 (the median for this sample was 3.79% during the same time period). Table 6.13 depicts the rankings across all measures:

<table>
<thead>
<tr>
<th>Salary (Review)</th>
<th>K-MAAP©</th>
<th>Citations</th>
<th>h-index</th>
<th>Average: All Rankings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1/2</td>
</tr>
</tbody>
</table>

These rankings are very consistent. Figure 6.7 on the next page depicts K-MAAP© productivity, impact, and patterns. An increase in overall productivity is indicated, fueled by an increase in invited lectures (at the national level). Peer-reviewed publications and grants are both steady, and at a higher level than peers in the Internal Medicine sample. Of note, productivity levels (expressed as total K-MAAP© points) are higher than others in the Internal Medicine sample.

\(^{53}\) Several of the details which might identity PI #B have been removed, and a unique identifier (“PI B”) has been created for this chapter.
The average cost per K-MAAP© point for PI # B for the period 2006/07 to 2010/11 is low at $1,349 (the average is $9,052 for the department in 2010/11, and $6,781 for other full Professors).

Figure 6.8 depicts the return on cost per K-MAAP© point and the total K-MAAP© points (peer-reviewed publications, invited lectures and peer-reviewed grants) for each year of the five year study period:

Indeed, Figure 6.8 depicts an optimal pattern: Productivity is high and increases between 2006/07 and 2010/01, however, the return on cost per output (demonstrated via K-MAAP© points) shows a steady decrease.
**PI # C**

PI # C is an Assistant Professor, not promoted during the study period. Both the research salary commitment and percentage FTE of protected academic time were decreased in the 2011 review process; 30% protected academic time has now been allocated (1.5 days per week). The cost per K-MAAP© point in 2010/11 was $2,292; this figure is 141% lower than the return on cost for other Assistant Professors of $13,305 in 2010/11. Self-citations comprised 4.86% of total citations (higher than the departmental median of 3.79%). Table 6.14 depicts his rankings across all measures:

<table>
<thead>
<tr>
<th>Salary (Review)</th>
<th>K-MAAP©</th>
<th>Citations</th>
<th>h-index</th>
<th>AVERAGE: All Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>22</td>
<td>12</td>
<td>12</td>
<td>16</td>
</tr>
</tbody>
</table>

Figure 6.9 demonstrates the productivity of PI #C between 2006 and 2011. An increase in peer-reviewed publications, and thus, overall productivity, is demonstrated. Productivity as demonstrated through total K-MAAP© points, is however low in terms of invited lectures and grants (4 K-MAAP© points for invited lecture at peak productivity in 2009/10, and 2 K-MAAP© points for grants in 2008-09).
The cost per K-MAAP© point for PI # C is very high, peaking at $72,698 in 2007/08. The cost per K-MAAP© point does however decrease over the five-year period, as productivity increases (and thus, the number of K-MAAP© points). Of note, the research salary peaked at $80,415 in 2009/10, and was then reduced to $48,249 in 2010/11. Protected academic time was also decreased during this period. Figure 6.10 depicts the return on cost versus the total K-MAAP© points for 2006/07 to 2010/11:

This presents a challenge for academic leaders; productivity was low, and so it was reasonable to reduce the research salary and academic time allocated. But then, productivity and impact start to show an increase. In this case, it might be helpful to run the K-MAAP© Predictive Analytics (and of course, address the issue with the individual).

**Chapter Summary**

The Internal Medicine Research Performance and Assessment Program is a hybrid system which includes both individual elements (performance reviews with individualized feedback, mentorship, protected academic time based on performance and research salaries) and group-level
features (performance reviews for all GFT faculty regardless of tenured or non-tenured status). The system is based on notions of merit, equity, fairness, and transparency.

This case study demonstrated increased total group level outputs (the total K-MAAP©) over a two-year period between 2006/08 and 2008/09, a slight decrease in 2009, and then relative stability from 2010 to 2011. This is similar to the Anesthesia sample which also showed an initial increase in productivity with a slight decrease towards the end of the study period, but contrasts to the impact/productivity demonstrated in the Surgery case study which was stable but showed no increase. For this case study, information on the percentage FTE of protected academic time and the research salaries that could be directly linked to the academic outputs were provided. These details added richness to the productivity-related data by allowing the connection of productivity to impact, costs and compensation, as well as the development of a research efficiency-type rating and a replacement value calculation.

In this chapter, the K-MAAP© was also used to show the group-level impact of peer-reviewed publications, invited lectures, and peer-reviewed grants. Further, the K-MAAP© was used to explore the productivity, impact, and productivity cycles of two PIs who were selected as the department had either increased or decreased their protected academic time and/or research salary based on the performance reviews. The K-MAAP© was extended further to calculate the return on cost (K-MAAP© return on cost) for each output, efficiency ratings and the RP-RV of each academic physician, over the five-year period of the study. This analysis may provide academic leaders with another decision-making tool.

Certainly, the revisions of the department’s budget model as well as the Research Performance and Assessment Program appears to have increased engagement as well as recruitment and retention efforts. These are initiatives implemented by the chair, in collaboration with the Executive (discussed further in Chapters 8 and 9). It is also possible that the RPAP has
contributed to the growth, or helped sustain the academic achievements of the faculty members included in this case study. Similar to the Pediatrics case study, this chair has a tremendous amount of control and influence over departmental resources, recruitment and retention packages, the provision of protected academic time, research salaries, overall salary/compensation levels, benefits, mentorship program, and career progression. Because of this influence, an ideal environment for academic success has evidently been established.

Again, the challenge is that other qualitative factors could also have contributed to the sustained productivity and impact, including the drive, motivation and hard work of individual academic physicians. Certainly, the strong leadership that has been provided by the chair could also have impacted on intrinsic drive and motivation. The chair implemented systems to encourage, recognize and reward high performance, but systems have also been implemented to reallocate the efforts of those who have not succeeded in the academic realm elsewhere. The chair has also created an internal pipeline of future academics through the return-of-service training and funding programs that are offered which has greatly abetted the recruitment and retention of those physicians with an academic interest.
Chapter Seven: Case Study # 5 (University of Alberta)

Overview and Research Question

The purpose of this case study is to explore the methods used by the University of Alberta’s Faculty of Medicine and Dentistry to compensate and assess academic physicians. The four previous case studies in this dissertation focused on two universities, two different provinces, and four clinical departments: Anesthesia, Internal Medicine, Pediatrics and Surgery. Those case studies used a mixed methods research methodology (quantitative, qualitative interviews) to explore the methods used to compensate and assess academic physicians. This case study used document analysis and qualitative interviews to explore the following research question: How does the University of Alberta compensate and assess academic physicians?

Case Study Rationale

The institution was of interest for several reasons. First, the types of academic appointments as well as the system used to compensate and assess academic physicians in the Faculty of Medicine and Dentistry is different from the methods used by the other institutions and departments included in this dissertation.

Second, the academic physicians who are on the A-ARP participate in a comprehensive system which includes a base salary, an incentive (salary increase, not a bonus), a well-articulated career component, an annual academic and clinical assessment program (using a type of peer-review model), and compensation which covers clinical, academic (research, teaching) and administrative responsibilities. Within the same institution – in other clinical academic departments – there are groups of faculty who are not on A-ARPS, but who are compensated through a range of different sources including fee-for-service, university salary, etc. When we drill down further, we find that within one clinical academic department (Surgery) some faculty are on an A-ARPS
(neurosurgeons) while others in the same department, and even the same hospital, are not on an A-
ARPs.

Third, the medical school was phenomenally successful in attracting talented researchers to
the institution, and the province, commencing in the late 1990s. Starting in the early 2000s, these
recruitment activities were buttressed by substantial government funding increases driven by high
energy prices (oil), and multi-billion dollar government surpluses. These surpluses were used by the
government to implement a $4.5 billion educational endowment, as well as provide grants and
support for academic positions through the Alberta Heritage Foundation for Medical Research
(AHFMR). The University of Alberta used the Heritage Foundation monies to fund geographical full-
time (GFT) positions and chairs (tenure-track positions), thereby facilitating national and
international recruitment initiatives. Since the global economic downturn in 2008, the financial
climate has however changed considerably, including news that the AHFMR grants will be
withdrawn by 2017, leaving the medical school with an urgent need to find new funds to support
the GFT positions.

Finally, salaries for academic physicians and nurses in Alberta are considered to be “roughly
double” those in other Canadian provinces including Ontario, British Columbia, and Quebec54. Data
obtained from the Canadian Institutes for Health Information (CIHI) 2013-2014 report indicates that
the 2013-2014 average gross fee-for-service payment for Anesthesiologists in Alberta was $417,666
(14% higher than the national average of $361,681), $539,728 for Internal Medicine specialists (36%
higher than the national average was $396,105), for general surgeons was $519,804 (23% higher
than the national average was $420,484), and $328,303 for Pediatricians in Alberta (25% higher than
then national average of $284,600). CIHI also indicates that Alberta has the highest rate of per capita

54 Data obtained through the case study interviews (two respondents), University of Alberta, May 2014.
spending on health care in Canada ($6,783 in 2014), excluding Newfoundland and Labrador (only 2.7% higher at $6,973).

While interest was initially shown in the quantitative component of the mixed methods research methodology that I employed for this dissertation, the quantitative data sets were not available. Thus, a decision to proceed with the case study, using only interviews of academic leaders, was made.

**Area of Study**

Through my dissertation supervisor, I had access to one of the interview subjects. The case study was negotiated through this individual, and includes five senior academic leaders. During the phase 1 national survey, three chairs had also self-identified, contacting me directly to indicate their willingness to participate in an interview. Interview participants include the chairs of Anesthesia, Pediatrics and Surgery, the Vice Chair of Clinical Affairs in the Faculty of Medicine & Dentistry, and the Provost, University of Alberta. To preserve anonymity, all those interviewed are referred to as “the administrator” in this chapter. The Dean of the Faculty of Medicine and Dentistry declined an interview request made via the Vice Dean. All of the interviewees presented a rich and credible source of data for this study as they possess insider’s knowledge with regards to the compensation and assessment systems that are used.

**Study Period**

The interviews took place during the early summer of 2014. The questions asked covered the same time period as for the other case studies, 2006/07 to 2010/11.

**Methods**

A qualitative methodology was used for this case study, focusing on interviews of academic leaders as noted above. As noted in Chapter 3, the qualitative interviews were designed to elicit additional information in follow-up to the phase one national survey and the phase two document
analysis. The interviews explored the survey findings, confirmed and expanded understandings about the compensation and assessment systems that are used and the rationale which underpins their use.

Three of the interviews took place in a conference room at the University of Alberta. The fourth interview took place via teleconference, while a fifth took place at a mutually convenient meeting place in Toronto, Ontario.

Data was interpreted using an inductive, ongoing, and evolving process. The transcripts and field notes were read, and re-read until categories of analysis emerged. Concept maps were developed to help record, interpret and analyze the categories and sub-categories of analysis which emerged during the interviews. Novak notes that concept maps can be used to frame a research project, reduce qualitative data, analyze themes (or categories of analysis) and interconnections in a study, and present themes (Novak, 1998).

**Provincial Alternative Academic Relationship Plans**

The province of Alberta first implemented A-ARPs in specific medical specialties during a period of economic growth in the province. Following the recommendations of several national and provincial reports on the health care system and alternative mechanisms to compensate physicians (including the Kirby, Mazankowski and Romanow reports), the first A-ARPs were introduced at the University of Alberta in 2002, and the University of Calgary in 2004 (Bichel *et al.*, 2011).

Similar to AFRPs in other provinces, the A-ARPs were intended to ameliorate systemic issues faced by academic physicians and academic medical centers including personnel shortages, recruitment and retention.

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55 The three reports included:
issues, and income stability which were perceived to result to some degree from the fee-for-service clinical payment programs. The A-ARPs were also explicitly designed to enable clinical innovation (Kunimoto & Meddings, 2011).

The A-ARPs are comprehensive, paying academic physicians for both clinical and academic activities at the clinical work rate. The framework has “an elaborate allocation -- for this bundle of money the government gets this much clinical, this much teaching, this much research, this much service” (interviews, University of Alberta, 2014). For existing plans, new positions need to be approved first by Alberta Health Services, and then the Ministry of Health. Alberta Health also provides a supplementary “conditional grant” that bridges the gap between funding contributions and actual expenses, thereby allowing all physicians in the A-ARP to be compensated equally (based on their discipline) for clinical and academic work.

Thus, an A-ARP constitutes a contractual funding arrangement involving multiple principals, not a fee-for-service, piece-rate type arrangement. The arrangement is between a group of physicians (the agents) and several principals including the University of Alberta, Alberta Health, Alberta Medical Association, and Alberta Health Services. Funds provided through the various principals are pooled into a single funding envelope to compensate academic physicians for clinical service, research, education, administration and innovation at a rate commensurate with the earnings of those physicians who are focused solely on the provision of clinical services. Additional stakeholders include the Faculty of Medicine and Dentistry, Alberta Advanced Education and Technology (the education ministry – the original A-ARP included a grant to the faculty from this ministry), the regional health authorities (clinical service level agreements), and the actual members of the A-ARP. These relationships are depicted in Figure 7.1:
At the University of Alberta, the A-ARP covers only three departments (Pediatrics, Family Medicine and Medicine), plus one division (Neurosurgery) within a department (Surgery). Although the Alberta Health website continues to indicate that the A-ARPs will be opened to other specialties in 2013, those who were interviewed for this case study indicated that the government has not provided access or reopened talks for several years, despite multiple planning exercises. The Alberta Health website notes that “Academic ARPs have been successful in: attracting and retaining needed specialists to the province; supporting innovative clinical practice; and enhancing the quality of Alberta’s medical education and research”\(^\text{57}\). No data were provided to support this assertion. The Program Management Office for ARPs in Alberta also does not provide any data to support the

\(^{56}\) Dennis Kunimoto & Jon Meddings, December 2011. Department of Medicine Retreat, Provincial Academic Alternative Relationship Plan, University of Alberta and University of Calgary.

efficacy of clinical ARPs\textsuperscript{58}. It should be noted that some clinical departments at the University of Alberta are funded through a non-academic ARPs which do not involve the university.

Of interest, funding for the A-ARPs flows through the Faculty of Medicine & Dentistry at the University of Alberta, and then to the respective departments. The funds do not flow to the hospitals or the physicians. As of 2011, funding for the University of Calgary’s A-ARP was managed by Alberta Health Services.

**Clinical Academic Appointments: University of Alberta**

The Faculty of Medicine and Dentistry currently classifies clinical academic appointments into four main categories: Tenure track (geographical full-time – two sub-types), A-ARPs (which applies to only four departments in the medical school), Special Continuing (two sub-types), and Clinical Academic Colleagues. Figure 7.2 shows the four main categories and sub-categories of clinical academic appointment:

\textit{Figure 7.2: Categories & Sub-Categories of Clinical Academic Appointments, University of Alberta}

Table 7.1 provides key details on the categories and sub-categories of clinical academic appointments, with explanatory notes based on the interview data:

\textsuperscript{58} Project Management Office for Alternative Relationship Plans website. See http://www.arppmo.org/home/
<table>
<thead>
<tr>
<th>Type of Appointment</th>
<th>Primary Academic Focus</th>
<th>% FTE</th>
<th>Position Funding Source</th>
<th>University Status</th>
<th>Tenure Y/N</th>
<th>Research Y/N</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenure Track (Base Funded)</td>
<td>Teaching + Research</td>
<td>Full-time</td>
<td>University (central administration)</td>
<td>Employee</td>
<td>Yes</td>
<td>Yes</td>
<td>Tenured, member of faculty association</td>
</tr>
<tr>
<td>Tenure Track (Contingent)</td>
<td>Teaching + Research</td>
<td>Full-time</td>
<td>Various funding sources (e.g., AHFMR, endowed chairs)</td>
<td>Employee</td>
<td>Yes</td>
<td>Yes</td>
<td>Position contingent on external funding source. If funding lost, position and university employee status are lost</td>
</tr>
<tr>
<td>Academic A-ARP</td>
<td>Teaching + Research</td>
<td>Full-time</td>
<td>University + A-ARP (no fee for service)</td>
<td>Independent Contractor</td>
<td>No</td>
<td>Yes</td>
<td>Only 4 clinical depts. on an A-ARP</td>
</tr>
<tr>
<td>Special Continuing (AHS)</td>
<td>Teaching and/or Research</td>
<td>Mostly full-time</td>
<td>Alberta Health Services funded. No university salary.</td>
<td>Independent Contractor</td>
<td>No</td>
<td>Yes</td>
<td>Same treatment as tenure without guarantees. Cannot hold a grant.</td>
</tr>
<tr>
<td>Special Continuing (FFS + Research)</td>
<td>Teaching and/or Research</td>
<td>Mostly full-time</td>
<td>Fee for service clinical + research funding. No university salary.</td>
<td>Independent Contractor</td>
<td>No</td>
<td>Yes</td>
<td>Same treatment as tenure without guarantees. Cannot hold a grant.</td>
</tr>
<tr>
<td>Clinical Academic Colleagues</td>
<td>Teaching</td>
<td>Part-time</td>
<td>Fee for service. Stipend for PG teaching</td>
<td>Independent Contractor</td>
<td>No</td>
<td>Maybe</td>
<td>Different promotions standards/rank</td>
</tr>
</tbody>
</table>

**Tenure Track Clinical Academic Appointments**

At the University of Alberta, clinical academic faculty members (MDs) are eligible for tenure-track academic appointments, also referred to as “geographical full-time” (GFT). There are three major sub-categories: Tenure Track (base/university budget funded), Tenure Track (contingent), and Teaching Professor category. Faculty members in the tenure track positions are expected to carry out a significant research program, plus teaching, clinical activities and administration (service). The positions are treated the same in terms of the appointments process, types of academic appointments and academic rank (Lecturer, Assistant Professor, Associate Professor and Professor), tenure and promotions standards, status as a University of Alberta employee, compensation.
standards, benefits, performance reviews and merit (salary) increases. However, the base funded positions are funded by the central administration of the University. The contingent positions are funded through various “external” sources including the Alberta Heritage Foundation. When the funding source expires, the position and status as a university employee also expire. If no alternative funding source is found, the position incumbent then reverts to a Special Continuing or Clinical Academic Colleague-type appointment.

**Academic Alternative Relationship Plans (A-ARPs) Appointments**

These appointments are similar to the Special Continuing appointments, however, they are funded through the A-ARP that only three clinical departments and one division (within a fourth department) have established with the Government of Alberta. These appointments may receive funding from the university or through the professional component of the A-ARP. They are concentrated within the AHSC hospitals. The A-ARPs are comprehensive in that the funding covers total compensation (both academic and clinical activities). Shadow billings are required by AHS in lieu of fee-for-service clinical billings. Funding flows from the government’s physician services budget, same as the funds that flow for fee-for-service billings. Funding for benefits are provided through the A-ARP (administered by the group of physicians), not the university. The faculty members are not considered to be university employees, but rather, are independent contractors. As such, they do not participate in the faculty’s performance review process, administered via the Faculty Evaluation Committee. They are however understood to lead a research program, plus engage in clinical activity, teaching and administration (service).

**Special Continuing Appointments**

Special Continuing Appointments comprise two major sub-categories: 1. Positions funded by AHS; and 2. Positions funded by a combination of fee-for-service clinical billings and research grants. The appointees are full-time academic physicians, however, they are not paid by the university nor
are they university employees (they are also independent contractors). Further, they cannot hold grants in their name (grants are officially held by the chair). They are however treated the same way as tenure stream faculty in terms of the types of academic appointments and promotions standards. Their performance is not assessed by the Faculty Evaluation Committee as they receive no funding (or salary increases) from the university. Not all academic departments have these types of positions; in the past, they were mostly concentrated in those departments on an A-ARP as the individuals in question were funded through AHS, prior to the implementation of the A-ARPs (e.g., Pediatrics, Internal Medicine).

Clinical Academic Colleagues (CACs)

Clinical Academic Colleagues (CACs) were previously referred to as part-time faculty, and are comprised of full-time clinicians and part-time teachers practicing in community-based hospitals or teaching sites (although there are some anomalies). The primary compensation source is fee-for-service clinical billings. CACs do not receive a university salary (they are also considered to be independent contractors), although they can receive a teaching stipend from the Postgraduate Medical Education Office. The value of the stipend ranges from $2,000 to $14,000 per annum, based on the volume of teaching activities that were completed, and the concomitant teaching points that were earned. The chairs who were interviewed for this case study indicated that CACs do engage in research, sometimes quite significant amounts. The academic appointment and promotions standards for these appointees are different from the other types of appointees (the academic ranks are Clinical Assistant Professor, Clinical Associate Professor and Clinical Professor).

It should be noted that some CACs in Pediatrics are members of the A-ARP for historical reasons related to their clinical appointment (not their academic appointment). They receive a payment for teaching through the A-ARP, not Postgraduate Medical Education.
Results

During the interviews, several categories and sub-categories of analysis emerged. Figure 7.3 maps those categories and patterns. Many of the categories and sub-categories of analysis overlap, creating an intricate and complex mesh:

**FIGURE 7.3: CONCEPT MAP: EMERGING CATEGORIES AND SUB-CATEGORIES OF ANALYSIS**

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**Academic Alternative Relationship Plans, Compensation**

One of the first categories of analysis that arose during the interviews was related to the A-ARP and compensation models for academic physicians. The sub-categories of analysis that were identified include issues around the implementation of the A-ARP, the perceived strengths and challenges of an A-ARP, administrative issues (deliverables, processes, demonstrating accountability), conflict and competition related to the A-ARP (and its implementation in some
specialties, but not others), and on a broader level, compensation levels for academic physicians in Alberta.

**Implementation and Administration of Academic Alternative Relationship Plans**

Several of the administrators who participated in the interviews highlighted issues around the implementation and complexity of the A-ARP, lack of a systems-level integration in the province, as well as persistent change in the Faculty of Medicine & Dentistry, and the provincial government more generally.

Commenting on the history of the A-ARPs, one administrator explained that the Department of Medicine initially applied to the government for an A-ARP-type arrangement in 2001. At the time, the driver was the need to acquire new resources to fund academic practices. This was followed by Pediatrics, then Family Medicine, and then Neurosurgery. Other departments attempted to follow, but were unsuccessful in obtaining an A-ARP for their specialties. The administrator noted,

There were a number of other departments that made application that were waiting in the wings but did not get approval from the government to go forward, for whatever reason. Largely we think it was probably a funding issue. And then we had a big push in 2011 to go on what we call a provincial ARP [alternate relationship plan] where all of the departments would go into an academic ARP. But then the government basically said they would not fund it, so it’s back on hold. Deloitte’s now been hired to do what’s called an academic framework review. And then they were to bring forward a proposal to Alberta Health about what the future of academic compensation should look like in the province.

The administrator also indicated that because the four existing A-ARPs were rolled-out at different times, the agreements are all different. Seemingly, this has led to an overly complicated system with agreements and deliverables that are difficult to monitor. As a result, the administrator noted that under the new academic framework, the province may implement academic productivity metrics in addition to shadow billings (for clinical productivity). Further, he indicated that with the Deloitte review, “the government is probably trying to introduce some uniformity”.

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Another administrator who was interviewed for this case study had a different perspective on the rationale for the government’s delay in implementing any type of A-ARP to other specialties, particularly in light of persistent changes within the government organization itself:

We’ve had three ministers of advanced education in six months. And now we’re on our second Minister of Health, our third Deputy Minister of Health, our third Deputy Minister of Advanced Education, so we don’t have a lot of consistency in government. Every time it [the government] turns over, we start over. Through successive governments they have badly downsized the entire civil service and they have retired the experienced, expensive civil servants, so our ADM [Assistant Deputy Minister] in Advanced Education was on the job six months when he was made an ADM. So there’s not a lot of expertise; there’s actually no expertise of substance. They rely on us [the university] to give them the numbers and then they hire external auditors.

The administrator went on to comment on the extension of A-ARPs to departments who are not currently on this model – departments that for the most part, expressed interest during my interviews to access the program. The administrator noted,

The government’s view is they lose control over costs [with alternative relationship plans], and they would rather deal with physicians billing the insurance scheme [fee-for-service] than paying A-ARPs [academic alternative relationship plans]. And I think it’s the Ministry taking a bureaucratic, disaggregated approach, where the Minister doesn’t see the big picture. There’s the A-ARP branch and there’s the group that does the insurance company branch [fee-for-service billings] and there’s AHS [Alberta Health Services], which is not involved in the A-ARPs but is involved in fee-for-service delivery under the agreement that they made. It’s stunningly confusing. And in fact, I think the Ministry uses that confusion as a means of breaking the increase in costs, slowing down the cost increases. And that’s a perfectly reasonable strategy on the government’s part to contain costs when they can’t really control the positions.

As noted, several of the chairs were however keen to move onto an A-ARP. One interview participant described the reasons as follows:

I think part of the problem with physicians, with anybody is, when there is an opportunity to make more money, there is often the temptation to put the academic work secondary, and take the opportunity to earn some money by seeing patients. And so I think, within most departments, physicians probably spend more time seeing patients than is good for their academic careers. On the academic ARP model it doesn’t work that way in the sense that you get paid the same whether you see a thousand patients or a hundred patients... over a given period of time. And so, the driving force tends to be to make sure that you do good patient care but then you also make time to make sure that your academic work gets taken care of. So I think it certainly is more balanced from the physician point-of-view. And, then
the physicians are making a reasonable income for their work and... [pause] aren’t having to try and do a lot of extra clinical work to try and, you know, bring in the income.

When asked if he was at all concerned that clinical productivity would drop, as has been the case with the implementation of AFPs in jurisdictions such as Kingston, the respondent noted that he “does not think this would be a concern in Edmonton” (though no further elaboration was provided). While this administrator advocated for the implementation of an A-ARP on the basis of income stability, others commented on the higher-than-average salary levels that physicians in Alberta receive, regardless of whether they are on an A-ARP or a fee-for-service billing plan. One administrator noted that the compensation levels are much higher for all physicians in Alberta, stating, “For [specialty X], the level is twice what they are making in other provinces”.

Not all of the administrators who were interviewed were interested in pursuing an A-ARP given the history of how the plans were implemented in Alberta, the “stops and starts” that occurred around negotiations with the government for new departments/new plans, and more general concerns around the model in relation to clinical productivity. One administrator stated,

There’s been a lot of energy around A-ARPs in this province. There were several large initiatives that went nowhere so there’s reluctance from most of us to get involved in that discussion anymore. I’m always interested in talking about the options but after being involved in multiple failed starts putting a ton of energy into the A-ARP thing, put a ton of energy into academic health sciences network development which went nowhere, a ton of energy into getting a new computer system province wide which went nowhere. I mean I’m just not interested. I’m tired of that stuff.

When asked to elaborate further on whether an A-ARP might help address broad-spectrum issues around compensation, recruitment, retention, and productivity in academic medicine, the same administrator noted,

I’ve worked in both environments [alternative funding plan and fee-for-service academic environments]. You can make either one work. You can deliver a comparable volume of clinical service under an A-ARP that you can under a fee-for-service model. But it takes a lot of work. Under an A-ARP, you would grow your academic productivity remarkably but that needs to be separately funded. For the sake of argument, let’s say a government in Edmonton wants to put our specialty under an A-ARP. I would go out and add up the incomes across the zone. If the average physician here is making $700,000 thousand a year
and you have two hundred guys, that’s $140 million. So the government needs to put $140 million into the pot that could be distributed to these physicians. That’s how I would position it. And then at the back end, the practice plan has to drive clinical productivity. Well, all of a sudden, the currency is now time. Money is fixed. The ability to put together a practice plan is what drives the clinical productivity. We know how to drive academic productivity. My experience with AFPs is that as soon as you bring in an alternative payment plan, clinical productivity per unit per FTE falls remarkably. I think that has happened in every single one [AFP site] that I can think of in the nation starting with Kingston. That’s why governments don’t want to do it. I think the other solution is to look at pay for performance, bundling of compensation amounts, which really could be done in a very sensible way in an academic environment. It doesn’t matter what plan you bring to play. Any of those compensation schemes can be adapted to an academic environment. But the challenge for the University of Alberta probably isn’t what the compensation scheme is, it’s probably the relationship between the university and Alberta Health Services.

Another administrator – who was keen to go onto an A-ARP - expressed concern over persistent and ongoing changes while advocating for a systems-level, integrated approach to academic medicine and health in Alberta:

I think it’s all about people. Alberta Health Services has been in turmoil for years now with changes of leadership. And Alberta’s a very political province – well so is Ontario – but you know we have had changing health ministers, we’ve gone from a regional health authority to a zone health authority – we can’t use the word region anymore – so now we have. I can’t remember how many regions there used to be, like fifteen or something, then it went to nine regions, then it went to five zones. Now we’ve got two sectors. Everything just keeps changing and so we’ve had a multitude of health ministers and Alberta Health Services have changed their CEO. Alberta Health and Alberta Health Services can’t seem to figure out who’s responsible for what. So that’s led to a lot of turmoil and, and, so therefore a lot of division I think. We’ve gone through a lot of Deans here. A province like Alberta could really get it together and decide that we were going to become a real academic health care force, you know. But that would take a lot of cooperation.

**Strengths: Academic Alternative Relationship Plans**

The perceived strengths of being on an A-ARP were frequently mentioned. These include inducements or incentives to do academic work (income replacement for less clinical activities) with an attendant reduced incentive to engage in high levels of fee-for-service clinical work, the funding levels provided through the A-ARP, and the perceived satisfaction of faculty members. When asked what he would change about his department’s current compensation program, one of the administrators noted that he would like to get onto an A-ARP or AFP-type arrangement. Failing that,
he would like to implement a formal practice plan arrangement where income is pooled and
redistributed in support of common, departmental goals:

But it [an Alternative Funding Plan] would have to be an academic one, not just a clinical one. Barring that, I’m begging our groups to consider practice plans where they would contribute to the salaries of those people who do a significant amount of research and teaching. Interestingly, and this is just a one-off, we at the present time, because we cannot hire any academic faculty, we can, we have one group that wants to hire a surgeon who has a PhD who will have a basic science lab. Three of the faculty within that division are actually paying the university salary of that person. It’s a very successful academic division. But they’re missing that basic science component so they have decided, three of them, you know it’s a $100,000 dollars a year for salary plus benefits.

The administrator stated that the fee-for-service clinical earnings of the three faculty members would fund the position. This is perhaps the clearest example that I came across during my dissertation research, of clinical earnings directly supporting the academic mission of a department or university.

The perceived satisfaction of physicians was cited as a strength of the A-ARPs. When asked about faculty satisfaction levels with the current A-ARP compensation program, one of the administrators noted,

Overall people are happy. If you ask them if they want something other than an ARP [alternative relationship plan] they’d say “no”. Do they believe that they are well compensated on a national scale, they’d say “absolutely”. And people are well aware the University of Alberta is probably the top funded ARP in Canada.

The administrator did however confirm that no formal assessment of satisfaction with the compensation model has been implemented to date. Another administrator echoed the statement above, but commented on the university salary levels in particular:

Our university salaries are large compared to other universities. But there is nothing we can do about that because it’s AASUA, the union. If we as a department voluntarily said “let’s cut everybody’s salaries in half and hire twice the number of people” we would not be allowed to do that.
Here, the higher-than-average compensation level was cited as a strength of the University of Alberta, but also a challenge for academic leader to maintain, and even increase, those salary levels in a context of decreasing higher education budgets, and tough economic times within the province.

When asked how satisfied the administrator thinks faculty members are with the current compensation model, the administrator replied,

On the tenure track side, I think physicians would be happier for the most part if they’re in an Academic Alternative Relationship Plan. And I think those within an academic ARP [alternative relationship plan] for the most part are satisfied. For clinical academic colleagues, I think that they would be happier if they were paid more for their educational contributions. So I’m sure the special continuing would be happier if they...So there’s the two categories -- one where they’re paid a full amount but it’s from Alberta Health Services and therefore they actually get paid for their academic work. The other category is special continuing where they are doing fee-for-service and they’re not paid anything for doing their academic work so I’m sure they would be happier if they could get some money for doing academic work.

The administrator also indicated that most of the special continuing faculty would want to go on an A-ARP if it were available. Further, the administrator noted that the clinical academic colleagues are paid a small honorarium for their resident teaching activities, but there are currently no payments available for teaching undergraduate medical students (clerks). It was suggested that a comprehensive A-ARP could remedy this.

**Challenges: Academic Alternative Relationship Plans**

Several challenges related to the administration of the A-ARPs were also highlighted during the interviews. These included negotiations, deliverables, poor accountability, a lack of clear and rigorous processes around the administration of the A-ARPs, and conflict amongst the departments.

With regards to the negotiations, one of the administrators noted,

One of the downfalls of the ARPs in the past was that they take forever to renegotiate and people saw erosion of their income relative to their community colleagues -- because they weren’t seeing the increases in the fee-for-service budget.

The Alberta Medical Association was a signatory to the original agreement, in part, because,
The Alberta Medical Association was a signatory to the original agreement because money actually comes out of the PSB [physician services budget] or the monies that they [the Alberta Medical Association] negotiated for fee-for-service clinical services. Faculty have two forms of remuneration: one as an employee/employer and one as an independent contractor. For a total gross amount.

The agreements vary from department-to-department. One administrator provides the example of Clinical Academic Colleagues (part-time, community-based faculty members) who receive a teaching payment through the A-ARP, not the Postgraduate Medical Education Office as is the case with other departments in the Faculty. The other A-ARP agreements at the University of Alberta do not include teaching payments for CACs. This complicates the A-ARP, as well as the relationship amongst departments, and adds a layer to the already complicated relationships amongst the different types of clinical academic appointments in the Faculty. The source of the teaching payment was also perceived to “create a different class of citizenry” (the implication being is that those receiving teaching payments from the A-ARP are seen by others to be more privileged).

As noted, accountability, processes, and rigor were noted to be challenges in the administration of an A-ARP. Commenting on what they would change about the A-ARP, one administrator noted,

I would not change the compensation model, but I would change some of the ancillary aspects of it. We should have built in, right from the start, greater accountability. A greater set of defined processes. Academic and clinical.

When asked to elaborate, and if specifically, the challenge was around academic or clinical accountability and deliverables, the administrator stated,

Academic accountability and deliverables are much easier to define. We [departments] have the annual online report and a set of academic assessment guidelines that have been approved right through the university. The clinical deliverables have been less well-defined in the past although the contract with Alberta Health was quite explicit about rigor around shadow billings. There was not a rigorous process in the past. We all know, there are multiple studies which show, that shadow billings are not a great marker of productivity or innovation in clinical work. To date, nobody has come up with something better. And it is a currency that Health Ministries seem to understand and fall back to. The recent audit by Deloitte seemed focus on clinical deliverables.
The administrator also noted that increased scrutiny has been applied to the A-ARP by the government, and items that were previously funded, no longer are:

The A-ARP has got much more explicit about what are and are not eligible expenses. We are allowed to fund administrative staff that support our academic endeavors. We cannot fund lab technicians for people. We cannot fund PhD salaries. In 2009, Alberta Health all of a sudden came-up with a big list of “thou shall nots”.

When asked what the impetus for these changes was, the administrator commented that accountability issues arose “because there were no explicit instructions in place”.

One of the administrators who was interviewed for this study indicated that the implementation of an A-ARP in some departments but not others, has led to conflict and jealousy across departments:

We’ve seen Pediatrics and Medicine, and I don’t want to sound jealous but I am a bit, we’ve seen Pediatrics and Medicine grow from a faculty GFT perspective where Surgery, Anesthesia, Obstetrics, and Gynecology, haven’t been able to grow because they don’t have any academic positions. But those without university salaries are doing as much teaching and stuff as some of the A-ARP members. So it leads to a fair bit of conflict.

The conflict is not limited to the ability to recruit academic physicians, but also the amount of teaching work that is done:

I hear, “I’m teaching, you’re teaching, you’re getting paid for it, I’m not”. So it leads to conflict. The difference between the ARP departments and other departments is that we have people doing as much or more teaching without university salaries as some of the ARP physicians who are getting a salary. And so there is conflict between departments as well.

**Academic Appointments**

Several sub-categories of analysis were identified with regards to academic appointments, as well as challenges related to tenure, varying union, and cultural, identity-related issues stemming from the academic appointment types.

**Definitions**

The first sub-category of analysis that emerged during the interviews centered on varying definitions of tenure and academic physicians. During the interviews, almost all of the respondents
frequently spoke about “tenure”, and “tenured appointments”. However, a senior administrator explained that although tenure is indeed frequently spoken of, it seems like a misnomer:

Tenure is not a concept. We have contingent positions. Contingent meaning that the source of money is from somewhere else [other than the university], for example, our Heritage people contingent, people whose source of income is from Alberta Health Services are contingent and their contracts are basically said you’ll continue to be university employees long as the source of funding continues. And if the source of funding goes, then basically your position disappears. So within the Faculty of Medicine for the physicians, less than 30 percent are base funded and the rest are contingent. In that case, tenure means nothing because you basically have a position while funding continues and funding doesn’t your position is gone.

The contingent position sub-type does not carry with it the usual guaranteed income that is frequently seen as a fundamental condition of “tenure”, although they are given one year’s salary continuance when a position is eliminated due to their collective bargaining status. A senior administrator noted that the concept of a GFT position is worth continuing, but “the idea of tenure doesn’t apply”.

Different opinions on the definition of “academic physician” were also presented by those who were interviewed. One administrator noted that the University of Alberta does not consider Clinical Academic Colleagues, despite their teaching loads, to be “academic physicians”. The administrator confirmed that that they hold the titles of Clinical Assistant Professor, Clinical Associate Professor and Clinical Professor, and they can be promoted (albeit on different grounds than those in the other appointment streams). This view is very different from those of the chairs, who urged equity in defining academic physicians as those individuals who engage in teaching or research on behalf of the university. Further, the administrator stated,

The mandate of what we call academic physicians, the tenure track positions, is to do educational research. Whereas the mandate on the clinical academic colleagues is really to, you know, earn a living as a physician. And they do education because there may be some benefits but also because it’s of interest to them but they... do it, if you want, more out of the goodness of their heart as opposed to because they’re not compensated for their time.
This view is also in stark contrast to the statements of the chairs who noted that some CACs engage in significant amounts of teaching and research, and in some cases, even hold grants. On the other hand, the special continuing faculty are constituted as follows:

Some of them [special continuing faculty] may be funded through Alberta Health Services which is the clinical health delivery entity for this province. For example, a lot of the special continuing may be in Oncology because historically they were paid through the Cancer Board. And so they had their funding entirely through the Cancer Board. But for them to have a university position, we made had this special category which is special continuing. So it, they fall into two groups. The first is where their funding is through Alberta Health Services but there is a provision that they will do academic work. And then the second is we have some who are straight fee-for-service but they’re interested in an academic positon and they go into special continuing. The likely reason is likely that there are no positions, and if they want an academic career they pay for it themselves in a sense.

The differences of opinion on how “tenure” or “academic physician” are defined might seem insignificant, simply a matter of semantics. However, the administrators did frequently speak of challenges related to decision-making, budgets, merit increments, departmental culture issues, and the “union”. A senior administrator indicated that the Faculty of Medicine & Dentistry “has no unions” for academic physicians:

We have no unions. We have an association called the AASUA, the Alberta Academic Staff University Agreement or whatever the acronym stands for. They’re not a union under Alberta labour law. We have a negotiated agreement but they’re not...it’s like an association. In Alberta, under the Post-Secondary Learning Act there’s no possibility of strike or lockout. We have mandatory final offer selection and an elaborate dispute mechanism. There is a physician’s union...and I don’t actually know whether our clinical professors are also part of the Alberta Medical Association – yeah, they are. But I don’t know if that’s the union under Alberta labour law or not.

The administrator noted that a “point of debate” has come-up around whether the Alberta Academic Staff University Agreement has jurisdiction over clinical matters, noting that the AASUA represents all clinical faculty members in academic disputes, regardless of their academic appointment type. The real issue here might not be whether a recognized union does or does not exist, although disputes may certainly come-up as a result of blurred boundaries. Rather, the fact that chairs think a union exists, and frequently referred to union-related issues and “grievances”
during the interviews (particularly when discussing the academic assessment process), might be
more relevant to understanding the context in which they operate as academic leaders.

Another administrator noted that internal departmental challenges related to culture and
identity are further exacerbated by the fact that some of the clinical faculty members (tenure
stream, university paid), are members of a provincial collective bargaining unit or union:

If you get a salary from the University of Alberta whether its faculty funded or centrally
funded, you’re a member of ASSUA. And they’re the collective bargaining unit for us. I think
it works reasonably well but you will probably get different opinions. Some people feel that
AASUA is not very representative. Other people find that it’s, you know, too right wing, too
left wing, varying opinions. The problem with AASUA is if you’re having problems... I mean
it’s a union. And you know here we are in financial crisis and you come with some solutions
and sometimes there is a resistance because you get that union mentality right? But this is,
this is a time when we are talking about potentially losing jobs you know – are you better to
lose jobs or are you better to back off on what you are asking, you know.

Here, the Faculty Association is referred to as a “union”, with a distinct connotation.

**Academic Appointment Types, Funding Sources**

Four of the administrators who were interviewed for this case study noted that the
academic appointment types seemed to flow from, or were closely coupled with, the funding
sources for the positions. Funding flows from multiple different sources, all with differing
agreements and requirements. There are several sources including the University, Alberta Health
Services, the A-ARP, endowed chairs, legacy alternative relationship plan agreements, the Cancer
Board, etc. It was also confirmed that the various funding sources can be blended together, to pull
together a total package:

The AHS, Alberta Heath System, is heavily involved in the third funding scheme which is the
so-called “shared positions.” We have University physicians, we have A-ARP [Academic
Alternative Relationship Plan] positions, we have what’s called shared positions, sometimes
called “fifty-fifty” although there are very few exactly fifty-fifty’s. Those are three schemes.
You can be purely funded by one of the three schemes. You can be funded by two of the
three schemes. So you can have a University fractional appointment and a shared fractional
appointment. You can have a university appointment and an A-ARP appointment. And that’s
where it gets really complicated.
The complexity of the funding model is further reflected in the types of academic appointments that are available within the Faculty. The various funding sources, and the academic appointment types, may lead to identity and culture-relates issues given that the academic physicians, as agents, have multiple principals and stakeholders to whom they are accountable.

Not all departments contain a mix of the different appointment types. Commenting that there are no special continuing appointments in his department, one administrator noted,

We do not have any special continuing in our department. No [chuckle, pause]...That was a highly politically charged question but that was created for individuals and departments and the best example is probably Pediatrics. They had a clinical department of emergency medicine, pediatrics emergency medicine, and when they switched to an A-ARP, the A-ARP required that all practicing pediatricians at the university site be put in that plan so they got forced into it. And they’re not tenure track but they’re special continuing. That was a political accommodation rather than have them leave on mass from the Department of Pediatrics.

Indeed, the Pediatrics chair confirmed,

The Special Continuing appointments are a way of keeping options open for junior faculty. They have an academic appointment, but no university funding. In our department, the special continuing are a way provide university standing in the face of old legacy funding arrangements.

Culture, Identity and Conflict

The third sub-category of analysis that emerged focused on concerns around the organizational culture and professional identities that the various types of appointments may stimulate, unintentionally or not. It is said that culture trumps strategy every time. An effective culture, one where the purpose, values and approach are implicit, agreed upon, and where people support one another, will help to drive performance as well as recruitment and retention.

Commenting on the fact that some full-time academic physicians are tenured, while others in the same department are not, the cultural issues that the “second-class citizenry engendered” was noted. One of the administrators explained how this issue was dealt with when he commenced his appointment:
How about I use Hamilton as an example. When Bob Rae (Premier of Ontario, 1990-1995) bunched everything together, there was a lot of animosity amongst the parties that went from the General to the Henderson, to Chedoke, to Mumsey. So it wasn’t a marriage made of romance it was a marriage made of force – they were forced together – and in the end, St. Joe’s played the trump card and stayed out. The same thing went on in Halifax between the Halifax Infirmary and Victoria General. They got merged together. There was a lot of animosity moving them together. And the same thing happened here in Edmonton. The image of the university hospital amongst the other hospitals was that the Royal Alex Hospital defines itself as “we’re not the University hospital”. “We’re not the U”. Same thing with the Misericordia and the Grey Nuns. So if you were a Clinical Academic Colleague, working at any other hospital other than the university hospital, the focus of that animosity is the GFT group. They were protected, most favored nation, better than the rest of us and that kind of thing and that’s virtually disappeared. In the years that I have been in this role, here I can tell you that’s changed because the GFT and the CACs are recognized for the teaching and research they already do. I don’t expect them to be GFTs. I expect the GFTs to be GFTs because they are paid to do it.

Another senior administrator who was interviewed for this case study also commented on the inner struggles of the Faculty, and the history from which these struggles may arise,

The street-level view is that the Royal Alexandra is the hardworking production shop, uh, inner-city, urban hospital, deals with the indigenous, all of the hard-luck cases. And those prime donna NDP-PhDs across the river at Mackenzie just don’t have to work quite so hard. And the people at Mackenzie Scholarly University say, well Royal Alexandra doesn’t carry their weight, they’re a teaching hospital but always getting us in trouble, all of our accreditation issues are the Royal Alexandra’s or the faith-based system. So this is the politics of a large, complex, very hard to understand system. And then there’s separate, formerly separate cancer board, which had its own facility and its own department of Oncology that wasn’t part of, it was 100 percent funded by the cancer, the cancer board, even though half the professors were basic radiology, nuclear medicine. So all of this is legacy... I’m not even a little bit surprised it’s so stunningly complicated.

Another administrator also pointed to the challenges around the different types of academic appointments and salary sources. He noted that 50 percent of the university-funded salaries are paid through the health authority. When asked, he acknowledged that the physicians have “too many principals” – and really don’t identify with any, essentially operating as independent contractors.

This sentiment was echoed by another administrator who commented on the identity-related challenges for academic physicians who are paid 100% by the university,
Somebody who’s a full time university salaried tenure track person... Under the University rules, they work 100 percent for the University. And they’re a full time employee of the University. Physicians have always had another source of income as we’ve discussed and I think many physicians think that their primary job is to be a physician and the University component is kind of a side job because it only pays maybe a third or a quarter of their income. But by accepting a University salary, under University rules, you work 100 percent for the University. So sometimes there is conflict between the University duties and clinical duties because the University would think you’re doing too much clinical work. And the person is supposed to then cut back based on the fact that they have a university salary which pays them to be a full time university employee.

**Tenure-Track Positions for Academic Physicians**

Tenure track positions have historically been designed to ensure academic freedom and income stability. The utility of tenure-track positions in academic medicine, and how the individuals were chosen in the past, was questioned by the chairs that were interviewed for this case study.

One administrator noted,

> It [tenure] is a struggle for some. I think we needed to be more cautious and careful about who we gave that role to in the past. We are now. I think that it raises the caliber of your institution from a teaching perspective, from a research perspective, translational research perspective, and it creates the type of environment that one would aspire towards.

Difficulties with the provision of tenure, and the A-ARP, were also noted:

In the past, the department did not do a good job in mentoring and articulating what a GFT [tenured] position was. When I came into this role, there was a huge glut of people hired on the A-ARP who had not met the requirements for tenure. And it was a great moment of reckoning and it was very, very difficult. The repercussions of that are still perceived to be quite negative. But I, I think that if you are open, transparent and manage and message it properly, positively, and always play to the everybody has a piece and a role, and the strengths and the diversity is important and good, then it can work well. We’ve struggled a bit. Because we did not initially articulate that what it is to be a GFT, that people have other options, and they’re all good and they’re all important. So at a year six mark when you say to someone you are not going to make tenure or people going for tenure didn’t make it, it’s a very negative messaging rather than starting off with a different culturing message. I think ultimately, you do need to have diversity, you need to have different groups, you need to have researchers, investigators and clinician specialists. That’s what makes it a vibrant environment. And that’s the beauty of an ARP...is that you can treat everybody equally remuneration-wise.

Other challenges related to tenure indicate the financial pressures embedded within the merit/remuneration model. This is addressed in the next section.
Assessment Models and Merit

Several administrators commented positively on the comprehensive annual assessment process implemented in the Faculty of Medicine and Dentistry, including the transparency, accountability, rewards for performance and recognition that is embedded in the system, as well as the peer-to-peer comparisons. A few challenges were also highlighted though.

The annual assessment process culminates in a discussion at the Faculty Evaluation Committee (chair’s level) with regards to relative merit. The Faculty provides the chairs with a mean that the rating assigned to individuals is meant to achieve. The chairs noted that the mean is usually 1.0. The merit level that is assessed is then tied to a base salary increment for tenure-track faculty members. For those who receive no funding from the university (Special Continuing appointments), recognition only is provided. One administrator noted that the mean rating is based on the budget that is available – and in this way, the actual rating is somewhat artificial. When asked what happens if too many faculty members have been given a 2.0 (on a scale which goes up to 3.0), the chair replied,

Then we get into an interesting discussion of the chairs [at the faculty evaluation committee]. And then you start to look at relative numbers – is that really a 2.0? I called this a 2.0? So then you get into this discussion. And this year, let me tell you, we ratcheted it up. Some of interpretation of the guidelines is still pretty flexible. I get that it’s a document that grows over time. But I find that the enforcement and interpretation depends upon the parts per million of caffeine in the system of the Chair [laughter]. I shouldn’t say that [laughter], but it’s not always consistent.

Another administrator commented that the system works really well, with two exceptions: how the system is funded, and the ratings that are occasionally given to avoid “union grievances”. The administrator believes that the merit increase should not be added to the base salary, but rather, should be constructed as an annual bonus. With regards to the ratings that are given, the administrator noted that anything below a rating of 1.0 can be grieved by the faculty member. He commented,
The other discussion about merit is that if we made 0.5 non-grievable more people would hand out 0.5s. I think we hand out a lot of 1.0s that probably should be 0.5 because people want to avoid the hassle of an appeal. But it, it’s also the psychology. If it’s appealable, it must mean it’s wrong. 0.5 basically means you’re doing your job but you have a deficiency in one of the areas of teaching, research, administration or clinical work. That’s a lot [emphasis] of people. If you said 0.5 is non-appealable though, I think more people would accept a 0.5 saying “well you know this is all about quality improvement your telling me I can do better, I didn’t do my 40 half days of teaching, or my teaching evaluation scores are okay but they’re not really good, compared to my peers might be a little bit low”. People would accept that. It’s positive feedback. But because it can be appealed I think the attitude is that it means you have given me less than I deserve and I’m being given the opportunity to appeal that decision.

The administrator also noted that the departments used to undertake the assessments, but now they are done at the Faculty level. He emphasized the challenges of making sure that most ratings come in at 1.1 (which has now been lowered to 1.05) because “if you’re over that then you are in trouble”. It was noted that if some faculty are not scored at 0.5, then those with a 2.5 also can’t be rewarded if they are exceptional, especially if the individual belongs to the Special Continuing group of appointments. The challenge is partially related to funds available to support merit increases to base salaries:

It especially doesn’t work for the special continuing group. Cause giving somebody a 2 merit when they don’t have a salary.... [pause]. It’s kind of like getting the smiling elephant in grade one on your homework right? So the only incentive for them is being told that you are doing a good job.

A senior administrator explained that the total pool of funding that is available is based on 1.175 merit increments per person, for 760 eligible faculty members in the Faculty. It was acknowledged that the merit ratings have a very strong link to the funding that is available, as well as the challenges related to the fact that ratings below 1.0 can be appealed. Because of this, it seemed that the ratings are tied more closely to the pool of funds that are available, than actual performance. Again, it should be noted that tenure-stream faculty go through the evaluation process, and are given a salary increase with the merit rating. Special Continuing faculty also go through the evaluation process, but are given recognition only, and no salary increase (as they are
not provided with a salary to begin with). A senior administrator, commenting on the faculty evaluation system, noted, “In 2003, I thought it was a magnificent system now I see it as a credible system with some very serious flaws”. While the peer-review approach was lauded, the system was referred to as “stunningly time consuming” (and by dint, expensive to administer).

Of note, the system described above was originally developed and used by the Faculty of Medicine and Dentistry for all GFT faculty members who have tenure-track academic appointments. The system will however be adopted in other faculties at the University of Alberta in the near future.

**Bonuses and Incentives**

Several of those who were interviewed indicated that the University of Alberta does not offer a financial “bonus” per se. The annual assessment process is a merit-based, base salary increase – not a true bonus (which would be offered on a one-time-only basis, but also on the basis of merit).

The matter of whether an extrinsic measure such as a bonus – or a financially-based, merit increase based on performance – could stimulate or recognize performance was discussed. One of the administrators noted,

> We have a pay for performance system in place on the academic side of the house. It’s part of the collective agreement so I haven’t got much choice. I think that you are better off using the other currency actually with academics which is time. If you’re really successful and you do a really good job and you get rewarded with time.

Here, the administrators perceived lack of influence, or control over the process was noted, as well as the importance of protected time for academic activities. He explained further,

> So, uh, first of all I believe that from a, from a physician perspective, an hour of clinical work is no more valuable than an hour of education work is no more valuable than an hour of research work. So I think that on an hour to hour basis they’re worth the same. That’s one thing. Some people don’t believe that, but that’s my, that’s my position. In addition to that, if you do really, really great work, you deserve a reward. And the question is, should that be money or time because there are only two currencies in life: time and money. At my previous university, the currency was time. If you were really productive, you got more protected academic time. But at the University of Alberta, the merit is in money. The problem [chuckle] with the system at the University of Alberta is that if you had a really,
really great year last year and you got a three merit increment, and then this year you have a really lousy year and you get a zero increment, you still keep the three you got last year. See what I mean?

Motivation and the potential potency of financial bonuses were discussed with another administrator. When asked if an extrinsic, financial bonus would “work” in stimulating the performance of performance of academic physicians, the chair noted,

Yes it would. For some of them. They’re quite vocal about it. Some of them feel that if they’re working hard and putting in those extra hours, the reward is the accomplishment itself, but it should have a market value as well. There are some who say, “If there is no market value what’s the point? I can just do mediocre”. And there are those individuals who are not driven by remuneration. So I wouldn’t say it’s across the board, but I think it does have its place.

The administrator also that he would provide a one-time bonus, not a cumulative bonus (funds added to the base salary). When asked about how the bonus could be structured, or the value of the bonus, the administrator stated,

One has to be careful about how you culture it [a bonus], how you message it, how you manage it. In confidence, I can tell you that you need to be in the 15 percent range before you can incentivize a change in practice. Having said that, one has to be realistic. And the other part is how we are funded by health. They don’t like the term ‘bonus’. It does not go over well in government. It has a bad connotation in this province.

As the notion of a bonus was fleshed through further during the interview, the administrator reconsidered, noting, “I don’t think it would work. I think the vast majority of academic physicians are motivated by their patient populations and to make things better”.

Another administrator noted that he has come across “several perspectives” on extrinsic rewards for academic success through a university committee that he participates in. For him, the biggest challenge is whether the merit increase should be a bonus (one-time-only financial recognition), or be added to the base salary:

The problem of putting it [merit] in base salaries is that every year the salary component of the University budget goes up significantly. And then you get cost of living. It’s like compound interest, right. So I give you $2,000 bonus which goes into your base salary, but then next year you not only get that as salary you’re going to get cost of living on that so
that the escalation of salary costs at the University – I mean that’s why the University is in trouble – it’s the escalation of salary costs.

Another administrator, remarking on the competitive nature of their department and the role of positive feedback, recognition, and their own role in motivating academic physicians, noted that,

We continue to try to promote the idea that we are an academic department. My role is more of a motivational speaker-type thing than actual rewards. Again, the university salary is a small component of what most people would make. But people are highly protective of what their merit increment is. I’ve had people in the past where I’d say “look we’re running out of merit increments here. I really think you are a 2.5 but would it be okay if I gave you a 2?” And their answer is absolutely not. You know, I’m worth my 2.5. And I mean here you might end up talking about $900 dollars in a salary. It’s like nothing, right? But I think it’s the pat on the back that drives a lot of people.

A senior administrator indicated that he believes that for the most part, recognition works better in motivating faculty, and improving morale and satisfaction, than a financial incentive or bonus would:

I think that recognition would work better than money. I suppose money gives recognition additional import but...unless you are able to offer a substantial amount of money... If somebody gets some recognition and they get a $500 dollar or $1,000 dollar bonus for that, that’s not very much in the scheme of things. But getting it and being named mentor of the year or being the researcher of the year or something like that probably carries a bit more weight than having a small bonus.

A senior administrator, in suggesting that financial bonuses should be provided to reward high academic performance in academic medicine in particular, stated,

Obviously, that’s the only one [financial bonus] that counts in the physician world. They talk and talk and talk about uplifting the people but then they measure things by dollars. And outstanding performance in any of the key areas should be part of the annual merit system and outstanding performance across-the-board should be celebrated and be systematic nomination for awards and accolades and things like that. I'm not a big fan of a bonus because then what is the base salary for? I can live with most anything and if we were offered a whole bucket of money for bonuses than I would make use of the money, but I think bonuses can have a powerful steering effect on people through their behaviour. You start seeing gaming... Well let’s hold back the article this year so that you get five next year instead of two and three, because two and three is normal and there’s no real dramatic downside that if I have a good year with five then I’ll get bonus. That kind of gaming can distort what is already a very complicated career management system.
It should be emphasized that the performance assessment process – which for some is tied to a salary increase – could also have a steering effect, especially given the variables in the system that lead to a specific increase (e.g., publications, grants, graduate students, etc.). When asked to reiterate whether a financial incentive should be supplied for strong performance, the administrator noted again, “It’s not the only way, but it’s the clearest”.

Another administrator explained that the base salary increase is not applied evenly across all departments in the Faculty of Medicine and Dentistry given the multitude of funding sources that are provided for salary:

Merit... [pause]. With our merit we kind of “giveth” and then we “taketh away”. So your university salary will increase... this is a part of the negotiation with Health... We have a fixed gross amount so if your university salary goes up you have to have a commensurate decrease in your fee, your independent contractor monies, to meet the bottom line. A third of your income comes from the University and the employee/employer relationship and two-thirds comes from your fee for service. That [the fee for service] goes up as the AMA negotiates fee increases.

In this way, departments that are on an A-ARP are not really part of the university-based compensation program. Any increase that faculty see in relation to performance, is offset by funds flowing from the A-ARP so that the net compensation relationship is the same as prior to assessment. Thus, the assessment/merit program is more about accountability, and recognition. The financial recognition piece of the assessment and salary increase program, at least in terms of acting as a performance-based, extrinsic, financial recognition or reward, doesn’t really apply.

**Financial Challenges**

The categories and sub-categories of analysis that emerged with regards to financial challenges included the impact of cuts to the departmental (university) operating budgets, the impact of those cuts on the operations and organizational culture of the clinical departments, internal budget models, and the impact of the current merit assessment model on the departmental
budgets. As mentioned above, the complexity and variability of funding arrangements and salary sources was also highlighted.

**Cuts: Departmental Operating (University) Budget**

Several of the administrators commented on the “deep” cuts to the university budget that have been implemented since 2008. As noted above, the economic downturn in 2008 resulted in a substantial decrease to the university’s endowments, as well as cuts to higher education budgets. Since that time, there have been repeated budget cuts, although there are signs of improvement.

Though very much cognizant of the serious challenges that the university faces, one of the administrators who was interviewed was more optimistic than the others, noting,

> I have a faculty member who came from the University of Manitoba who said in Alberta you got havees and have mores, [laughter] not havees and have-nots. Certainly, we don’t have the same flexibility and cash flow and discretionary funding from Health that we had up until 2008. The last six years have been much leaner and the university certainly experienced cutbacks so we get creative, we get less wasteful. We leverage with the research institute, we partner more with our basic science colleagues who have no money to recruit. I think we’re better stewards of the public dollars in tough times because you got to be. You just can’t all go off and duplicate things and do it on your own because there’s lots of cash out there.

Other administrators were however less positive. Another interview participant commented on the “deep” cuts to the university budget since 2008, stating,

> Last year’s cut was 7 percent. But there was a 4 percent increase in compensation. So it meant an effective cut of 11 percent. So without an increase [budget increase] they [departments] are looking at decreased budgets. What’s happened is that within departments, a lot of their so-called operating funds are paired down to the bone and usually to be able to meet a budget cut, it means giving up a position. So if somebody retires, you don’t replace the person or they replace it with a part-time person or something like that. This certainly has a negative impact.

The administrator noted that if a faculty member retires, the department will lose the position and its funding. The funding will now go back to the University pool to achieve budget savings.

Another administrator also commented on the cuts to the budget, and the potential impact on the academic activities of the department. The administrator stated,
It [further budget cuts, downloading costs] means we’ve become a clinical department. Our department is pretty successful from funding, from productivity, but we will become less successful if this continues. I think our department is a bit different than many in that it’s been a highly functional department. A lot of teaching is done by the clinical academic colleagues, some of the research is done by the clinical academic colleagues. A lot of the administrative positions are filled the clinical academic colleagues... at least 50 percent if not more of our program directors are not university faculty they are clinical academic colleagues who get a small stipend to do the job. What we’ll have to do if these budget cuts continue, and we have cut absolutely everybody we can cut, and cut expenses wherever we can, the only option I would have would be to take somebody who is a faculty member, give them their one year’s notice and turn them over to the CAC [clinical academic colleagues] pool.

**Merit-Based Assessment Process (Salary Increases)**

Three of the administrators highlighted the challenge of linking a financial incentive (base salary increase) to the annual assessment process. As noted above, some of the challenges that occur are related to the different academic appointment types, and the fact that some contingent, non-university funded, special continuing appointments carry no financial recognition or increase.

One of the administrators remarked on the financial sustainability of providing a base salary increase tied to the annual academic assessment process, as opposed to a one-time-only bonus:

There are two different performance reviews that are done. One by Alberta Health Services from a clinical point of view. And then a review every three years for their clinical appointments. And then on a yearly basis we have the Faculty Evaluation Committee. We have two FEC meetings per year – one for promotion and one for what’s called merit. So we have a merit system within the University.

When asked how well the “merit system” works, the administrator responded,

In a word: “poorly” right now but. I’ll just give you a little context of that. Each year we have faculty evaluation guidelines that we use for merit and it’s sort of the default position if somebody gets one merit increment per year. And depending on whether you are an assistant, an associate, or professor the merit increments will have different numerical values. So if you are performing well, I would go to the Faculty Evaluation Committee and say Dr. So-and-so should get one merit increment. And then his or her salary would go up by $1,500 dollars... the base goes up by $1,500. There is a Provost’s Advisory Committee now because there is a lot of concern about our merit and should it actually go into base or should it actually be a bonus. Because the University is going broke. It’s not sustainable and they are actually going to download it to the faculties next year. Merit and cost-of-living will be downloaded to us.
The impact on departmental operating budgets was also highlighted by two of the administrators who were interviewed. One of the administrators, commenting on the problems of the financial merit that is added to the base salary, explained,

On a million dollar budget, I’ve lost 150,000 dollars in the few years that I’ve been here. A lot of it is related to the merit increases. The faculty contract also includes a 2% cost of living per year – guess where that comes from? To cope, I’ve developed new revenue streams, beat the bushes on advancement. We’ve got some endowments that we draw on. And the funds are defined broadly so I can use them to actually support operating, which isn’t what you want to do, but what you have to do. I don’t have a tax or tithes in the department which I think would be considered by some of our faculty to be okay. I think most hate taxes and tithes. We run a fellowship program that generates a fair amount of cash for us a year that allows us to run our operation now. It also provides small stipends for people who do non-compensated teaching work. But now I’m faced with having to reduce the stipends that we pay to these people, and some of them may not do the job because of that.

Two of the administrators expressed concerns with regards to financial issues, specifically, the downloading of base salary increases and negotiated cost-of-living expenses. One of the administrators commented on the impact to the departments if further costs are downloaded:

It will kill us. I mean every year we get a budget cut. And our budget is as lean as can be. We are in the position that if they were to download merit to us, I probably would have to end some of our faculty positions. They will become clinical academic colleagues with no salary support. They’ll just do more clinical work. So they won’t do academic work.

Another administrator echoed this concern for their department, also noting that positions would need to be cut to ensure the financial viability of the clinical departments should the budget cuts or downloading of expenses continues. This administrator also highlighted the potential impact on the organizational culture and professional identity of faculty members:

The culture of our department would be affected. It would alienate the department from the University and there is already a lot of that within this city. There is a river in this city called the North Saskatchewan River. It’s really not much more than a stream but it’s like the biggest gulley that you can imagine. So the hospital on the North side of the river...there are lots of very bad feelings toward the University. And then, we have some other major hospitals where there are no academic faculty. This city is still very site-based in their thinking about the practice of medicine even though we have these zones. And so we have eight hospitals in our zone but there is still a lot of town and gown here. And so I think losing our academic faculty would probably just strengthen the position that its town and gown.
The administrator advocated for much greater integration between the health authorities, the zones (or hospitals) and the University. It was noted,

> It’s been my position that you come to Edmonton to do something academic. But we need an academic institution that is a partnership between the University and the health care system. And there’s competition right now between the two. Alberta Health Services is starting to do their own research and Alberta Innovates Health Solutions, which used to be AHFMR, the money from AHFMR used to go to the universities now a lot of it is being channeled through the health authority. I would say that the health authority and the University, at least in this system – sorry in this city – are starting to divide rather than come together. In a province like Alberta it should be, Alberta Health Services/University of Alberta/University of Calgary/University of Lethbridge, and it all should be considered as an academic health authority.

Of note, concerns about the impact of university finances on the organizational culture or academic focus of the department was not raised by the administrator whose department is on an A-ARP.

Another administrator, also commenting on the potential impact if these costs are downloaded, highlighted the importance of strong relationships between the Faculty and University leadership:

> The impact of cost of living being downloaded to the Faculty is going to be huge. The Faculty of Medicine here is a huge piece of the University of Alberta – 80% from what I understand. I think it boils down to the relationship that our Dean has with the Provost specifically.

Finally, a systems-level issue with the university’s current compensation model was pointed-out by one of the administrators,

> We have another little flaw in the University of Alberta as well right now – you must take retirement at such and such an age. You really don’t have to retire, you just have to start taking your pension. So we have a certain number of people in this University that are drawing their pension as well as a full-time salary.

The administrator clarified that at 69, those who draw a university salary (tenure track or GFT faculty) must take a full pension, but can also stay on a 1.0 FTE position. The administrator noted that several chairs consider this to be a serious flaw in the system, and have recommended that if a faculty member continues to draw salary, the salary level should be decreased by the amount of pension, so that pension plus salary can never equal more than 1.0 FTE.
Internal Models: Academic Tithes, Practice Plans

At present, some clinical academic departments at the University of Alberta tithe clinical revenues (generated through the fee-for-service program) and then pool those funds to support some elements of the academic mission. One of the administrators explained this as follows,

The only pooling of income we have is for our faculty members. We take 8 percent of their clinical earnings, but 2 percent of that goes back to the Faculty. Now some of that I think is where the compensation for some of our Faculty-funded professors probably comes from. And then we also put money into an enrichment fund for our faculty and we also have a fund that helps pay their secretaries. So there is no real sharing of that pool of money.

Another administrator indicated that he would like to start a formal practice plan. Practice plans, as they are constituted in many other jurisdictions, do not currently exist at the University of Alberta 59.

Another administrator, who was keen to see the implementation of an A-ARP for all specialties, was also asked if the formation of a formal practice plan arrangement might be a first-step? The individual noted,

Well put it this way, the only practice plan that existed was in the Department of Medicine since 1988 to about 2001 [the year of the implementation of the A-ARP in that department]. There was discussion but there was never any ability to move it forward. I think the interest isn’t there. I think the fee-for-service mentality is very deeply embedded... you know, you take home what you do the work for. And if somebody else doesn’t do the work they don’t take it home. Some departments have a tithe which is used to further the academic mission whether it means giving a stipend to somebody for teaching or whether they, it goes to support somebody’s initial research or whatever. But they use it to further the academic mission. So, there are various components that are kind of like a practice plan but not in the full-fledged sense of a practice plan.

Tolerance for Failure

The Faculty of Evaluation Committee normally evaluates tenure-stream faculty after three years. Up to five years, from the start of the academic appointment, is given to achieve promotion to Associate Professor, and pass tenure review. They are however given an extension through the

59 In Chapter 2, Cohen and Fox defined a practice plan as “an organized structure within an academic medical center that provides such services as billings, collections, revenue distribution, and financial services to the full-time teaching faculty” (Cohen and Fox, 2003: 120).
Faculty Evaluation Committee, and under extraordinary circumstances, another extension may be granted by the Provost.

The chairs that were interviewed for this case study all noted that tenure-track faculty (GFTs) can be removed if performance is poor. In describing how the problems are addressed, one of the administrators explained,

You just don’t promote them. After six years here you – assuming you’re a GFT— go through a tenure hearing. Which is also the time when you go from assistant to associate professor. But it’s really a tenure hearing. We’ve had people fail that. They can appeal it of course. But if you don’t make tenure, your position is deleted. But you can still stay as a clinical academic colleague.

In the past, the department would have been able to rehire into the funded position. The administrator noted that at this time though, the department would probably not be able to keep the position given the financial pressures faced by the university. When asked if this situation might affect decision-making, the administrator stated,

It wouldn’t affect mine. If you’ve got such a low performing person it doesn’t strengthen your department. Just having somebody in the position doesn’t help me. I need somebody who’s performing and so, I’d be just as happy to lose the position as keeping a low performing person in the position. So yes you can deal with poor performance.

Tenure-track faculty can also be removed (or demoted to CAC status) if they repeatedly rate poorly through the annual assessment process. A senior administrator described the process:

A rating of below 1.0 means that they [faculty members] are deficient in one area. And you can be deficient in one area indefinitely if you choose. If you get a zero, what’s called a zero-D, basically that’s unacceptable. If you get two zero-Ds you can be fired. Zero-Ds are very unusual, I don’t ever remember a zero-D. You basically have to do almost nothing.

Another administrator also commented on the tolerance for failure and the annual assessment rating at the University of Alberta, noting,

We’re pretty lax. It takes a lot to get zero. Through our assessment scheme, you’re [faculty] rated between 0 to 3 every year. If you get a zero two out of three years, then the Dean can ask the Provost to dismiss you. Even if you have tenure. It takes a lot to get a 0. I don’t worry about being overly harsh. One thing we do worry about is as Deans come and Deans go, faculty evaluations system is owned by the Deans, it’s just there is no university-level view. If the Dean comes in, you got to worry about the Dean completely revising the assessment.
scheme because you have professors that have worked under one Dean for ten years, and now the new Dean comes in and... uh oh.

Teaching is also evaluated, but the process is less demanding for CACs, who generally engage in teaching on a part-time basis. These faculty members also submit an annual request for reappointment, with details provided on their activities during the past year. No merit or recognition of performance is provided. One of the administrators did however discuss how problems with teaching effectiveness were dealt with at one of the community-based teaching sites:

We know we all have to teach. We know we all have to support research, equipment and supplies, safety and quality, wellness. Things like that. So there are things that the sites are responsible for and there are things that the zone [Edmonton health care zone] is responsible for, and the entire zone recognizes that we are in the education business. But there are some [faculty] that are awful teachers and they don’t teach. So I took away their clinical academic appointment which means they don’t get their stipends for teaching residents.

The administrator discussed how academic fluctuations, or declines in productivity and efficacy, are managed:

If you have 220 faculty and the grants aren’t coming in, something’s going on. I go see them. I ask them what’s wrong – is it because I’m not providing you with enough support? Sometimes it’s just part of the cycle. I don’t have a problem with that. I don’t want to penalize a guy... and so we have a war chest of funds and the war chest of funds is often used to do bridging. The university isn’t a lot of help on that, quite frankly.

In noting that he asks faculty members about whether he, as the chair, is providing enough support, the administrator indicated that he feels that he has a fair degree of power to make a difference – influence to provide support and enable the academic mission as well as individuals.

**Recruitment and Retention**

Several of the chairs remarked on the recruitment and retention of academic physicians to the University of Alberta has seemed to follow the “boom and bust” economic cycles Alberta faces as a province. Some noted that the A-ARPs (where available) have greatly facilitated recruitment and retention strategies, while others commented on the funding previously available through
Alberta Heritage Foundation for Medical Research. (AHFMR) The challenges of recruiting physicians to Edmonton more generally were also highlighted.

One senior administrator noted that “recruitment and retention is a major problem”. The individual indicated that roughly 100 individuals were paid through the AHFMR but that government will stop funding the program by 2017. The administrator indicated that some of the issues will be dealt with through retirement or attrition, however, “Even after we’ve gone through that whole scenario [acquiring new funding sources], we’ve probably still have 30 to 40 people where there is no solution at the moment”. Another administrator commented on the lack of alignment between the goals of the university and the hospitals within the AHSC complex,

AHFMR was a tremendous benefit to Alberta. They had a huge pool with which to attract the best and the brightest. And now we’re being forced into a pool with all the other mediocre universities in Canada like the University of Toronto, McGill, UBC... [chuckle]. I’m trying to recruit a senior level “Trojan Horse” right now. The only problem is that the Alberta Innovates pool of money is actually governed by the hospital corporation. And what’s important to a hospital corporation isn’t usually what’s important to a Faculty of Medicine. We’re pretty focused on pillar one and pillar two research here at the U of A, but the Alberta Innovates funding is for is for translational research which is a bit of pillar three and four. So we’re trying to mold our operation to go after that kind of funding but it’s difficult when that’s not the genetics of your university. Or the faculty.

Another chair, discussing the challenges of recruiting academic physicians to Edmonton more broadly noted,

No compensation problems. Problems happen if you show up here in February for a recruitment visit [laughter]! Its 25 degrees today, it’s green and it’s pretty right now and the river valley is gorgeous. Edmonton is not an easy city to recruit to. The quality of life is very good here, especially if you’ve got a family, it’s a great quality of life. I do not have any issues bringing people here based upon the people having to mentor them, based upon compensation, based upon start-ups, supports, that is never the issue. It’s location.

One of the administrators stated that a small minority of the faculty members in their department are in tenure-stream (GFT) positions, and the funding available from the university comprises roughly 20 percent of gross salary with the balance coming from fee-for-service billings.
When asked whether they would like to see an A-ARP for the other divisions as well, the administrator indicated,

I cannot recruit faculty positions right now. I have no opportunity to hire people with university or Faculty-paid salary so all of my recruitments right now are either clinical academic colleagues or special continuing. Which means we give them a faculty appointment but they get no salary for it. So I cannot recruit anybody right now as there are just no salaries available.

When asked about how university funded positions are vacated, he replied “Death and retirement”.

He then noted that the availability of positions is one challenge, however funding is another, noting “I can’t get any money from the Dean or the University to do that [recruit].”

**The Role of the Chair**

The chairs who were interviewed were asked to comment on their role and the degree of influence that they feel that they possess. All of the chairs, to varying degrees, saw themselves as mentors or role models, helping to fulfill the academic mission by providing resources and supports to faculty members. One chair noted,

I can be an enabler by assigning resources to assist them in being successful [research]. And the other influence is how successful I am in capturing resources from the Faculty of Medicine to support my researchers at this end. And how much influence do I have with the Dean of Medicine? I have been able to get a GFT position when no one else got one. It’s all about resources.

On commenting how he demonstrates accountability, not just for his own performance, but for the overall performance of the department, the same chair noted,

The department needs to be viewed as a corporate citizen in the Faculty of Medicine. I think it’s up to us to develop relationships with the other clinical and basic science departments and show that other departments want to work with us. And I’m an informal mentor to many of the [physicians] and interns throughout that come to my office from other departments. Maybe I don’t publicize that, but that’s one of the roles I have taken on here.

Another chair noted,

My role is to create a foundation that all can draw upon for academic success, and try to remove some of the barriers that busy people have. Whether it’s seed funding or making sure you got people into mentorship programs. Really, in a word, my job is a facilitator. Not just to initiate that success but to sustain that success.
When that chair was asked to whom they are accountable, it was noted,

I’m accountable to my faculty, to do a good job and to advocate and represent them honestly and openly and transparently. I am accountable to my Dean, to whom I report and then ultimately up to the Provost of the University. Dr. Miller has brought in a set of common expectations of Chairs that have to do with deliverables on CIHR funding, extramural funding, graduate students, extramurally-funded graduate students, participation in UGME teaching, PGME teaching, accredited programs, contributions to leadership of the Faculty within education and research, across the board of my department. On the clinical side, I am accountable to Alberta Health Services Medical Affairs and ultimately to the people of Alberta.

Another chair commented that he feels that his accountability is more to the other Chairs than to the Dean:

I think from an academic point of view I’m accountable to the Dean but really I’m accountable to the Faculty Evaluation Committee. Which is a committee made up of all the chairs. So yes, when you go to FEC [Faculty Evaluation Committee] your department is under scrutiny. And I have to admit, and I’ve told our department this, when I go the FEC I’m very comfortable because I think we have a highly functional group that are performing well.

The chair went on to note that they feel that ensuring -- and then communicating -- the successes of their department is a major part of the role of chair,

I feel like the success of the department is my responsibility. And in fact our Dean has changed this as well. It used to be that we would meet with the Dean every year to look at our own annual report and he’s changed that. I am now evaluated on our department success. It’s not my own successes. I’m okay with that but I think a mix would be good. But I do think that it’s our job as a chair is to make sure our department is performing.

The Role of the University

The Vice Chair of Clinical Affairs noted that the,

The role of the university is to try and nurture academic leaders. Encourage, recognize and support academic leaders. We have developed initially within the Faculty of Medicine now for two years an academic leadership training program. It’s successful and will be offered in three other faculties. And then the following year it will be offered University-wide and basically it is to try and provide leadership training, academic, to our academic leaders. It initially started at the Faculty of Medicine but it’s actually supported through the University itself and is now be a university leadership program.

Several of the individuals who were interviewed for this case study commented on culture, identity, and the integration of individuals into the university more generally. Several noted that most faculty
identify more strongly with AHS or their hospital, than the university or the clinical academic department. To encourage greater recognition of the individual’s relationship to the university, one of the administrators noted that the university is trying to,

Recognize peoples’ academic work. The very fact that people have to do an annual report online reminds people every year that they have an academic mission that they need to fulfill. We try and bring more things to Faculty Council that are relevant to people where they can feel they have a roll in decision making. Also, making sure people are aware of the benefits that the university brings them like access to the library, the online digital information that’s there, and whatever other benefits that they may be eligible for so that they can feel like they are getting some benefit from being affiliated with the University. But trying to certainly recognize people’s accomplishments, academic accomplishments helps people to feel like they are part of the University community.

The administrators, to different degrees, all commented on the role of the university, particularly in relation to the Alberta government, and AHS. As noted in previous sections, the majority of those interviewed for this case study advocated for greater integration between the university, and the health care system, perhaps even on a provincial levels. A senior administrator also stated that the relationship of the health system to the university, and the value of creating a single, integrated health/education system, is a “missing piece in a lot of narratives”. When asked to comment on issues that should be considered in conducting my research, it was noted,

The only thing in Alberta that you’d have to worry about is the effect of creating the Alberta health system. Because we had city region health systems, and there were very, very tight uplinks between the health system and the institutions [universities]. And the CEO of Capital Health and the CEO of Calgary Health and their chief medical officers were partners with the Dean on all of these things, regardless of which scheme or which combination of schemes was used. With AHS [Alberta Health Services] it’s much more difficult with a central province-wide system, for many reasons. It’s huge and the senior people are far removed. And the UofAlberta/UofCalgary competition is no longer contained by the city region health systems. So it doubled up. In the last two years they have created Red Deer North, Red Deer South, so they took AHS and divided it at roughly Red Deer, which is not really the middle of Alberta, sort of looks like it’s the population-weighted middle of Alberta. And we started then evolving back to what was a much, much more effective system, of a regional health system tightly coupled with the medical schools. But I think, you know, the last however many years, five years, or whatever, everything we are talking about has been impacted a lot or a little, by the reorganization of the health system. And that’s, that’s a missing piece in a lot of narratives. So, the countervailing argument is AHS is a brilliant maneuver because it creates a single health system for people with two medical schools. And we are beginning to figure out how to extract value from that aggregation. It’s not there yet, maybe we’re 60-70
percent there. But it has enormous potential. You can do wonderful things. And it’s the challenge of all of us to get past the daily grind and seize the upside. We have over-indulged on the downside. It’s time to seize the upside.

Chapter Summary

The University of Alberta case study utilized a different research methodology from the other four case study chapter. Here, the research question was designed to elucidate the methods used to compensate and assess academic physicians, as well as the perceptions of academic leaders on those methods. The research methods included document analysis, and qualitative interviews of academic leaders.

Figure 7.3, the concept map of categories and sub-categories of analysis which emerged during the interviews, also highlights some of the issues and challenges which surfaced. Some of these issues are shared by other medical schools in Canada, and include financial issues (persistent budget cuts, funding sources), recruitment and retention issues, and the impact of extrinsic, financial incentives or bonuses on academic performance. The perceptions of the role of the chair, as well as that of the university, were also discussed, and were very similar to comments provided by academic leaders at other universities.

Some issues were however unique to the University of Alberta context. These included the various categories and sub-categories of academic appointments, the collection of funding sources that are used to fund different types of academic positions (e.g., tenure-track, contingent, A-ARP, special continuing), and the cultural challenges that are engendered by a system that is so varied, and complicated. At other universities, there are also differences in the types of academic appointments and the funding arrangements for these positions, but the difference is usually limited to academic physicians practicing in an AHSC versus those in community-based, affiliated teaching sites. At the University of Alberta, the situation is far more complicated, and is largely based on historical arrangements. In some cases, the issues are linked to past decisions made outside of the
medical school context, by the government. Several interviewers commented, directly and indirectly, on the long-term, ongoing impact of those historical arrangements.

The influence of the academic assessment model on the finances, organizational culture, and professional identity of faculty members was also a pervasive topic, with many concerns expressed about the future sustainability of both the academic assessment system and the budget model that is linked to that system (i.e., base salary increases and cost-of-living expenses that have been downloaded to the clinical academic departments). The differences between those departments who are on an A-ARP – versus those departments or division which are not – were also emphasized. In Surgery, one Division (Neurosurgery) is on an A-ARP, while the others divisions are not, even though they were all keen to seek an A-ARP arrangement.

For academic leaders at the University of Alberta, perhaps the most unique and serious issue that has been faced relates to persistent change, on a few different levels. These changes include leadership turnover at the decanal level in the Faculty of Medicine and Dentistry, and persistent changes in personnel at the government level (both health and education ministries). The reorganization of the health system in Alberta more generally has had a continuing impact on the academic environment as well, given the interconnected nature of the health and education systems. Several administrators talked about the impact of moving from a regional health care arrangement to a zone-based health authority (roughly 15) to regions (roughly 9) to sectors (only 2), particularly in terms of the organizational culture and relationships between various health care institutions and the physicians practicing therein. Given the principals, multiple agents and stakeholders that are included in the current arrangements, a systems-level approach to academic medical centres is very much needed.
Chapter Eight: Qualitative Interviews (University of Toronto and University of Manitoba)

Overview

This chapter reports on the results of the qualitative interviews of academic leaders from the University of Toronto and the University of Manitoba. For the University of Toronto, the chairs of Anesthesia, Pediatrics and Surgery as well as the Vice Dean of Clinical Affairs, were interviewed. In Manitoba, the chair and a senior administrator in the Department of Internal Medicine were interviewed. For the purposes of this chapter, all interviewees are referred to as the “administrator” to preserve anonymity. To further preserve the anonymity of the department, the merit awards program, academic points program, Career Development and Compensation Program or Research Performance Assessment Program will simply be referred to as “the department’s program”.

The research question, research methods, study period and rationale for the case study are as outlined in Chapters 3, 5 and 6.

Results

Culture, Identity and Practice Plans

The interviews demonstrated that the tension between the academic physicians (agent), that practice in academic health science centres, and the multiple stakeholders and principals to whom they are responsible is an accurate portrayal of the relationship and represents a persistent issue in academic medicine. Several administrators noted that the practice plans play a large role in driving the academic mission (teaching and research) of the university more broadly, but buy-in or support across the practice plans can vary. One of the administrators stated,

The magnitude of that problem is so great that it’s not possible to tackle it effectively in the current climate. But there are things that I can tackle such as the development of the [departmental program] for those people who truly are academic or are on the fringes, and for targeted recruitment. So, there are several things that I can do. The other thing that I can do that is very helpful to the academic mission is raise fund for endowed Chairs.
In regards to the latter, the administrator has persuaded four practice plans to contribute funds to establish five endowed research chairs (at $3 million each), one at each of the major affiliated hospitals. Outwardly then, the department’s program provides quality assurance, monitoring and recognition for the university in particular. The contributions of the practice plans to endowed research chairs provides further evidence of clinical revenues being used to support the academic mission.

One administrator lamented that he has no direct impact on academic productivity, although he can help shape it through recruitment of research-oriented residents or early career investigators, as well as connecting people across the city, and providing counselling and mentorship. He did however express concern over the lack of communications between hospital chiefs, chairs, CEOs and research institute directors, noting that mechanisms to develop these relationships and facilitate multi-level planning might help increase the influence and impact of the university department across an Academic Health Science Centre. He noted that,

We have phenomenal productivity at our university, and so it is hard to argue that the system is broken. But the fact of the matter is, the rules of engagement across the practice plans vary phenomenally, and some department’s [practice plans] work better than others.

The fundamental challenge for academic leaders in some departments may be the nature, goals and definition of a “practice plan”. One administrator stated:

I think the main problem is the tools for academic leadership and that is the practice plans. The practice plans are extremely variable in terms of what they mean. The clinical faculty agreement, the definition of a practice plan is really immensely vague, you know. It’s not clear what is the primary goal of the practice plan. It’s not very clear whether it’s a business group, whether it’s a department, or it’s a department within a business group. It seems that the institution/hospital does not have a primary role in selecting members for membership, but instead, accepts individuals onto the hospital staff who are chosen with the practice plan’s interests served first.

At universities with practice plans, separate practice plans are typically formed by each specialty or department at each hospital. Some departments have dozens of practice plans, each with their own AFP arrangements, practice plan agreements, decentralized governance structures, and leaders. The
model for most practice plans is based on autonomy, independence and self-management, with variable means to integrate or collaborate with the university departments. Some of the practice plans are academically oriented, while others are not. When asked how the practice plans contribute to the academic mission financially, one administrator noted,

The practice plan is kind of vague around its core mission -- that is to say furthering the academic mission.... You need an expectation of what percent of clinical incomes would go towards the academic mission. I don’t think that it should be a very large amount.... A tax of sorts although no one likes to call it that. And maybe they are right, maybe the university isn’t efficient in many areas and maybe they spend in some programs and so with less money. But there is no way that university money should ever be a substantial component of a clinical department.

One of the goals of the Anesthesia and Surgery programs is to facilitate, or help ensure, the provision of protected academic time. However, there are no formal agreements with the practice plans or hospital chiefs around the amount, frequency or consistency of academic time that is provided. One of the administrators noted,

We do not police the time given. We simply say that what we will do is look at productivity and if they don’t have enough productivity then they either didn’t have enough ability, good fortune, collaboration, or necessary time. If individuals come to me because they are having difficulty with their time, I will certainly make representations on their behalf.

Of note, Anesthesia’s 2010 survey of those who received a merit award indicated that 53% were not given any additional time than prior to receiving the award. Nonetheless, the K-MAAP© analysis of this department demonstrates increased academic productivity over the study period. Thus, the department’s program may not have funded additional academic time (i.e., time that was not already provided previously by the practice plans), but it may provide some level of income stability or reimbursement to the practice plans for the time that is given. The department’s program may also provide peer recognition or public support for those who receive the awards, reinforcing desirable behaviours on the part of the practice plans (i.e., the allocation of academic time). Indeed, the chair notes that the program does not come close to equaling clinical earnings or adding new income, but,
The merit awards, frankly, are largely symbolic. We have an understanding that we pay a certain amount of money and in return, they [the academic physician] will get a free day of time per week. They will often get additional time from the department also.

One of the departments uses an incentive scheme that is funded through academic enrichment funds available through the AFP, not the university budget, to recognize the contributions and academic “engagement level” of each clinical faculty member. The administrator notes that,

We have a system that provides further funding to full-time academic surgeons but the [university] department is not in control of the academic enrichment funds (AEFs) at the hospitals or the AFP funds from the Ministry [health ministry] to the hospitals. We give scores from the [university] department to each physician, and to the Division Heads of each of the practice plans to decide how to divide these funds. The AFP monies are all pooled, and then the practice plans would decide the distribution of funding based on the academic scores.

Further, the administrator indicated that the chair, hospital chiefs and division heads access data for the physicians in their local group, but, “the practice plan decides what to do with the academic scores. I don’t control that”. The administrator noted that the university had decided years ago to flow the AFP academic funds directly to the practice plans, as business partnerships. Echoing comments made by other academic leaders in the interviews, it was noted that the university could have had the AFP funds flow directly to the university, and then the chairs, and then the chair “come up with a plan by which the department’s system would have tremendous, stronger merit than what it potentially does now”. Additionally,

This would have put the University, the Faculty of Medicine, in more control of the distribution of funding to the practice plans and the destiny of the faculty members. But because the physicians saw this as hard-earned money from their clinical practices, the Dean did not wish to take the funding out of the hands of the physicians.

Financial Challenges, Internal Models and Academic Tithes

As indicated above, the chairs in two of the departments have dual leadership roles (clinical and academic), and one administrator also serves as the head of the practice plan. As such, he oversees university money, AFP funding, practice plan clinical revenues from fee-for-service billings,
revenues from the clinical services programs, and a tithe that is levied against the practice plans earnings and redirected to mostly academic undertakings.

When the administrator commenced his leadership appointment, he insisted on reviewing the finances for the unit as a whole. At the time, finances were tight, and the department was operating with a $1 million deficit, due in large part to “mismanagement of the university funds”.

The clinical revenue tithe was also being used to fund PhD positions (non-MD), but productivity was low. A deliberate effort was however made to avoid moving the clinical and academic operations to a comprehensive AFP such as the model used at Queens University in Kingston (i.e., Southeastern Ontario Academic Medical Organization) simply to change the flow of revenues. It seems that the decision not to seek an AFP-type arrangement was designed to ensure a degree of autonomy from government control around recruitment, clinical services and operations management. The chair noted,

So in Kingston, it [the alternative funding plan] you have to get approval for additional positions, you have to go through all kinds of bureaucratic gymnastics to expand your department or to alter [clinical] services. In other words, you were getting cash up front but you were basically giving up any possibility of having any ability to influence what goes on. That was not a desirable way to fund a department from my perspective.... But when I became department head, they were several months away from issuing pink slips to about 40 people in the department.

The administrator revised the clinical revenues capitation scheme, and levied a tithe on fee-for-service revenues in the first year. During the second year, a surplus was generated allowing for a lower tithe. The chair stated,

When I started, I said that I wanted to see the books. I want to see how the money is spent in the department and I want to see the department’s university budget. And then I spent a couple of hours looking at that and then I came to the conclusion that I could do quite a bit better, and I’ll probably be able to reduce the tithe... But when I generate a surplus I get to use it to advance the academic mission of the department and I decide how. And that’s how I proceeded. That first year, we generated about a million dollars in surplus so we went from a million in the hole to a million to the good.... I then reduced the tithe which was allowed with permission from the dean. They were suspicious; the dean had been asking for money to cover their deficits.
The tithe is used to fund the academic mission of the department, develop new programs and clinical databases, and support recruitment and retention efforts. Notably, the department used to fund salaries (stipends) for education leaders (residency and undergraduate program directors) through its own operating budget, however, in an effort to create consistency amongst all departments in the value of the stipend, the Faculty now pays these stipends for all departments directly (but has also reduced the operating budget allocation of each department to fund these costs). This has been perceived negatively as reducing the level of control or ownership that the department has over its academic administrators.

Another administrator noted that while he is aware of clinical academic departments in Quebec that levy a tithe on clinical income, determining an appropriate percentage would be difficult:

If it’s small [the percentage of tithe on clinical incomes], than you have the worst of both worlds. You have a population of people who are working very hard so they feel they are overworked because they are overworked. So, you try to get something from them in a collaborative way, but if they are being taxed, they will never want to give anything else. So, the real tool of the trade is the definition of a practice plan.

**Assessment Models: Strengths and Challenges**

The four models described in the University of Toronto and University of Manitoba case studies all include academic assessment models which include an element of peer-review (external and/or internal).

For one department, the peer review component of their departmental program is of interest given that full-time clinical faculty are not formally reviewed by the university department and/or chair. The hospital chiefs review clinical productivity, but the department’s program is the only real means to assess academic productivity and performance of researchers, across different sites and sub-specialty areas. The administrator noted that he meets with all faculty regularly, however, the meetings are mostly “communications-oriented”, because,
Many people fundamentally don’t see their main role as academic. I think the terminology is sort of ticking boxes really as opposed to being that useful... The term ‘full-time clinical faculty’ is an extremely broad term. The definitions imply that you would you would work in an academic centre. And that implies you would have an academic interest and undertake academic duties. At a minimum, that would be teaching. At a minimum teaching could be very little teaching. Very occasionally, some individuals will seldom come across residents or medical students. Other people have very large teaching portfolios. Smaller number of people have very large administrative or research portfolios. So the further on that spectrum you get then the more engaged the individual is in the academic mission. So, there are some people who feel that having – the term is sometimes “worker bees” – medicine, surgery, anesthesia, obstetrics, and those people quote-unquote drive the overall academic mission because they generate clinical funds.

Another administrator, who department regularly assesses performance, reflected on the strengths of their program, noting,

The major strengths of the program are three things. Number one, people come in with a job profile independent of whether they are clinician scientists, clinician investigators, clinician educators, academic clinicians which includes clinician teachers and clinician specialists, all the categories. In other words, whether they predominately clinical, educational or research they with the same expectations for advancement. They understand what the expectations are for their category.... The next thing is the annual assessments by the division head, which keep the career trajectory moving ahead. And that’s rewarded to a small degree by an annual bonus. As time has gone on, that [the incentive] has become smaller proportionate to income. And it’s not really pay for performance but its’ on that sort of spectrum...

The administrator emphasized that their department’s assessment and compensation program “does not constitute a true pay for performance” program, however, the annual bonus does function as an incentive of sorts. The administrator continued by citing the triennial peer review process as strength of their program:

The triennial process is a really rigorous peer review program overseen and sort of approved and signed off by the department Chair and the Executive. It looks at people’s ongoing achievements and gives them a base salary increase. The annual bonus is giving them a little, sort of, “chump change” because it’s a little more than that but it gives them something on an ongoing basis and then if they performing well over three years they get a salary boost. If they are performing very well they get a double boost.

The administrators noted that most faculty members are expected to progress through the full job/salary levels in 21 years. The base starting salary is set at a specific dollar figure for the vast
majority of new academic physicians, with a slightly higher starting base salary for physicians in specific sub-specialty areas. The administrator noted the base salary levels comprise,

A really egalitarian view of the world so an XX doesn’t get more than an XX or more than a XX person, so it’s very fair. Because of the way we pay people, and the fact that our salaries are competitive nationally and internationally, we don’t have everybody saying ‘I don’t get paid enough’

Of note, this administrator did however state that he believes that academic physicians are intrinsically motivated. This is explored further below.

Bonuses, Incentives and Motivation

Academic leaders are also challenged with finding ways to engage and motivate academic physicians. Two of the four departments included in the University of Toronto and University of Manitoba case studies offer a regular and ongoing performance bonus. One administrator indicated that he believes that the motivation to do well is mostly intrinsic in nature:

What motivates Clinician Scientists who are successful is essentially that they wish to make a difference to patient health. They wish to be the ones who contribute to new knowledge that improves health care, improves quality of life. Intrinsic is not enough. So, you need to be very intelligent. But that’s not enough. You need to have character. But that’s not enough either. You also need the training, and you need a supportive environment. And in many cases, even with all those things, it won’t work out. So, you need ego, interest, humanity – all those things mixed up.

The administrator noted that he is “very leery of rewarding research success” [with bonuses]. He felt quite strongly that other rewards were more potent than cash – time to do research, publications, patents, intellectual property, peer recognition, grant funding. The administrator noted, “I don’t think you need to have a large increase in salary, particularly among people who already earn a lot of money”. On the question of bonuses in particular, the administrator stated,

I think they [bonuses] are a waste of money in truth. I know of an institution in New York that pays per paper. I think that paying people extra when they already get paid a lot of money is not so good…. Especially when people are worried about plagiarism and fraud and so on, it’s just one little thing to leave out. Research itself if the big incentive... It is beyond

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60 The sub-specialty areas were replaced with “XX” to preserve confidentiality.
money. Far better to reward people by maybe giving them a graduate student or something along those lines, just enable their research. That’s the way I see that.

Another administrator noted that he does not feel that their annual bonus performs the function of a bonus or acts as a signal, but rather, is really viewed as part of the overall salary package. However, he noted that the previous chair established the bonus levels and process, and did in fact think that the annual bonus acts as a true monetary (external) incentive. The current administrator reported that the annual bonus is “taken for granted”, and should probably comprise a higher percentage of gross income (maximum of 15%). The administrator noted that in keeping with Daniel Pink’s book “Drive” (Pink: 2009), most academic physicians in his department are motivated by a sense of autonomy, mastery and purpose, not monetary incentives. When asked about motivation, the administrator stated,

If it’s heuristic, which means people use their brain, and you give them a living wage, then it depends on autonomy. And everybody’s got a little bit of autonomy, through time, that is protected [academic] time. Mastery is the key.

Another administrator, in acknowledging that their department’s program comprises an individually-focused compensation model, and not a small bonus or extrinsic incentive for all in the department,

Giving, you know, frittering away – excuse the term – a large portion of the department income on that [bonuses for all] is, well, it could be tokenism and is probably a waste of money. You know, giving people awards, you know, competitive awards for being the best teacher for example, and funding an awards ceremony where their families and their friends and peers and colleagues can see just how well their celebrated that would have far greater effect I would say. And the other problem with giving people small amounts of money is when you want to take it away, they think it’s a big amount of money. That’s human nature. These issues are magnified when the amounts of clinical income are large, the practice plan size is large, and the amounts of university income are small.

For some, the competitive nature of awards may also be motivational (extrinsic motivation), particularly given the distributed nature of academic physicians across multiple hospitals.
When I asked an interviewee about potential changes to their current system – a group-focused system – to a more individually focused system, the administrator also indicated that recognition is more important than a monetary incentive:

I would like to pay the physicians more. Each one of them. But we have a limited budget for that and it’s unlikely we’re going to get any increase in our budget so we may have to be strategic about where we put the money in the future. In terms of the balance, we have the most investigators, then teachers, then scientists. All groups need support, but perhaps the investigators and scientists require the most support. I would pool that [the funds available] to redistribute to investigators and scientists in a way that’s more meaningful to support their efforts and their academic careers.

Further the administrator indicated,

If I could, I would have a sort of merit scheme embedded in the formula that would be used to try to determine who gets what. It may be based, you know, depending on the numbers of years of practice, or publications, or grants. We would have to work hard on trying to get a scale that accurately reflects from a merit basis what the faculty member deserves.

Agreeing with other administrators, this administrator also noted that that paying time out of clinical practice is the best way to support academic activities. The challenge that he identified is in deriving a scale to equally reward everyone financially, as some physicians in his department who are “extremely busy” will earn much more than those who are less busy. Paying for time out-of-the-clinic in some specialties is less straightforward than others. He also indicated, “I’d like to see the chair have more responsibility in terms of assessing academic productivity and ascribing some hard funds to the physicians accordingly”.

Not all academic leaders are in favor of proving a bonus or incentive based on performance. When asked why they do not believe that bonus should be provided, one of the administrators indicated,

Physicians make a lot of money. I think that giving them a five percent or ten percent bonus is a lot of money for a department but it’s not a lot of money for them. And I think that what they value the most is being recognized. So we try to recognize people formally. Awards and a recognition event.
In addition to an annual recognition event, the department provides an award of $30,000 to the most productive junior investigator who has been on faculty for six years or less (it was not clear how productivity is measured). The award is however used to spend on research-related supports and resources.

When asked whether a chair has a role in motivating others, one of the administrators noted that the most powerful reward that could be given is “the time to think and innovate – that’s a reward in and of itself”. On the matter of motivation, the administrator believes that faculty members are intrinsically motivated by a desire to “learn something that nobody else knows, because it’s interesting, it’s innovative, it’s what people should be doing in an academic institution”.

Program Evaluation and Satisfaction

To date, two of the departments have formally evaluated the perceptions of their faculty members with regards to their assessment and compensation programs. Additionally, one administrator co-authored a white paper on the future of the clinician scientist. The paper reported on the results of a survey which explored issues around satisfaction, professional identify as a clinician scientist, and recruitment and retention issues. The administrator noted that some of the issues that were identified included,

Protected time for their research. Feelings about lost income if they’re doing research versus clinical work. Mentorship is a big problem; they didn’t know to whom to turn at times for problems that arose for them. Acknowledgement of how hard they are working, trying to do both jobs as clinician and as scientist. And then financial support, like where is the money going to come from to support their research work and so on... I would say on balance, most of them felt as though they got what they needed, whether it was all from the department [university department] or in combination with the hospital and research institutes, they felt as though the systems were in place. Pediatrics at the University of Toronto conducted two formal evaluations of their program in 2001 and 2002\(^1\). All faculty members who had undergone at least one, formal triennial review were asked to complete a confidential questionnaire. A 68% response rate was achieved (60 of 88 eligible

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\(^1\) The department is identified here as the reports are publically available on their website, and results in two journal publications.
academic physicians participated). The responses were collated, and subsequently, focus groups led by external facilitators were held. The department reports on their website that the majority of respondents had indicated that the program has addressed the principles it sets out “somewhat, to a great extent, or extremely well”. Specific numbers were not indicated in the report (O'Brodovich et al 2003).

The department also published three articles on the system (O'Brodovich et al 2003, O'Brodovich et al 2007, Daneman, Kennedy & Coyte 2010). The 2003 article reports on the results of the evaluations (survey responses and focus groups) that are referenced on the website, and were carried-out by an external consultant. The 2007 publication focused on the results of the triennial peer reviews that were held between 1995 and 2005, with a goal to “determine whether the principles of the Career Development and Compensation Program were sustained during the initial seven years of its implementation” (O'Brodovich et al, 2007: e791). The study concluded that the “CDCP satisfied its design principles from the department’s perspective” and that all “achievements in clinical care, education and research were valued equally”, regardless of job profile, gender or academic rank, and that all faculty in the department had an equal opportunity to move through the levels of the Career Development and Compensation Program. The 2010 publication also evaluated the system; interviews with 27 members of the department were conducted and reported on. This notes that concerns were expressed around the “potential negative outcomes of assigning points to particular activities, the inequitable level of support provided to staff across the department and the costs of the review process” (Daneman et al 2010: 64). In particular, those with heavy clinical demands are perceived to be at a “disadvantage because clinical service is not recognized by the CDCP”, the documentation requirements are seen as too onerous (a single merged performance dossier was created), and, the ability to act upon feedback is “insufficiently robust” (Ibid: 67-68). In response to the latter, a formal system of mentorship was established.
Another administrator, when asked about his perception of the satisfaction level of the academic physicians within his department, the administrator indicated that,

I think it’s pretty good [satisfaction]. I think people feel supported. I think if you interviewed clinician scientists in the department they would be hard pressed to be critical about the fairness or transparency of the system. And, you know, the fact that we’re willing to spend money to support them, start-up funding bridge funding between grants and so on.

Indeed, the retention rate in this department (a 60% increase in recent years) speaks to the engagement and satisfaction level of the academic physicians in this department.

**Tolerance for Failure**

Those who were interviewed at the University of Toronto and University of Manitoba indicated that their departments exhibit a fairly high degree of tolerance for academic failure.

In addition to the triennial review process, one of the departments requires an annual review of all faculty members by the respective department head. Usually, issues are identified and support is provided before the triennial review process takes place. The triennial peer review committee is provided with instructions that,

85 to 90 percent of faculty should be on track for ‘excellent’. We added the word ‘excellent’ because nobody wants to be told they are simply on track or meeting expectations. About 5 percent would be below expectations and 5 to 10 percent would have had an exceptional year in any one year, but not year in, year out. If someone doesn’t perform this year, they get a half bonus and next year they would get nothing. If they are not functioning well at the next triennial review, they don’t get a base salary increase and if this is a continuing problem we ask them to leave. Remember that is very difficult. We don’t have a tenure system but it’s not easy.

If a faculty member has garnered a rating of “below expectations”, the chair and division head provide guidance on expectations which are then agreed to (in writing) by the faculty member. The chair also noted that faculty members are not provided with an opportunity to switch to a different job profile; if they were hired as a Clinician Investigator, they cannot switch to a different job stream (e.g., Clinician Teacher). In large part, this is because the number of funded positions in each category are negotiated with the health ministry per the terms of the AFP.
As noted in the case study chapters, another administrator set out to discontinue university supported, payroll positions after his appointment commenced. The chair then obtained permission to convert the funding associated with those positions to the department’s university operating budget, while allowing those who still occupied a tenure-like position to remain in them. All faculty do however participate in the academic assessment process. Over time though, the administrator found that many of the faculty in research positions were “not producing” and so, the previous, sometimes very high, funding for academic work was withdrawn or lowered after a poor performance assessment. Unlike the department above, academic physicians who were not producing academically were allowed to switch to another job stream. The administrator noted,

In most cases, there were no hard feelings. They understood, you know, that they were getting salary for nothing and, and to be fair, there were people in the department in the past who would come to the department head and say ‘I don’t know why I’m getting that salary, give it to somebody else’. But that was rare.

All new clinical faculty at the University of Toronto and University of Manitoba undergo a probationary review after three years. If there are issues, the probationary period can be extended for another eighteen month to two years, after which time another formal performance review takes place. During the extension, more intensive mentorship is provided to help ensure success. One of the administrators indicated that if there is no progress after five years, a new role in the department is provided to the academic physician (e.g., less research, more teaching, more clinical duties):

By and large, either you’re doing a decent job and you’re competitive, or you’re not. We don’t want to eliminate the people who are borderline, especially early on, we want to support those people or otherwise we made a bad investment. It’s important to have clear and basic guidelines on performance.

Importantly, the administrator reported that a new role was provided to academic physicians following review 17 times in the first seven years of the department’s assessment program initial
implementation. The administrator also remarked that the flexibility of their program, as well as the department’s financial models, is one of its greatest strengths:

If you have a system that works, not only can you identify people who just aren’t producing and then give their money to somebody who might, but also you can give people a shot, people who traditionally would never get a chance. In the past, when I was a young member of this department, the department head at the time told me that I would never do science, that I had a good career in front of me as a clinician teacher in the department but I would never basically go beyond that, because people who did science had to have this, and they had to have that. This was heartfelt on his part, he was a very successful clinician scientist, but it was based on the perception that there was no such thing as a clinician that came into the department and then decided to become a scientist. That wasn’t a possibility because there was no risk tolerance and so salaries were given to people who already had established track records in research.

And,

What we did was implement a system that evaluates people who understand what the productivity standards are. I can now have a young person come in to see me, and we can have a discussion, and they can say I’d like to have 25 percent protected time and pay me 20 grand or 25 grand and I’ll take a shot, I’ve got some good ideas. And if I produce and I like it, then maybe I’ll get some extra training, you can support me and I’ll go up to 40 percent or 50 percent protected academic time. And if I don’t, then it’s not a failure; basically, I had an opportunity, but I’ve decided to go in a different direction. So there’s no stigma, right? And I present it to people that way. If you produce that’s great, and if you don’t then that that’s not what you want to do.

The administrator acknowledged that an element of risk is embedded within such a system in that it is difficult to predict whether or not someone will be successful in an academic role if they do not have a proven track record. However, he suggested that the risk is only short-term as the protected academic time and research salary are provided on a short-term basis due to the absence of tenure.

Recruitment and Retention

As noted in the overview of the chapter, a flat job market has presented recruitment-related issues for surgery programs in recent years. In contrast, Anesthesia suffered from a personnel shortage in the early to mid-2000s; new recruits were largely international medical graduates with an academic interest. Retention has been less of an issue for these departments. One of the administrators noted that since he began his tenure, the department continues to attract top
academic physicians from Canada and the United States, and very few active, productive academic physicians have moved onto other positions:

We’ve been able to retain many of our faculty just by putting together packages that have worked in a complex but effective way between hospitals, division, and sometimes going to philanthropy to get things in place that will keep people that are really important to our mission.

However, the department has encountered issues in attracting medical students to their specialty generally, and in particular, to the clinician investigator training programs. The administrator reported that,

Every division of XX has issues in the job placement market so I would say the number one issue facing our trainees is where they are going to get jobs... I meet with medical students frequently. We have programs set up for them. I think now more than ever we’ve been doing a lot to try to cater to their interests, try to reassure them that there will be jobs for good people in XX. Throughout the year we run a seminar on what it’s like to be an XX and field questions, and I think they all appreciate it. But it’s a hard sell because very few are willing to bank on the opportunities that could arise five years from now. They want to know today that they’re going to have a job tomorrow. And you know it’s just not like that unfortunately.

Further, the administrator expressed concern about the “non-traditional”, research-related choices that trainees are making, and the impact upon the trainees’ ability to obtain academic positions in the future:

What’s evolving is a clear interest in population health research and non-traditional research streams, in a way that I wonder if it will be sustainable to achieve peer reviewed fellowship support. It may be an issue for our clinician scientist program. So it is a concern of mine seeing this trend among our trainees. But that won’t play-out for another five years or ten years, so we’ll see how the wind blows.

Recruitment and retention were not identified as an issue for Pediatrics. In general, the administrator felt that the comprehensive nature of the recruitment package and the competitiveness of the salary and benefits for pediatricians across North America (with the exception of Alberta) greatly assisted in recruitment. The administrator also noted that faculty find the possibility of “working in a hospital with one of the highest profiles worldwide” very attractive.
Another administrator reported that when he started his appointment, 80% of the department’s recruitment efforts were directed at their own medical students. To encourage recruitment, students were provided with top-up funding (up to $100,000) to leave the institution, complete residency or other training elsewhere, and then return. This “return of service” came with a guarantee of a full-time contract and salary agreement that was provided before the student even left for the training period. The administrator noted,

They all came back with one exception and we got compensated for that because they had a return-of-service agreement. So they had to pay back the money. I called the university that hired the individual and said you owe me $75,000 to $100,000 dollars, which they paid.

The administrator also believes that their assessment and compensation program has contributed greatly to recruitment and retention efforts, resulting in a 60% increase in clinical faculty, with very few leaving the university. The chair believes that the terms of the program, the resources dedicated to fund that program, recognition programs, and the sound financial position of the department have all helped to ease previous recruitment and retention challenges. Further, the department also holds several endowed chairs, which has helped to recruitment clinician scientists in particular. At this time, the department recruits 50% of their faculty locally. The department does however continue to grapple with personnel shortages in two sub-specialty areas.

The Role of the Chair

The administrators all described the role of the chair as focused on building the reputation of the university, furthering the academic mission, recognizing academic achievements, fostering academic promotions, recruitment, retention, and role modeling. When asked whether the chair helps to drive academic productivity, one administrator noted:

I think I set the tone for the Department of XX. To this day I’m still running a laboratory, publishing, writing and getting grants. I still do all that I would expect my scientists to do. So coming from the top when you have a leader in that type of position who not only talks the talk but walks the walk, I think that makes a difference.
The administrator also stated that he is accountable to the dean of the faculty, as well as the department’s executive committee and the division heads. While a report that lists the collective achievements of the department is produced each year, the chair did not indicate whether the chair or department is accountable to others though (given how academic medicine is funded in Canada).

Another administrator noted that their role is “to engender and support academic leadership”. He went on to explain that there are two types of leaders in academic medicine: those who have strong leadership skills, integrity, charisma and insight with a focus on the academic mission, and those who possess the same personal qualities – but are not focused on the academic mission. The administrator was quick to clarify that he does not view second type of leader negatively, but did imply that the lack of “academic drive” could be a challenge in academic medicine.

A third administrator also described his role as furthering the academic mission; mentoring faculty and staff; recognition; and role modeling, or “setting a tone”. The administrator noted that he believes very strongly in providing autonomy, and working in a collaborative manner, always seeking the opinions of others. Reflecting on the importance of recruitment and leadership, the administrator remarked on an interaction with a faculty member at a large conference,

One person said to me, ‘what do you want your legacy to be?’ I said it’s too early to think about legacy. We went to the conference that night, and I started to think about this question. And I went to that person afterwards, and I said I know exactly what I want my legacy to be. She said what? And I said ‘you.’ She said that’s too heavy a burden. I said I’m going to bear it. Not just you but all of the ‘you’s’ that we hire. One of the things that you have to do as a leader is you have to give up yourself. If you don’t, it’s going to be a bloody mess. If it’s all about your career and your shining light you’re in deep trouble. Reflect the shining light from others.

The third administrator acknowledged that due to the integrated funding model (with a large budget which covers academic and clinical deliverables) which his department is on, he possesses a “phenomenal advantage” and a “higher level of control over the vast majority of people in the department” over other chairs in academic medicine. The administrator also noted that one
of his most important leadership responsibilities is essentially predictive or intuitive; that is being able to anticipate future trends, and build strategies to manage those challenges. He drew analogies between leadership performance and professional sports, noting,

I am reading this book called “The Sports Gene”. By I think David Weinstein, or something like that, they are trying to find the gene for performance... He’s tried to describe why some people hit the baseball and it’s not reaction time, it’s not clear vision, it’s somehow being able to... Because by the time you see the baseball out of the pitchers hand, if you think where it’s going to go it’s too late... as soon as you see it you have to swing in an area that you have a chance of hitting it.

At the end of our interview, the chair referred to attachment theory (as a psychological model that describes the dynamics of interpersonal relationships) and its applicability to leadership styles in his area, stating,

I think it’s really important for me to know a little bit about everybody. I am fascinated by the story of people’s lives. They’re incredible. We each have our heroic things and we each have our tragedies.

However, he also lamented that academic leadership can be lonely given its very public, visible nature, which at times, feels like a “popularity contest”. He told a story whereby,

Recently I took my granddaughter to swimming. And my wife went with her into the change room and out came one of our faculty members with their little daughter who is not quite three. And she is a jabberer. She jabbers, jabbers, jabbers and then she suddenly looks at me because I’m standing there alone, my wife and granddaughter are getting changed to go swimming, and she says to me ‘do you have any friends?’ I said in my line of work they get hard to come by. Some of the things you know about people... And you have to keep very quiet about it. Truth is crazier than fiction.

Another administrator emphasized the chair’s role as a business leader. He indicated that he feels that he has a good deal of influence, and advocated for a more practical, hands-on business role for chairs:

I run it [the department] like a business. We’re in the business of generating science, we’re in the business of providing good quality care, and we’re in the business of training professionals. Those are our outputs that are made possible by the wise use of funding. But you can’t consistently sustain improvement over time without having the ability to spend money on change.

Commenting on the importance of the chair maintaining control over funding, he stated,
Some of the chairs have the power [over money] but they give it away. I’m here to be fair but at the end of the day, I have a job to do. And that job is to produce. A department head of another big department here, who’s a very smart guy, asked me what I was doing the first couple of months. I said that I was going all over the finances with my business manager. And he said, “Why are you spending your time doing that silly stuff? You’ve got a lot more important things to do. That’s the first thing I realized when I became department head -- I handed over the finances to a finance committee, appointed a committee chair, and gave them the responsibility of handling the finances in the department”. My jaw dropped, but I said, “Oh, that’s interesting”. He basically spent the next term cursing the fact that he was thwarted by the finance committee every time he tried to do something innovative in his department. Why? Because the people who dominate his finance committee are the high income earners that have absolutely no academic role in that department.

This speaks to the ability of the practice plan to control academic activities; in the situation described above, the chair has no real influence, and the role of the university is only peripheral. The administrator who was interviewed attributed this situation to the lack of training – particularly finance-related training – for new chairs and other academic leaders:

I think that people are poorly trained to become department heads. They don’t know the game. You really need to think about managing the money. The most mundane part of your work is actually the most important part. And I can sit here and talk about recruitment, productivity and blue sky and all the rest of it. But at the end of the day, those discussions are a waste of your time if you have no resources to apply to them.

Overall, the chair left the impression that the university department is far more integrated with the practice plan, as a financially autonomous business entity, than with the Faculty of Medicine, or the university.

**The Role of the University**

Several of the administrators paused when answering this question, sometimes providing vague answers. Others noted that the practice plans present multiple challenges:

The practice plans are extremely variable in terms of what they mean. The clinical faculty agreement, the definition of a practice plan is really immensely vague, you know. It’s not very clear whether it’s a business group, whether it’s a department, or it’s a department within a business group. Whether it’s a third entity... So where the practice plan is kind of vague around its core mission that is to say furthering the academic mission. And it’s here, you know, how good is a carpenter that doesn’t have the correct chisel right?
Others noted that the university, or dean’s offices, provide some degree of oversight over academic deliverables, policy development, and also play a role in restricting practice plans. When asked and re-asked about the role of the university, another administrator noted,

The average faculty member knows almost nothing about what the Dean does on a day-by-day basis. If I step back five years... I knew little about the Dean... So yes, there’s university enterprise going on but very little contact on a day-by-day basis. But the catch is if you don’t have a university appointment then you can’t practice your trade as a physician at the hospital. So it’s a very important relationship but it’s one that the faculty don’t think much of on a day-to-day basis.

Chapter Summary

This chapter presented the results of the qualitative, semi-structured interviews of academic leaders at the University of Toronto and the University of Manitoba. Chapters 6 and 7 presented the quantitative results of the case studies; Chapter 8 investigated leaders’ perceptions on their compensation and assessment systems, the use of bonuses or incentives to stimulate motivation or encourage productivity in academic medicine, tolerance for failure, recruitment and retention issues, the role of the chair, and the role of the university. The administrators were also asked if they had evaluated their compensation and assessment systems, and were asked to comment on their faculty members’ satisfaction with the system. Certainly, many shared beliefs were encountered during the interviews; as an important example, all of the administrators who were interviewed believe that most academic physicians are intrinsically motivated by the creative, scholarly process. Yet, financial bonuses or incentives are offered. These issues are explored, compared and contrasted further in Chapters 9 and 10.
Overview

Phase 1 of this dissertation’s emergent research methodology consisted of a national survey of academic leaders focused on compensation and assessment models for academic physicians. The survey results were used to develop the methodology for the three phase 2 case studies which followed. These case studies utilize a mixed methods approach to explore the methods used to compensate and assess academic physicians. Three universities, three provinces, four academic clinical departments and 150 academic physicians - representing four specialty and multiple sub-specialty areas – were included. The K-MAAP© was developed to organize, present, compare and contrast data on academic productivity, effort and impact on these physicians across the four departments.

In this chapter, the results of these findings are first compared and contrasted across the entire sample of academic physicians, but also the clinical departments. Similarities and differences are highlighted. Correlations across the entire sample are tested, and analyzed. The findings are then analyzed and discussed. Theories that attempt to explain the empirical behaviour are however presented in Chapter 10.

Background Information: General Comparisons across the Specialties

In chapters 5 and 6, background information on the specialties included in this dissertation was provided. The information included data from the CNPS on the number of specialists, growth in the past few years, the gender ratios, the percentage of physicians practicing in AHSCs, and the ratio of specialists to population. That information has not been repeated here. It is however important to compare and contrast information across three data sets: the primary remuneration method by
source, teaching payments by source, and average compensation levels by specialty (including growth over time).

Table 9.1 on the next page illustrates the primary remuneration method by source for the four specialties, and multiple sub-specialties, included in the case studies:
Table 9.1: Primary Remuneration Method by Source 2013 (Anesthesia, Internal Medicine, Pediatrics and Surgery vs. All Physicians)\textsuperscript{62}

<table>
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<tr>
<th></th>
<th>ANES</th>
<th>INTERNAL MEDICINE</th>
<th>Peds</th>
<th>SURGERY</th>
<th>ALL</th>
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<tr>
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<td>Gastroenterology (Gastro)</td>
<td>Immunology (Immun)</td>
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<td>1.0%</td>
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<td>0.7%</td>
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<tr>
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<td>5.8%</td>
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<tr>
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<td>0.0%</td>
<td>0.6%</td>
</tr>
<tr>
<td>90%+ Sessional/per diem/hourly</td>
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<td>0.0%</td>
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<tr>
<td>90%+ Service contract</td>
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<td>2.8%</td>
<td>0.0%</td>
<td>1.7%</td>
</tr>
<tr>
<td>90%+ Incentives and premiums</td>
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<td>0.2%</td>
<td>0.0%</td>
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</tr>
<tr>
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<td>5.5%</td>
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<td>3.7%</td>
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</table>

Table 9.2 on the next page provides the averages for the specialties, based on the data presented in Table 9.1 (extracted from the 2013 CNPS), shown above. Note that the column called “All Physicians/Specialties” includes data from the CNPS on all specialties (i.e., those specialties which have not been identified in the tables). The averages are calculated on the basis of Anesthesia, Internal Medicine, Pediatrics, Surgery and All Physicians/Specialties:

Table 9.2: Remuneration Method by Source: AVERAGE

<table>
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<th>AVERAGES</th>
<th>All Physicians/ Specialties</th>
<th>AVERAGE</th>
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<td></td>
<td>Anesthesia</td>
<td>Internal Medicine</td>
<td>Pediatrics</td>
</tr>
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<td>90%+ Fee for Service</td>
<td>50.5%</td>
<td>49.3%</td>
<td>31.1%</td>
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<tr>
<td>90% Fee for Service (uninsured)</td>
<td>0.8%</td>
<td>0.5%</td>
<td>0.2%</td>
</tr>
<tr>
<td>90%+ Salary</td>
<td>2.9%</td>
<td>10.7%</td>
<td>15.4%</td>
</tr>
<tr>
<td>90%+ Capitation</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>90%+ Sessional/ per diem/ hourly</td>
<td>1.5%</td>
<td>0.7%</td>
<td>4.6%</td>
</tr>
<tr>
<td>90%+ Service contract</td>
<td>2.9%</td>
<td>2.2%</td>
<td>5.0%</td>
</tr>
<tr>
<td>90%+ Incentives and premiums</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>90%+ Other</td>
<td>1.8%</td>
<td>1.6%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Blended</td>
<td>36.1%</td>
<td>32.5%</td>
<td>37.2%</td>
</tr>
<tr>
<td>No Response</td>
<td>3.3%</td>
<td>2.6%</td>
<td>6.2%</td>
</tr>
</tbody>
</table>

The data demonstrates that the vast majority of Canadian physicians practicing in the specialties noted above, with the exception of pediatricians, are primarily remunerated through a fee-for-service type scheme, followed closely by blended models. Blended models may include AFPs (including comprehensive plans), AFPs, ARPs or other models. Very few physicians listed above are remunerated through a capitation program, and no physicians are on an incentives + premium scheme. In Pediatrics, 15.4% of physicians are remunerated through a salary arrangement. Unfortunately, the CNPS does not produce data which shows the primary remuneration method for academic physicians only.

Table 9.3 depicts the source of teaching payments, for specialists in Anesthesia, Internal Medicine, Pediatrics and Surgery, vs. those for “All Physicians”, based on data extracted from the 2013 CNPS. Note that the data for all sub-specialties indicated in each case study has been included, as well as the average for the specialty as a whole.
Table 9.3: Teaching Payments by Source (Anesthesia, Internal Medicine, Pediatrics and Surgery vs. All Physicians)\(^{63}\)

<table>
<thead>
<tr>
<th>Source of Remuneration</th>
<th>ANES</th>
<th>INTERNAL MEDICINE</th>
<th>Pediatrics</th>
<th>Surgery</th>
<th>All Physicians</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANES</td>
<td>Card</td>
<td>Gastro</td>
<td>IM</td>
<td>Nephro</td>
</tr>
<tr>
<td>Paid by department/faculty of medicine</td>
<td>57.7%</td>
<td>52.3%</td>
<td>53.8%</td>
<td>68.1%</td>
<td>68.0%</td>
</tr>
<tr>
<td>Paid via an AFP or APP</td>
<td>21.9%</td>
<td>24.2%</td>
<td>31.3%</td>
<td>25.4%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Paid directly by the provincial ministry of health</td>
<td>24.6%</td>
<td>39.5%</td>
<td>15.1%</td>
<td>24.2%</td>
<td>27.4%</td>
</tr>
<tr>
<td>Paid through a practice plan</td>
<td>5.9%</td>
<td>6.6%</td>
<td>3.2%</td>
<td>9.7%</td>
<td>12.4%</td>
</tr>
<tr>
<td>Other source of remuneration</td>
<td>2.0%</td>
<td>0.0%</td>
<td>3.0%</td>
<td>0.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>No response</td>
<td>0.8%</td>
<td>0.0%</td>
<td>5.1%</td>
<td>0.5%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Table 9.4 provides the averages for the specialties, based on data extracted from the 2013 CNPS for teaching payments by source. Again, note that the column called “All Physicians/Specialties” includes data on all specialties (i.e., those specialties which have not been identified in the tables). The average is calculated on the basis of Anesthesia, Internal Medicine, Pediatrics, Surgery and All Physicians:

\(^{63}\) Responses for sub-specialties in Surgery (cardiac surgery, neuro surgery, plastic surgery and urology) and Internal Medicine (immunology and medical oncology) were suppressed in the 2013 National Physician Survey as the column ‘n’ was less than 30. While the columns were included within the case studies, the columns have not been repeated in Table 86. The source for the data presented is the 2013 Canadian National Physician Survey.
Here an average of just over 61% of academic physicians are paid to teach by their academic department or Faculty of Medicine (the lowest is Anesthesia at 57.7%), while 22.3% receive some type of teaching payment through their AFP. An average of over 23% of academic physicians receive funding directly from a provincial ministry of health; these types of payments are focused on those teachers who participate in a distributed medical education-type program (DME), who teach in remote areas, and physicians in Quebec who are compensated for half-days of teaching, following a new agreement reached in 2008 with the provincial health ministry.

Finally, Table 9.5 depicts data obtained from the CIHI’s Average Gross Fee-for-Service Payment Report, with detail on the specialties included in the case studies, for 2005/2006 and 2010/2011, with the percentage change calculated for each specialty. On average, fee-for-service billings increased by 24.3% between 2005/2006 and 2010/2011.
TABLE 9.5: CANADIAN INSTITUTES FOR HEALTH INFORMATION AVERAGE GROSS FEE-FOR-SERVICE CLINICAL BILLINGS COMPARISON: 2005/06 VS. 2010/11

<table>
<thead>
<tr>
<th>Specialty</th>
<th>2005/06</th>
<th>2010/11</th>
<th>% Change (2005/06 vs. 2010/11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia</td>
<td>$ 273,486</td>
<td>$ 338,355</td>
<td>23.7%</td>
</tr>
<tr>
<td>Internal Medicine**</td>
<td>$ 319,651</td>
<td>$ 371,595</td>
<td>16.3%</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>$ 195,598</td>
<td>$ 268,172</td>
<td>37.1%</td>
</tr>
<tr>
<td>Surgery: Cardiac</td>
<td>$ 432,928</td>
<td>$ 529,728</td>
<td>22.4%</td>
</tr>
<tr>
<td>Surgery: General</td>
<td>$ 315,484</td>
<td>$ 411,995</td>
<td>30.6%</td>
</tr>
<tr>
<td>Surgery: Neurosurgery</td>
<td>$ 317,744</td>
<td>$ 381,728</td>
<td>20.1%</td>
</tr>
<tr>
<td>Surgery: Orthopedic</td>
<td>$ 314,602</td>
<td>$ 397,784</td>
<td>26.4%</td>
</tr>
<tr>
<td>Surgery: Plastic***</td>
<td>$ 282,538</td>
<td>$ 345,747</td>
<td>22.4%</td>
</tr>
<tr>
<td>Surgery: Urology</td>
<td>$ 361,178</td>
<td>$ 434,795</td>
<td>20.4%</td>
</tr>
<tr>
<td>Average: Surgery, All</td>
<td>$ 337,412</td>
<td>$ 416,963</td>
<td>23.7%</td>
</tr>
<tr>
<td>AVERAGE: ALL</td>
<td>$ 315,062</td>
<td>$ 389,686</td>
<td>24.3%</td>
</tr>
</tbody>
</table>

All Case Studies: Total Sample

The total number of academic physicians included in the quantitative elements of the case studies (Anesthesia, Internal Medicine, Pediatrics and Surgery) was 150 (n). The breakdown is as follows: Anesthesia (n=40), Internal Medicine (n=30), Pediatrics (n=40) and Surgery (n=40). Table 9.6 illustrates the composition of the sample across all case studies by academic rank:

TABLE 9.6: ACADEMIC RANK: TOTAL SAMPLE (ANESTHESIA, INTERNAL MEDICINE, PEDIATRICS AND SURGERY)

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Lecturer</th>
<th>Assistant Professor</th>
<th>Associate Professor</th>
<th>Full Professor</th>
<th>TOTALS</th>
<th>% Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia</td>
<td>0</td>
<td>14</td>
<td>15</td>
<td>11</td>
<td>40</td>
<td>26.7%</td>
</tr>
<tr>
<td>Internal Medicine**</td>
<td>2</td>
<td>6</td>
<td>9</td>
<td>13</td>
<td>30</td>
<td>20.0%</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>0</td>
<td>6</td>
<td>16</td>
<td>18</td>
<td>40</td>
<td>26.7%</td>
</tr>
<tr>
<td>Surgery</td>
<td>0</td>
<td>9</td>
<td>15</td>
<td>16</td>
<td>40</td>
<td>26.7%</td>
</tr>
<tr>
<td>TOTALS</td>
<td>2</td>
<td>35</td>
<td>55</td>
<td>58</td>
<td>150</td>
<td>100.0%</td>
</tr>
<tr>
<td>% Total Sample</td>
<td>1%</td>
<td>23%</td>
<td>37%</td>
<td>39%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

The ratio of males and females in the sample across all case studies is 2.6:1. The total percentage of female academic physicians included in all case studies is 27% (n=41) and the percentage of male academic physicians is 73% (n=109). Table 9.7 provides the breakdown by department:
| TABLE 9.7: GENDER: TOTAL SAMPLE (ANESTHESIA, INTERNAL MEDICINE, PEDIATRICS AND SURGERY) |
|-----------------------------------------------|-------------|-------------|-------------|-------------|-------------|
|                                               | Female      | % Female    | Male        | % Male      | TOTALS      |
| Anesthesia                                    | 13          | 32.5%       | 27          | 67.5%       | 40          |
| Medicine                                      | 9           | 30.0%       | 21          | 70.0%       | 30          |
| Pediatrics                                    | 12          | 30.0%       | 28          | 70.0%       | 40          |
| Surgery                                       | 7           | 17.5%       | 33          | 82.5%       | 40          |
| TOTALS/% All Case Studies:                    | 41          | 27%         | 109         | 73%         | 150         |

The total number of academic physicians who are Canadian medical graduates (CMGs) included in this dissertation is 67% (n=50), with 33% being international medical graduates (IMGs, n=100). The largest percentage of IMGs can be found in Anesthesia, at 52.5% of the total case study sample. The lowest is in Internal Medicine, where foreign-trained physicians constitute only 7.5% of the total sample of academic physicians included in the case studies (n=3).

Finally, forty-three percent of the academic physicians had achieved academic promotion between 2006/07 and 2010/11 (n=64). The breakdown is as follows: Anesthesia (18 or 28.1% of the total sample); Internal Medicine (9 or 14.1% of the total sample); Pediatrics (17 or 26.6% of the total); and Surgery (20 or 31.3% of the total sample across all departments). Academic promotion is one of the most important ways in which that university can recognize academic excellence, productivity and faculty, and so this indicates an “effect” that resulted in promotion.

**Similarities and Differences across the Case Studies**

As indicated in Chapter 1, my interest in this subject matter arose from the observation that each of the clinical academic department’s at the University of Toronto used a different system to compensate and assess academic physicians. None of these models had been tested empirically, nor had the impact of the models been demonstrated (other than to list volumes of publications or grants in an annual report). As my research unfolded, the phase 1 survey also indicated that a good deal of heterogeneity in the types of compensation and assessment models that are used across academic medicine in Canada. The types or categories of clinical academic appointments vary from
institution-to-institution, and this is partly related to the university funding mechanisms or university budget models that have been implemented. Further, because of the rate of promotion, the influence of the models is clearly not static.

To organize, compare and contrast these findings, this section includes four main subsections, data sets and analyses: clinical department budget model/funding sources; categories and features of clinical academic appointments; compensation models for academic physicians; and, assessment models for academic physicians.

**Clinical Academic Departments: Funding Sources**

The budget models and funding sources used by the universities and clinical academic departments included in the case studies share many common features at the local level. As an example, the Faculties of Medicine at the University of Toronto, University of Manitoba and University of Alberta all receive grant funding either directly or indirectly from the provincial education ministry, tuition fees, plus funding from the ministry of health that is specific to the medical school. All universities receive a pool of funding for postgraduate medical education, and all medical schools attract education-related revenues generated from international fellows (who also provide clinical services). The clinical departments all receive an operating budget from the Faculty of Medicine, plus they may receive monies from the postgraduate office (*e.g.*, stipend support for education leaders). Some of the clinical academic departments receive direct funding through AFP-type arrangements, while others do not. Table 9.8 compares and contrasts data on the main funding types and sources for clinical academic departments:
### Table 9.8: Main Funding Sources for Academic Medicine

<table>
<thead>
<tr>
<th>Funding Type/Source</th>
<th>University of Toronto</th>
<th>Manitoba Internal Medicine</th>
<th>University of Alberta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANES</td>
<td>Peds</td>
<td>Surgery</td>
</tr>
<tr>
<td>Education Ministry: Grants (PG BIUs – via University centrally)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tuition Fees (undergrad)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Budget (Faculty of Medicine)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Health Ministry: Postgrad Funding (residents)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Health Ministry: Postgrad IMG training</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Health Ministry: DME programs (rural)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Geographical Full-Time (tenure-track funding)</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>FFS (used to support the university department)</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>AFP, ARP or APP</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>AFP: Comprehensive (Pediatrics &amp; Neurosurgery)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFP: Clinical</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>AFP: Recruitment</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>AFP: Academic</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>AFP: Training &amp; Research</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Research Grants</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Endowed Chairs</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

During the interviews, academic leaders voiced concerns about budget cuts, as well as the distribution of some types of revenue. At the University of Alberta, academic leaders noted that the budget cuts, and the reallocation of central costs to departmental costs, would result in funding shortfalls. At the University of Toronto, citing concerns around the academic mission and culture, two chairs noted that the AFP arrangements should have been flowed through the Faculty of Medicine -- and not directly to the practice plans – to clearly delineate the AFP monies that are allocated to academic activities. In Toronto, when the funds for part-time faculty teaching in the community-based sites were rolled-out in 2011, many full-time faculty members commented that they “don’t get paid to teach”, attributing this to a lack of engagement and participation. These community-based teaching funds were subsequently distributed by the Dean’s Office – and no
doubt, contributed to a substantial increase in the number of academic appointments and teaching activities in the community-based sites\textsuperscript{64}.

Another persistent challenge around budget models relates to the funding model for AHSCs, and in particular, the distribution of clinical revenues generated through fee-for-service models. In Chapter 2, Fox and Lozon, Smith, Schneller and others advocated for the adoption of a mission-based model for AHSCs – as opposed to “everything to everyone” (Lozon & Fox, 2002, Fyffe et al, 2002, Smith 2002, Schneller 2002). Smith and others also commented on the fee-for-service model as a huge barrier to change. The issue identified during the interviews is that fee-for-service revenues continue to support the academic mission. Some of the departments includes in this dissertation directly “tax” some fee-for-service revenues, and pool the funds to support the clinical academic department (and thus, support the AHSC complex). The clearest example was the three faculty members at the University of Alberta who were pooling their own incomes to provide a salary of $100,000 per annum to a promising young researcher. Other examples were provided in the interviews too. While academic medicine in Canada has thrived on this approach, it seems that clearer data on the financial contributions of the various principals involved in academic medicine should be made available. Only then can a new model be proposed – a model tied to the mission of the AHSC - and effectively implemented. These data just doesn’t seem to exist at this time.

Finally, there seems to be some variation in how revenues flow down to the clinical academic departments as several concerns were raised during the interviews. As an example, 12.5% of the revenues generated by training fellows from the Gulf States are allocated to clinical departments at the University of Toronto, but in Manitoba, clinical departments receive almost 70% of the total revenues. In Manitoba, the university department levies a tithe on fee-for-service clinical revenues (to fund academic operations), while this is not the case in other departments. While the

\textsuperscript{64} Office of Integrated Medical Education Report, Faculty of Medicine, University of Toronto, 2014.
institutional budget model is of course a local decision, some models appeared to be more palatable than others.

**Categories and Features: Clinical Academic Appointment Types**

At the University of Alberta, the compensation funding sources are directly connected to the types of clinical academic appointments that are available. These include GFT faculty (three sub-types), A-ARP (two sub-types), Special Continuing (two sub-types), and Clinical Academic Colleagues (CACs). The CAC-type appointments share many of the same features as part-time or adjunct appointments in Toronto or Manitoba (i.e., part-time clinical faculty focused on teaching, no funding from the university, physicians generally located in community-based hospitals). Academic physicians in tenure-track appointments are considered to be employees of the university, and are members of provincial collective bargaining unit for all types of faculty. It should be stressed that a senior administrator in Alberta noted that the collective bargaining agreement for these faculty does not constitute a “union”, however, the chairs repeatedly referred to the “union” and commented on the possibility of “union grievances”. But, they provide clinical services too. They are essentially agents with multiple principals, with occasionally conflicting demands. These relationships are further complicated by the addition of a collective bargaining unit to the mix: one might consider that the status of some academic physicians (but not others) in the union further jeopardizes their loyalty to the university, the hospital, their hospital group and clinical academic department. In Alberta, the union is in effect another principal – perhaps the most powerful principal for the GFT, tenure-track professors. This may be inevitable as too much loyalty to any given principal would jeopardize their loyalty to the union, the collective bargaining process or the agreement. This relationship is even more complicated by the complex, changing, web of interconnected and overlapping relationships constructed by AHS, as well as the fact that many academic physicians are not tenure-track eligible.
The types of clinical academic appointments available at the University of Manitoba and University of Toronto are fewer, and much more streamlined. They are not directly tied to a funding source. The University of Manitoba does have GFT, tenure-track appointments for some full-time clinical faculty members. However, the chair of Internal Medicine persuaded the university to convert the funding for the positions into the departmental operating budget, and then eliminated all but three of the tenured positions. Accordingly, there is no differentiation within the group – all clinical faculty members in this department have basically the same type of academic appointment, and they are independent contractors, not university employees.

Tenure-track or GFT positions are not available for clinical academic physicians at the University of Toronto. Full-time academic physicians have an FTE of 80-100%, and practice in an AHSC. They have six different job streams linked to an academic position description. Full-time clinical faculty may receive some funding through the university department (though the majority in Anesthesia, Pediatrics and Surgery do not), but they do receive academic remuneration through an AFP administered through the hospital department. All clinical academic physicians at the University of Toronto, regardless of their appointment type, are considered to be independent contractors.

Table 9.9 compares and contrasts appointment types across the three institutions included in this dissertation:
<table>
<thead>
<tr>
<th>Type of Appointment</th>
<th>University</th>
<th>Primary Academic Focus</th>
<th>% FTE</th>
<th>Position Funding Source</th>
<th>University Status</th>
<th>Tenure Y/N</th>
<th>Research Y/N</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenure Track (Base Funded)</td>
<td>Alberta</td>
<td>Teaching + Research</td>
<td>Full-time</td>
<td>University (central administration)</td>
<td>Employee</td>
<td>Yes</td>
<td>Yes</td>
<td>Tenured, member of faculty association</td>
</tr>
<tr>
<td></td>
<td>Manitoba</td>
<td>Teaching + Research</td>
<td>Full-time</td>
<td>University (central administration)</td>
<td>Employee</td>
<td>Yes</td>
<td>Yes</td>
<td>Internal Medicine no longer has these appointments</td>
</tr>
<tr>
<td>Tenure Track (Contingent)</td>
<td>Alberta</td>
<td>Teaching + Research</td>
<td>Full-time</td>
<td>Various sources (e.g., AHF, endowed chairs)</td>
<td>Employee</td>
<td>Yes</td>
<td>Yes</td>
<td>Position contingent on external funding source. If funding lost, position, university employee status lost</td>
</tr>
<tr>
<td>Academic A-ARP</td>
<td>Alberta</td>
<td>Teaching + Research</td>
<td>Full-time</td>
<td>University + A-ARP (no fee for service)</td>
<td>Independent Contractor⁶⁵</td>
<td>No</td>
<td>Yes</td>
<td>Only 4 clinical depts. on an A-ARP</td>
</tr>
<tr>
<td>Special Continuing (Alberta Health Services)</td>
<td>Alberta only</td>
<td>Teaching and/or Research</td>
<td>Mostly full-time</td>
<td>Alberta Health Services funded. No university salary</td>
<td>Independent Contractor</td>
<td>No</td>
<td>Yes</td>
<td>Same treatment as tenure without guarantees. Cannot hold a grant. Historical funding arrangements.</td>
</tr>
<tr>
<td>Special Continuing (FFS + Research)</td>
<td>Alberta only</td>
<td>Teaching and/or Research</td>
<td>Mostly full-time</td>
<td>FFS clinical + research funding. No university salary</td>
<td>Independent Contractor</td>
<td>No</td>
<td>Yes</td>
<td>Same treatment as tenure without guarantees. Cannot hold a grant.</td>
</tr>
<tr>
<td>Clinical Academic Colleagues</td>
<td>Alberta</td>
<td>Teaching</td>
<td>Part-time</td>
<td>FFS clinical, Stipend for PG teaching</td>
<td>Independent Contractor</td>
<td>No</td>
<td>Maybe</td>
<td>Different promotions standards and academic rank</td>
</tr>
<tr>
<td>Clinical Full-Time</td>
<td>Toronto</td>
<td>Teaching + Research</td>
<td>80% FTE+</td>
<td>AFP</td>
<td>Independent Contractor</td>
<td>No</td>
<td>Maybe</td>
<td>5 types of appointments – not all have research included (e.g., Clinical Teachers)</td>
</tr>
<tr>
<td></td>
<td>Manitoba</td>
<td>Teaching + Research</td>
<td>Full-time</td>
<td>AFP or fee-for-service</td>
<td>Independent Contractor</td>
<td>No</td>
<td>Maybe</td>
<td>Some full-time faculty are focused on teaching only.</td>
</tr>
<tr>
<td>Clinical Part-Time/Adjunct</td>
<td>Manitoba</td>
<td>Teaching</td>
<td>Part-time</td>
<td>FFS. May receive stipend (teaching)</td>
<td>Independent Contractor</td>
<td>No</td>
<td>No</td>
<td>Some part-time faculty may undertake research</td>
</tr>
</tbody>
</table>

⁶⁵ An independent contractor does not have an employer/employee relationship with the university. Payment is received through a business partnership.
Compensation Models for Academic Physicians

At the departmental level, a variety of compensation, bonus and financial incentives models are used for academic physicians. The details of these compensation models are provided in the case study chapters. Table 9.10 builds on these findings to compare and contracts the results presented in the case studies:

<table>
<thead>
<tr>
<th>Model</th>
<th>University of Toronto</th>
<th>Manitoba</th>
<th>University of Alberta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANES</td>
<td>Peds</td>
<td>Surgery</td>
</tr>
<tr>
<td>University Salary (tenure, or other)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>AFP (comprehensive)</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>AFP (other)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Salary (non-university funded, includes teaching payment)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salary Increase based on merit (annual, for those who receive a university salary)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Bonus (small in proportion to gross income, annual, based on performance)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Salary + Salary Increase + Bonus</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merit Award (funds used to buy academic time from practice plan)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative Stipend (university budget)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

The compensation models that are used may produce different results, and are connected to different academic appointment categories and assessment models. The next section of this chapter details the types of academic assessment systems that are used.

Academic Assessment Models

The case studies detailed the systems that have been implemented by the clinical academic departments to assess academic physicians. This section highlights similarities and differences.
First, all clinical departments at the University of Alberta use the same type of assessment model. Academic assessments are done on an annual basis, and focus on peer-reviewed publications, invited lectures, grants, and graduate student supervision. Academic leaders undertake the assessment which results in a rating for each academic physician. The ratings are linked to a salary increase which is then discussed by chairs and academic leaders at the Faculty level where peer-to-peer comparisons are undertaken. Because the funding pool for the salary increases is held at the Faculty level, the final ratings are determined by all chairs. The chairs who were interviewed for this case study commented on the usefulness and rigor of the academic assessments, but highlighted the challenges involved with providing a true merit rating in the face of a limited pool of funds, constrained budgets, concerns about union involvement or grievances (if a low rating is provided), and fairness/comparability in the assessment methodologies used by different departments. Another challenge is that the assessment system results in base salary (merit) increases for tenure-track faculty members, but only those who receive a salary from the university. Faculty members in other types of academic appointment categories participate in the assessment process but will not receive a salary increase or a bonus (they receive recognition only). Several of the academic leaders who were interviewed for this dissertation suggested that the base salary increase be converted to an annual bonus, mostly for budgetary reasons. Although academic leaders stated that the word “bonus” is taboo in Alberta, this may indicate that they believe that a base salary increase or a bonus will have the same effect as an incentive.

The system is expensive to implement annually (time is expensive), and based on the K-MAAP® data on typical productivity cycles for the 150 academic physicians included in the quantitative analyses for this dissertation, would likely function just as well if implemented every three years (although the two-year cycle provides budgetary flexibility). The system is difficult to characterize as individual, group or a hybrid-type model because not everyone can truly be
recognized through the system. It creates a false incentive of sorts – there is the promise of a salary increase for some (an external financial incentive designed to stimulate extrinsic motivation) but for others, within the same department, there is no salary increase, only recognition. Recognition, I would argue, is designed to stimulate one’s intrinsic motivation. Again, it would have been very interesting to access the data sets to compare the performance of the faculty members in the different types of academic appointment categories using the quantitative methodology.

Internal Medicine at the University of Manitoba implemented a triennial assessment process in their department which will also be adopted by other clinical academic departments at that university. The “Research Performance and Assessment System” is also comprised of an annual assessment focused on academic activities. All GFT faculty members participate in the system, on a rotating basis, every third year. The assessments determine the research salary increase, as well as the amount of protected academic time. No bonus or financial incentive is offered. The chair indicated that the assessment model has contributed to the reliable allocation of academic time which was previously done in an ad hoc fashion. The reviews are done by senior leaders in the department plus an external reviewer. The usual academic activities are reviewed through the provision of a Curriculum Vitae (publications, grants, lectures, graduate student supervision) but the activities undertaken by graduate students are not included in the analysis.

The system used by Pediatrics at the University of Toronto shares some similarities with Internal Medicine in Manitoba in that formal assessments take place every three years, all full-time faculty members are included in the process, and research salaries are increased or decreased based on performance. The chairs of both departments are also the heads of the clinical departments, and have a good degree of control over finances and resources. Pediatrics utilizes an annual bonus while Internal Medicine does not.
Anesthesia’s system is unique from the other three systems; the merit awards program is a competitive, intramural competition which faculty can apply to (but are not required to apply to) every second year. No formal assessments of academic performance are completed, only three faculty in the departments receive payroll from the university, and the funds for the merit awards program flow to the practice plans, not the individual. The merit awards do not constitute a bonus or incentive – rather, they are used to secure protected academic time from the practice plans.

**Comparing Academic Productivity: All Departments**

**Journals and K-MAAP© Categories**

As part of the phase 2 quantitative analyses for Anesthesia, Internal Medicine, Pediatrics and Surgery, the journals that faculty members publish in were grouped into K-MAAP© categories to undertake the K-MAAP© analyses. Table 9.11 compares the distribution of journals (number and percentage of journals in each category) for all four specialties across the K-MAAP© categories:

<table>
<thead>
<tr>
<th>Journals K-MAAP© Category</th>
<th>K-MAAP© Impact Factor Rating</th>
<th>Anesthesia</th>
<th>Internal Medicine</th>
<th>Pediatrics</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># Journals</td>
<td>% Journals</td>
<td># Journals</td>
<td>% Journals</td>
<td># Journals</td>
</tr>
<tr>
<td>Super High</td>
<td>20+</td>
<td>1</td>
<td>0.7%</td>
<td>5</td>
<td>2.4%</td>
</tr>
<tr>
<td>High</td>
<td>10.01 – 20</td>
<td>8</td>
<td>5.8%</td>
<td>9</td>
<td>4.2%</td>
</tr>
<tr>
<td>Moderate</td>
<td>5.01 – 10.0</td>
<td>21</td>
<td>15.1%</td>
<td>34</td>
<td>16.0%</td>
</tr>
<tr>
<td>Low</td>
<td>0.01 – 5.0</td>
<td>77</td>
<td>55.4%</td>
<td>153</td>
<td>72.2%</td>
</tr>
<tr>
<td>Unknown</td>
<td>Assigned to “low”</td>
<td>32</td>
<td>23.0%</td>
<td>11</td>
<td>5.2%</td>
</tr>
<tr>
<td><strong>TOTALS:</strong></td>
<td></td>
<td>139</td>
<td>100%</td>
<td>212</td>
<td>100%</td>
</tr>
</tbody>
</table>

Anesthesia published in far fewer journals than Internal Medicine, Pediatrics or Surgery, who all published in over 200 journals between 2006/07 and 2010/11. This does not necessarily impact on productivity or impact though. Anesthesia and Surgery also published in larger numbers of journals for whom no journal impact factor could be located (32 for Anesthesia, and 44 for Surgery).
Medicine published in the largest percentage of low-impact journals (72.2% or 153 journals) with Pediatrics following closely at 71.8% of journals (148 journals).

**Group-Level Productivity, 2006/07 to 2010/11**

Figure 9.1 depicts overall, group level outputs for all departments included in the quantitative case studies (total K-MAAP©):

<table>
<thead>
<tr>
<th></th>
<th>2006-07</th>
<th>2007-08</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia</td>
<td>780</td>
<td>1,080</td>
<td>1,242</td>
<td>1,410</td>
<td>1,330</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>590</td>
<td>896</td>
<td>757</td>
<td>822</td>
<td>818</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>2,047</td>
<td>2,163</td>
<td>2,514</td>
<td>2,699</td>
<td>3,296</td>
</tr>
<tr>
<td>Surgery</td>
<td>1,860</td>
<td>1,871</td>
<td>1,848</td>
<td>1,942</td>
<td>1,909</td>
</tr>
</tbody>
</table>

It would seem that money produces results in academic medicine. Table 9.12 demonstrates the percentage of growth or decline in K-MAAP© points for all four departments between 2006/07 and 2010/11:
<table>
<thead>
<tr>
<th>Period</th>
<th>ANESTHESIA</th>
<th>INTERNAL MEDICINE</th>
<th>PEDIATRICS</th>
<th>SURGERY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006/07</td>
<td>657</td>
<td>590</td>
<td>2,065</td>
<td>1,860</td>
</tr>
<tr>
<td>2007/08</td>
<td>971</td>
<td>896</td>
<td>2,102</td>
<td>1,871</td>
</tr>
<tr>
<td>% change (1 year)</td>
<td>47.8%</td>
<td>51.86%</td>
<td>1.79%</td>
<td>0.59%</td>
</tr>
<tr>
<td>2008/09</td>
<td>1,115</td>
<td>757</td>
<td>2,529</td>
<td>1,848</td>
</tr>
<tr>
<td>% change (1 year)</td>
<td>14.8%</td>
<td>-15.51%</td>
<td>20.39%</td>
<td>-1.22%</td>
</tr>
<tr>
<td>2009/10</td>
<td>1,278</td>
<td>822</td>
<td>2,754</td>
<td>1,942</td>
</tr>
<tr>
<td>% change (1 year)</td>
<td>14.6%</td>
<td>8.58%</td>
<td>8.89%</td>
<td>5.08%</td>
</tr>
<tr>
<td>2010/11</td>
<td>1,153</td>
<td>818</td>
<td>2,591</td>
<td>1,909</td>
</tr>
<tr>
<td>% change (1 year)</td>
<td>-9.8%</td>
<td>-0.48%</td>
<td>-5.19%</td>
<td>-1.66%</td>
</tr>
</tbody>
</table>

Table 9.13 on the next page breaks-down these results, showing data on peer-reviewed publications, invited lectures and peer-reviewed grants, for all four departments:
Pediatrics, a department on a comprehensive AFP (clinical and academic deliverables) which offers a well-developed career development program, mentorship, base salary, triennial assessments based on internal peer-review, regular increases to the base salary based on merit plus an annual bonus based on merit, has shown the greatest increase in productivity and impact, with volumes of outputs also higher than the other three departments included in this dissertation. In terms of leadership, the chair also acts as the clinical chief and acknowledges that he has a good deal of control over the finances. The Pediatrics compensation and assessment approach is characterized as a hybrid model, involving both individual and group-based elements. The system is based on the notion that substantial financial incentives (extrinsic) are important. Figure 9.2 and Table 9.13 appear to support this notion.

<table>
<thead>
<tr>
<th>Period</th>
<th>ANESTHESIA</th>
<th>INTERNAL MEDICINE</th>
<th>PEDIATRICS</th>
<th>SURGERY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pubs</td>
<td>Invited Lectures</td>
<td>Grants</td>
<td>Pubs</td>
</tr>
<tr>
<td>2006/07</td>
<td>334</td>
<td>231</td>
<td>92</td>
<td>240</td>
</tr>
<tr>
<td>2007/08</td>
<td>351</td>
<td>461</td>
<td>159</td>
<td>222</td>
</tr>
<tr>
<td>% change (1 year)</td>
<td>5.1%</td>
<td>99.6%</td>
<td>72.8%</td>
<td>-7.5%</td>
</tr>
<tr>
<td>2008/09</td>
<td>356</td>
<td>583</td>
<td>176</td>
<td>272</td>
</tr>
<tr>
<td>% change (1 year)</td>
<td>1.4%</td>
<td>26.5%</td>
<td>8.2%</td>
<td>22.52%</td>
</tr>
<tr>
<td>2009/10</td>
<td>570</td>
<td>619</td>
<td>89</td>
<td>241</td>
</tr>
<tr>
<td>% change (1 year)</td>
<td>60.2%</td>
<td>6.2%</td>
<td>49.4%</td>
<td>-11.39%</td>
</tr>
<tr>
<td>2010/11</td>
<td>238</td>
<td>734</td>
<td>181</td>
<td>267</td>
</tr>
<tr>
<td>% change (1 year)</td>
<td>-58.3%</td>
<td>18.6%</td>
<td>103.4%</td>
<td>10.78</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Anesthesia introduced a new, merit-based, competitive awards program in 2009. The system is individually-focused. In 2007/08, overall academic productivity based on K-MAAP© points demonstrated a substantial increase of 47.8%. The new chair emphasized an internal/external assessment model, conducting biennial peer reviews of all faculty members providing significant amounts of funding (relative to gross income) from university operating budgets to individuals. Anesthesia also shows some growth in productivity over the five-year study period, with a small decline (9.8%) in 2010/11. The system is based on the notion that recognition and protected academic time contribute to, and motivate research success. While Anesthesia is on an AFP arrangement, it is not comprehensive (although some funding for academic work is provided), and funding is flowed directly to the practice plans. The chair has no control over these funds, and they do not comprise a bonus.

As depicted in Figure 9.13, Surgery’s productivity shows a relative remained stable but did not increase over the five-year study period. Their overall level of productivity and impact as demonstrated by K-MAAP© points is lower than Pediatrics, but higher than Anesthesia and Internal Medicine. Surgery is also on an AFP arrangement, with funding flowed directly to the practice plans as is the case with Anesthesia. The chair does not control the AFP funds. Unlike Anesthesia, Surgery’s compensation and assessment model is group-based in that everyone in the department receives a small bonus, relative to income, based on the academic points achieved and an annual assessment system. Surgery also does not provide a salary through the university department, and the career development and mentorship programs are not as well-developed as those offered by Pediatrics. The system is based on the presumption that a small monetary incentive will provide an extrinsic incentive, and act as recognition.

Internal Medicine showed a small increase in productivity in 2007/08, followed by relative stability in productivity/impact as demonstrated by K-MAAP© points. Again, the total sample for
Pediatrics, Anesthesia and Surgery was 40 and 30 for Internal Medicine. This might help explain the lower volumes of K-MAAP© points over the five-year study period. The total number of K-MAAP© points for each department between 2006/07 and 2010/11 was as follows: Anesthesia 5,842 (n=40), Internal Medicine 3,883 (n=30), Pediatrics 12,719 (n=40) and Surgery 9,430 (n=40). Internal Medicine offers a base research salary, increases to that base research salary based on internal assessment and merit, and protected academic time based on performance. The system is also a hybrid in that all GFT faculty participate in the system, but it recognizes individual achievements only. Again, no bonus is provided.

Comparing the Rankings: Peer Review, Bibliometrics, and the K-MAAP©

Different ranking systems produced different results. Appendix 9.1 provides a detailed listing of all of the research rankings (K-MAAP©, h-index, citation index), for all PIs included in the total sample of 15066.

Table 9.14 explores the top 10% of the total sample, sorted by the K-MAAP© rankings. The academic physicians who were ranked in the top 15 according to the K-MAAP© were mostly full Professors (13 out of 15, or 86.7%), with the remaining two faculty members holding academic appointments at the rank of Associate Professor. Nine out of 15 of the top 10% are in the Department of Pediatrics (60% of the top 15), and all practice in the same hospital setting. They do however practice in different sub-specialty areas. Additionally, 14 out of 15 in the top 10% are male (93% with males constituting 73% of the total sample) and just over 50% (n=8 or 53%) are IMGs:

66 Note the teaching rankings were not included as Manitoba does not produce teaching scores.
The rankings for PI # 72 are homogeneous (1, 1 and 1 across all three measures), with greater variation shown amongst other PIs in the sample. As an example, PI # 75 ranks 13th in the K-MAAP©, but 42nd for total citations between 2006/07 and 2010/11, and 22 for the h-index.

The numbers could be attributed to the fact that K-MAAP© measures peer-reviewed publications, invited lectures and peer-reviewed grants, but the citation index and h-index only address publication-related metrics. The h-index also reflects the career h-index, and not the h-index for the period 2006/07 to 2010/11. It is however interesting that Pediatrics has the highest number of academic physicians in the top 10%.

**Plotting the Rankings across the Departments: Percentiles**

Once the comparison of rankings across all four departments were completed, I was keen to determine where faculty from each department tended to rank based on the K-MAAP©. In other words, if you are a faculty member in Pediatrics, are you more likely to be in the top

---

Note: Data on the division, gender and IMG/CMG status were removed to preserve anonymity.

---

<table>
<thead>
<tr>
<th>PI #</th>
<th>Department</th>
<th>Academic Rank</th>
<th>RANK: K-MAAP©</th>
<th>RANK: Total Citations</th>
<th>RANK: H-Index</th>
<th>AVERAGE: All Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>58</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>2</td>
<td>11</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>73</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>3</td>
<td>28</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>130</td>
<td>Internal Med</td>
<td>Associate</td>
<td>4</td>
<td>5</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>74</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>5</td>
<td>8</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>57</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>6</td>
<td>23</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>114</td>
<td>Surgery</td>
<td>Professor</td>
<td>7</td>
<td>32</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>115</td>
<td>Surgery</td>
<td>Professor</td>
<td>8</td>
<td>6</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>43</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>9</td>
<td>15</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>44</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>10</td>
<td>26</td>
<td>26</td>
<td>21</td>
</tr>
<tr>
<td>122</td>
<td>Internal Med</td>
<td>Professor</td>
<td>11</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>116</td>
<td>Surgery</td>
<td>Professor</td>
<td>12</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>75</td>
<td>Pediatrics</td>
<td>Professor</td>
<td>13</td>
<td>42</td>
<td>22</td>
<td>26</td>
</tr>
<tr>
<td>1</td>
<td>Anesthesia</td>
<td>Professor</td>
<td>14</td>
<td>36</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>42</td>
<td>Pediatrics</td>
<td>Associate</td>
<td>15</td>
<td>82</td>
<td>13</td>
<td>37</td>
</tr>
</tbody>
</table>

Note: Data on the division, gender and IMG/CMG status were removed to preserve anonymity.
90-100\textsuperscript{th} percentile, in the middle, or the bottom 1-10\textsuperscript{th} percentile of the K-MAAP© rankings? Figure 9.2 depicts the outcomes of this analysis visually and numerically:

Figure 9.2 shows that Pediatrics has the highest percentage of faculty in the top 10\% of all faculty (green), followed by Surgery. The number of faculty members in each percentile are listed numerically in Table 9.15:

<table>
<thead>
<tr>
<th>Percentiles</th>
<th>Anesthesia</th>
<th>Internal Medicine</th>
<th>Pediatrics</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100%</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>80-89%</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>70-79%</td>
<td>5</td>
<td>0</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>60-69%</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>50-59%</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>40-49%</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>30-39%</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>20-29%</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>10-19%</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1-10%</td>
<td>5</td>
<td>9</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
The next step was to plot the distribution of the K-MAAP© rankings. Normal distribution, sometimes called the “normal curve” or the “bell-shaped curve” is a visual representation of the characteristics of scores where the mean, median and mode values are equal to one another, and the curve is perfectly symmetrical. If the median and the mean are different though, than the distribution is skewed one way or another (Salkind 2011: 142). The samples for each department are considered large sets (n=30+ for each department). As a first step to comparing the rankings (across percentiles) for each department, the number of faculty in each percentile were plotted into histograms. These results are depicted in Figures 9.3, 9.4, 9.5 and 9.6.

Figure 9.3, the distribution of rankings for Anesthesia faculty members across percentiles, demonstrates bimodal distribution (a double peak-like pattern) with most academic physicians falling below the 49% percentile.

Figure 9.4 (Internal Medicine) shows a curve that is heavily skewed to the left of centre (left-skewed distribution as shown by the tail of the curve) with the majority of faculty members also falling below the 49th percentile.
For Pediatrics, Figure 9.5 shows the opposite of Internal Medicine. Here, the curve is skewed to the right (as shown by the tail of the curve). Far more faculty are in the upper percentiles (nine faculty are in the 90-100th percentiles).

The curve for Surgery, depicted in Figure 9.6, represents an almost comb-like formation (the bars are alternately tall and short with some variations), with curvature towards the left. The majority of faculty members do however rank above the 50th percentile, in the top half of the overall rankings for the full sample of academic physicians.

A similar analysis was not completed for the h-index or citation index because the K-MAAP© produces more useful data -- it rarely results in tied scores, data are based on specific time periods, it provides a more holistic view of academic productivity than just publications or citations, and it does not discriminate based on career length.
Statistical Correlations: Toronto and Manitoba Case Studies

Academic Promotions Compared

The case studies looked for increased academic productivity ("peak productivity") in the year or two immediately before or after academic promotion (for those faculty members who had sought academic promotion between 2006/07 and 2010/11). The idea was that academic productivity might show some increase in the period immediately before/after the academic promotion was sought. As Table 9.18 demonstrates, a moderate statistical relationship exists in Anesthesia (correlation coefficient of 0.5122) and a weak statistical relationship exists in Pediatrics. However, the promotions cycle does not appear to have any relationship with the productivity peaks depicted by the K-MAAP© analyses for Surgery and Internal Medicine (demonstrated by correlation coefficients that are less than +/- .29). In other words, productivity did not increase significantly in the years immediately before or after academic promotion for Surgery and Internal Medicine, and so, the incentive of promotion does not necessarily provide motivation to significantly increase productivity in these departments. However, productivity did increase in the years immediately before or after academic promotion for Anesthesia, and to a lesser degree, for Pediatrics. For these departments, the incentive of promotion may provide motivation to increase productivity. Table 9.16 demonstrates this relationship for all four case studies:

<table>
<thead>
<tr>
<th>Promotion Cycle (Academic Year)</th>
<th>K-MAAP© Productivity PEAK</th>
<th>All Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anesthesia</td>
<td>Surgery</td>
</tr>
<tr>
<td>Correlation Coefficients</td>
<td>0.5122</td>
<td>-0.2659</td>
</tr>
<tr>
<td>t-value</td>
<td>2.3854</td>
<td>-1.1700</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.0298</td>
<td>0.2572</td>
</tr>
<tr>
<td>N</td>
<td>18</td>
<td>20</td>
</tr>
</tbody>
</table>
Here, the correlation coefficients measure the strength of the relationship between two variables. When the correlation \( (r) \) equals \(+0.01\) to \(+0.19\), this represents no or a negligible relationship. A weak positive relationship is denoted by values ranging when \( (r) \) equals \(+0.20\) to \(+0.29\), a moderate positive relationship is denoted by values ranging when \( (r) \) equals \(+0.31\) to \(+0.70\), and values between \(+0.71\) to \(+1.0\) indicate a strong positive relationship.

**Statistical Correlations: Ranking Methods**

**Research Rankings Methods and Teaching Effectiveness**

Correlations amongst the various research ranking methods were also tested as part of the statistical model that was employed for the case studies. Research-related rankings and measures were also compared against the rankings produced by teaching effectiveness scores (note that teaching effectiveness scores are not produced by Internal Medicine). The purpose was to look for correlations between high research rankings (research effectiveness as denoted by high productivity and impact) and high teaching evaluation scores. As Table 9.17 demonstrates, none of the research-related items that were tested correlated with the teaching effectiveness scores. Only the Anesthesia K-MAAP© ranking had any relationship to teaching effectiveness, the correlation coefficient denoting a weak positive relationship (0.3082). The K-MAAP© ranking for Surgery and Pediatrics was not at all related to the teaching effectiveness scores (e.g., correlation coefficient of 0.0701 for Pediatrics and 0.1343 for Surgery). All other correlations were insignificant. In this sample, highly ranked researchers are not necessarily highly-ranked teachers.
Research Ranking Methods

When the K-MAAP© was compared with the other ranking methods, the data demonstrated mostly a moderate positive relationship with the other ranking and bibliometric systems (e.g., 0.6894 for citation index with Pediatrics, and 0.6934 for h-index with Surgery), with no significant relationship with the teaching evaluation scores (as demonstrated in Table 9.18). This was the case for all three case studies (Anesthesia, Pediatrics and Surgery). Appendix 9.2 contains several tables (9.2.1, 9.2.2, 9.2.3) which demonstrate these results numerically.

Statistical Correlations: Academic Rank

The various research rankings were also compared with variables including academic rank. The data demonstrates mostly a moderate positive relationship with the K-MAAP© and a moderate positive relationship to strong positive relationship with the other rankings (citation index, h-index).

In other words, those with a higher academic rank did tend to rank higher overall. The small values of Sig. (2 tailed) also provide strong evidence that the relationships exist. These statistical relationships are shown in Appendix 9.3.

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68 Internal Medicine at Manitoba does not collect teaching evaluation scores.
Statistical Correlations: Gender

The data also shows that for Anesthesia, Surgery and Pediatrics, gender has no significant relationship with the K-MAAP®, the citation index, h-index or teaching effectiveness scores. For Internal Medicine, the data indicates that gender has a moderate positive relationship with the ranking and bibliometric methods (citations, h-index, and K-MAAP©). That is, male academic physicians tended to rank higher on this sample in terms of citations, h-index and the K-MAAP©. Appendix 9.4 depicts these results. Additionally, table 9.4.4 (Appendix 9.4) shows that a negligible statistical relationship exists between gender and teaching effectiveness scores (University of Toronto data sets only).

Statistical Correlations: IMGs vs. CMGs

The rankings produced by the K-MAAP®, the citation index, h-index or teaching effectiveness scores (University of Toronto only) showed no significant differences based on whether an individual is an IMG or a CMG; only a negligible statistical relationship was detected. Tables 9.1.9, 9.1.10, 9.1.11, and 9.1.12 in Technical Appendix 9.5 demonstrate these figures.

Impact, Productivity and Individual Productivity “Cycles”

Peer-Reviewed Publications

As reported in the previous case study chapters, the individual productivity cycles of the academic physicians included in the case studies varied quite a bit (n=150). For publications, the previous chapters also demonstrated that the vast majority of publications tend to be in low-impact journals, either as a PI (first or senior responsible author) or as a collaborator. Figures 9.9, 9.10, 9.11 and 9.12 demonstrate impact for publications, as well as the typical cycles of productivity for each department as a whole.

Figure 9.7 depicts peer-reviewed publication for Anesthesia. Here, while individual’s patterns of productivity will of course vary, a two-year cycle for effort as either a first-author or a
collaborator on low-impact publications (where the majority of productivity or time spent has been allocated to the individual) is depicted for the department as a whole.

Figure 9.8 portrays the same data set (peer-reviewed publications) for Surgery. In keeping with Anesthesia, the vast majority of effort and productivity is spent on work as a first-author, senior responsible author or collaborator on publications in low-impact journals. The volumes of K-MAAP© points are however higher than Anesthesia overall. However, Surgery also follows a two year cycle of productivity peaks:
Figure 9.9 depicts the same information for Pediatrics. Here, no real productivity curve or cycle appears to emerge for effort as a collaborator on low impact journals (a steady increase is shown), but a two-year cycle is depicted for work as a first author or senior responsible author on low impact publications. Again the overall levels of productivity – as shown by K-MAAP© points- are higher for Surgery than for Anesthesia:

![Figure 9.9: Impact, Productivity and Productivity Cycles: Surgery Peer-Reviewed Publications 2006 to 2011](image)

Figure 9.10 shows the impact, productivity and productivity cycle for Internal Medicine. Here, the cycle for all levels of publication look very different from the other departments, with lower overall volumes as well (for Internal Medicine, n=30). No real consistent pattern emerges, with the possible exception of low impact peer-reviewed publications as a Principal Investigator.

![Figure 9.10: Impact, Productivity and Productivity Cycles: Internal Medicine Peer-Reviewed Publications 2006 to 2011](image)
The same analysis was completed for peer-reviewed grants and invited lectures. The concept of a productivity-cycle does not really apply to grants; the grant terms might range from one to several years, enabling outputs such as publications or invited lectures. Thus, the analysis that was completed did not indicate a “cycle” of sorts.

**Comparing and Contrasting: Leaders’ Perceptions**

The K-MAAP© and quantitative analyses more generally, provide an “architecture of choices” for academic leaders. When considering productivity, efficiency and performance, the math (metrics) constitute one side of a coin; the other side is the human or cognitive side. How are people motivated, and how do they stay motivated? How should effort or impact be recognized? And in the case of the qualitative interviews which were conducted, how do academic leaders navigate through, consider, and learn in this difficult terrain?

Principals (here, academic leaders, department chairs) do seem to operate under a common set of beliefs on many issues. However, they appear to diverge on others, namely, the overall focus of the compensation and assessment models that they use. As an example, the chair of Surgery inherited a group-based system which awards a small bonus to everyone in the department based on the number of academic points achieved through an annual review program. The chair of Anesthesia however, discontinued historical payroll-based arrangements and stipends shortly after he commenced his appointment (with the support of the affected faculty members), and created an individually-focused, competitive, intra-mural merit awards system which does not offer a bonus, but which provides a substantive payment to the practice plans to help fund the provision of protected academic time. The chairs of Pediatrics, and to some extent, Internal Medicine, have much greater control over the provision – or withdrawal should performance be low – of funds, resources and protected academic time. Both chairs are also the head of the clinical department, and as such, provide leadership over the clinical revenues and/or AFP monies. They have both
implemented hybrid-type systems, although Internal Medicine does not offer a bonus (public recognition only). Both Pediatrics and Internal Medicine have indeed withdrawn academic funding; in the case of Pediatrics, those who do not perform according to their position description are not simply moved into a new one, but are actually terminated.

The interviews also indicated that all four departments, plus those at the University of Alberta, have a fairly high tolerance for failure (or at least, believe that multiple chances to improve should be provided). They did however note that their respective systems are setup to recognize failure quickly through a peer-review process. None of the departments currently include quantitative indicators in the assessment processes, whether they are done every year (Surgery, University of Alberta), every second year (Anesthesia) or every third year (Pediatrics and Internal Medicine). All chairs noted that if productivity or performance has deteriorated, they will address with the issue with the division head or the individual.

All chairs and academic leaders also commented on recruitment and retention challenges. Internal Medicine in Manitoba noted that this was previously a challenge, but following revision of their financial model and assessment process, has improved. In particular, retention is much higher than it was previously. Anesthesia as a specialty had previously experienced a personnel shortage, but this was ameliorated through the recruitment of academically-focused IMGs, the implementation of Anesthesia Care Teams in Ontario (ACTs) and AFPs which included “academic repair” programs. Surgery has not encountered a retention problem, and the chair noted that they continue to attract top talent from Canada and the United States. The job market for surgeons is flat though, and so retention of medical students into the specialty has been a challenge. While the impact of this was not detected during the study period, it may become an issue in future. Pediatrics has not faced any recruitment or retention issues which the chair attributes to the high profile of the hospital. The comprehensive compensation package may contribute to Pediatrics’ success as well.
The chair’s perceptions on incentives and motivation are particularly germane to this dissertation. The chair of Pediatrics noted that their substantive, annual bonus functions as a true external incentive. However, he also stated that the bonus has become expected, or “taken for granted”; I would suggest because of the long-term, expected nature of the bonus, it’s really considered part of the overall compensation package as opposed to a monetary acknowledgement of merit or incentive. In Alberta, all of those who were interviewed noted that physicians are driven by money, and they almost have to offer a bonus on an annual basis; but then three of the chairs also noted that most academic physicians are driven by intrinsic (internal) motivation, such as the joy of teaching, the thrill of discovery, etc. One of the chairs changed their perspective during the actual interview, noting at first that money drives academic physicians, but then later indicating that motivation for academic physicians is mostly intrinsic. Here, the perspective of the academic leaders who were interviewed seems to be as conflicted as the system itself; again, it should be highlighted that the various types of academic appointments and funding models in Alberta result in a salary increase paid to some physicians based on annual review, while other academic physicians receive no monetary incentive, regardless of performance (a result of the funding source for their academic position).

At the University of Toronto, one of the chairs noted that he had inherited the current system, but initially suggested that a bonus does provide a “small incentive”. When asked whether he would change the system, the chair noted that pooling resources to support researchers may work well better. In one of the other departments included in this dissertation, the chair indicated that a bonus for high performance for an academic physician constitutes tokenism and a waste of financial resources. A third chair echoed this belief, stating that he does not believe that bonuses are necessary given the high incomes that Canadian academic physicians enjoy, and the fact that “giving them a five or ten percent bonus is a lot of money for the department but it’s not a lot of money for
them”. These chairs believe that protected academic time is the main source of “currency” within an AHSC.

With the exception of two departments (Anesthesia and Pediatrics), none of the departments that were included in this dissertation had formally reviewed their compensation or assessment programs, or conducted any satisfaction-type evaluations. Anesthesia implemented a satisfaction survey two years after putting their program into place in 2007. Pediatrics has evaluated their program on a few occasions, and has published the results.

All of the academic leaders who were interviewed seemed to agree on the role of the chair. Broadly, these duties include building the reputation of the unit; acting as a role model for faculty members; leveraging and acquiring resources to facilitate academic activities; and mentoring others (students, faculty members, staff). The chairs of Pediatrics and Internal Medicine also highlighted their role in ensuring fiscal responsibility, acting as business leaders. Indeed, practice plans and academic medicine more generally, really is a business.

On a provincial systems level, it should be noted that very few concerns were raised by academic leaders in Manitoba or Ontario. The leaders were clear on whom they are accountable to. The classical principal-agent problem is related to goal conflict, but in terms of the perceptions of these chairs, the conflict between principals, agents, and even the organizations, seemed minimal. Those at the University of Alberta did however raise the issue of integration between the university, the hospitals, local health authorities and Alberta Health Services more generally, as a major challenge. Here, persistent change, lack of continuity in leadership, and the perceived absence of a systems-level, integrated academic and health strategy for Alberta as a whole were repeatedly mentioned, and did seem to result in goal conflicts between principals, agents and organizations.
Chapter Summary

This chapter summarized, compared and contrasted background information about the four clinical academic departments/specialties that were incorporated into the case studies (Anesthesia, Internal Medicine, Pediatrics and Surgery). Leader’s perceptions of key challenges in clinical academic medicine were also discussed and analyzed, including funding sources and budgets, categories and features of clinical academic appointments, compensation models for academic physicians and academic assessment models.

Chapter 9 also compared various quantitative data sets including academic productivity, statistical correlations and productivity cycles or patterns. Perhaps the most significant information that was presented was found in Figure 9.2, the comparison of overall productivity per the K-MAAP©, for all four departments included in the case studies. Figure 9.2 clearly depicts a steady, upwards increase in productivity for the Department of Pediatrics, over the period 2006/07 to 2010/11. The academic physicians in Pediatrics demonstrated higher volumes of productivity over the five-year period (Table 9.13), while Figure 9.3 showed that academic physicians in Pediatrics tended to be ranked in the top percentiles of the total sample across all four departments of 150 academic physicians. Again, Pediatrics is a department on a comprehensive AFP (academic and clinical deliverables) which offers a nationally competitive base salary, base salary increases, a career development program, mentorship programs, triennial academic assessment, a substantive bonus based on merit and an environmental that is highly conducive to research.

The results for the three institutional case studies are discussed further in the next chapter. As noted in Chapter 1, each department uses a different compensation model and none of the models had been tested empirically, one was grounded in theory and was linked to the department’s academic plan, and none of the departments demonstrated the impact of their models other than to list volumes of publications, grants or lectures that were produced. We now
know the impact of the models for the period 2006/07 to 2010/11, and so in Chapter 10, a theoretical analysis and discussion is connected to the research questions for each case study.
Chapter Ten: Implications and Theoretical Models

Productivity is not everything, but in the long run, it is almost everything. A country’s ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker.

Paul Krugman, Nobel Prize winner in Economic Sciences 2008.69

Overview

In “The Age of Diminishing Returns”, Krugman argues that productivity is commonly defined as a ratio between the output volume and the volume of inputs. It measures how efficiently production input, such as labour, is being used in an economy to produce a given level of output (Krugman, 1997: 9). Productivity is a driver of prosperity in society, and absolutely, it also drives the success of universities, academic medical centres, and our health care and education systems more broadly. Universities, in particular medical schools and clinical academic departments, produce “joint products” where single units of input (academic physicians) participate in the production of multiple outputs: research, patient care, student instruction and administration. As a result, they are responsible to multiple principals (government, hospitals, hospital foundations, universities, clinical academic departments, practice plans, medical associations, research institutes, and sometimes, unions). As illustrated in Chapter 9, the K-MAAP© is a quantitative bibliometric and predictive tool designed to provide academic leaders with information on group and individual productivity, scholarly outputs, productivity cycles, impact, effort, efficiency, returns on cost and even research productivity-replacement value. This information provides mathematical, quantitative, graphical and comparative signals about agents (academic physicians) to principals, stakeholders, and organizations. But while the main research question in this dissertation focuses on how academic

physicians are compensated and assessed, the quantitative elements or math constitutes only one side of the coin. The other side that is explored in this chapter is the human or cognitive side.

As stated in Chapters 1 and 3, this dissertation pursues two inter-related lines of questioning. To begin, how do Canadian clinical academic departments compensate academic physicians, and how do specific compensation systems – and the measures used to assess, measure and recognize academic productivity of Clinician Investigators or Clinician Scientists – relate to the department’s overall productivity and impact? How is merit or “excellence” in academic medicine defined and recognized by academic leaders? How do the various measurement systems that are employed to assess academic performance compare in the cases of departments and individuals? And second, how do institutions, departments or academic leaders make choices around the allocation of scarce resources? How is policy designed when it comes to academic physicians? Is there a connection between university-based compensation and academic productivity systems to methods used by governments to fund academic physicians? Further, how do other “principals” fit into the academic productivity equation? But as stated in Chapter 9, there are also issues that underpin those main lines of questioning. How are academic physicians motivated? How should effort or impact be recognized? And, is there a theoretical framework that can help explain the behaviours that have been uncovered in this dissertation?

Academic physicians are expensive to compensate and difficult to assess given the multiple principals and stakeholders to whom they are accountable. No one theory can explain the current landscape, or how choices appear to be made. As indicated in Chapter 2, behavioural economics is an emergent field which studies the impact of psychological or social factors on the economic decisions or market choices that individuals make, and the attendant results in terms of resource allocations and choices that are made. While few studies have been situated within academia or the
health sciences at this time, this dissertation will attempt to link data on real-life choices gleaned from the case studies (and their specific research questions) to theory.

This chapter is organized as follows. First, a summary of the theoretical considerations are provided in a tabular form. Second, the research questions for each case study are presented, discussed, analyzed and discussed in order. Third, the features of a new type of incentive that emerged through this study – tentatively called a “placebo incentive” – are developed and elucidated. Finally, a summary which includes theoretical considerations and comparisons across all case studies is provided.

Key Theoretical Concepts and Considerations

Classical economy theory is based on certain key assumptions. Principal-agent theory posits that incentives serve to reinforce desired behaviour. Agents respond to incentives. In psychology however, dissonance theorists argue that rewards may impair performance in the long-run. Rational choice theory elucidates how people should behave. Behavioural economics seeks to close the gap between classical economic theory and cognitive theories in psychology by showing how people actually do behave.

Policymakers also believe that incentives can change the behaviour of agents. Presumably, those changed behaviours will trickle down to other agents too. That’s the model on which current physician compensation models have been built. Indeed, health ministries have offered physicians a variety of different compensation models (fee-for-service, capitation schemes, pay-for-performance, AFPs), all of which have presumably been designed to produce a desired effect (high productivity). At the Southeastern Ontario Academic Medical Association in Kingston, Ontario, the first AFPs were introduced to ameliorate issues attributed to the fee-for-service (piece-meal) clinical payment models. However, while academic issues may have been addressed, clinical productivity has dropped in certain clinical specialty areas.
Charting Theoretical Constructs

To commence the theoretical analysis, key constructs from economics, psychology and behavioural economics were reviewed and linked to the case study data. The broad themes that were covered include the methods used by the department or institution to compensate and assess academic physicians, the funding sources for these compensation programs, the focus of the system (group, individual or hybrid model), and various features based on economic theory. Table 10.1 was constructed to chart the theoretical constructs that are embedded within the case study research questions and demonstrated by the departments or institutions that were researched. However, these features do require further explanation.

First, features based on classical economic theory include the principal-agent dilemma, adverse selection, and asymmetric information (Eisenhardt 1989, Shapiro 2005, Wright et al 2001). In the organizational behaviour and management literature, agency theory tends to focus on empirical studies related to compensation models and behaviour-oriented devices (e.g., salary) versus outcomes-oriented models (e.g., piece rates, fee-for-service, commissions, bonuses) (Shapiro, 2005). The principal-agent dilemma refers to issues that may arise when the agent (academic physician) is able to make decisions on behalf of the principal (university departments, hospitals, other stakeholders and principals in academic medicine) (Eisenhardt 1989). One of the fundamental challenges is that the principal is presumed to have asymmetric information – imperfect or incomplete information about what the agent does given the specialized knowledge and skills of the agent (e.g., medical or scholarly knowledge in academic medicine). Here, goal conflict may occur – differences between the principal’s goals (academic leaders) and those of the agent (academic physicians) (Spence 1973). When the goals of the agent diverge from those of the principal, these are referred to as “agency costs”. Academic leaders are faced with great uncertainty and risk every day, especially where creativity, science, and the scholarly outputs of academic
physicians are involved. Peer review is one method to attempt to limit this uncertainty, risk and asymmetric information; however, the peer review process itself is fraught with biases (Bornmann 2011, Lee et al 2013, Marsh et al 2008, Rustum 1985).

Second, features of the contract design are reviewed. Assumptions from principal-agent and contract theory that were included in table 10.1 include the informativeness principle, equal compensation principle, monitoring principle, and monitoring format. Milgrom and Roberts note that the informativeness principle is designed to demonstrate the performance of the agent in relation to the contract, and should be included within incentive-type contracts (e.g., AFPs, especially the Department of Pediatrics). As an example, most departments on AFP-type arrangements are subject to “shadow billings” to ensure that clinical productivity remains at contracted levels (however, shadow billings constitute only 10% of the fee-for-service claim value in Ontario). The departments on comprehensive AFPs or A-ARPs are not currently required to report on academic deliverables, and this should be reconsidered. Following the 2011 Auditor General’s Report in Ontario, the Ministry should consider a more detailed review and analysis of the information that is provided (Auditor General’s Report 2011: 183).

The equal compensation principle simply notes that equity should be implemented in compensation programs; activities that are equally valued by employers (principals) should be valued equally in terms of compensation. Finally, the monitoring principle (also referred to as the “monitoring intensity principle”) and monitoring format are closely linked together. These refer to the types of monitoring methods (i.e., performance assessment models or accountability requirements) that are included in the contract, and how often, or how detailed, these are. Shadow billings would fall into this category, but annual reports submitted by academic physicians to their university department are another example. As a reminder, the phase 1 survey indicated that sixty
percent of chairs use annual reports to measure performance, however, not all faculty submit accurate information as shown in Table 4.6.

Third, Table 10.1 indicates the types of incentives that are used, and the effect that they attempt to stimulate (e.g., external monetary incentives vs. recognition to stimulate intrinsic motivation). Concepts from behavioural economics are also summarized across the case studies. These include evidence of the reverse impact of incentives, paying for “interesting tasks” (e.g., bonuses for research or scholarly activities), paying too little (financial incentives or bonuses that are low such as in the Department of Surgery featured in this dissertation), paying the wrong party, punishments (such as withdrawing or lowering bonuses, reducing protected academic time), gender differences in competition, ongoing versus temporary bonuses or incentives, and expected bonuses or monetary incentives.

Finally, the psychological literature on incentives refers to “primes” as a stimulus to induce particular behaviours (Kamenica 2012). Primes are closely related to framing, or how choices and incentives are presented. Primes however, can be implicit, explicit or subliminal (Ibid: 13.14). A financial or monetary incentive or bonus that is known, and competed for, may prime certain social behaviours in a particular way. Non-financial incentives offered by principals (e.g., recognition events, awards, public announcements of success) may also prime agents to behave in an expected way.

As noted, Table 10.1 was constructed to chart the theoretical concepts that are embedded within the case study research questions and findings:
<table>
<thead>
<tr>
<th>Focus of the Case Study</th>
<th>University of Alberta</th>
<th>Internal Medicine (Manitoba)</th>
<th>University of Toronto</th>
<th>Anesthesia</th>
<th>Pediatrics</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group or individual focus?</td>
<td>Individual</td>
<td>Hybrid</td>
<td>Individual</td>
<td>Hybrid</td>
<td>Group</td>
<td></td>
</tr>
<tr>
<td>Method used by the department or institution to assess academic physicians</td>
<td>Internal peer review + Faculty Evaluation Committee (chairs)</td>
<td>Internal Peer Review + Chair’s decision</td>
<td>External Peer Review (Chair non-voting)</td>
<td>Internal Peer Review recommendation + Chair’s decision</td>
<td>Internal Peer Review recommendation + Chair’s decision</td>
<td></td>
</tr>
<tr>
<td>Objective (e.g., quantitative/bibliometric assessments)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Subjective (e.g., peer review assessments)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Method used by the University Department to compensate academic physicians</td>
<td>Multiple methods - depends on type of academic appointment</td>
<td>Salary + Salary Increase (for merit)</td>
<td>Merit Awards for top 30-40 (sizable payments to the practice plan)</td>
<td>Salary + Salary Increase + $ Bonus (merit)</td>
<td>Small $ bonuses for everyone</td>
<td></td>
</tr>
<tr>
<td>Funding Source: University Funds</td>
<td>Multiple sources (depends type of academic appt.)</td>
<td>University operating budget + AFP+ GFT position funding + clinical revenues</td>
<td>University operating budget + T&amp;R</td>
<td>Comprehensive AFP (Hospital + University combined) + university operating budget + T&amp;R</td>
<td>University operating budget + T&amp;R + AFP (academic side)</td>
<td></td>
</tr>
<tr>
<td>Features - based on Economic Theory:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal-Agent Dilemma</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Asymmetric information</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 10.1: Theoretical Concepts
<table>
<thead>
<tr>
<th>Contract Design:</th>
<th>University of Alberta</th>
<th>Internal Medicine (Manitoba)</th>
<th>University of Toronto</th>
<th>Anesthesia</th>
<th>Pediatrics</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informativeness Principle</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Equal Compensation Principle</td>
<td>No</td>
<td>Yes</td>
<td>n/a</td>
<td>Yes</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Monitoring Intensity Principle - high/low?</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Monitoring frequency</td>
<td>Annual</td>
<td>Biennial</td>
<td>Biennial</td>
<td>Triennial</td>
<td>Annual</td>
<td></td>
</tr>
<tr>
<td>Monitoring Format</td>
<td>Academic assessment process</td>
<td>Peer Review</td>
<td>Tournament, External Peer Review</td>
<td>Tournament, Internal Peer Review + Chair's evaluation</td>
<td>Tournament, Internal Peer Review + Chair &amp; Division Head's evaluation</td>
<td></td>
</tr>
<tr>
<td>Incentives:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>External - monetary</td>
<td>Yes</td>
<td>Yes - salary increase on a pre-determined grid</td>
<td>Yes</td>
<td>Yes - salary increase on a grid + $ bonus</td>
<td>Yes - small $ bonus</td>
<td></td>
</tr>
<tr>
<td>Value of incentive/bonus relative to gross income</td>
<td>Low</td>
<td>Low - Moderate</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Intrinsic (other forms of recognition)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>For tenure track only: base salary increase. Others - recognition only</td>
<td>Movement on salary grid + protected academic time</td>
<td>Merit (high value). Paid to practice plan to &quot;buy&quot; academic time</td>
<td>Merit Bonus (high value relative to income). Paid to individual + salary increase</td>
<td>Merit Bonus (low value relative to income). Paid to individual.</td>
<td></td>
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<tr>
<td>Payee (bonus)</td>
<td>Individual</td>
<td>Individual</td>
<td>Practice Plan</td>
<td>Individual</td>
<td>Individual</td>
<td></td>
</tr>
<tr>
<td>Behavioural Economics:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Evidence of reverse impact of incentives</td>
<td>Data n/a</td>
<td>For some (i.e., decline)</td>
<td>No</td>
<td>For some (i.e., decline)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Paying for &quot;interesting&quot; tasks</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Paying too little (incentives)</td>
<td>Yes/No</td>
<td>N/A</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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<td></td>
<td>University of Alberta</td>
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<td>University of Toronto</td>
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<td>-----------------------------------------------------------------</td>
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<tr>
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<td>Anesthesia</td>
<td>Pediatrics</td>
<td>Surgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paying the wrong party</td>
<td>Yes/No</td>
<td>No</td>
<td>Possibly</td>
<td>No</td>
<td>No</td>
<td></td>
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<tr>
<td>Paying too much incentives)</td>
<td>Data n/a</td>
<td>No</td>
<td>Possibly</td>
<td>Possibly</td>
<td>No</td>
<td></td>
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<tr>
<td>Punishments (e.g., withdrawing/lower bonuses)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Gender differences in competition</td>
<td>Data n/a</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Crowding out/crowding in of internal motivation</td>
<td>Unclear</td>
<td>Unclear</td>
<td>Unclear</td>
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<td>Ongoing vs. temporary incentives</td>
<td>Ongoing - tenure stream only</td>
<td>Ongoing</td>
<td>Temporary</td>
<td>Ongoing</td>
<td>Ongoing</td>
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<tr>
<td>Expected bonus/monetary incentives</td>
<td>Yes - tenure stream only</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Inferences - bonuses provided to increase desirability of academic activities?</td>
<td>Yes</td>
<td>n/a</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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**Social Behaviour & Crowding: Primes**

| Peer Review as a prime                                         | Possibly              | Possibly                    | Possibly              | Possibly              | Possibly              |
| Financial incentives (bonuses) as a prime                       | Possibly - for tenure track only. Incentive very low | Possibly                    | No                    | Possibly              | Unlikely              |
| Non-financial incentives as a prime                            | Possibly              | Possibly                    | Possibly              | Possibly              | Possibly              |
| If applicable, type of non-financial incentive?                | Recognition, high rating | Recognition, academic time | Recognition, academic time | Recognition, academic time | Recognition, academic time, other resources |

**Theoretical Models and Research Questions**

This section restates the research question for each case study, review the key findings in each chapter, and then link the theoretical concepts presented in Table 10.1 to these findings.
The University of Toronto case study (Chapter 5) explored the following research question:

How does each department’s compensation or incentive program impact upon the academic productivity of the department? The five-year results for all departments were captured in Figure 5.1, repeated here:

In Figure 5.1, Pediatrics shows the highest level of steady increase in productivity over the study period, as well as impact and volumes of outputs (as depicted by K-MAAP© points). Table 5.9 on page 87 demonstrated the percentage of growth or decline in K-MAAP© points for the same study period.

**Department of Anesthesia**

As described previously, the chair of Anesthesia implemented a new, competitive, external peer-review focused merit awards program in 2007. The merit awards are used to ensure protected academic time from the practice plans for those academic physicians who received the “award”. The merit awards do not supplement personal income, they provide recognition (the results are widely
announced and reported on), the system is individually focused whereby individuals self-select via application to the program, and the applications are internally/externally peer reviewed. It is a subjective process which does not include any objective measures or metrics, and the peer review process is imperfect due to asymmetric information; because of the many sub-specialty areas, the external reviewers are not necessarily experts in all scholarly or clinical fields. Thus, adverse selection may occur. Indeed, the K-MAAP© and bibliometric analyses indicated that if more quantitative measures been used, several applicants who had not received an award would have. van Raan states that although a strong correlation between the opinion of peers and quantitative indicators can usually be found, “If bibliometric indicators show a good performance, and the peers’ judgment is negative, there is a good chance that the peers are wrong” (van Raan, 1996: 413).

The contract for the merit awards is fairly simple: practice plans are expected to allocate additional protected academic time on receipt of the funds, and faculty members are expected to make maximum use of that time (a group-based, external incentive). However, the department’s survey of awards recipients in 2009 indicated that protected academic time is not always guaranteed. The chair confirmed that the provision of this time has not been closely monitored. Thus, the monitoring intensity is low. Further, awards recipients are not required to submit an annual report which details the use of the funds; the chair has noted that if productivity is low, then the PI simply won’t be successful when they reapply for an award in the next tournament (competition). Over time, some faculty members have not reapplied to the program, including those who were previously successful. As such, punishments, or a low tolerance for failure, are subtly incorporated into the merit awards program. Based on the findings of the K-MAAP© productivity cycles or patterns, one might infer that two years may be too short a period of time to deliver results for some individuals, particularly those who are basic scientists.
Again, the Anesthesia merit awards program provides a temporary financial incentive (monies to “purchase” protected academic time). The merit awards are expected, but only for a two-year period. Principal-agent models in standard economic theory predict that increasing incentives will result in higher performance. As Gneezy and Rustichini argue, “this prediction is a conclusion of a very basic assumption in economic theory: performance is positively related to effort, effort is unpleasant and money is good” (Gneezy & Rustichini, 2000a: 791). However, the chair stated that he did not wish to provide a bonus or financial incentive given the salary levels that physicians earn (a sentiment that was echoed by other chairs). This may be backed-up by theory. As indicated in Chapter 2, Pokorny and others point out that real effort and abstract effort choice experiments have “shown what psychologists have been claiming for some time, namely, that the introduction of incentives does not inevitably stimulate higher effort choices” (Pokorny 2006: 251). Pokorny does not argue that incentives don’t work, but like Contandriopoulos and Perroux (2013), she suggests that they will only increase outputs if the individual’s income level is below their “target income” or “reference income” level. Briefly, the reference point in behavioural economics refers to wage levels, with the idea being that people will be more willing to engage in risk-taking behaviours if their wage level is below the reference point, and will avert risk if their wage level is above the reference point. Once the reference level is achieved, no additional effort will be expended. Anesthesiologists in Toronto earn a high income, and the merit awards do not add to income (but instead, are intended to ensure protected time and effort). Thus, the merit awards may encourage greater risk-taking behaviours (and therefore, more creativity and innovation) because the income level is not threatened (or enhanced). Certainly, the mean payments per 1.0 FTE for Anesthesiologists (mean earnings) have increased by 85% from 1999/2000 to 2009/2010 (above the rate of inflation). In other words, providing a bonus or financial incentive to individuals who already earn a high income is unlikely to increase productivity beyond a certain level.
There is no evidence of reverse impact of the incentives. There is however evidence of paying for interesting or creative tasks (scholarly work, research). The wrong party may have been paid; the department pays practice plans for academic time which should be covered through the AFP agreements. This may constitute paying too much, or paying the wrong party. A limited-term, stipend-type arrangement between the university department and the academic physician, with a detailed contract and deliverables, may have garnered the same results. The academic physician need not be categorized as a university employee, but could remain an independent contractor. The stipend that is provided could be used by the academic physician to “purchase” academic time. The problem is that the practice plan would need to take on additional partners, associates or fellows to provide clinical coverage. This could impact on the income levels of the partners as the university department (and therefore, the academic physician) is not in a position to cover the actual value of the lost income (the value of which is much higher than any university salary). In this case, goal conflict between the objectives of the practice plan as a business partnership (to generate revenue) and the university (to produce academic deliverables) could become an issue.

Nonetheless, the transfer of funds to the practice plans seems necessary to engender goodwill and to ensure the provision of academic time. This reveals two issues. First, the contract is essentially between the university and the practice plan, not the academic physician, as the practice plan controls the allocation of academic time (perhaps the greatest factor contributing to academic productivity). Therefore, it’s an incomplete contract with low monitoring principles. Second, goal conflict may exist as one of the implicit goals of any business partnership (the practice plan) is to maximize income or profit. This goal may conflict with the mission of the university (i.e. to maximize academic/research performance and impact). These challenges are mitigated somewhat through the competitive nature of the merit awards program in that those sites that recruit scholars and encourage teaching and research are more likely to be successful in the merit awards competition.
Of note, the data sets available through Anesthesia show that some hospitals/practice plans have been more successful in securing merit awards over a ten-year period. The total number of faculty members at each site, with the exception of UHN-Women’s College, are roughly the same, but it should be noted that one practice plan covers four hospitals (three separate corporate entities) encompassing the UHN-Toronto General Hospital, the UHN-Toronto Western Hospital, Mount Sinai Hospital and Women’s College Hospital.

Thus, there are two major challenges that Anesthesia must grapple with. First, the distribution of academic physicians with a research program varies considerably from hospital-to-hospital. Ullberg notes that creative environments, those that balance the creative process of “new” with the productive process of “more”, tend to have strong research environments in terms of collegiality, communities of practice, trust, resources, and tolerance for failure. While anecdotal information is available, variances in the recruitment, retention and research-related practices of those hospitals are of interest.

The second issue, and this one applies to Surgery in Toronto as well, is that the AFP monies do not flow through the university. While the university is a party to the AFP contract, there appears to be only a limited ability to align incentives or accountability frameworks with the academic mission of the university. In Anesthesia, the university has no control over how the AFP funds are utilized in support of the academic mission (although they do have influence). Annual reports function as an accountability mechanism, but if productivity is low, or academic time is not provided per the goals of the merit awards program, there is very little recourse for the academic department. The amounts and source of teaching payments which are derived from the AFP in particular are unclear, making it very difficult for the principals (university, academic department) to monitor the performance of the agents (academic physicians).
Nonetheless, based on the data sets that were available, it appears that there may be a positive relationship between the competitive merit awards and the overall productivity and impact for those who were included in the sample.

**Department of Surgery**

As shown in Figure 5.1, the productivity and impact demonstrated by Surgery did not increase during the study period between 2006/07 and 2010/11.

Surgery implemented a group-focused compensation and academic assessment model that is based on an annual review system. The reviews of annual report data are completed internally, and result in “academic points” based on outputs. The annual review is not done by a peer-review committee (a subjective process), but is undertaken by division heads and other academic leaders. No quantitative metrics are included in the review process other than counts of outputs. To a degree, information is asymmetric between principals and agents; however, this may be mitigated somewhat by the fact that the reviews are undertaken by the division heads who have more knowledge of the faculty member’s contributions. Goal conflict between principals (the department) and agents (individual academic physicians) does not seem to be an issue in this department.

Surgery awards an annual bonus to everyone with the amounts varying based on the academic points that were awarded. The annual bonus is however small in comparison with income, ranging from 1-3% of gross income (based on the average general surgeon’s gross income, data derived from the CNPS). The total value of the system does however comprise a fairly significant percentage of the department’s budget. Here we have a clear example of a monetary incentive (a bonus) in recognition of merit as demonstrated by academic outputs. The funds are paid directly to the individuals, not the practice plans. The details on the bonuses that were awarded are not announced publically, but a confidential letter of congratulations is provided to the recipients. Thus,
the bonuses are not designed to stimulate intrinsic motivation, but really are a clear example of an external financial incentive.

The contract for Surgery’s academic points system is as follows: faculty members are given an academic position description linked to their job stream, and are required to submit an annual report for the assessment process. The annual monitoring requirements are simple, but the frequency and intensity is high. Tolerance for failure is also high; if faculty do not submit an annual report, they are not eligible for a bonus. If performance is low, they do not achieve a high bonus but will still get something except in rare circumstances (a mild punishment). If performance is very low, then the matter is addressed internally, but not through the assessment system.

From a theoretical perspective, I would suggest that there are several difficulties with Surgery’s system. First, the academic points system constitutes an incomplete contract. The expectations for performance are not clearly delineated, nor can they be. Surgery does not have an infinite budget to fund the academic points system, and so ratings ultimately must fit into a pool, similar to the compensation and assessment model implemented by the University of Alberta for tenure-stream, base-funded clinical faculty members. However, the presence of a financial incentive, the annual bonus for teaching or research, in essence modifies the terms of the contract by sending a signal (per Gneezy and Rustichini, 2000b). According to motivation crowding theory, the bonus signals that scholarly activities (teaching and research) are undesirable, and should be rewarded financially. This situation is further exacerbated by the fact that the bonuses are ongoing (they are not temporary incentives for specific undertakings), are expected, and have been offered for a long period of time. Withdrawing the bonus, small as it may be, could prove problematic for performance, satisfaction, motivation and the organizational culture of the department. There is no clear evidence of reverse impact of the incentives, but productivity and impact demonstrate a relative flat-line effect. Frey and Jejen argue that the “motivation crowding effect” shows that
raising monetary incentives reduces, rather than increases, supply (2001: 590). A reduction in performance is not seen, but we also don’t see significant increases either.

Second, if a bonus is to be offered – theoretically, to stimulate performance -- the amount should likely be more significant in comparison with gross income. As Pokorny (2006: 51) argues, the Surgery case study presents empirical data which shows that the “introduction of incentives does not inevitably stimulate higher effort choices”. Pokorný’s theory is however derived from a series of lab experiments which showed that incentives are only effective if the agent’s income level is below their reference level (the target income hypothesis). She concludes that one would be better to pay nothing at all than to pay a bonus that is too low in relation to the reference of target income.

Briefly, Contandriopoulos and Perroux also state that,

In economic theory, the target income hypothesis posits that people aim for a given level of income and will adjust their work practice to reach it... Rapid and steep increases in paid rates are thought to induce a strong diminution of work intensity than modest and steady increases. In the same way, it is commonly suggested that workers with incomes in the highest deciles are more likely to choose quality of life and additional leisure over income increases. Given those postulates, it is not surprising that physicians are often given as an example to illustrate this hypothesis. (Contandriopoulos and Perroux, 2013: 31)

Salary levels in Surgery are significant, and the bonuses are small. I don’t know if the surgeons included in this case study sample believe that they are paid at their reference level income, but the bonus in and of itself it not likely significant enough to induce higher productivity.

The fundamental challenge in both Surgery and Anesthesia is that the funding provided by the university department comprises only one piece of the total compensation package. Academic productivity is one part of the productivity piece. The principal-agent dilemma here, as stated in Chapter 1, is that there may be “too many cooks in the kitchen”. It is not a simple matter of a contract between an employer (the university) and an employee (the academic physician). Instead, it is multiple agreements, multiple principals and multiple stakeholders, each with competing interests. Academic physicians occupy multiple roles (clinician, researcher, teacher and
and their total compensation is derived from multiple sources through the organization of contemporary AHSCs or “principals” all of whom have an interest in their performance as agents (government, hospitals, universities, clinical departments, practice plans, medical associations, granting agencies and research institutes). They are also accountable to multiple stakeholders including patients, policymakers, the public, other health care professionals, academic, the media. Thus, the challenge is aligning incentives with the mission of the university. Surgery is currently reconsidering the group-level bonus in favor of moving towards a more competitive model. In an optimum state, any funding or incentives provided via the department’s university operating budget should be aligned with funds from other sources, such as the AFP, which can then be used to construct a more complete “contract”.

Department of Pediatrics

The highest rate of growth, productivity and impact (the total K-MAAP© points) was demonstrated by Pediatrics, as depicted in Figure 5.1. Between 2006/07 and 2007/08, growth of 1.79% was realized, 20.39% from 2007/08 to 2008/09, 8.89% from 2008/09 to 2009/10, with a decline of -5.19% from 2009/10 to 2010/11.

Pediatrics is on an academic comprehensive AFP (clinical and academic deliverables). Through the Career Development and Compensation Program (CDCP), the department offers career and professional development, educational funding, mentorship, compensation which consists of a base salary, regular increases to the base salary based on merit plus an annual financial bonus based on merit, benefits, and triennial assessments based on internal peer-review. The university department, the clinical department and the practice plan are fully integrated with one chair/chief as the head. The hospital is internationally renowned, and provides an environmental that is highly conducive to research. The program is a hybrid model which incorporates both individual and group-level items (e.g., a salary grid which all academic physicians in the department are expected to
progress through). The value of the bonus is significant in comparison with gross income. Both clinical and academic activities are monitored closely (high intensity, frequent monitoring). For academic activities, the internal peer review process focuses on subjective assessments (no quantitative metrics are included).

The principal-agent relationships are less complicated in Pediatrics. The clinical and academic departments are fully integrated with a shared mission, comprehensive funding, and thus, fewer principals involved. As a result, goal conflict is less apparent. The provincial government has implemented a contract which explicates the clinical deliverables that are monitored through a shadow billing arrangement as well as an academic component. Because the activities take place within one hospital, the Research Institute also does not compete with the university department, but rather, helps integrate the research mission across the unit. The principal-agent dilemma is still present, it’s just not as acute as in Anesthesia and Surgery where it is less clear if the agents (academic physicians, practice plans) are able to make too many decisions which ultimately impact on the principal (the university).

The design of the contract that Pediatrics holds with their academic physicians is also clear. As indicated, the contract includes full details on clinical and academic deliverables articulated through position descriptions. As noted above, the CDCP delineates a salary grid, expected movements along the grid, and the assessment model that will be used. The informativeness principle (clear delineation of performance expectations and salary grids) and equal compensation principle (the salary and bonus grids apply to everyone) are embedded within the compensation and assessment models. Again, the monitoring principle is high and frequent. Internal peer review, done via the triennial review process, may act as a prime or stimulus to induce higher performance signaling both expectations and rewards.
The Pediatrics model is designed to offer both external monetary rewards (extrinsic motivation) plus recognition and clear signals on expectations and outcomes designed to stimulate intrinsic motivation. Certainly, there is no evidence of the reverse impact of incentives; quite the contrary, money and the organization of the department contributes to an increase in productivity (shown in Figure 5.1). Paying for interesting, creative tasks (academic work) doesn’t seem to be a problem given the productivity levels. Paying the wrong party is not an issue as the academic physicians are paid directly. There is a good degree of tolerance for failure embedded within the program (faculty are given multiple opportunities and resources to improve low performance), but there are punishments too. Unlike Internal Medicine, Pediatrics will ask low-performing faculty to move on to another institution. Ederer and Manso conducted a study which sought to reconcile the contrasting views in economics (principal-agent theory) with research in psychology on the effects of performance-based-compensation; the study concluded that a combination of tolerance for early failure and rewards for long-term success are effective in motivating innovation (Ederer & Manso 2012).

Based on the theoretical lens that was applied to the case studies, there are a few challenges in Pediatrics that were evident. First, while the bonuses are substantial in relation to gross income, they are ongoing, and according to the chair, expected. Benabou and Tirole argue, The tension between short-term and long-term effects on motivation of offering a reward also suggests the following idea: Once a reward is offered, it will be required – and “expected” – every time the task has been performed again – perhaps even in increasing amounts. In other words, through their effect on self-confidence, rewards have a “ratchet effect” (Benabou & Tirole, 2003: 503)

Academic physicians in Pediatrics may view the annual bonus as a part of the compensation package as opposed to recognition of high performance. If that’s the case, then the monetary incentive may be perceived as insurance that the agent’s target income is met as opposed to actually incentivizing performance. Second, one must question if the bonus could send a signal about the desirability of
academic work over time, similar to Surgery. However, the bonus in Pediatrics is not focused exclusively on academic outputs, but is based on total performance across clinical activities, teaching, research and administration (**i.e.**, the “joint product”). Finally, the performance assessment model has not been changed in several years, and therefore, could be open to “gaming” of the system. For example, academic physicians may focus on those items known to increase their performance rating (**e.g.**, large volumes of low-impact publications, or publishing the same article with minor revisions, multiple times, in multiple journals) as opposed to original, creative, but more labour-intensive publications. Additionally, Akl *et al* note that “faculty might assume that the item not being evaluated is unimportant”, because “faculty game the system, intentionally or not” to score high in the productivity assessment piece. These authors note the unintended impact:

“Clinical care or teaching are two areas vulnerable to such effects. Appropriate and validated measurement tools as well as an adequate culture are needed to help avoid these situations. (Akl *et al*, 2012: E608)

Certainly, the assessment model is based on peer review, and therefore, I would recommend adding quantitative elements to supplement the review process. The Department of Pediatrics uses a comprehensive academic AFP to build a strong organizational culture which includes clear career pathways, mentorship programs, clear contracts, supportive leadership, feedback mechanisms and loops, recognition, and a progress-through-the-ranks approach. Further, Pediatrics and the hospital more generally provide a strong research environment including collegiality, communities of practice, trust, interdisciplinarity, and a good deal of tolerance (and remediation) for failure. Following Daniel Pink though, the chair indicated that he believes that ultimately, academic physicians are motivated by autonomy, mastery and a sense of purpose (Pink 2009). Certainly, the system which Pediatrics has implemented seems to act on both intrinsic and extrinsic motivation.
In figure 5.1, Internal Medicine demonstrated increased group-level outputs over a two-year period between 2006/07 and 2007/08 (growth was almost 52%), a decrease of -15.51% from 2007/08 to 2008/2009, and then relative stability to 2010/11. Of note, the increased productivity was driven mostly by invited lectures. The volume of K-MAAP© points were lower than in Anesthesia, Pediatrics and Surgery (where the sample size was 40), but the sample size for Internal Medicine was 30.

Internal Medicine shares many of the same features as Pediatrics. The chair is also the clinical chief. As indicated in Chapter 6, he manages university funds, AFP monies that flow via the university department, the practice plan clinical revenues from fee-for-service billings, revenues from the clinical services programs within the regional health system, and a tithe that is levied against the practice plans earnings and redirected to academic undertakings. Here is where Internal Medicine diverges from Pediatrics and Surgery: Internal Medicine does not offer any type of financial bonus based on academic or clinical performance. Salary increases are however offered (a financial incentive), as well as performance-based adjustments to protected academic time. Similar to Pediatrics, Internal Medicine has implemented a hybrid model to compensate and assess academic physicians. All 197 GFT faculty members participate in the triennial research performance and assessment program. The monitoring frequency and intensity is high and frequent. No quantitative metrics are included in the research assessments, and thus, they are subjective.

It should be highlighted that the tolerance for failure is high and punishments are low. Individuals are given a fairly long period of time to perform well as a Clinician Scientist or Clinician Investigator, but if they don’t perform well, they are moved into another job stream (e.g., Clinician or Clinician Teacher). In this way, adverse selection in Internal Medicine is not an expensive issue as it may be in Pediatrics, especially given the recruitment and retention issues previously faced in
Manitoba. In the short-term, adverse selection of Clinician Scientists or Clinician Investigators may however lower academic productivity. The chair has however implemented the “return of service” program to fund additional training for potential faculty, and this may facilitate higher productivity in the long-run. Azoulay et al found that those researchers (biologists) whose funding model encourages risk and tolerates initial research failures will produce more highly influential papers than those researchers whose funding is dependent on meeting closely defined, short-term research targets (Azoulay et al, 2010). In the long-run, this may increase both productivity, and also creativity, quality and the impact of scholarly activities.

The principal-agent dilemma is also less complicated in Internal Medicine than it is in Anesthesia or Surgery. Because the clinical and academic departments are completely integrated, there are fewer principals involved. The department is situated in a hospital where much of the clinical activities take place, though not all. The interview results indicated no issues amongst the hospitals or the Winnipeg Regional Health Authority. Thus, goal conflict, while present to some degree, seems to be less apparent than in institutions where faculty are distributed across multiple hospitals, research institutes, or campus-based research units.

Internal Medicine’s contract is comprised of a practice plan-type agreement, an academic letter of offer (from the university) and a position description. As no financial bonus is offered, there is no evidence of possible reverse impact of incentives (this would require further research), nor is there evidence of paying too much or paying too little for interesting tasks. Paying the wrong party is not an issue as the salary goes to the academic physician. The peer review and recognition event may serve as a prime to motivate performance.

For Internal Medicine, we also had access to several data sets that were not available for the other case studies. These included the research salary and the amount of protected academic time versus clinical time for the period 2006/07 to 2010/11. By using the K-MAAP©, the return on cost
was calculated for each faculty member (outputs per $) as well as efficiency ratings (K-MAAP© efficiency scores) and the research productivity-replacement value (RP-RV). Efficiency is based on three elements: clarity, measurement and accountability. Here, the research outputs, impact and effort could be directly connected to the research salary and protected academic time that was provided. The calculations showed large variances in productivity and return on cost begging questions on the optimal allocation of limited resources. For example, the return on cost for PI # 126 was $9,572 per K-MAAP© point between 2006/07 and 2010/11, but the return on cost for PI # 146 was just $619. Protected time is a precious resource in academic medicine, and so Figure 6.6 (reproduced here) shows what could happen if the academic time allocated to PI #126 was reallocated to PI # 146:

This reveals three theoretical questions: First, if protected academic time were in fact reallocated (research productivity-replacement value), would overall, group-level productivity increase? Is it possible that although the productivity and efficiency of PI # 126 is low, their scholarly activities might increase and be more innovative if a longer tolerance for failure was introduced per Azoulay’s
research? Second, how might group-level productivity be impacted if an additional financial incentive were introduced? In Surgery, the empirical data shows a small financial incentive was offered to everyone in the department, but overall productivity/impact did not increase during the five-year study period. In Pediatrics however, we have empirical information which demonstrates that the combination of a base salary, salary increases, a performance-based bonus that is more substantial in comparison with gross income, recognition and a supportive organizational culture increased productivity over the five-year study period. Pediatrics also has higher levels of productivity (total K-MAAP© points) than Anesthesia, Surgery or Internal Medicine.

Some might argue that calculating return on cost is antithetical to an academic environment in which creativity, autonomy and intellectual freedom are paramount. But understanding the return on cost could motivate performance (for those individuals who thrive on competition), and facilitate accountability. Miller et al state,

Increased transparency in the sources and uses of funds will facilitate accountability. Within each unit, the financial and academic contributions of each faculty member can be calculated, and the medical school can set appropriate annual expectations for each. Such policies can be a powerful lever for changing the culture of a medical school, transforming it into an institution that embraces productivity without sacrificing academic freedom. (Miller et al, 2012: 1749)

While “financial contributions” typically refers to grant funding, graduate students and other revenues, I would suggest that the return on cost and efficiency calculations also provide information and transparency on costs.

As is the case in Anesthesia, Pediatrics and Surgery, the current assessment model is based on peer review, and therefore, it recommended that quantitative elements be added to the review process. Internal Medicine has also sought to build a strong organizational culture which values research, provides a clear contract (though it can be renegotiated based on performance), supportive leadership, feedback mechanisms and recognition. The elimination of tenure within the department has likely strengthened the sense of equity, transparency and collegiality in the
department. A progress-through-the ranks pathway is not clearly delineated, but could be.

Mentorship programs are also under development as well as the initiative to develop a “pipeline” of potential academic physicians through the return-of-service program.

The chair indicated that he does not believe in the value of a bonus, however, based on my research findings, a portion of the clinical tithe could be used to introduce a “bonus” which could be used to grow research programs further. The “bonus” could be used to fund research supports that are tied to specific goals and the broader research mission (e.g., graduate students, research associates, seek additional training or visiting professorships, etc.). The monies need not be paid to individual as a form of compensation. In this way, the department could attempt to stimulate both intrinsic motivation (through recognition) but also create an environment which recruits and retains researchers.

**University of Alberta**

This case study explored the following research question: How does the University of Alberta compensate and assess academic physicians? As noted previously, quantitative data to analyze productivity and impact was not provided by the institution. However, the qualitative interviews did provide rich information to understand the challenges that this institution faces.

First, the principal-agent relationships are very complicated in the Faculty of Medicine and Dentistry at the University of Alberta. As is the case with academic physicians across Canada, they serve both the health and education sectors, and function as clinicians, researchers, teachers and administrators. Multiple principals and stakeholders are involved, but the principal-agent dilemma may be intensified by the continuous change in the organization of the health system, the personnel turnover in the various health sectors and turnover in senior leadership and personnel in the Faculty of Medicine and Dentistry. The issues felt in other AHSCs may be aggravated in Alberta by the presence of a faculty union. While the unit may not comprise a union per se, academic leaders did
refer to “the union” and its impact on how issues are dealt with internally. At the University of Toronto, clinical faculty members are not part of a faculty association or union, but are governed by a policy on clinical faculty. In Manitoba, tenure was removed in Internal Medicine, and the academic physicians are not parties to a collective agreement. The challenge is two-fold: First, not all clinical faculty members in Alberta are members of the collective bargaining unit. Second, the union is in essence another principal which might compromise the loyalty of the academic physician to the other principals. Faculty associations are meant to promote the interests of faculty members, and uphold principles such as equal compensation, academic and intellectual freedom, and fraternity amongst its members. I would suggest that it is difficult to reconcile the interests of a faculty member in Arts and Science with those of a physician in the Faculty of Medicine and Dentistry.

Second, the compensation and assessment models are not universally applied in the Faculty of Medicine and Dentistry. There are multiple categories and sub-categories of academic appointments, multiple funding sources that are linked to those categories of academic appointments, and thus, variability in how the compensation and assessment models are enacted. The most significant difference is that tenure-stream base-funded academic physicians are assessed annually and are then awarded a base salary increase based on the performance rating that was achieved. However, those who are not funded through the operating base are still assessed, but are not eligible for a base salary increase or a bonus of any sort. Here, the implicit expectation is that an external incentive (merit-based salary increase) will increase satisfaction or productivity – for some.

As noted, a central tenet of classical economic theory is that incentives stimulate effort and performance. An incentive may reinforce expected behaviours. Again, those who are eligible for a base salary increase are also part of a province-wide collective bargaining unit for all tenure-stream faculty (not just clinical faculty). In many universities, staff members are also members of collective bargaining units which have negotiated salary increases. In other institutions, and unless legislated
otherwise, staff that are not part of that collective bargaining agreement are usually given a salary increase too. Offering some faculty in a department, but not others, a salary increase based on performance seems divisive and counter-productive. The incentive may act as positive reinforcement for some faculty (i.e., those who are given a salary increase and are motivated by external incentives) but that same salary increase might also work as negative reinforcement for other faculty in the same department thereby decreasing effort or productivity (i.e., those faculty who did not receive a salary increase, and who are supposed to be intrinsically motivated). The result is a false incentive – a salary increase has been signaled to some faculty as an external financial incentive designed to stimulate extrinsic motivation but for other faculty, within the same department, there is no salary increase, only recognition. Recognition, I would argue, appears to have been designed to strengthen intrinsic motivation. Thus, we have additional variations in how academic physicians are expected to be motivated and no data to back-up the efficacy of either model.

Third, the academic leaders who were interviewed for this case study expressed several concerns about the financial aspect of offering a base salary increase to tenure-stream faculty, particularly if those costs are passed down to the departments. Two of the chairs suggested that the base salary increase be converted to a one-time-only bonus. There are of course challenges to implementing this given the collective bargaining agreement which is in place, but following Benabou and Tirole, I would posit that the “hidden costs” are perhaps more serious than the financial issues. If a bonus were to be implemented, particularly if it is meant to incentivize performance, it should be offered equitably. Here a number of issues are present according to behavioural economic theory: expected incentives (for some but not others), ongoing incentives (for some but not others), financial incentives as a prime (for some but not others), false incentives (for some but not others) and incentives that may be viewed as punishments by some. In terms of the
contract design, the equal compensation principle has been negated; this principle suggests that activities that are equally valued by the principal should be equally valuable in terms of compensation.

The fourth challenge is that the several of the academic leaders noted that the performance ratings that are given through the assessment process are not entirely reflective of performance in that they are often modified by the Faculty Evaluation Committee (FEC) to keep the ratings in line with an average rating that was pre-determined for the assessment cycle. The average rating coincides with the pool of funds available to fund the salary increases. This creates a degree of inequity in competition, but also serves as another false incentive. If the motivation of an individual academic physician is highly sensitive to a monetary incentive, and they are aware of their performance in relation to their peers, having the rating reduced to fit in with a pool of funds could be frustrating or demotivating. In this way, the incentive of a base salary increase is false, and has likely created hidden costs. Further, because the ratings are often lowered, intrinsic motivation may be affected too.

Fifth, some departments/faculty members in Alberta are funded through an Academic Alternative Relationship Plan (A-ARP) but other departments are not. In one department, neurosurgeons are on an A-ARP, but none of the other surgeons are. Those who are not on an A-ARP are paid through a fee-for-service (piece rate) clinical payment model through the provincial ministry of health. The perception amongst those who were interviewed is that the presence of an A-ARP for some, but not others, creates a feeling of “haves and have not’s”. Those departments that are on an A-ARP have the resources and model available to implement a more comprehensive and less complicated organizational structure within their unit. Ultimately, this impacts on performance, productivity, impact and the organizational culture. I don’t presume to offer any solutions here,
however, this issue, as well as the multiple types of academic appointments linked to different funding streams, underpinned many of the comments that were received during the interviews.

Despite the fact that clinical salaries are higher in Alberta than in other Canadian provinces, these issues combined with a weak economy, decreased research funding sources and a changing health system model, could impact on recruitment and retention issues for academic medicine in Alberta. It should also be noted that the three chairs who were interviewed for the case study had all contacted me directly after the phase 1 national survey was launched to offer to participate in an interview.

**Discussion and Implications**

In undertaking this research, I wished to understand the efficacy of the various models that are used to compensate and assess academic physicians, as well as the goals or theory that underpin those models. Certainly, I had a few expectations as to what the research might reveal; I expected that little empirical research, evaluations or evidence on the efficacy of the models that are used exists, and that the goals of the clinical academic departments, in many cases, are poorly integrated or aligned with the goals of the hospital, practice plan, or even the medical school. I believed that complexities would be revealed, for example, in the funding models that are used. This turned out to be the case.

A few things were however uncovered that were unanticipated. First, I knew that a method to compare the outputs of departments was required, and that nothing currently exists that would work well for these case studies. I did not however anticipate both the controversy, and the interest, that the K-MAAP© would generate. In developing the K-MAAP© typology, my goal was not to explicate which system is “best” or who “won”. But I did hope to create an “architecture of choices” by linking empirical data as well as information from the qualitative interviews to the compensation and assessment models that have been used with some conviction on the part of the leaders and
departments who enacted those models. However, the results produced by the departmental K-MAAP© analyses were surprising; while I questioned the value of offering a small, group-level bonus to all faculty in a department, I also did not anticipate that the productivity of those who were included in the Surgery sample would demonstrate such little variation between 2006/07 and 2010/11. Certainly, indices such as the K-MAAP© might not stimulate or account for creativity, innovation, new ways of thinking or motivation. But, productivity indices are a trend in higher education and academic medicine that are here to stay.

Second, a phenomenon was observed that cannot be explained by existing theoretical models in standard or behavioural economics. Several of the chairs stated that they did not believe that financial incentives motivate physicians. Rather, they stated that academic physicians are motivated intrinsically, by the research process, the thrill of discovery, learning new things. Others stated that recognition motivates academics (presumably, by stimulating intrinsic motivation). But, these same individuals also lamented during the interviews that they “have to” provide a financial incentive or bonus. This was particularly the case in those departments/institutions where the bonuses have been in place for some time and are expected. This struck me as unusual; if an employer believes that a bonus doesn’t motivate employees, would they continue to offer the bonus? If the fiscal environment was constrained, would they continue to offer a bonus? Not likely. What are the factors then that appear to drive the choices made by academic leaders? Three models were developed to visually simulate the decision-making choices that were made. Figure 10.1 demonstrates models 1 and 2:
Here, two possible pathways or choices are illustrated: In Model 1, the academic leader believes that academic physicians are intrinsically motivated. They provide some form of recognition which is believed will facilitate satisfaction, performance and productivity. This would apply to Internal Medicine, although salary increases are also provided. In Model 2 though, the leader believes that academic physicians are extrinsically motivated, by external monetary incentives. A financial incentive (bonus, salary increase) is provided based on the theory that this will facilitate satisfaction, performance and productivity (the hoped for outcomes). Model 2 would be consistent with the practice in Pediatrics.

Model 3 (Figure 10.2) depicts a practice that was revealed during the interviews, which I have tentatively called a “placebo incentive”. The notion here is that academic leaders believe that academic physicians are intrinsically motivated, however, they offer a financial incentive (which is intended to act on extrinsic motivation). Perhaps more interestingly, the “placebo incentive” is offered to engender goodwill, cooperation and solidify the willingness to teach. In other cases, the
financial incentive (e.g., a bonus) is provided because it’s always been provided. Figure 10.2 depicts
the choices that are made by leaders:

**FIGURE 10.2: PLACEBO INCENTIVES FOR ACADEMIC PHYSICIANS**

In this model, the rationale for providing the bonus seems focused on fostering cooperation,
goodwill or a willingness to continue to engage in academic activities. It was almost as if the
academic leaders “kind of have to” continue to offer it.

The idea of providing a bonus to incentivize or recognize performance is based on standard
economic theory, not behavioural economics or other cognitive theories of motivation such as social
cognitive theories; affective approaches; attribution theory; self-regulation; goal theory; or interest
models and flow theory, to name a few. I would also suggest that the notion of providing a financial
incentive follows a “carrots and sticks” (reward and punishment theory) type approach to
motivation. As noted previously, two of the central tenets of standard economic theory are as
follows: 1. Agents respond to incentives; and, 2. Policymakers and/or leaders believe that incentives
can change the behaviour of agents. This represents a model whereby principals (academic leaders)
believe that financial incentives will not change the behaviour of agents. Yet, a “carrot” is offered despite the fact that the carrot is not perceived to be needed.

The leader’s motivation for offering the incentive could be more closely related to leadership challenges, cultural issues in the department or institution, or lack of time to try something new. In medicine, a placebo is defined as a “substance having no pharmacological effect but given merely to satisfy a patient who supposes it to be medicine”. A placebo incentive is a motivational and performance-related tool employed by academic leaders even though they don’t think it will actually work on motivation or enhance performance. A placebo incentive is not the same as attempting to stimulate both intrinsic and extrinsic motivation; this was done quite skillfully by Pediatrics who understood that motivation fits along a continuum where the price effect dominates one end, and intrinsic motivation dominates the other end of the continuum. To say that academic physicians, or employees, are motivated by the price effect OR are intrinsically motivated is an overly simplistic representation of motivation. No, a placebo incentive is the act of offering an incentive despite the fact that it is not believed to work on motivation. The challenge here is that the placebo being offered might in fact have a negative effect on the cognitive or social aspects of motivation. Traditional rewards don’t always work the way we think.

**Chapter Summary**

Chapter 10 presented a summary of the theoretical considerations which supported the research questions explored in this dissertation were discussed and then charted, and presented in a tabular form (Table 10.2). Table 10.2 highlighted key constructs from standard economic theory, contract theory and behavioural economic theory, linking those theoretical considerations to the features and results of each of the case studies. The research questions for each case study were then presented, discussed, analyzed and discussed in the order that they were presented in this dissertation; of note, no one theory can wholly explain the results of the case studies. Finally, the
features of a new type of incentive that emerged during this study – called a “placebo incentive”
were described and modeled (Figure 10.2).
Chapter Eleven: Analytical Conclusion

Overview

This dissertation used a mixed methods, emergent, flexible research methodology, combined with a behavioural economics theoretical approach blended with elements of economic, incentives and contract theory, to understand the efficacy of the models that are used by three institutions, three provinces, and four clinical academic departments to compensate and assess academic physicians. The national survey and case studies confirmed several key issues, including: the complexity of the methods used to fund Academic Health Science Centres in Canada and the United States (Howard 2013, Ludmerer 2002, Miller et al 2012, Smith 2002); the lack of integration and alignment of systems-levels goals and needs in AHSCs (Bernstein 2002, Lozon & Fox 2002, Schneller 2002); problems involved in evaluating and measuring “efficacy” and academic productivity (Bornmann 2011, Diem & Wolter 2013, Edward 2011, Lee et al 2013); varying and diverse compensation models (with little previous evidence or research to support their use); reported rising health care and physician compensation costs (CIHI 2012, ICES 2012); the questionable ability of some AFPs or ARPs to effectively ameliorate recruitment, retention and productivity issues in academic medicine; and, the popularity and impact of “metrics, measures and grades” (institutional rankings, bibliometrics, professors rankings) in the higher education sector. This dissertation also paid a good deal of attention to leadership challenges and the issue of “too many cooks in the kitchen”: multiple principals, multiple stakeholders and agents (academic physicians) to whom the conventional faculty compensation, assessment, engagement and organizational commitment models and theories in higher education often do not apply.

It is important to highlight that the issues in academic medicine are situated within a broader discourse on productivity, efficiency and assessment. Indeed, this discourse signals a
fundamental shift in the socioeconomic and political environment within which academic medicine
and higher education more generally, are situated (Kitchener 2002, Smeenk et al 2009, van den
Brink et al 2013). Beginning in the 1980s and 1990s in Canada (and prior to that in the United
States), the new public management or “market managerialism” began to emerge. Managerialism is
defined by Smeenk et al (2009) “as the trend of adopting organizational characteristics, such as
organizational forms, technologies, management instruments and values that originate from the
private sector organizations” (Smeenk et al, 2009: 591). Kitchener notes that market managerialism
is a “way to ‘get more for less’ from public services” (Kitchener 2002: 392 quoting Hood, 1991).
Fueled by neoliberal ideologies on the need to achieve greater accountability, fiscal responsibility,
quality, productivity, competitiveness and efficiency, management-oriented systems including
performance assessment tools and compensation models were implemented with little evidence of
their efficacy, or even basic research (Eijenkaar 2012, Akl et al 2012). Models such as pay-for-
performance were based on business models and were taken-up as “logical” and “rational” (Jones et

This dissertation has provided empirical information on the relationship between
compensation and assessment models, financial incentives, and academic productivity, performance
and impact. A new and emerging theory, behavioural economics, allowed me to link theories on
motivation, incentives and performance to actual practices and the perspectives of academic
leaders. In Pediatrics at the University of Toronto, group-level academic productivity seemed to
respond to the combination of a base salary, financial incentive (significant, ongoing annual bonus),
intense monitoring principles (assessments), peer review, career development and progression,
mentorship programs and recognition, demonstrating average growth of 6.47% per year over five
years. We see similar results in Internal Medicine at the University of Manitoba with average growth
of 11.2% per year, although the sample size was smaller and the volumes of outputs were lower.
Both departments enjoy an integrated organizational form (leadership, funding structure, clinical and academic activities), and have utilized hybrid models to compensate and assess academic physicians. In Anesthesia, productivity has also increased significantly, but in Surgery, productivity did not increase. In both Anesthesia and Surgery, the organizational form is loosely coupled under the University of Toronto umbrella and there is a high degree of professional autonomy and control (exercised via the practice plans).

This dissertation has provided information on the methods used by several departments and institutions across Canada to compensate, assess and motivate academic physicians. The phase 1 national survey revealed the types of compensation and assessment paradigms which are most frequently employed by departments of Anesthesia, Internal Medicine, Pediatrics and Surgery. The survey provided a useful and analytically accessible repository of data as well as a template for a broader investigation of all clinical medicine departments, informing the methodology used for the case studies.

But the fundamental challenge is as follows: the phase 2 case studies provider deeper details on the types of models that are used, and their potential efficacy. We also know that an academic comprehensive Alternative Funding Plan (clinical and academic deliverables) appears to facilitate academic productivity, performance and impact – as well as recruitment and retention – of academic physicians within an elite, globally recognized, hospital and university. Indeed, the Department of Pediatrics (University of Toronto) case study provides empirical evidence of increased productivity, high impact and no recruitment and retention issues between 2006/07 and 2010/11 (see Chapter 5). Their hybrid system is founded on the notion that significant monetary incentives (in comparison with gross income) are logical and “work”, that recognition is important, high monitoring via triennial assessments are key, that paying for interesting or creative tasks will not quash intrinsic motivation and that punishments (e.g., lower bonuses, performance
management) are beneficial. Here, the triennial peer assessments may serve as a prime, and when combined with career development, mentorship, resources and protected academic time, may act as a significant means to facilitate professional autonomy, a sense of purpose, and motivation.

Why then is there a challenge? One of the issues is that very few departments are funded through academic comprehensive AFPs at this time, either in Ontario, Alberta, Manitoba or other Canadian provinces. At the University of Alberta, those who were interviewed for this dissertation emphasized the issues involved when some departments are on this type of AFP or ARP while others are not. In Alberta, many of the issues revealed during the interviews were tied to the various funding sources to compensate academic physicians, the varied types of academic appointments linked to those funding sources, the persistent systems-level changes, and the conflict, cultural, and identity challenges that resulted. The university’s assessment model, and merit-based salary increases for some faculty but not others, created additional tensions (see Chapter 7). The University of Toronto’s appointment structure is more streamlined and there are no tenure-stream (GFT) positions for clinical faculty (physicians). The departmental operating budgets are small, the AFP funds flow to the practice plans, and because of the number of hospitals, the number of full-time academic physicians, and low integration between the clinical and academic funding models for all departments except for Pediatrics, the options available to the university to compensate academic physicians, and therefore, influence or stimulate academic productivity, are very limited.

Certainly, this dissertation has provided information that the type of funding model can either increase or neutralize academic leaders’ ability to facilitate academic productivity, performance and impact. We found that funding models may contribute to productivity, but we also heard that academic funds should be seen as emanating through the university too.

The other issues relate to how academic physicians are organized into practice plans at many Academic Health Science Centres. Practice plans, as they are currently constituted, support
the academic mission via clinical revenues (this dissertation, Cohen et al 2003, Barzansky & Kenagy 2010, Ludmerer 2002, Miller et al 2012), undertake most of the clinical training of current and future medical professionals along the continuum of medical education, and provide resources, supports and protected academic time in support of the research mission. Certainly, practice plans ensure the autonomy and independent status of academic physicians as professionals, and act as principals (not agents). This dissertation has however provided information on issues related to the alignment of clinical and academic revenues, as well as the mission-related challenges involved when multiple principals exercise control over academic results.

Contributions of this Dissertation: Empirical, Methodological and Theoretical

This dissertation has contributed to knowledge in three ways: empirical, methodological and theoretical. First, this dissertation added to the existing, but sparse body of literature, and provided new empirical knowledge on compensation and assessment models for academic physicians. The phase 1 national survey of academic leaders on compensation, assessment, recruitment and retention models achieved a 61% response rate (39 respondents), and provided information to inform the phase 2 research methods. The phase 2 case studies provided rich quantitative data on the academic outputs, productivity, efficiency, impact of the 150 academic physicians included in the University of Toronto and University of Manitoba case studies over the five-year study period between 2006/07 and 2010/11 (Chapters 5 and 6). Qualitative data were gleaned from the interviews of academic leaders at those universities, as well as the University of Alberta, as reported on in Chapters 7 and 8.

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70 The American Association of Medical Colleges (AAMC) conducts an annual survey of member colleges on compensation models. The Association of Faculties of Medicine Canada (AFMC), currently does not run such a survey. The Canadian National Physician Survey includes very little data on compensation and assessment annually, and even less on academic medicine.
Second, the K-MAAP© constitutes a novel bibliometric and quantitative research methodology. Developed for this dissertation, the K-MAAP© assesses academic productivity, patterns of productivity, outputs and impact, efficiency ratings, research investment and return on cost for academic outputs over a given period of time. While the K-MAAP© was used to assess peer-review publications, grants and invited lectures in this dissertation, it is a customizable tool which could incorporate other data sets (perhaps those that are aligned with the mission and strategy of the organization). The K-MAAP© also has predictive potential though this was tested on a small sample. None of the bibliometric tools or metrics that are currently available to academic leaders or policymakers have the capacity to do this; the problems with current bibliometric tools were briefly highlighted in Chapters 2 and 3 (Mezrich et al 2007, Webber 2011, Reich et al 2008, Akl et al 2012, Toutkoushian & Webber 2011, Diem & Wolter, 2013, van Raan 1996, van Leeuwen 2003 and 2008).

Third, this dissertation used a behavioural economics approach to link data on real-life choices gleaned through the case studies (peer review rankings, compensation schemes, incentives) to models which showed the impact of those choices (the K-MAAP© methodology and assessments) in terms of productivity, impact and efficiency. Behavioural economics is an emergent approach that seeks to reconcile the gap between standard economic theories and cognitive theories by showing how people actually do behave – not just how they are supposed to behave based on theory. The main limitation of behavioural economics is that the use of “nudges” or recognition to encourage intrinsic motivation may produce a net effect that is no different than the bonuses or incentives utilized to stimulate extrinsic motivation in standard economic theory. Behavioural economics alone cannot explain the results of the case studies, but blended with standard economic approaches, a more fulsome picture emerges.

As noted, the higher education sector, including academic medicine, has seen a significant shift to logical, rational, business-like models designed to encourage productivity, efficiency,
performance and competition. Herein lies another challenge that was identified: most of the academic leaders who were interviewed for this dissertation believe that academic physicians do not require a monetary incentive in recognition of performance, as they are mostly, intrinsically motivated. Nonetheless, many of them offer a financial incentive or bonus, termed a “placebo incentive” in this dissertation (see Figures 10.1 and 10.2). AFPs and ARPs were implemented as a rational, strategic response to an identified problem in academic medicine: traditional FFS may have stimulated productivity and efficiency in health care, but income loss led to recruitment, retention and productivity issues in academic medicine. Again, the comprehensive, integrated funding, organizational and leadership models implemented by Pediatrics at the University of Toronto, under the auspices of an academic comprehensive AFP, has seemingly mitigated many of the usual barriers to productivity, resource allocation, policy development, leadership, compensation and assessment in academic medicine. This system includes a monetary incentive. Perhaps it’s time to acknowledge that an external incentive, assuming that the target income has indeed been reached, might help stimulate performance. It should be emphasized that issues related to the compensation and assessment of high-paid, autonomous professionals, such as academic physicians, have not yet been widely studied. This highlights another way that this dissertation has made a theoretical contribution, but also points to a future area for research, policy and theory-building.

Thus, this dissertation has contributed on empirical, methodological and theoretical levels. This information is important for policy makers, AHSCs, hospitals, physician associations, practice plans and academic leaders as they seek research addressed at understanding the efficacy of the models used to compensate, assess and incentivize academic physicians (extrinsic motivation), versus recognition and engagement (intrinsic motivation) to reward scholarly tasks that are inherently interesting, creative and innovative.
Policy Implications

In the management classic, “My Iceberg is Melting”, John Kotter and Holger Rathgeber (2006) posit that the first step in any change management process is the creation of a sense of urgency. In 2012 in Ontario, the government negotiated a five percent cut from physicians’ compensation (to billings submitted), but the savings were not as significant as needed and physicians have been without a contract since March of 2014. In Alberta, the current government has also looked at physician compensation as a way to control rising health care costs; Sarah Hoffmann, the Minister of Health has been directed to reduce health spending increases to an annual increase of 2% or less to 2018 with a focus on hospitals, drugs and physician compensation. This is down from an annual increase of 5.9% per year, for the past 15 years. The president of the Alberta Medical Association (AMA) has indicated that concerns that “the province’s attempt to contain costs could translate into a hardline in future contract talks”71.

The Canadian Medical Association (CMA) has also become involved in the debate. On March 2016, the CEO of the CMA, Tim Smith, formally apologized to its members for a “controversial” blog post entitled “Medical Professionalism Matters to Me” by Dr. Louis Hugo Francescutti, former President of the CMA72. The blog post was also deleted. Dr. Francescutti, an emergency physician and professor at the University of Alberta stated that physicians should be in salaried positions on one-year contracts with renewal contingent on meeting performance standards based on peer-review. He noted that this is in keeping with compensation models in other jurisdictions, such as the Cleveland Clinic, but acknowledged that Canada does not currently have the systems, data or performance metrics to support such a system.

Thus, the timing may be right to develop new compensation, assessment and accountability models that address strategies, needs and resources across the health care and education systems.

1. Methods to Fund Academic Health Science Centres

In Chapter 1, I noted that the methods used to fund AHSCs – and by dint, to facilitate the production of doctors and research – have resulted in poor systems level integration and alignment of incentives. Medical education portfolios are often managed by several different government departments and ministries, accountability metrics and reporting functionalities have not been integrated in most areas, the technology needed to develop and monitor sophisticated quality measures is lacking, and thus, oversight has been a challenge. Clinical revenues continue to support the academic mission although the extent is not currently understood. Provincial governments have struggled to find the capacity to engage in systems-level planning initiatives for academic medicine, which includes the university, medical school and hospital research institutes. This type of planning exercise would be hampered by historical arrangements and the legacy of fee-for-service and some AFP/ARP arrangements, however, one of the most fundamental challenges is that there appears to be little performance-related data to support large planning exercises.

There are however opportunities to develop new funding models, accountability frameworks, efficiency and productivity measures – certainly, this dissertation has presented two models which work well.

2. Methods to Fund Academic Physicians

In Chapter 1, an academic physician was defined as,

A Medical Doctor (MD) with a university-based academic appointment which is understood to have teaching and research within the medical school, in addition to the provision of clinical services, as a core function (Williams 2008).

In many clinical academic departments, the median ratio of faculty: residents is roughly 3:1. In Anesthesia, that ratio is 4.25:1, in Surgery it is 2.37: 1. In some AHSCs, individuals who are classified
as “Clinical Teachers” may engage in very little teaching at all, but take on higher clinical workloads to support the income of the practice plan as a group. In hospitals associated with AHSCs, these individuals are required to have academic appointments. There are a few problems with this.

First, many of the clinical practice plans in Canadian AHSCs are now taking on “Associates” in addition to Clinical Fellows. Associates are not paid at the same rate as practice plan members, their overnight call responsibilities are higher than partners, they may engage in teaching (unofficially), and they are not eligible for university appointments. As such, they are not included in any teaching programs, cannot apply for research grants, are not evaluated on their teaching, cannot seek academic promotion, are not required to submit a report of their activities, etc. Associates in academic medicine share many of the same challenges faced by non-tenured, sessional or part-time faculty in other parts of the university. This may represent a development necessary to sustain academic medicine, but it could also present risk to the university, and may signal potential recruitment and retention issues in academic medicine. Associates could also present an opportunity to revise funding models for academic physicians and deliver medical education. As is the case in higher education institutions in Europe, and in combination with the expanding role that teachers in community hospitals are taking on, this development may signal that there is no longer “a single, homogenous academic profession” in Canadian academic medicine (Hazelkorn 2008).

Second, those faculty who meet the definition of an “academic physician” should perhaps be defined, funded, and accounted for differently than those who do not meet the definition. In 2008 the Quebec Ministry of Health and Social Services negotiated with the FMSQ to provide physicians who teach with a stipend for each half day of teaching (excluding Clinical Fellows, who are seen as generating revenues). Clinician Researchers can also apply for a stipend which funds 50-75% FTE of protected academic time at the average annual remuneration rate of their specialty. Ontario’s Ministry of Health also provides community-based physicians with stipends to teach
medical learners (through distributed medical education models), and some community CEOs have expressed an interest in seeking an AFP arrangement to expand their teaching and research mission. Data is not yet available from Quebec, though this would represent an area for future research. Alternatively, some jurisdictions in the United States (e.g., Cleveland Clinic) provide faculty with a salary consistent with the market rate of their specialty, with a percentage of gross income tied to a clinical performance-related incentive or “bonus”. If the AHSC AFPs are to be reviewed, and if productivity, efficiency, accountability and sustainability are the goals of potential revisions, this issue should be addressed; I would posit that Clinician Researchers and Clinician Teachers, even those in AHSCs, may require different funding arrangements.

3. **Physician Compensation in Academic Medicine: Incentives**

Data from ICES and CIHI shows that physician salaries have increased considerably since the early 2000s. Physicians, especially Family Physicians, are small business owners who incur operating costs for overhead, staff salaries, and equipment. While some have proposed a salary for academic physicians, other incentives may help support income levels and fuel productivity.

In academic medicine, many individual specialists have incorporated themselves into “medicine professional corporations (MPC)”⁷³. Previously, income taxes levels were in the range of 40-46% of gross income (including university salaries). But inside a professional corporation, a physician can pay 15.5% by drawing only on the dividends from the corporation (i.e., a tax deferral). The first $40,000 paid out of the corporation by way of dividends is not subject to any personal income tax. Corporations are able to hold assets and incur liabilities, and income splitting is permitted. The latter means that family members who earn no other income can receive dividends of up to $40,000 without paying any income tax. Ontario was actually the last province to approve this practice in 2006, but it represents a significant incentive for academic physicians.

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⁷³ Other health professionals can also incorporate their practices, as can other professionals such as lawyers, social workers.
Researchers can also take advantage of SR/ED (Scientific Research and Experimental Development Tax Incentive Program). The SR/ED is a federal tax incentive program “designed to encourage Canadian businesses of all sizes and in all sectors to conduct research and development in Canada”\(^74\). Basically, SR/ED eligible expenditures are deducted from income taxes (personal, or those prepared by practice plans). The deduction amounts to roughly 40% up to a threshold of $3 million. Eligible expenditures include items related to basic or applied research. If audited, the documentation and audit requirements are however onerous and can include items such as evidence of the outputs of research (e.g., accounting documents, publications/copies of early drafts, experiment designs).

Finally, some practice plans have setup separate corporations to manage their research activities. SR/ED credits are claimed on the contributions made to the research corporations, and all funds (such as billed salary agreements) derived from the university are flowed through the research corporation.

4. Accountability, Metrics and Measuring Productivity

In undertaking this research, several departments came forward and offered to participate in the phase 2, case studies. Institutions included the University of British Columbia, McGill University, Western University, and another large department at the University of Toronto. However, the data sets required for the quantitative analyses were not available.

Aggregated data sets, to support accountability and return on investment, should be made available by universities to both policymakers and the public. Ideally, consistent clinical and academic metrics could be implemented. It should be noted that significant interest has in fact been demonstrated regarding the K-MAAP©. When I commenced this dissertation, my goal was not develop a methodology akin to the K-MAAP©, but it quickly became apparent that a satisfactory

method to measure or evaluate academic outputs, impact and results, especially over a five-year period, was needed. The K-MAAP© was initially developed to organize and compare data and outputs, and to look for patterns of productivity over specific periods of time. I also wanted to develop a method that was not reliant on past performance, but assessed the outputs during the study period. Different ways to expand the analytic capacity of the K-MAAP© then became apparent based on data sets that were made available.

The surprising part was that there seemed to be a real hunger for measures, metrics and grades, both to assess academic productivity, and as a mechanism to ensure accountability. I started to receive requests for consultations from academic leaders and managers as they had heard about my study from others, and then contacted me directly. This was unexpected, but is supported by Akl et al who state, “A central repository of strategies, processes and measurement tools would be ideal to assist academic leaders in designing their own programs” (Akl et al, 2012: E611). The general notion of the utility or value of measuring academic productivity does not seem to be as problematic in academic medicine as it may be in other areas of academia. Managerialism, as a negative concept, has never been raised during conversations, interviews or consultations on this topic. Infringements on academic freedom or the potential negative effects on creativity, innovation, motivation or drive, was never brought-up. Literature derived from the social sciences problematizes the measurement of academic productivity to a much larger extent.

Webber notes that “Although research productivity is the most widely discussed facet of faculty productivity, the alignment of research investment and productivity with institutional mission is equally important” (2011: 109). Transparency in articulating the measures that are used is vital in ensuring accountability and buy-in, however, efforts to discourage “gaming of the system” should also be considered. Further, I would suggest that quantitative or bibliometric data should not
be used in isolation, but rather, could be used to supplement other evaluation methods such as peer review.

5. Aligning Incentives, Compensation Programs and Motivation

If we accept that motivation is a combination of both intrinsic and extrinsic factors, then organizations should find ways to build the conditions which foster intrinsic motivation. Utilizing a behavioural economics approach, Osterloh and Frey (2013) provide several recommendations which could be considered in academic medicine: remunerate academic physicians on a fixed compensation (salary) scheme according to performance; provide autonomy and feedback to strengthen self-determination and pride in the job; offer awards and supporting forms of rewards (not necessarily financial bonuses) to bolster feelings of competence and esteem; ensure that procedural fairness is incorporated into assessment programs; and punish shirkers on the premise that “free riding” crowds-out the motivation of others.

This dissertation has provided empirical data which supports the recommendations put forth by Osterloh and Frey: the Department of Pediatrics has implemented such a system. For academic medicine, an academic comprehensive AFP with high monitoring principles and academic productivity or impact measures included in the arrangement should be considered. The use of a bonus or financial incentive should be carefully used especially if it is long-term and expected. While their work is not founded on academic physicians, creative activities, or the work of autonomous professionals more generally, Bénabou and Tirole indicate that incentives and rewards may be only weak reinforcers in the short term and may have hidden costs, in that they become negative reinforcers once they are withdrawn. Further research to understand when monetary incentives or rewards should be used, as well as the conditions under which each should be employed, is needed for academic medicine.
Future Research

As is the case with most academic inquiry, some questions have been resolved, but many more questions have emerged. This section outlines future empirical, methodological and theoretical areas of research.

Empirical: Integration of Clinical and Academic Productivity Data

It would be ideal to be able to combine clinical productivity data sets with information on academic productivity and impact. This would provide a more fulsome picture of the efficacy of physician funding models, such as fee-for-service versus AFPs, to enhance decision-making, strategy and policy.

Through the Internal Medicine case study, I had access to data on research salaries and protected academic time. This allowed for multiple calculations including the return on cost, research investment, efficiency and productivity, thereby allowing a more nuanced assessment of the impact of the department’s compensation and assessment model. If the clinical productivity data sets were added, a complete picture of productivity, performance and impact could be constructed, and theories could be further developed and refined.

Empirical: Big Data to Support Compensation Models

As noted previously, some organizations in the United States have implemented salary contracts for physicians (Kaiser Permanente, the Cleveland Clinic and others). The salary contracts are however linked to performance measures which are driven by large data sets and databases, patient surveys, patient evaluations, productivity-related outputs, clinical outcomes and other performance and quality-related data. In the many health care organizations in the United States, directors of physician compensation test, research and oversee the models that are used, implementing continuous quality improvement models. My research has indicated that Canada does not have these data sets available, nor do they have positions in place to drive the research that is
required. Understandably, health care in Canada is publically funded, and a benefit that Canadians hold dear. However, the current model to compensate physicians may not be sustainable, and further research into the systems used by other countries would be of interest.

In 2008, the Quebec Ministry of Health and Social Services negotiated with the Fédération Médecins Spécialistes du Québec (FMSQ) to compensate academic physicians directly for each half-day of teaching through the use of a provincial billing code linked to activities (billing codes for procedures are used in FFS programs). Currently, the universities are not required to provide any teaching data, nor has the government implemented any accountability or performance measures. At McGill, the teaching payments flow directly to the physician and are not reported to the university. At the Université de Sherbrooke, the teaching funds are pooled by the academic departments, and redistributed in support of educational activities. It would be interesting to assess any impacts related to physician compensation levels, recruitment, retention, physician satisfaction, teaching quality and clinical productivity.

**Empirical: National Survey on Compensation, Assessment, Recruitment and Retention**

The phase 1 national survey of Canadian academic leaders in departments of Anesthesia, Medicine, Pediatrics, and Surgery garnered a response rate of 61%. As noted previously, a similar survey is conducted each year by the AAMC but not the AFMC. Several academic departments have however indicated interest in participating in such a survey in future, to build a shared repository of information.

**Research Methods: Metrics, Measures and Grades**

Can measuring academic performance facilitate greater innovation and quality? Numbers don’t mean anything if they don’t help individuals, departments and institutions to establish goals, implement strategic goals, and then evaluate progress and performance. But numbers don’t stand in isolation – they reflect a departmental, institutional or systems level approach to a given topic or
goal. This is an area that has been almost completely neglected in the existing literature, but is a
topic worthy of further exploration. Methodologically, there are two major areas for future
research: further development of the K-MAAP© typology and supplementing traditional peer
review methods with quantitative performance-related data.

The K-MAAP© typology requires further development, testing and refinement.

Toutkoushian and Webber state,

Despite technological advances that enable policy makers to tabulate information on
research in more efficient ways than were possible a decade earlier, the state of the art in
measuring an institution’s research productivity remains fairly primitive. The challenges
encountered when attempting to do this fall into one of the following three categories: (a)
difficulties in obtaining data; (b) distinguishing between the quality and quantity of research
produced, and (c) difficulties in aggregating research productivity across fields/disciplines.
(Toutkoushian & Webber, 2011: 125)

Although 150 academic physicians were included in this dissertation, a larger sample would help
refine the K-MAAP©, especially the predictive analytics piece. A database to analyze data in an
automated fashion would prove powerful as the current “manual” analyses are very time-intensive.

With the help of a computer scientist, this would not be an onerous undertaking. Certainly, all
bibliometric, quantitative or statistical models and tools could be deconstructed and critiqued, but
customizable methods to assess academic productivity, over time, are an increasingly important and
timely topic for academic leaders, policymakers and physician organizations.

The departments featured in this dissertation rely on peer review to assess and rank
academic physicians as part of an academic review or merit awards process. However, there were a
few instances of academic physicians ranking high on quantitative metrics, but low on peer-review
(and vice versa). On further exploration, the reasons for this were unclear. Thus, I would like to
explore the rankings produced by both methods, but would like to take it one step further and
explore how or whether quantitative rankings influence, or impact on the peer review process and
rankings. I would suggest that quantitative or bibliometric data—other than the h-index or altmetrics—could be used to supplement assessment processes.

**Theory: Compensation, Incentives and Motivation**

This dissertation explored the perceptions of academic leaders on the compensation, incentivization and motivation of academic physicians. Behavioural economics, an emergent field of inquiry which has been rarely applied to empirical data, was used to build theory. This approach could be developed further and refined, using both basic and applied approaches. Further, it would be valuable to understand the perceptions of academic physicians themselves, on what motivates them and the supports that are needed to facilitate academic success.

Compensation models, particularly fee-for-service, seem to be designed to provide more money. While this may be the focus of bargaining strategies, it may not be all that valuable. Fee-for-service models have been in existence for far too long with no real alternative offered other than AFPs. However, blended model AFPs or ARPs may not be as helpful as academic comprehensive-type arrangements. Although the academic comprehensive AFP that Pediatrics in Toronto is on has produced strong academic outputs, ideally, these data sets should be linked to clinical outputs to fully support the success of the integrated, comprehensive funding plan.

**Conclusion**

This dissertation adopted an emergent, flexible, research methodology to explore the compensation and assessment of Canadian academic physicians. Very little empirical, methodological or theoretical literature on the compensation of academic physicians, particularly set within the Canadian context, currently exists. As a result, the developmental nature of the research methodologies and analytical approaches (the K-MAAP©), challenges in identifying suitable case studies (but then also narrowing down requests to participate in the case studies), and
then linking theory to the empirical data (behavioural economics) has provided to be intensely challenging and intellectually satisfying.

This dissertation has contributed to the existing but sparse body of literature, providing compelling information on existing practices, and has developed theory, including the notions of “false incentives” and a “placebo incentive”. The K-MAAP© presents a unique methodology to measure, assess and predict academic productivity, performance and impact, which may be used in future by academic leaders, universities or policymakers. It is recommended that peer review assessment models be supplemented with quantitative or bibliometric data. Finally, it is recommended that the strategy or goals that underpin financial incentives in academic medicine be carefully considered, both in terms of the political and economic environment within the AHSC complex as well as the available literature within theoretical fields including standard economic theory and behavioural economics. Finally, this study suggests that academic leaders and governments reconsider how academic medicine is funded.
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