Undergraduate Dental Students' Experiences and Perceptions in the Provision of Dental Treatment to Persons with Disabilities

by

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A thesis submitted in conformity with the requirements for the degree of Master of Science

Faculty of Dentistry
University of Toronto

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Abstract

This study was undertaken to evaluate undergraduate dental students’ clinical experiences in a hospital-based dental clinic (D-clinic), and their influence on students’ comfort with providing dental care to persons with disabilities (PWDs). Dental students from a single class at the University of Toronto (n=94) were recruited to complete a survey: (I) close to the start, and (II) near the end of their rotations in D-clinic. Focus group data were used to write and revise survey questions. There was no significant difference in the students’ comfort with providing dental care to PWDs between phase-I and phase-II. Previous experience with PWDs was a positive predictor of comfort ($P<0.001$). Students in phase-II were less willing to provide dental care to individuals with developmental delay compared to students in phase-I ($P=0.018$). The majority of phase-II students (71%) valued D-clinic; 55% desired additional clinical experience to increase their comfort with providing dental care to PWDs.
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1.0 Introduction

Dental care is recognized as one of the greatest unmet health care needs facing persons with disabilities (PWDs) in the United States of America (USA) (Newacheck, McManus, Fox, Hung & Halfon, 2000; Waldman & Perlman, 2010; Waldman & Perlman, 2002). In 2000, the Surgeon General’s report on oral health in the USA pointed out that PWDs experienced a disproportionate level of oral disease compared to the general population (U.S. Department of Health and Human Services, 2000). Similarly, the Canadian Pediatric Society recently stated that poor oral health is especially common among children with special healthcare needs (Rowan-Legg, 2013); however, comprehensive data concerning the dental status of PWDs in Canada is otherwise unavailable. Appreciating that oral health is an important component of overall health, one can understand how problems such as oral pain, missing teeth and dental infections could seriously affect an individual’s physical, mental and social wellbeing (Canadian Dental Association, 2005).

The dental needs of PWDs are complex and may be related to underlying congenital or acquired anomalies, as well as to an inability to receive adequate personal and professional care needed to maintain oral health (U.S. Department of Health and Human Services, 2000). Anders and Davis (2010) stated that improving access to dental care for PWDs requires “strategies to increase patient acceptance for routine care, additional training for dentists to provide this care, and the development of more effective preventive strategies to minimize the need for this care.”

The focus of this research project was to investigate undergraduate dental students’ perceptions of providing dental care to PWDs based on clinical experiences in the Mount Sinai Hospital Dental Program for Persons with Disabilities (D clinic). The D clinic is unique
among dental schools in Canada, and offers students hands-on clinical training in the dental management of PWDs.
2.0 Literature Review

2.1 Persons with Disabilities

2.1.1 Definition

Disability is a global term that includes a broad range of acquired, congenital and hereditary conditions (Hunter, 1987; WHO, 2011). A person with a disability is defined as an individual who has or has had an impairment causing a long-term adverse effect upon his or her ability to perform daily activities that are typical for his or her stage of development and cultural environment (Merry & Edwards, 2002). Another term that is commonly used in the literature to describe individuals with a disability is special needs. The Centre for the Improvement of Child Caring, or CICC (2012), defines special needs as “the special or unique concerns created by a person’s medical, physical, mental, or developmental condition or disability.” Consequently, additional services may be required to help an individual with special needs in one or more of the following areas: thinking, communication, movement, getting along with others and taking care of one self. The terms, disability and special needs, are often used interchangeably in the literature although certain journals tend to use one term over the other. In this study, the phrase persons with disabilities (PWDs) will be utilized.

2.1.2 Prevalence

Approximately 600 million people, or 10% of the world’s population, live with a disability (WHO, 2005). In North America, more than 50 million Americans, or one in five U.S. residents, have a disability (U.S. Census Bureau, 2003). Comparatively, 4.4 million Canadians have a disability, comprising 14.3% of the country's total population (Statistics
Canada, 2006). The number of Canadians living with a disability grew by approximately 22% from 2001 to 2006, and is expected to continue to grow as the country’s population ages and as more Canadians are diagnosed with chronic diseases (Statistics Canada, 2006). As a result of this growth, the demand for rehabilitation services is also expected to increase dramatically in the coming years (Toronto Rehabilitation Institute, 2010).

Unfortunately, the current healthcare system may not be able to accommodate such growth. For example, children with physical disabilities referred from the Montreal Children’s Hospital to pediatric rehabilitation centres experienced wait times in excess of five months (Feldman, Champagne, Korner-Bitensky & Meshefedjian, 2002). The Canadian Institute of Child Health (2000) reported that 7.7% of Canadians aged 0–19 years live with some form of disability, and more than 75% of these children experience long-term health problems for which they are seen within the healthcare system.

2.1.3 Oral Health Needs

As previously stated, the oral health needs of PWDs are complex. Several factors contribute to this reality, including the population’s underlying congenital or acquired anomalies, limitations in maintaining personal oral hygiene and issues related to access to care (U.S. Department of Health and Human Services, 2000).

To further investigate this, researchers evaluated the oral health condition and treatment needs of Special Olympics athletes in New York City (Fernandez, Lim, Dougherty, LaSasso, Atar & Daronch, 2012). Athletes were recruited on-site from 2005 to 2008 at the annual Special Olympics Metro Tournament held in Manhattan. A total of 664 athletes with a mean age of 26 years volunteered to have their teeth examined by dentists utilizing a
standardized examination form authorized by the Centers for Disease Control and Prevention. Of the 664 athletes, 28% had untreated decay, 9% reported oral pain at the time of examination, 8% needed urgent care and 60% had filled teeth. The authors concluded that PWDs attending the New York City Special Olympics had high preventive and restorative oral treatment needs. A systematic review by Anders and Davis (2010) also demonstrated that people with intellectual disabilities had poorer oral hygiene and a higher prevalence and greater severity of periodontal disease than individuals without intellectual disabilities. In a similar review, people who were unable to cooperate for dental treatment due to developmental delay typically lost more teeth than those who were able to tolerate simple preventive procedures provided in an office setting (Gabre, Martinsson & Gahnberg, 1999). McIver (2001) described five potential factors that contribute to this disparity in oral health for children with special healthcare needs:

- the **primary medical system**, which often fails to include oral health in the overall care of the child;
- the **child’s parents**, who unknowingly may contribute to their child’s oral disease or avoid seeking dental treatment when it is necessary;
- the **child him or herself**, who may be uncooperative for routine dental treatment and require the use of general anesthetic;
- the **dentist**, who may not be willing or comfortable providing dental care to children with special needs; and
- **payment for dental care**, which is often insufficient to cover the costs associated with providing comprehensive dental care to these children.
2.1.4 **Access to Dental Care**

In North America, the trend towards deinstitutionalization has resulted in the relocation of many PWDs to smaller, community-based residences (U.S. Department of Health and Human Services, 2000; Waldman, Fenton, Perlman & Cinotti, 2005). The 20-year period between 1988 and 2008 is often referred to as the “generation of community living”, as it saw an unprecedented increase in deinstitutionalization (Salmi, Scott, Webster, Larson & Lakin, 2010). In the USA, the proportion of PWDs residing in facilities with 16 or more people decreased from nearly 51% in 1988 to 14% in 2008 (Salmi et al., 2010). In 1987, the Ontario government passed a law mandating the closure of institutions for PWDs (Ministry of Community and Social Services, 1987). The province closed its remaining three large-scale institutions in 2009, relocating more than 6000 PWDs into the community (Community Living Ontario, 2013).

In-house medical and dental care, which was typically provided in institutional settings, is not readily available to PWDs in community living arrangements (U.S. Department of Health and Human Services, 2000; Waldman & Perlman, 2002). Most current residential facilities housing PWDs are too small, both in size and in number of patients, to support intramural services beyond an annual physical as part of a medical examination (Dwyer, 1998). As a consequence, residents in community facilities are dependent upon local practitioners for all their required health services (Waldman et al., 2005).

The number of children with special needs in the USA continues to rise and was estimated to be over 10 million in 2010 (Kerins, Casamassimo, Ciesla, Lee & Seal, 2011). Unfortunately, many dental departments in children’s hospitals across the USA lack the capacity to treat this growing population because of insufficient clinical resources (Kerins
et al., 2011). In some regions of the USA, the distribution of children with special needs per dental provider was approximately 2500:1 (Kerins et al., 2011). In 2009, the average patient-to-dentist ratio in the USA was 1500:1 (American Dental Association, 2009).

General dentists practicing in Nebraska reported a number of concerns, which they felt compromised their ability to provide care for PWDs (Salama, Kebriaei & Durham, 2011). These included: the level of patient’s disease, patient’s behavior, insufficient training/experience, poor reimbursement and inadequate facilities. Some dentists also stated, “my practice is already busy” and “I am not interested at this stage of my career”.

Similar to McIver (2001), Waldman and Perlman (2004) summarized the following reasons to explain the difficulties faced by many families in their attempt to obtain necessary dental services for the millions of children living with disabilities in the USA:

- limited educational opportunities in dental schools for the care of children with special needs;
- increased time requirements to provide preventive and restorative services to this population; and
- inadequate third-party reimbursement for the care delivered.

To elaborate on the limited educational opportunities identified by Waldman and Perlman (2004), a research team from the University of Texas Health Science Center Houston Dental Branch conducted a survey of 312 third and fourth year dental students at five universities across the USA (Wolff, Waldman, Milano & Perlman, 2004). Of 295 respondents, 68% reported receiving five hours or less of didactic instruction devoted to the dental management of PWDs, and 50.8% reported having no clinical training in this area at all.
Another survey conducted in Massachusetts confirmed that children with cerebral palsy, autism, developmental delay and Down syndrome had more aversions to dental treatment, more treatment complications posed by their medical conditions and more difficulty finding a dentist willing to provide care than children with medical conditions not involving cognitive delay (Nelson et al., 2011). Despite having private insurance and parents with higher than average incomes and education levels, 20% of the children in the study still had unmet dental needs. To further exacerbate the problem, children with disabilities are at an increased risk for oral infections, delays in tooth eruption, periodontal disease, enamel irregularities and malocclusion (Isman & Isman 1997).

On the contrary, Koneru and Sigal (2009) reported that the majority of PWDs living in Ontario were able to access dental care. This finding was based on the results of a self-administered survey, which was distributed by community organizations between September 2006 and November 2006 to PWDs living in the province. The survey instructions specified that in cases where the respondent was unable to complete the survey, a responsible caregiver should answer the questions on the respondent’s behalf. Many factors appeared to influence the respondents’ access to dental care. Personal (or internal) factors, such as family anxiety about dental procedures, an inability to tolerate dental treatment, apathy regarding dental care and an inability to communicate dental pain were more commonly reported as barriers to dental care than environmental (or external) factors, such as cost or dentist-related issues. Those individuals who required dental treatment under general anesthesia in a hospital facility reported the greatest difficulty in obtaining care.

The Ontario Disability Support Program (ODSP), funded by the Ministry of
Community and Social Services, provides financial assistance to PWDs in the province of Ontario (Ministry of Community and Social Services, 2013). Individuals included in this program receive a living allowance and basic dental insurance; however, the ODSP payment schedule for dental services is significantly less than the Ontario Dental Association’s suggested fee guide. Furthermore, ODSP does not cover non-pharmacological behavior management, which often extends appointment times and requires more energy from the clinician. This financial discrepancy may reduce dentists’ willingness to provide care to PWDs with government funded dental plans (Waldman & Perlman, 2004).

2.2 Undergraduate Dental Education Related to Persons with Disabilities

2.2.1 History

Since the mid-1950s, a number of dental schools have introduced some level of instruction regarding the care of PWDs (Waldman et al., 2005). Pioneering educators hoped to overcome dentists’ reluctance to treat PWDs by addressing the students’ lack of knowledge and experience in the clinical management of PWDs. In the 1970s, the Robert Wood Johnson Foundation provided large grants to 11 dental schools in the USA in order to improve undergraduate dental education concerning the treatment of PWDs (Robert Wood Johnson Foundation, 1973). Concurrently, the American Association of Dental Schools (now the American Dental Education Association) proposed a set of curriculum guidelines for teaching predoctoral students about persons with “handicapping” conditions (Bentz & Lotzkar, 1979). Early research showed that students’ educational experiences, and in particular their exposure to clinical situations, classroom instruction and multidisciplinary teams, were closely related to their willingness to provide dental care to PWDs (Roberts,
McCrory, Glasser & Askew, 1978).

However, by the end of the century, surveys found that more than half of the dental schools in the USA provided fewer than five hours of didactic instruction, and approximately 75% of schools devoted less than 5% of clinic time to the treatment of PWDs (Fenton, 1993; Romer, Dougherty & Amores-Lafleur, 1999; Wolff et al., 2004). At the 1979 National Conference on Dental Care for Handicapped Americans, concern was raised that an apparent lack of education and experience in the treatment of PWDs across the country could incite negative attitudes towards the “handicapped” in the future (National Conference on Dental Care for Handicapped Americans, 1979).

2.2.2 Accreditation Standards

The Commission on Dental Accreditation of Canada (CDAC) was established in 1988 by the Canadian Dental Association as an autonomous body responsible for accrediting dental, dental hygiene and dental assisting educational programs in Canada (CDAC, 2008). Similar to the Commission on Dental Accreditation in the United States (CODA), CDAC conducts site visits of dental schools and evaluates Canadian programs based on how well they meet accreditation standards that were developed by expert panels to represent the minimum requirements regarding all aspects of the educational program (CDAC, 2008; Formicola, Bailit, Beazoglou & Tedesco, 2008).

Waldman and Perlman (2002) criticized the accreditation process of dental schools in the USA, stating that it provided too much latitude in curriculum development for the dental management of PWDs. In 2001, under the auspices of the Special Olympics, Waldman and Perlman proposed that CODA reinstitute its standards, which were deleted in the mid-
1990s, requiring dental and dental hygiene graduates to be competent in providing oral health care to PWDs (Waldman et al., 2005).

In response to this criticism, CODA amended its accreditation requirement to include, “graduates must be competent in assessing the treatment needs of patients with special needs” (CODA, 2004). Patients with special needs are categorized as “those patients whose medical, physical, psychological, or social conditions make it necessary to modify normal dental routines in order to provide dental treatment for that individual. These individuals will include, but are not limited to, people with developmental disabilities, complex medical problems, and significant physical limitations” (CODA, 2004).

In comparison to the American requirement, CDAC requires that “graduates must have sufficient clinical and related experiences to demonstrate competency in the management of the oral health care for patients of all ages. Experiences in the management of medically compromised patients and patients with disabilities and/or chronic conditions, should also be provided” (CDAC, 2006). While must indicates that the requirement is mandatory, should implies that it is highly desirable, but not required.

2.2.3 Curriculum Content

CDAC’s requirement is not mandatory; consequently, many Canadian dental schools do not provide undergraduate students with any amount of didactic or clinical experience in the treatment of PWDs, as reported by Sherman & Anderson (2010), who surveyed Canada’s 10 undergraduate dental schools to catalogue both the educational modalities and the amount of time that the schools dedicated to the dental management of PWDs. Out of the 10 schools of dentistry, five provided no specific didactic instruction and another five
offered no clinical time devoted to the care of PWDs. The schools offered several reasons for this deficiency and described various limitations present within their curricula that minimized the amount of experience provided to students in the area of special care dentistry, such as full timetables, limited resources and the belief that dental care for PWDs was more advanced than what is appropriate for undergraduate dental students. Table 1 summarizes these findings.

Table 1. Special care curriculum taught in Canadian undergraduate dental schools (Source: Sherman & Anderson, 2010).

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<th>Schools</th>
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<tr>
<td>Didactic time devoted</td>
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<tr>
<td>to special care</td>
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<tr>
<td>curriculum (hours)</td>
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<td>Mandatory rotation to</td>
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<td>observe treatment of</td>
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<td>PWDs (hours)</td>
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<td>Mandatory rotation to</td>
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<td>treat PWDs (hours)</td>
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<tr>
<td>Elective rotation</td>
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<td>available to observe</td>
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<td>and treat PWDs (hours)</td>
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<td>Students eligible for</td>
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<tr>
<td>elective rotation to</td>
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<td>observe and treat PWDs</td>
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<td>(%)</td>
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</table>

A 2008 survey of 22 undergraduate dental schools in Canada and the USA also showed significant variation in the methods of educating predoctoral students in the
treatment of PWDs (Krause, Vainio, Zwetchkenbaum & Inglehart, 2010). Study data were
collected with a web-based tool only and the response rate, at 34% (n = 22 schools), was low. The survey was also anonymous and did not separate Canadian responses from U.S. responses. While 91% of the participating schools provided some level of instruction related to the topic, only 64% offered their undergraduate students specific clinical experience providing dental care to PWDs. The authors described the setting in which the clinical experiences were provided, but did not elaborate on the actual treatment that was delivered by the students. The majority of the schools replied that they planned educational changes over the next three years with the goal of increasing clinical and extramural opportunities for students to treat PWDs. This study was in agreement with the findings reported by Sherman and Anderson (2010), and both noted that the greatest challenge reported by the schools to such a change was current curriculum overload and a lack of educational support resources (Krause et al., 2010).

### 2.2.4 Outcomes

Moore, Boynes, Cuddy, Giovannitti and Zovko (2009) from the Department of Anesthesiology at the University of Pittsburgh School of Dental Medicine reviewed their predoctoral curriculum in anesthesia, and the preparedness of dental students enrolled in the program to provide anesthesia services to their patients. Selected students received both didactic and clinical instruction concerning the use of anesthesia as an adjunct for a variety of dental procedures. Students also assisted in providing deep sedation and general anesthesia services to individuals seen at the school’s Center for Patients with Special Needs. They found that recent graduates who received the specific training were more likely to treat PWDs in private practice, even without sedation, compared to those
graduates who did not receive the specific training. Participants also reported that they felt they were best prepared in the assessment of medical histories, physiology and pharmacology, while being the least prepared in the use of oral sedation, intravenous sedation and general anesthesia.

Delucia and Davis (2009) at the University of Buffalo School of Dental Medicine examined the influence of didactic instruction regarding PWDs, and previous experience (outside of school) with PWDs, on dental students’ comfort with providing care to this population. The students were asked to indicate their comfort level in treating PWDs using a scale from 1 (not comfortable) to 5 (completely comfortable). Likewise, the students were asked to indicate their anticipated comfort level and interest in treating PWDs in the future (using the same scale). The authors did not define the word comfort in their study. Third-year students were surveyed immediately before and one week, six months and one year after a lecture on the dental management of PWDs. The two-hour lecture included handouts on various developmental disabilities, video supplements and a question and answer period. At the six-month point, the students had also received an additional 50-minute lecture on Down syndrome, cerebral palsy, autism and attention deficit-hyperactivity disorder (ADHD). The results of the surveys did not show a significant difference in the students’ overall comfort with providing dental care to PWDs at any point following the didactic instruction; however, the results did demonstrate that the students’ previous social interaction with PWDs was a positive predictor of future comfort in clinical practice.

Dao, Zwetchkenbaum and Inglehart (2005) observed that many Michigan general dentists did not feel that their undergraduate dental education adequately prepared them to treat PWDs. This observation was based on a random sample of 500 dentists practicing
in the state, of which 208 (41.3%) returned a mail-in survey that investigated the practitioners’ educational background and current practice patterns regarding PWDs. Only a small percentage of the respondents who strongly agreed or agreed with the statement that dental school had prepared them well in this area (3.9%/7.3%) actually provided dental care to PWDs. Given that access to dental care for many PWDs is limited, the authors felt that it is important to revise dental curricula to provide more didactic and clinical education concerning the treatment of PWDs.

Similarly, in a retrospective study, Weil and Inglehart (2010) examined general and pediatric dentists’ perceptions of their dental education concerning the treatment of persons with autism spectrum disorders (ASD). Surveys were mailed to random samples of 500 general dentists and 500 pediatric dentists practicing in the state of Michigan. The survey assessed the respondents’ background, practice characteristics and educational experiences regarding the provision of dental care to persons with ASD. A total of 162 general dentists (32%) and 212 pediatric dentists (42%) replied to the mail-out questionnaire. The majority of the respondents (general dentists: 87% vs. pediatric dentists: 80%) reported that the quality of their undergraduate experience involving the treatment of persons with ASD, or lack thereof, was directly related to their future willingness to manage the dental needs of this population. No specific information was provided in the study concerning the number of hours or type of patient interactions that the respondents had during their undergraduate or postgraduate training. Rather, the educational assessment was subjective and asked the respondents to indicate “how well” they believed that their programs prepared them to treat persons with ASD. Neither group believed that their undergraduate dental education had prepared them well enough to
provide dental care to persons with ASD; however, the pediatric dentists indicated that their graduate education had better prepared them to provide such care. Eighty nine percent (n = 189) of the pediatric dentists in the study reported that they had persons with ASD in their patient pool, as compared to only 32% (n = 52) of the general dentists. The authors stressed that “it is important to revisit dental education efforts targeted towards preparing future dental care providers for the treatment of patients with ASD and special needs” (Weil & Inglehart, 2010).

Investigators from the University of the Pacific Arthur A. Dugoni School of Dentistry conducted a similar study to examine how their predoctoral dental curriculum, involving the management of PWDs, impacted alumni’s practice patterns (Chávez, Subar, Miles, Wong, Labarre & Glassman, 2011). Respondents who indicated that they treated more PWDs during dental school also reported that they treated significantly more PWDs in private practice. In another study, Casamassimo, Seale and Ruchs (2004) reported that, among a random sample of 1251 general dentists in the USA, only 25% had any undergraduate training dealing with individuals with cerebral palsy, mental retardation, or medically compromising conditions, and as few as 10% provided dental treatment to these individuals on a regular basis. This study also reported that approximately 40% of the same respondents would have found additional training pertinent to treating PWDs to be desirable or very desirable.

To summarize, a number of studies have been presented examining the relationship between dental education related to PWDs and dental students/practicing dentists’ comfort with and willingness to provide dental care to this population. The studies differ in terms of their nature (retrospective vs. prospective), survey design, subject population (dental
students, general dentists or pediatric dentists) and dependent variable (comfort vs. willingness vs. value). Consequently, it is difficult to directly compare one study with another, or draw meaningful conclusions based on all of the information provided.

2.3 University of Toronto

2.3.1 Mount Sinai Hospital Dental Program for Persons with Disabilities

The Mount Sinai Hospital Dental Program for Persons with Disabilities (D clinic) was established 40 years ago with the objective of broadening student exposure to PWDs (Sigal, 2010). In addition, the clinic provides an important service for PWDs residing in southern Ontario. The Discipline of Pediatric Dentistry at the Faculty of Dentistry, University of Toronto, coordinates the D clinic, with third and fourth year undergraduate dental students performing recall examinations and preventive care (including scaling, polish and fluoride treatment) on PWDs in a hospital setting. Students must rotate through the clinic in order to fulfill their undergraduate requirement in pediatric dentistry and, more importantly, to meet the demand for preventive recall care required by PWDs who attend the D clinic. Without the students’ help, the clinic would not be able to meet this demand. The majority of students complete at least two rotations by the end of their third year and an additional three to four rotations by the end of their fourth year, for a total of five to six rotations by the time the students graduate. One rotation is equivalent to a half-day clinic, and each student will normally see five to six patients during each rotation.

Clinics are supervised by a team of demonstrators from the Discipline of Pediatric Dentistry with a single demonstrator present during each rotation. The majority of patients who attend the D clinic are managed by utilizing non-pharmacological behavior
management techniques, which may include protective stabilization with appropriate consent. Individuals with significant treatment needs and/or those who are unable to cooperate in the ambulatory clinic can be referred for treatment under general anesthesia. In these cases, a hospital resident or graduate student in pediatric dentistry will provide the necessary care under the supervision of a staff dentist at the Mount Sinai Hospital. All phases of dental treatment provided in the D clinic are funded by government-subsidized dental plans designed specifically for PWDs. As previously stated, the level of reimbursement offered by such programs is substantially less (as low as 30%) than what is published in Ontario’s suggested fee guidelines (Ministry of Community and Social Services, 2013). Additional financial support is offered by the Mount Sinai Hospital and the University of Toronto, Faculty of Dentistry (Sigal, 2010).

2.3.2 New Initiatives

Two new initiatives were introduced at the University of Toronto in order to supplement the dental students’ experience in the D clinic. The first was a series of guest presentations given to the students during their didactic course in pediatric dentistry by PWDs or their designated caregivers. The main objective of these talks was to show the students that PWDs are people, not patients simply defined by their disability (Sigal, 2010). At the same time, the students gained valuable insight into the challenges faced by this population in their search for dental care. This series was stopped after three years due to consistently poor attendance by the third year dental students, an action embarrassing to both the guest speakers and the faculty.
Oral Health, Total Health is the second initiative. This non-profit organization was created by the undergraduate dental students themselves with the goal of improving access to dental care for PWDs across Canada (Sigal, 2009). Sharing Smiles Day is one of the organization’s premier events, which brings together students in oral health disciplines and PWDs in a non-clinical environment for a day of games, entertainment and education. Ultimately, dental students are provided with a meaningful opportunity to engage socially with PWDs. The results, thus far, have been extremely promising. Students who attend Sharing Smiles Day speak very highly of the event and its positive effect on their perceptions of PWDs.

Both initiatives were originally designed to highlight the human and social aspects of PWDs outside of the dental clinic (Sigal, 2010). In turn, it was hoped that this experience might improve the dental students’ overall impression of PWDs and potentially increase their willingness to provide dental care to PWDs.
3.0 Statement of Problem and Objectives

PWDs experience a disproportionate level of oral disease compared to the general population. This may be related to the PWDs’ underlying congenital or acquired anomalies, as well as to an inability to receive adequate personal and professional care to maintain their oral health.

During their undergraduate dental education, most dentists generally received limited clinical experience treating PWDs. This could have resulted in the dentists’ limited comfort with and willingness to treat this underserved population. The end result is high patient need, but limited access to dental care for PWDs.

The literature reports mixed results concerning dentists’ comfort with and willingness to provide dental care to PWDs. The Faculty of Dentistry at the University of Toronto provides a combined didactic and clinical program concerning the dental management of PWDs. This study looks to examine the undergraduate dental students’ perspectives of providing dental care to PWDs before and after their clinical experience in the D clinic.

The objectives of the study were to investigate:
1. The change in the students’ comfort with providing dental care to PWDs between the end of third year (i.e., limited to no experience in the D clinic) and the end of fourth year (i.e., near the end of the students’ D clinic rotations);
2. Predictive factors that may contribute to the students’ comfort with providing dental care to PWDs;
3. The change in the students’ perceptions of dental care for PWDs between the end of third year (i.e., limited to no experience in the D clinic) and the end of fourth year (i.e., near the end of the students’ D clinic rotations); and

4. The students’ assessment of the D clinic as a valuable component of their undergraduate dental education at the University of Toronto.
4.0 Methods

4.1 Study Subjects

All third year students (n = 94) from the Faculty of Dentistry Class of 2012 at the University of Toronto were invited by email in April 2011 to participate in focus groups and to complete surveys subsequently developed for this study. Emails were sent by the Discipline of Pediatric Dentistry secretary to avoid any feelings of obligation on the part of the students to participate in the project. The students began their clinical rotations in the D clinic in the spring term of their third year.

4.2 Data Collection

The study design included two distinct phases of data collection. Both phases included a focus group session and a self-reported survey. Phase one occurred when the dental students began their rotations in the D clinic (i.e., end of the third year of their dental program). Phase two occurred near the end of the students’ rotations in the D clinic (i.e., end of the fourth year of their dental program). Ethics approval was obtained from the Health Sciences Research Ethics Board at the University of Toronto on April 26, 2011.

Focus group size was targeted at six to 10 students to ensure a sufficient number for reliable and valid results (Flagg, 2013; Howard, Hublebank and Moore, 1989; MacIntosh, 1993). Prior to the start of each focus group, students were briefed on the purpose of the study and were required to review an information letter before signing a consent form (Appendix I; 9.1.1). Each focus group discussion was structured based on individualized scripts designed for each phase (Appendix I; 9.1.2/9.1.3). Students were advised that data collected during the study would remain anonymous and that the process would not
involve any faculty member at the University of Toronto, nor affect their academic standing in pediatric dentistry. Focus groups met within the Faculty of Dentistry at the University of Toronto and were moderated by the principal investigator. Discussions were approximately thirty to sixty minutes in duration, and were audio recorded and transcribed for evaluation. A silent observer, who had no affiliation with the students, was present to assist with paperwork. Refreshments were served at each focus group as a gesture of appreciation for the students’ time.

Information collected in the focus groups was then used to write and revise questions for the surveys (Appendix II; 9.2.2/9.2.3). Surveys were pilot tested on a convenience sample of three graduate students in the Discipline of Pediatric Dentistry at the University of Toronto and one student in the Dental Specialty Assessment and Training Program (DSATP) also at the University of Toronto. The DSATP student was a foreign-trained pediatric dentist who was completing an additional year of study in pediatric dentistry in order to attain licensure in Canada. The purpose of the pilot study was to assess the surveys for clarity and for any potential ambiguity. Surveys were then distributed to all students in the Dentistry Class of 2012 after each focus group. Both surveys were launched online utilizing SurveyMonkey®, a web survey development cloud. Specific links to each survey were provided in email invitations distributed by the Discipline of Pediatric Dentistry secretary. For those individuals not wishing to use the online tool, paper copies were also made available during the students’ seminars in pediatric dentistry. Prior to beginning the surveys, subjects were required to read an information letter that reviewed the nature of the study and outlined important survey instructions (Appendix II; 9.2.1). Likewise, the students were advised that all the data collected during the study would
remain anonymous and that the process would not involve any faculty member at the University of Toronto, nor affect their academic standing in pediatric dentistry. In each phase, the students were instructed not to complete a paper copy if they submitted their responses online, and vice versa. The students were asked to provide their unique University of Toronto student identification number as a way to match those individuals who responded to both surveys.

4.2.1 Phase One Focus Group

Phase one focus group information is included in Appendix I (9.1.2). Questions were designed to explore the students’ previous experiences with PWDs, and the students’ expectations of their upcoming rotations in the D clinic. More specifically, the students were asked to describe their previous experiences with PWDs and the context of those experiences. The students were also asked to identify aspects of the D clinic that they looked forward to, and aspects that they predicted would be challenging.

4.2.2 Phase One Survey

The phase one survey consisted of 21 questions and included sections on beliefs and perceptions, concerns and expectations and demographics (Appendix II; 9.2.2).

In the beliefs and perceptions section, the students were asked to quantify their previous experience with PWDs and the context of that experience (e.g., family member or friend). The students were then requested to specify their beliefs concerning dental care for PWDs in terms of who would be the ideal care provider (e.g., general dentist and/or specialist) and which setting would be the ideal care location (e.g., community practice or
hospital). Using an agreement scale, graded 1 (strongly disagree) - 5 (strongly agree), the students were asked to evaluate statements regarding:

• access to dental care for PWDs;
• incidence of dental disease in this population;
• importance of oral health related to overall health;
• level of intelligence required to provide consent for dental treatment;
• comfort with providing dental care to PWDs; and
• value of the D clinic as a component of the undergraduate curriculum.

In the concerns and expectations section, the students were asked whether or not they would provide dental care to PWDs after graduation, and the type of individuals that the students would be willing to treat at that time (i.e., physical disabilities and/or developmental delay). Using an ordered response scale, graded 1 (not at all) - 5 (very much), the students were also asked to evaluate their concerns in the D clinic including:

• being unable to provide ideal treatment;
• not having enough time to treat patients;
• being unable to communicate with patients;
• poor patient cooperation;
• fear of injury-to-patient; and
• fear of injury-to-self.

Finally, the students were asked to provide their demographic information. The students were given six weeks to complete the survey and were sent email reminders at three weeks, one week and 24 hours prior to the submission deadline.
4.2.3 Phase Two Focus Group

Phase two focus group information is included in Appendix I (9.1.3). Questions were designed to explore the students’ experience in the D clinic, the students’ suggestions how to improve the D clinic and the students’ willingness to provide dental care to PWDs in the future. More specifically, the students were asked to describe their feelings about the D clinic and their general reaction to PWDs. The students were also asked to identify aspects of the D clinic that they enjoyed, and to comment on the faculty who supervised the D clinic.

4.2.4 Phase Two Survey

The phase two survey consisted of 24 questions and similar sections as in the phase one survey (Appendix II; 9.2.3). All questions in phase one were repeated in phase two excluding questions about the students’ previous experiences with PWDs. Additional questions were included that asked the students to evaluate their experience in the D clinic and its potential impact on their future practice, as well as to specify the type of treatment(s) that they would be willing to perform on PWDs (e.g., diagnostic, preventive and/or restorative). Using an agreement scale, the students were also asked to indicate their desire for additional clinical experience in order to improve their comfort with providing dental care to PWDs. Furthermore, the students were asked to identify the type(s) of additional experience that they would want (e.g., more rotations in the D clinic and/or do simple restorations/extractions in the D clinic).

Using an ordered response scale, the students were asked to evaluate their clinical demonstrators in the D clinic based on the following qualities or attributes:

- provided constructive feedback;
• provided specific instruction on the dental management of PWDs;
• modeled appropriate behavior (as an example of how to provide dental treatment to PWDs);
• offered or provided assistance when needed;
• answered questions related to my patients and their treatment; and
• were supportive.

Finally, the students were asked to identify which aspects of the D clinic that they most enjoyed (e.g., patient interaction and/or working in a hospital) and which aspects of the D clinic that they least enjoyed (e.g., having to use physical restraint and/or working under time constraints). The students were given six weeks to complete the survey and were sent email reminders at three weeks, one week and 24 hours prior to the submission deadline.

4.3 Data Analysis

4.3.1 Focus Groups

Focus groups were audio recorded and transcribed for review. The dictations were read by the principal investigator and one other member of the research team. The students’ ideas, concerns and specific phrasings were utilized to write and revise survey questions. The intent of this process was to ensure that the surveys would be relevant for their target audience and not biased by the research team, and to increase the validity of the questions posed in the surveys.
4.3.2 Surveys

Survey data were analyzed using the R Project for Statistical Computing (R Foundation for Statistical Computing, Vienna, Austria). Paired comparisons were made between phase one and phase two responses using chi-square analysis (changes in proportion) and t-tests (differences in mean).

The students’ comfort with providing dental care to PWDs (dependent variable) was correlated with additional factors based on the students’ answers to other questions in the surveys. Pearson’s product correlation coefficients were calculated for each factor and then tested for significance. Coefficients were interpreted as follows:

- negative coefficients = inverse relationship with the dependent variable; and
- positive coefficients = direct relationship with the dependent variable.

Regression analyses were also used to identify specific variables that best predict the students’ comfort with providing dental care to PWDs, and the students’ value of the D clinic as a component of their undergraduate education. Odds ratios were interpreted as follows:

- \( \text{OR}>1 \) = response is associated with greater comfort/greater value; and
- \( \text{OR}<1 \) = response is associated with lesser comfort/lesser value.

Finally, comparisons were supplemented with descriptive statistics including mean, median, mode, frequency and percentage.
5.0 Results

5.1 Subject Response and Demographics

5.1.1 Subject Response

Six students participated in the phase one focus group, while three students participated in the phase two focus group. Forty-five of 94 third year dental students (48% response rate) completed a phase one survey. Forty-two of 94 fourth year dental students (45% response rate) completed a phase two survey.

5.1.2 Dentistry Class of 2012

The Dentistry Class of 2012 at the University of Toronto consisted of 94 students: 30 male students (32%) and 64 female students (68%). Sixty-six students (70%) began their dental degree as part of the four-year undergraduate program, while 28 students (30%) initially registered as part of the two-year international dentist advanced placement program (IDAPP).

5.1.3 Survey Demographics

Phase one students were between the ages of 24 and 41 with a mean age of 28.7 years (SD = 5.5 years). The majority of phase one students were female (65%). Thirty-two phase one students (71%) began their dental degree as part of the four-year undergraduate program, while 11 students (25%) initially registered as part of the two-year IDAPP. Two students (4%) did not report their class registration.

Phase two students were between the ages of 24 and 41 with a mean age of 29.2 years (SD = 5.5 years). The majority of phase two students were female (57%). Twenty-
seven phase two students (64%) began their dental degree as part of the four-year undergraduate program, while 13 students (31%) initially registered as part of the two-year IDAPP. Two students (5%) did not report their class registration.

Phase one and phase two students were representative of the Dentistry Class of 2012 at the University of Toronto (Table 2). Many students did not provide their University of Toronto student identification number; therefore, it was not possible to track the students individually, or make comparisons between respondents versus non-respondents.

Table 2. Distribution of student respondents in comparison to the Dentistry Class of 2012 at the University of Toronto.

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Gender</th>
<th>Initial Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Dentistry Class of 2012 (n = 94)</td>
<td>n = 30 (32%)</td>
<td>n = 64 (68%)</td>
</tr>
<tr>
<td>Phase One Students (n = 45)</td>
<td>n = 15 (33%)</td>
<td>n = 29 (65%)</td>
</tr>
<tr>
<td>Phase Two Students (n = 42)</td>
<td>n = 17 (41%)</td>
<td>n = 24 (57%)</td>
</tr>
</tbody>
</table>

Gender: $\chi^2 (1,N = 87) = 0.23, p = 0.633$
Initial registration: $\chi^2 (1,N = 87) = 0.20, p = 0.651$

5.1.4 Number of Rotations

The mean number of rotations completed by students in phase one was 1 (0.90), while the mean number of rotations completed by students in phase two was 5 (4.90).

Figure 1 depicts the number of D clinic rotations completed by the students at the time of
survey for both cohorts. The average number of rotations completed by the students in phase two was significantly greater, \( t(72) = -20.23, p < 0.001 \), than the students in phase one.

**Figure 1.** Number of rotations completed by students in phase one and phase two.

Mean difference: \( t(72) = -20.23, p < 0.001 \)

### 5.2 Focus Group Summaries

#### 5.2.1 Phase One Focus Group

The six students in the phase one focus group did not engage one another during the session. Instead, each student answered as if the conversation was limited to the
moderator. One student had significant experience with PWDs, and was outspoken compared to the five other students. Examples of previous experience described by the students included: a one-time encounter with PWDs at summer camp, or knowing a distant family member who had special needs. Overall, the students felt that their previous interactions with PWDs were positive. One student explained,

“I think my experience has taught me that, similar to what you were saying, largely they're [PWDs] very much normal people. They have disabilities but they want to, and should, be treated as normal people.”

The students seemed eager about their upcoming rotations in the D clinic, but also shared some concerns regarding what to expect in the teaching clinic. When asked what they have heard about the D clinic from senior students, one student stated,

“They found that it was busy, stressful, too many patients, patients were aggressive or biting, so they had a negative experience.”

Four of the six students were particularly concerned about the limited amount of time that they would be provided per patient in the D clinic. Nevertheless, the students were excited to have the opportunity to work in a hospital and to increase their knowledge about PWDs. For example, one student commented,

“I just expect to add to my toolbox, every patient will probably be something new to see, new to learn. I feel like you're always learning when you’re working with persons with special needs.”

All of the students expressed some interest in providing dental care to PWDs following graduation. One student explained,
“I hope to have enough experience that I can feel comfortable enough to see at least some spectrum of special needs patients in private practice and not say, I’m not comfortable seeing you.”

5.2.2 Phase Two Focus Group

The three students in the phase two focus group engaged one another during the session. The group did not feel that they had a sufficient amount of experience in the D clinic to maximize their comfort with the dental management of PWDs. One student stated,

“... but in order to be comfortable to treat patients in the future as a dentist I feel that I definitely need more rotations.”

At the same time, the students indicated that their comfort level increased as the year progressed. This was highlighted by the comment,

“The first time it was definitely a learning experience. I wasn’t as confident. I wouldn’t say I was as fast either. I’ve been there three times now, after the third time I feel a lot more confident.”

All three students expressed a particular interest in observing and performing restorative treatment and extractions in the D clinic.

In terms of their general reaction to patients in the D clinic, the students mentioned that they were nervous at first, but became more comfortable once they began interacting with PWDs. One student described,

“... after a while, after five or 10 minutes of the treatment I felt more comfortable. I thought if I don’t do anything wrong, if I don’t cause pain in his mouth, he will not be aggressive. My first feeling was fear.”
Furthermore, the students stated that their clinical demonstrators were good role models in terms of how to provide dental care to PWDs. The students also expressed a desire for their clinical demonstrators to provide more detailed instruction on the clinic floor.

When asked what they enjoyed most about the D clinic, the students all agreed on positive interactions with PWDs. For example, one student stated,

“I feel a lot more comfortable talking to them [PWDs], approaching them, and interacting, and making friendships with them. That aspect I really enjoyed. I did gain a lot from that.”

All three students indicated that they would like to provide dental care to PWDs following graduation, but would be quick to refer to a pediatric dentist if the PWDs were uncooperative.

5.3 Students’ Comfort

The students were asked to specify their level of agreement, from 1 (strongly disagree) to 5 (strongly agree), with the following statement: *I am comfortable providing basic dental treatment (including examinations, preventive care, restorations and simple extractions) for persons with disabilities.* The sample median/mode in phase one was 3/2, and in phase two was 3/4. The distribution of responses in phase one was positively skewed, and in phase two was more symmetric. When comparing the change in response (based on proportions) between phases, the difference was not significant, $\chi^2 (1,N = 63) = 0.88$, $p = 0.312$. These results are demonstrated in Table 3.
Table 3. Students’ median/mode for comfort in phase one and phase two, along with the distribution of responses to the question, “I am comfortable providing basic dental treatment (including examinations, preventive care, restorations and simple extractions) for persons with disabilities”.

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Median/Mode</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Disagree</td>
</tr>
<tr>
<td>Phase One Students</td>
<td>3/2</td>
<td>n = 18 (41%)</td>
</tr>
<tr>
<td>(n = 44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Two Students</td>
<td>3/4</td>
<td>n = 16 (38%)</td>
</tr>
<tr>
<td>(n = 42)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Change in proportion: \( \chi^2 (1, N = 63) = 0.88, p = 0.312 \)

5.4 Comfort Predictors

5.4.1 Previous Experience

Phase one students were asked to indicate the amount of experience that they had with PWDs at the time of the survey. The majority of students (74%) specified having had little to no experience (of any sort) with PWDs (Figure 2). The phase one students’ previous experience with PWDs was tested against the students’ comfort with providing dental care to PWDs. The model was significant, \( R^2 = 0.25, F(1,42) = 15.1, p < 0.001 \), indicating that previous experience with PWDs was a positive predictor of the students’ comfort with providing dental care to PWDs.
5.4.2 Other Factors

Factors such as gender, age, and number of rotations were not significantly correlated with the students’ comfort with providing dental care to PWDs; however, the students’ answers for ideal care location, care provider, consent, specific concerns in the D clinic, and willingness to treat target populations were significantly correlated (Table 4).

Results in Table 4 were computed based on combined data from phase one and phase two. The purpose of combining the two groups was to allow for comparison of certain factors such as the number of rotations completed by students, which was different between phases. The students’ concern with poor patient cooperation had the strongest correlation
with comfort ($r = -0.57$), while the students’ indication that dental care for PWDs was best provided by a pediatric dentist had the weakest correlation ($r = 0.00$).

**Table 4.** Factors correlated with students’ comfort with providing dental care to PWDs.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Pearson Correlation Coefficient ($r$)</th>
<th>Degrees of Freedom (df)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0.04</td>
<td>83</td>
<td>0.751</td>
</tr>
<tr>
<td>Age</td>
<td>0.10</td>
<td>79</td>
<td>0.371</td>
</tr>
<tr>
<td>Number of rotations</td>
<td>0.08</td>
<td>82</td>
<td>0.497</td>
</tr>
<tr>
<td>Initial registration</td>
<td>0.07</td>
<td>81</td>
<td>0.525</td>
</tr>
<tr>
<td>Care location</td>
<td>0.26</td>
<td>84</td>
<td>0.018*</td>
</tr>
<tr>
<td>Care by general dentist</td>
<td>0.50</td>
<td>84</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Care by general dentist with one year hospital residency</td>
<td>0.15</td>
<td>84</td>
<td>0.176</td>
</tr>
<tr>
<td>Care by pediatric dentist</td>
<td>0.00</td>
<td>84</td>
<td>0.980</td>
</tr>
<tr>
<td>Patient IQ and consent</td>
<td>0.29</td>
<td>84</td>
<td>0.006*</td>
</tr>
<tr>
<td>Concerned with ideal treatment</td>
<td>-0.33</td>
<td>84</td>
<td>0.002*</td>
</tr>
<tr>
<td>Concerned with time</td>
<td>-0.38</td>
<td>84</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Concerned with inability to communicate with patient</td>
<td>-0.40</td>
<td>84</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Concerned with poor patient cooperation</td>
<td>-0.57</td>
<td>83</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Concerned with injury-to-patient</td>
<td>-0.42</td>
<td>84</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Concerned with injury-to-self</td>
<td>-0.41</td>
<td>84</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Willingness to treatment individuals with developmental delay</td>
<td>0.31</td>
<td>84</td>
<td>0.004*</td>
</tr>
<tr>
<td>Willingness to treat individuals with physical disabilities</td>
<td>-0.05</td>
<td>84</td>
<td>0.627</td>
</tr>
</tbody>
</table>

* = statistically significant
Stepwise regression was then used to identify variables that best predict the students’ comfort with providing dental care to PWDs. The statistical model was significant, \( R^2 = 0.413, F(4,75) = 14.87, p < 0.001 \), and identified two positive predictors and two negative predictors of the students’ comfort (Table 5). These were:

1. (+) Students who indicated that basic dental care for PWDs was best provided by general dentists;

2. (+) Students who ascribed higher capacity for treatment consent in individuals with lower IQs;

3. (-) Students who were concerned with time constraints while providing dental care to PWDs; and

4. (-) Students who were concerned with poor patient cooperation while providing dental care to PWDs.

Table 5. Odds ratios for variables that best predict students’ comfort with providing dental care to PWDs.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care by general dentist</td>
<td>1.69</td>
<td>1.08 – 2.64</td>
<td>0.024</td>
</tr>
<tr>
<td>Patient IQ and consent</td>
<td>1.35</td>
<td>1.03 – 1.77</td>
<td>0.031</td>
</tr>
<tr>
<td>Concerned with time</td>
<td>0.83</td>
<td>0.68 – 1.02</td>
<td>0.082</td>
</tr>
<tr>
<td>Concerned with poor patient cooperation</td>
<td>0.74</td>
<td>0.60 – 0.91</td>
<td>0.001</td>
</tr>
</tbody>
</table>

\( R^2 = 0.413, F(4,75) = 14.87, p < 0.001 \)
While the concern for time had a confidence interval that crossed 1 (meaning no association between the students’ comfort and the factor), it was still important in the overall model in terms of its relationship with the other variables.

5.5 Students’ Perceptions

5.5.1 Willingness to Treat

The majority of the students in both phase one (98%) and phase two (98%) indicated that they would at least attempt to provide basic dental care to PWDs after graduation. Furthermore, the students were able to specify whether they were interested in providing dental care to individuals with developmental delay (IQ level below 70), individuals with physical disabilities, or both. These results are depicted in Table 6. Changes in proportion were assessed using Pearson’s chi-square test with Yates’ continuity correction. Significantly fewer students, $\chi^2 (1, N = 86) = 5.60, p = 0.018$, were interested in providing basic dental care to individuals with developmental delay in phase two compared to students in phase one. In terms of the students’ willingness to treat individuals with physical disabilities, there was no significant difference between phases, $\chi^2 (1, N = 86) = 0.00, p = 1.000$.

Additionally, phase two students were asked to specify the type of dental treatment that they would be willing to provide to PWDs after graduation. The majority of students were willing to conduct examinations (98%) and perform preventive care (91%). Figure 3 elaborates on these results.
Table 6. Students’ willingness to treat target populations following graduation in phase one and phase two.

<table>
<thead>
<tr>
<th>Target Population</th>
<th>Phase One Students (n = 44)</th>
<th>Phase Two Students (n = 42)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals with Developmental Delay (IQ level below 70)</td>
<td>n = 31 (70%)</td>
<td>n = 18 (43%)</td>
<td>0.018*</td>
</tr>
<tr>
<td>Individuals with Physical Disabilities</td>
<td>n = 41 (93%)</td>
<td>n = 39 (93%)</td>
<td>1.000</td>
</tr>
</tbody>
</table>

* = statistically significant

Figure 3. Phase two students’ willingness to perform specific treatments for PWDs.

If you are willing to provide dental treatment to persons with disabilities, what type of treatment would you be willing to provide?

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Percentage of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examinations</td>
<td>98%</td>
</tr>
<tr>
<td>Preventive care</td>
<td>90%</td>
</tr>
<tr>
<td>Simple restorations</td>
<td>50%</td>
</tr>
<tr>
<td>Simple extractions</td>
<td>48%</td>
</tr>
<tr>
<td>Endodontic therapy</td>
<td>5%</td>
</tr>
<tr>
<td>Dentures</td>
<td>7%</td>
</tr>
<tr>
<td>Crown and bridge</td>
<td>5%</td>
</tr>
<tr>
<td>No treatment</td>
<td>2%</td>
</tr>
</tbody>
</table>
5.5.2 Location and Provider

The students were surveyed on their beliefs regarding basic dental care for PWDs to determine what the students felt was the ideal location and care provider for this population. The students could choose multiple options for care provider (general dentist, general dentist with one-year hospital residency, pediatric dentist and/or other), but were only able to choose one option for care location (community private practice, hospital or other). Results for both phases are presented in Table 7. Significantly more students, $\chi^2(2,N = 87) = 23.91, p < 0.001$, in phase two indicated that basic dental care was best provided in the community than students in phase one. Overall, there were no significant changes between surveys in terms of the students’ beliefs regarding the ideal care provider in the dental management of PWDs. Responses for other included, “it depends on the patient’s health status” or “depends on cooperation”.

Table 7. Students’ beliefs in phase one and phase two regarding the dental management of PWDs in terms of ideal location and care provider for this population.

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Care Location</th>
<th>Care Provider</th>
<th>General Dentist</th>
<th>General Dentist with Residency</th>
<th>Pediatric Dentist</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Community</td>
<td>Hospital</td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase One</td>
<td>Private Practice</td>
<td>n = 17 (38%)</td>
<td>n = 25 (55%)</td>
<td>n = 3 (7%)</td>
<td>n = 13 (29%)</td>
<td>n = 24 (53%)</td>
</tr>
<tr>
<td>Students (n = 45)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Two</td>
<td>n = 27 (64%)</td>
<td>n = 12 (29%)</td>
<td>n = 3 (7%)</td>
<td>n = 17 (40%)</td>
<td>n = 22 (52%)</td>
<td>n = 31 (74%)</td>
</tr>
<tr>
<td>Students (n = 42)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Care location: $\chi^2(2,N = 87) = 23.91, p < 0.001$
Care provider (general dentist): $\chi^2(1,N = 87) = 1.14, p = 0.286$
Care provider (general dentist with residency): $\chi^2(1,N = 87) = 0.00, p = 1.000$
Care provider (pediatric dentist): $\chi^2(1,N = 87) = 3.39, p = 0.065$
5.5.3 Access to Dental Care

The students were asked to indicate their level of agreement, from 1 (strongly disagree) to 5 (strongly agree), with the following statement: *Access to dental care for persons with disabilities in the province of Ontario is adequate (i.e., meets the needs of this population).* The majority of students in phase one (67%) and in phase two (90%) disagreed with this statement. The students’ median/mode and distribution of scores are depicted in Table 8. The overall change in response (based on proportions) was significant, $\chi^2 (1, N = 72) = 4.73, p = 0.030$, indicating that the students in phase two felt that access to dental care for PWDs in the province of Ontario was less adequate than the students in phase one.

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Median/Mode</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Disagree</td>
</tr>
<tr>
<td>Phase One Students</td>
<td>2/2</td>
<td>n = 30</td>
</tr>
<tr>
<td>(n = 45)</td>
<td></td>
<td>(67%)</td>
</tr>
<tr>
<td>Phase Two Students</td>
<td>2/2</td>
<td>n = 38</td>
</tr>
<tr>
<td>(n = 42)</td>
<td></td>
<td>(90%)</td>
</tr>
</tbody>
</table>

Change in proportion: $\chi^2 (1, N = 72) = 4.73, p = 0.030$

5.6 D Clinic Experience

5.6.1 Perceived Value

The majority of students in phase one (82%) and phase two (71%) agreed or strongly agreed that the D clinic was a valuable component of their undergraduate training
at the University of Toronto (Figure 4). There was no significant difference, \( \chi^2 (3, N = 87) = 1.45, p = 0.693 \), in the students’ beliefs regarding the value of the D clinic between phases.

**Figure 4.** Students’ value of the D clinic as a component of their undergraduate dental training in phase one and phase two.

The disabled clinic at the Mount Sinai Hospital will be/was a valuable component of my undergraduate dental training at the University of Toronto.

<table>
<thead>
<tr>
<th>Percentage of Students</th>
<th>Phase One Students (n=45)</th>
<th>Phase Two Students (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>0%</td>
<td>5%</td>
</tr>
<tr>
<td>Disagree</td>
<td>10%</td>
<td>13%</td>
</tr>
<tr>
<td>Neutral</td>
<td>19%</td>
<td>57%</td>
</tr>
<tr>
<td>Agree</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>21%</td>
<td></td>
</tr>
</tbody>
</table>

Change in proportion: \( \chi^2 (3, N = 87) = 1.45, p = 0.693 \)

### 5.6.2 Additional Experience

The majority of students in phase two (56%) agreed or strongly agreed with the following statement: *I feel that I need more clinical experience to feel comfortable when*
providing dental care to persons with disabilities. Furthermore, 32% of the students in phase two disagreed or strongly disagreed with this statement (Figure 5).

Figure 5. Phase two students’ desire for additional clinical experience to increase their comfort with providing dental care to PWDs.

![Bar chart showing学生的满意度](chart.png)

Figure 6 reports the specific types of additional experiences desired by phase two students. The list of options was compiled from focus group dialogue and individuals could choose all that applied. A subset of the students (26%) stated that they would not require any additional experience. Other students expressed interest in postgraduate education: specialize in pediatric dentistry (7%), complete a one-year hospital residency (17%) or continuing education (29%). The majority of students (57%) indicated that they would like
to do restorations and/or extractions on PWDs in the D clinic. As well, 29% of the students indicated a desire to do more D clinic rotations.

**Figure 6.** Phase two students’ desire for specific types of additional experiences from the D clinic and beyond.
5.6.3 Clinical Demonstrators

The students in phase two were asked to evaluate their D clinic demonstrators in several categories. The majority of students (64%) specified that their clinical demonstrators modeled appropriate behavior as an example of how to perform dental treatment on PWDs. Conversely, fewer students reported that their clinical demonstrators provided specific instruction on the dental management of individuals with special needs (24%), or provided constructive feedback during the rotations (36%). These results are depicted in Figure 7.

**Figure 7.** Phase two students’ evaluation of their clinical demonstrators on specific categories in the D clinic.
5.6.4 Enjoyment

Phase two students (n = 42) were surveyed on what were their most enjoyed and least enjoyed aspects of the D clinic. The students were able to choose multiple aspects for each question. The list of aspects provided to the students was compiled from focus group dialogue. The majority of students in phase two enjoyed interacting with patients in the D clinic (64%), treating challenging patients (71%) and having the opportunity to work in a hospital (67%). None of the least enjoyed aspects of the D clinic reached a majority among the students with having to work in a hectic and/or chaotic work environment being the most reported at 43%.

One individual could have least enjoyed what was most enjoyed by another. For example, while 41% of the students indicated that they most enjoyed their clinical demonstrators, 7% of the students also reported that they least enjoyed their clinical demonstrators. A small percentage of the students (5%) specified that there was nothing about the experience they enjoyed most. On the contrary, 33% of the students reported that there was nothing about the experience they enjoyed least. These results are depicted in Figure 8 and Figure 9.
Figure 8. Phase two students’ most enjoyed aspects of the D clinic.

<table>
<thead>
<tr>
<th>Which aspect(s) of the D clinic did you most enjoy?</th>
<th>Percentage of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>There was nothing about the experience that I enjoyed most</td>
<td>5%</td>
</tr>
<tr>
<td>Opportunity to work in a hospital</td>
<td>67%</td>
</tr>
<tr>
<td>Clinical demonstrators</td>
<td>41%</td>
</tr>
<tr>
<td>Experience treating challenging patients</td>
<td>71%</td>
</tr>
<tr>
<td>Number of rotations</td>
<td>6%</td>
</tr>
<tr>
<td>Patient interaction</td>
<td>64%</td>
</tr>
</tbody>
</table>
Figure 9. Phase two students’ least enjoyed aspects of the D clinic.

<table>
<thead>
<tr>
<th>Which aspects of the D clinic did you least enjoy?</th>
<th>Percentage of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>There was nothing about the experience that I enjoyed least</td>
<td>33%</td>
</tr>
<tr>
<td>Working under time constraints (limited time per patient)</td>
<td>33%</td>
</tr>
<tr>
<td>Hectic and/or chaotic work environment</td>
<td>43%</td>
</tr>
<tr>
<td>Having to use physical restraint</td>
<td>41%</td>
</tr>
<tr>
<td>Clinical demonstrators</td>
<td>7%</td>
</tr>
<tr>
<td>Experience treating challenging patients</td>
<td>7%</td>
</tr>
<tr>
<td>Number of rotations</td>
<td>10%</td>
</tr>
<tr>
<td>Patient interaction</td>
<td>26%</td>
</tr>
</tbody>
</table>

5.6.5 Value Predictors

Using logistic regression, the phase two students’ value of the D clinic was tested against the students’ answers for demonstrator evaluation, most enjoyed aspects of the D clinic and least enjoyed aspects of the D clinic (Table 9). The model was significant, $R^2 = 0.705$, $F(20,17) = 5.41$, $p < 0.001$, and identified six variables associated with the students’ value: demonstrator provided constructive feedback, demonstrator answered questions related to my patients and/or treatment, enjoyed positive interactions with the patients,
enjoyed treating challenging patients, enjoyed the opportunity to work in a hospital, and did not enjoy working under time constraints.

**Table 9.** Logistic regression beta coefficients, standard errors and significance levels of all variables tested against students’ value.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\beta$</th>
<th>Standard Error</th>
<th>$p$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrator provided constructive feedback</td>
<td>-0.381</td>
<td>0.156</td>
<td>0.026*</td>
</tr>
<tr>
<td>Demonstrator provided specific instruction</td>
<td>0.067</td>
<td>0.124</td>
<td>0.598</td>
</tr>
<tr>
<td>Demonstrator modeled appropriate behavior</td>
<td>0.129</td>
<td>0.192</td>
<td>0.510</td>
</tr>
<tr>
<td>Demonstrator offered or provided assistance</td>
<td>0.002</td>
<td>0.183</td>
<td>0.991</td>
</tr>
<tr>
<td>Demonstrator answered my questions</td>
<td>0.653</td>
<td>0.174</td>
<td>0.002*</td>
</tr>
<tr>
<td>Demonstrator was supportive</td>
<td>-0.227</td>
<td>0.232</td>
<td>0.630</td>
</tr>
<tr>
<td>Enjoyed patient interactions</td>
<td>0.888</td>
<td>0.284</td>
<td>0.006*</td>
</tr>
<tr>
<td>Enjoyed number of rotations</td>
<td>0.180</td>
<td>0.367</td>
<td>0.630</td>
</tr>
<tr>
<td>Enjoyed treating challenging patients</td>
<td>-0.802</td>
<td>0.352</td>
<td>0.036*</td>
</tr>
<tr>
<td>Enjoyed clinical demonstrators</td>
<td>0.100</td>
<td>0.232</td>
<td>0.671</td>
</tr>
<tr>
<td>Enjoyed opportunity to work in a hospital</td>
<td>0.721</td>
<td>0.261</td>
<td>0.013*</td>
</tr>
<tr>
<td>There was nothing that I enjoyed most</td>
<td>-0.487</td>
<td>1.048</td>
<td>0.648</td>
</tr>
<tr>
<td>Did not enjoy patient interactions</td>
<td>-0.109</td>
<td>0.294</td>
<td>0.716</td>
</tr>
<tr>
<td>Did not enjoy number of rotations</td>
<td>0.400</td>
<td>0.467</td>
<td>0.404</td>
</tr>
<tr>
<td>Did not enjoy treating challenging patients</td>
<td>-0.418</td>
<td>0.505</td>
<td>0.419</td>
</tr>
<tr>
<td>Did not enjoy clinical demonstrators</td>
<td>0.350</td>
<td>0.445</td>
<td>0.443</td>
</tr>
<tr>
<td>Did not enjoy having to use physical restraint</td>
<td>-0.303</td>
<td>0.301</td>
<td>0.327</td>
</tr>
<tr>
<td>Did not enjoy hectic and/or chaotic work environment</td>
<td>0.072</td>
<td>0.328</td>
<td>0.829</td>
</tr>
<tr>
<td>Did not enjoy working under time constraints</td>
<td>-1.047</td>
<td>0.268</td>
<td>0.001*</td>
</tr>
<tr>
<td>There was nothing that I enjoyed least</td>
<td>-0.511</td>
<td>0.368</td>
<td>0.183</td>
</tr>
</tbody>
</table>

* = statistically significant
Stepwise regression was then used to determine which of these variables best predict the phase two students' value of the D clinic. The statistical model was significant, $R^2 = 0.791, F(9,28) = 16.5, p < 0.001$, and identified three positive predictors and two negative predictors of the students’ value (Table 10). These were:

1. **(+)** Clinical demonstrator readily answered questions related to patients and/or treatment;
2. **(+)** Enjoyed positive interactions with patients;
3. **(+)** Enjoyed opportunity to work in a hospital;
4. **(-)** Did not enjoy treating challenging patients; and
5. **(-)** Did not enjoy working under time constraints.

**Table 10.** Odds ratios for variables that best predict phase two students' value of the D clinic as part of their undergraduate dental training at the University of Toronto.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>$p$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical demonstrator readily answered questions related to patients and/or treatment</td>
<td>1.89</td>
<td>1.57 – 2.27</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Enjoyed positive interactions with patients</td>
<td>2.26</td>
<td>1.60 – 3.20</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Enjoyed opportunity to work in a hospital</td>
<td>2.21</td>
<td>1.61 – 3.04</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Did not enjoy treating challenging patients</td>
<td>0.54</td>
<td>0.30 – 0.95</td>
<td>0.043</td>
</tr>
<tr>
<td>Did not enjoy working under time constraints</td>
<td>0.37</td>
<td>0.25 – 0.54</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

$R^2 = 0.791, F(9,28) = 16.5, p < 0.001$
6.0 Discussion

This study had four main objectives. These were to investigate:

1. The change in the students’ comfort with providing dental care to PWDs between the end of third year (i.e., limited to no experience in the D clinic) and the end of fourth year (i.e., near the end of the students’ D clinic rotations);

2. Predictive factors contributing to the students’ comfort with providing dental care to PWDs;

3. The change in the students’ perceptions of dental care for PWDs between the end of third year (i.e., limited to no experience in the D clinic) and the end of fourth year (i.e., near the end of the students’ D clinic rotations); and

4. The students’ assessment of the D clinic as a valuable component of their undergraduate dental education at the University of Toronto.

6.1 Students’ Comfort

When comparing students at the end of their third year to students at the end of their fourth year, there was no significant difference in comfort with providing dental care to PWDs. This result differs from what has been previously reported in the literature, which demonstrated a positive correlation between students’ exposure to PWDs and the students’ overall comfort with providing dental care to PWDs (Chávez et al., 2011; Weil & Inglehart, 2010; Moore et al., 2009; Dao et al., 2005; Wolff et al., 2004).

One may suggest a few possible reasons to explain why the present outcome is different. First, the term comfort is subject to qualification. Some individuals may consider comfort, in the context of providing dental care to PWDs, to be dependent on the dental
procedure being performed. For example, a student may be comfortable polishing a patient’s teeth, but be uncomfortable performing endodontic therapy on the same patient. Level of comfort may also be related to how a student feels about interacting with an individual patient, and not because of the student’s clinical ability or the nature of the procedure. In this case, a lack of comfort could be based on social stigmas associated with a particular patient group such as PWDs, individuals with HIV, the elderly or other minority populations in society. To adequately assess comfort, it is important to define the meaning of comfort at the beginning of a questionnaire so that the respondents understand the context in which the word comfort is being used. Unfortunately, this was not done in the present study. Future research involving the D clinic and its effect on the students’ comfort with providing dental care to PWDs should include an explicit definition of the word comfort to improve the students’ understanding of its meaning, and to increase the validity of the measure.

One could also postulate that the set number of rotations in the D clinic was insufficient to actually produce a substantial change in the students’ comfort. This hypothesis is supported by the fact that the majority of the students at the end of their fourth year (56%) desired additional clinical experience to increase their comfort with providing dental care to PWDs. Subsequent research could examine how increasing the number of D clinic rotations impacts the students’ comfort, as well as the number of rotations required to optimize the students’ comfort.

Nevertheless, if the present finding is an accurate indication of the students’ comfort with providing dental care to PWDs, it could represent an awareness of the limitations that students recognize within themselves. Practitioners who are able to identify their comfort
level with certain patients are better positioned to exercise discretion in treatment planning (e.g., referrals) as opposed to practitioners who have not yet achieved self-awareness of their own abilities. For those students who are comfortable, or for those who would like to increase their comfort with providing dental care to PWDs, additional study in the area of special care dentistry may be worthwhile at the undergraduate level. This could be offered to the dental students in the form of elective rotations (as part of their core program) either in the D clinic or in other settings where PWDs seek dental care (e.g., home visits, public health or community screenings). During these rotations, the students would gain further experience with providing dental care to PWDs. Overall, the rotations would serve two purposes: to increase the students’ comfort, and to encourage interested students to take an active role in the dental management of PWDs.

The value of elective study is well illustrated in a study that was undertaken at the University of Missouri School of Medicine (Quinn, Kane, Stevermer, Webb, Porter, Williamson & Hosokawa, 2011). Investigators examined how elective programing designed for medical students with an interest in rural practice influenced participating students’ specialty choices and location preferences following graduation. The elective curriculum consisted of a preadmissions program for rural students, a summer community program for second year students, a six-month rural track clerkship for third year students and a rural track elective for fourth year students. Three separate cohorts of participants (defined by graduation year) were tracked and compared to students who did not participate in the program. Overall, students who completed the special programing were 2.6 times more likely than nonparticipants to choose family medicine as a career. Furthermore, 57% of students who completed the special programing established their first practice in a rural
setting. These results highlight the potential impact that elective study for students may have on their future interests and activities in healthcare.

If the Faculty of Dentistry at the University of Toronto were going to establish an elective program for undergraduate dental students interested in special care dentistry, it could need to map out a schedule similar to the one described by Quinn et al (2011) at the University of Missouri School of Medicine. An example of this might be:

• **Second Year** – the dental students would attend evening lectures or seminars concerning advanced topics in special care dentistry.

• **Third Year** – the dental students would conduct community visits where they would screen PWDs in their homes, residential facilities, schools or local programs and then refer those individuals who require necessary dental treatment to a dental clinic or practitioner.

• **Fourth Year** – the dental students would attend an elective clinic (as part of their core program, but separate from the main clinic) at the University of Toronto, Faculty of Dentistry, where they would perform all phases of dental treatment on PWDs. In terms of a potential space where the students could provide such care, the Children’s Clinic might be one option; however, the elective clinic would require a sufficient number of demonstrators and clinical resources to be sustainable.

This is just one example of how an elective program could be structured. Once again, the purpose of the rotations would be to increase the students’ comfort with providing dental care to PWDs, and to inspire the students to continue working with this population following their graduation.
6.2 Comfort Predictors

Prior non-clinical experience with PWDs was a positive predictor of the students’ comfort with providing dental care to PWDs. This relationship has been previously reported in the literature (Delucia & Davis, 2009; Kuthy, Heller, Riniker, McQuistan & Qian, 2007). Such experience may allow dental students to develop meaningful relationships with PWDs (Kuthy et al., 2007). An extracurricular program called Oral Health, Total Health (OHTH) was developed by dental students at the University of Toronto in part to provide an opportunity for non-clinical interaction between PWDs and students. OHTH is now a growing initiative in Canada that is bringing dental students and PWDs together in an effort to improve the students’ comfort with these individuals and to hopefully instill a willingness in the students to treat PWDs after graduation (Sigal, 2009).

Based on the students’ answers to questions in the surveys, several other factors were identified, which were significantly correlated with the students’ comfort with providing dental care to PWDs. The data set used in this analysis was the sum of the data from phase one and phase two. The potential disadvantage of combining the data would be evident if the two cohorts were dissimilar (i.e., gender, age or initial registration). However, there were no significant differences among the students in phase one and phase two based on these characteristics, therefore, the data from the two cohorts could be combined.

Comfort was positively correlated with the following responses: care best provided in the community, care best provided by a general dentist, lower IQ for treatment consent and an increased willingness to treat individuals with developmental delay. These positive factors provide an image of a general dentist working in the community who would be comfortable providing dental care to an individual with cognitive disabilities. However,
comfort was negatively correlated with: concern with ideal treatment, concern with time, concern with communication, concern with poor patient cooperation, concern with injury-to-patient and concern with injury-to-self. These concerns are similar to those identified by Casamassimo et al. (2004), who reported that both limited cooperation and inadequate funding/time deleteriously affected general practitioners’ motivation to provide dental care to children with disabilities in the USA.

Using a stepwise regression model, the four best predictors of comfort with providing dental care to PWDs were identified. Two predictors were positive in nature and affirmed the students’ comfort with providing dental care to PWDs. Reporting that basic dental care for PWDs was best provided by general dentists implies a definite level of comfort in students who share this belief. As well, ascribing a higher capacity for treatment consent in individuals with lower IQs suggests a greater appreciation by students for the capabilities of PWDs. This attitude also exemplifies the students’ openness to engage in a meaningful conversation with individuals who are developmentally delayed.

The remaining two predictors were negatively associated with the students’ comfort and were also specific concerns that were addressed by the students during the focus groups: poor patient cooperation and limited time to provide necessary dental treatment. Negative predictors of comfort could help clinical demonstrators identify potential students at risk. For example, students who voice concerns regarding poor patient cooperation or time constraints may require additional support while in the D clinic. Students rotating through the D clinic will typically see five to six patients in an afternoon. This is a substantial increase from a typical half-day, where students will normally see one or two patients. Alloting the students more time per patient in the D clinic might seem like a
practical solution to this problem, but the reality is most patients who attend the educational clinic will not tolerate an appointment longer than 30 minutes. Time management is critical when non-pharmacological behavior guidance is used in dental practice (American Academy of Pediatric Dentistry, 2011). If patient appointments run too long, many PWDs will become increasingly uncooperative. Thus, while the dental students may find it challenging to work within the confines of the D clinic’s rigid schedule, it is important for them to appreciate the purpose of this arrangement. Dental educators can help prepare students by discussing, ahead of schedule, realistic appointment times and treatment goals that one can expect during the rotations. The current demonstrators who supervise the D clinic do this by an orientation lecture and then by sitting down with each student group (4 to 5) on their first rotation to review these conditions.

Ultimately, the four variables associated with the students’ comfort with providing dental care to PWDs have practical significance. As previously stated, educators can use these results to potentially identify those students who may exhibit greater or lesser comfort in the D clinic. Educators can then engage students who may be at risk for lesser comfort, and review strategies to help minimize these feelings (e.g., behavior management techniques) at an earlier stage in the educational process. As well, educators can encourage those students who have greater comfort with providing dental care to PWDs to take an active role in the dental management of PWDs both in the D clinic and after graduation.
6.3 Students’ Perceptions

6.3.1 Willingness to Treat

This study demonstrated that significantly fewer students were interested in providing basic dental care to persons with developmental delay at the end of the D clinic rotations; yet, there was no difference in the students’ willingness to provide dental care to persons with physical disabilities. Moreover, the majority of the students in both phases (93%) were willing to treat persons with physical disabilities. Nelson et al. (2011) reported similar findings among children with special healthcare needs residing in the state of Massachusetts. They found that those with some degree of cognitive delay experienced greater difficulty in finding a dentist who was willing to provide care than those with a disability not involving cognitive delay.

This discrepancy in willingness to treat is one that deserves further analysis. In theory, providing dental students with clinical experience relating to the management of PWDs should increase the students’ comfort and willingness to provide dental care to this population. If this is not the case, then it is imperative to investigate why students feel this way. This matter was not addressed in the present study, but one may speculate that their decision to treat could be based on several factors, including heightened concerns, such as with time constraints or poor patient cooperation, and a lack of comfort with providing dental care to PWDs. New dentists in Canada and the USA are graduating from university with increasing debt (Valachovic, 2000). As a result, these overdrawn practitioners may be less inclined to treat PWDs who have government subsidized dental plans and who may require additional time to treat. Students’ core attitudes towards PWDs, especially those with developmental delay, and students’ response to social norms regarding PWDs may
also hinder them from fully engaging PWDs in their practice. Equally important are the attitudes of those individuals who live with and care for PWDs. Koneru and Sigal (2009) reported that personal factors among caregivers, including anxiety regarding their dependent’s behavior, and apathy about dental treatment were more commonly cited as barriers to obtaining care than environmental factors, such as cost or physical access.

Kuthy et al. (2007) surveyed University of Iowa dental students who were required to complete two consecutive, five-week community health clinic rotations, and found that following their extramural rotations, the dental students were less willing to provide care to individuals who were frail and elderly or those who were HIV positive. This study, among others, confirms that dental students’ exposure to PWDs does not necessarily translate into future practitioners who will be willing to provide dental care to a population in need (Bedi & O’Donnell, 1989; Block & Walken, 1980; Casamassimo, 1983; Kuthy et al., 2007).

Improving access to dental care for PWDs may involve a rethinking of the current educational model. The dental accreditation bodies in North America have charged dental schools with the task of teaching all undergraduate students about the dental management of PWDs. Ideally, all students would be willing to treat PWDs; however, the present study does not support this model. Rather than generalizing students, it may be beneficial for dental schools to target those individuals who have demonstrated a particular interest in providing dental care to PWDs. In this case, students with an aptitude to the subject would attain greater, personalized experience in the dental management of PWDs through elective study regarding PWDs as part of their core program.

Ideally, some individuals may choose to dedicate their entire dental career to PWDs. In 2005, the General Dental Council of Great Britain approved the establishment of a
specialty in Special Care Dentistry (Fiske, 2006). The discipline provides “preventive and treatment oral care services for people who are unable to obtain routine dental care because of a physical, intellectual, medical, emotional, sensory, mental or social impairment, or a combination of these factors.” (Royal College of Surgeons of England, 2009). Interested candidates must complete an approved advanced training program in the field in order to qualify for licensure. Special Care Dentistry, as an advanced training program, represents the apex of formal training in the field of dental care for PWDs. At the moment, Special Care Dentistry is not a recognized specialty in North America; however, the creation of a specialty in this area may have the potential to influence students’ career paths and potentially improve access to dental care for PWDs.

Finally, the psychosocial profile of students admitted to undergraduate dental programs is another factor that may be considered as part of a strategy to improve access to care for PWDs. Is there a way to select students who will be willing to provide dental care to PWDs? Presently, the admission process among North American dental schools varies greatly; however, criteria remain heavily focused on academic achievement with much less consideration given to nonacademic measures (American Dental Education Association, 2013; Canadian Dental Association, 2013). Smithers, Catano and Cunningham (2004) reported that admissions decisions based strictly on cognitive abilities and previous academic performance will only predict academic success in dental school. If dental schools are going to admit individuals who will have the potential to be more willing to provide dental care to PWDs, attention must be given to the applicants’ prior work experience, volunteer history and motivation for applying to the profession.
Given the findings in the present study, what is the purpose of the D clinic, education or service? As previously stated, the educational clinic provides necessary dental services for PWDs in southern Ontario. Also, the program may not necessarily increase the number of dentists willing to care for PWDs, but it can reinforce the desire to treat these individuals in students who already favor PWDs (Casamassimo et al., 2004).

6.3.2 Care Location and Access to Dental Care

The students were limited to only three options when choosing the ideal care location for PWDs: hospital, community practice or other. The provided list did not include all of the possible locations where dental care could be provided to PWDs (e.g., public health or home care). Consequently, the reported findings concerning care location may not represent the students’ true beliefs on the subject. Nonetheless, students at the end of their rotations in the D clinic were more likely to indicate that basic dental care for PWDs was best provided in the community than in a hospital setting.

This is an encouraging result given that hospital dental departments have insufficient resources to treat the growing numbers of PWDs (Kerins et al., 2011). Dental departments may be found in some teaching hospitals, and are rarely present in community hospitals. In Ontario, downsizing and cutbacks have forced the closure of many hospital dental departments leaving the few that remain with limited capacity to treat PWDs (Baird, 1999). If more PWDs received their dental care in the community, the burden placed on hospital dental departments would be lessened (Park & Sigal, 2008). This shift would also ensure that those individuals who needed to receive dental treatment in a hospital setting would have improved access to such resources when they were necessary.
Presently, new patients requiring non-urgent consultation at the Mount Sinai Hospital Dental Clinic wait up to six months for an appointment, and those requiring elective treatment under general anesthesia typically wait a year or longer for an operating room date (Ministry of Health and Long-Term Care, 2010; Park & Sigal, 2008). This information is publically reported by the Ministry of Health and Long-Term Care, and can be accessed online through *Ontario Wait Times* (Ministry of Health and Long-Term Care, 2010). Extended wait times for necessary dental treatment could adversely affect the wellbeing of PWDs, especially since these individuals experience a disproportionately high level of oral disease compared to the general population (Rowan-Legg, 2013; U.S. Department of Health and Human Services, 2000). Witnessing these disparities may explain why the students, at the end of their hospital rotations, were more likely to indicate that access to dental care for PWDs in the province of Ontario was inadequate. Still, this change represents a greater appreciation among the students regarding the oral healthcare needs of PWDs. Recognizing that there is a problem could be the first step in improving PWDs’ access to dental care in the future.

6.4 D Clinic Experience

6.4.1 Perceived Value

The majority of the students, both at the beginning of their D clinic rotations (82%) and near the end of their D clinic rotations (71%), reported that the rotations were a valuable component of their undergraduate training at the University of Toronto. However, this finding might be subject to social desirability bias, or the tendency for respondents to reply in a manner that would be viewed favorably by others (Phillips & Clancy, 1972). In
this case, the students may be stating that the D clinic is valuable in order to please the research team or others involved with the educational clinic. However, the students were given an opportunity to qualify their “value” of the D clinic, and did identify a number of aspects of the rotations that they enjoyed most, along with aspects that they enjoyed least. Factors such as challenging patients, clinical demonstrators and patient interactions were listed as responses under both most enjoyed and least enjoyed aspects of the D clinic. While more students found that these particular factors positively contributed to their value of the D clinic (71%, 41% and 64% respectively), there was a smaller percentage of students who felt that challenging patients (7%), clinical demonstrators (7%) and patient interaction (26%) were negative aspects of the D clinic. Some of the least enjoyed aspects reported related more to clinical factors, which might also be due to the students’ lack of clinical experience in general, not just with PWDs (i.e., working under time constraints (33%), hectic/chaotic work environment (43%) and having to use physical restraint (41%)). Aspects of the D clinic that were least enjoyed were consistent with issues that were identified in the focus group discussions. It is difficult to conclude, with any certainty, why particular factors were identified as most or least enjoyed, especially since the rationale behind the responses was not investigated. Further discussion and/or questioning would be helpful in order to gain a better understanding of the students’ value of the D clinic, and factors that either contribute or detract from this value.

6.4.2 Additional Experience

Most students in the D clinic will only perform recall examinations and preventive care. Few are provided with the opportunity to do restorations and/or extractions during
their D Clinic rotation in the hospital. Not surprisingly, the majority of the students near the end of their D clinic rotations were willing to provide examinations (98%) and preventive care (90%) to PWDs. It is encouraging to note that over half of the same students (57%) indicated a desire to perform restorations and/or extractions in the D clinic. One could hypothesize that dental students who gain this experience during their rotations would be more willing to provide restorative and/or surgical treatment to PWDs.

Previous studies have been completed that support such a theory (Chávez et al., 2011; Dao et al., 2005; Moore et al., 2009; Subar, Chávez, Miles, Wong, Glassman & LaBarre, 2012; Weil & Inglehart, 2010). Conversely, additional experience may have no effect on the dental students’ willingness to provide restorative and/or surgical treatment to PWDs. This was the case in the present study where students reported being less willing to provide dental care to persons with developmental delay despite having been exposed to these patients in the D clinic.

An objective of this study was to evaluate aspects of the D clinic in order to look for ways that could improve the students’ experience. One way to accomplish this could be to provide the students with more opportunities to perform simple restorations and extractions during their rotations. Such an undertaking would require an increase in manpower to help supervise the D clinic, which would also necessitate an increase in funding. This might not be feasible since the D clinic is already limited by the amount of capital available for its operation, as well as by the number of faculty available to teach in the program (Sigal, 2010).

Another possible option would be to assign the dental students to assist or observe postgraduate residents or staff dentists who work in the hospital. In this situation, the
dental students would gain firsthand experience observing restorative and surgical
treatment on PWDs, and would be able to participate in the treatment in a capacity other
than as the operator. However, one must also appreciate that dental students who have
limited to no experience with PWDs, or functioning as a dental assistant, may offer poor
assistance and could, in fact, hinder care. Finally, the Faculty of Dentistry at the University
of Toronto may consider establishing an integrated teaching clinic designed for PWDs. The
proposed clinic would operate at the Faculty of Dentistry in the same building and space
where the main teaching clinic is located. This model is supported by the students’
perception that basic dental care for PWDs is best provided in the community over a
hospital setting. In the proposed clinic, students would have the opportunity to perform all
phases of dental treatment on PWDs under local anesthesia with or without mild sedation.
The creation of this clinic would be a major undertaking for the dental school, and would
require financial support and dedicated resources (e.g., demonstrators). Such a clinic still
might be limited in its ability to provide comprehensive dental care to all PWDs, as some
individuals will require comprehensive treatment under general anesthesia, or emergency
care outside of the scheduled clinic hours. This level of care is likely not possible at the
Faculty of Dentistry without the support from an affiliated hospital dental department.

6.4.3 Clinical Demonstrators

In terms of evaluating their demonstrators, the majority of students (64%) reported
that their D clinic demonstrators modeled appropriate behavior as an example of how to
provide dental treatment to PWDs. This finding complements what was found by Talwar
and Weilin (2005), that part-time clinical demonstrators/instructors felt that effective
teaching was best characterized by being a positive role model for dental students on the clinic floor. In the focus group session conducted near the end of the D clinic rotations, one student stated,

“... but definitely watching Dr. X, I find that I really learned a lot actually from just watching Dr. X. I think Dr. X is excellent at what Dr. X does, and so I was just mimicking Dr. X and it seemed to work for me afterwards.”

Healthcare educators who teach by example are able to impart knowledge, skills and values of their profession to future practitioners (Cruess, Cruess & Steinert, 2008). The proven value of role modeling in healthcare education has been previously documented in the literature (Cruess, Cruess & Steinert, 2008; Curry, Cortland & Graham, 2011; Kisiel, Bundrick & Beckman, 2010).

Fewer students in the present study felt that their D clinic demonstrators provided constructive feedback (36%) or specific instruction related to the dental management of PWDs (24%). No details were available regarding what the students would have liked in terms of feedback, although the students’ expectations could be investigated in future studies. Information regarding the dental management of PWDs is presented to the dental students during their lectures in pediatric dentistry. It is unknown if the students who expected their demonstrators to provide such information during their rotations did so because the students did not review their lecture material prior to the rotations, or if the students were looking for additional feedback to enrich their experience in the context of a particular patient.
6.4.4 Value Predictors

Using a stepwise regression model, the students’ value of the D clinic was best predicted by five variables. Three positive variables were identified, namely students who felt that their clinical demonstrator readily answered questions related to patients and/or treatment; students who had positive interactions with patients; and students who appreciated the opportunity to work in a hospital. Conversely, students who had negative experiences treating challenging patients, and who were concerned with time constraints while providing such care placed less value in the D clinic.

In addition to their statistical significance as predictors, the variables also have clinical or practical significance. Educators may use the findings from this study to modify or reinforce certain aspects of the D clinic in order to increase the students’ value of the educational modality.

6.5 Challenges and Limitations

The decision was made to use focus groups rather than individual interviews in this study. The strength of a focus group is that it is interactive and allows more data to be collected in less time compared to individual interviews (Kitzinger, 1995). Participants can share feelings and insights, which can produce a rich dialogue. However, focus groups also have weaknesses, including a lack of anonymity and potential breach of confidentiality on the part of the participants (Kitzinger, 1995). The quality of the data collected in focus groups can also suffer if one member of the group dominates the discussion or is seen to unduly influence the views of others. In the present study, the primary reason for using
focus groups rather than individual interviews was related to time constraints and limited funding.

The phase one focus group included a student who had a significant amount of experience with PWDs. It is unknown whether that made the other students in the group, who did not have that same degree of experience, reluctant to engage in an open and honest conversation out of fear of embarrassment or inadequacy. The phase two focus group contained a balanced group of students. Their discussion highlighted similar feelings regarding the need for more experience in the D clinic to maximize their comfort with providing dental care to PWDs. Responses from both focus groups were felt to positively contribute to the contents of the surveys.

The survey response rate was low because obtaining completed surveys proved to be quite challenging. This could have been due to the students’ busy schedules or disinterest in the project. It was assumed that contact with the students would occur during classroom lectures or seminars; however, the students’ attendance in their pediatric dentistry seminars was poor, which limited survey distribution. Lecture attendance could have been low for multiple reasons, including the fact that attendance at lectures is not mandatory for undergraduate dental students at the University of Toronto, required course material can be found online or in printed manuals, and lecture capture provides lecture content to the dental students online. These various means of acquiring course information may have resulted in less incentive for the dental students to attend lectures or seminars, which then impacted on obtaining completed surveys.
The poor attendance in the pediatric dentistry seminars was reminiscent of the students’ behavior when they failed to attend a series of guest presentations designed to supplement their experience in the D clinic. In general, declining attendance during university lectures/seminars has been observed for decades (Beard & Senior, 1980; Snyder, 1971). Certain educators attribute this change to the students’ motivation (Coxon, Jenkins, Marshall & Massey, 1994). Coxon et al. (1994) stated that, for some students, “education is seen as a means towards some end, rather than being valuable in its own right”. Dolnicar (2004) reported that students do not attend university lectures/seminars for the value of learning, but focus on the end goal, which is their degree or career. Dental students who share this sentiment may be less likely to attend scheduled lectures/seminars or participate in elective research projects.

The students’ first and last rotation in the D clinic varied between May of their third year and April of their fourth year. Ideally, surveys would have been completed before the students began their first rotation in the D clinic and after the students’ final rotation in the D clinic; however, due to the groups’ varied rotation schedule, this did not happen. For future classes, the research team will attempt to survey the students immediately prior to their first rotation in the D clinic (i.e., schedule a 10 minute window before the patients arrive) and again, immediately after the students’ final rotation in the D clinic. Students are expected to attend all clinics so the proposed arrangement will increase the likelihood that the students are at least present to participate in the study; however, many students arrive late to the hospital due to morning clinics at the Faculty of Dentistry that run over their allotted time. It may also be difficult to include an additional component in the already busy
D clinic schedule. Any requests of this nature would have to be approved by the Discipline of Pediatric Dentistry.

As previously noted, a limitation in this study was the sample size. While the results of the study provide some insight into the D clinic, they must be interpreted cautiously as the small sample size may not necessarily reflect the true beliefs and perceptions of the Dentistry Class of 2012. Likewise, data collection was restricted to a single class. Additional classes at the University of Toronto, Faculty of Dentistry should be surveyed to improve the validity and reliability of the results. The study was also limited in its ability to compare student responses between the two surveys. Since the majority of students did not provide their University of Toronto student identification number, it was not possible to match student responses in phase one and phase two, and to compare changes at the individual level. Students may have refused to provide their identification number because of apathy, concern for disclosure, or fear of association. Future research may involve using a modification of the student identification number (i.e., last 5 numbers) to ease their anxieties. Moreover, the students will be explicitly informed about the purpose and importance of providing this information (i.e., for better comparison between phases).

6.6 Future Directions

The Dentistry Class of 2014 at the University of Toronto has been invited to participate in the next version of this project. Additional data from subsequent classes will provide a more longitudinal picture to formulate conclusions. Such research in the D clinic could be used to enhance the curriculum for undergraduate dental students in the treatment of PWDs both at the University of Toronto and at other institutions. Several
recommendations have been proposed in this study, which could be incorporated into the University of Toronto's existing dental curriculum to maximize the students' experience in the D clinic. For those schools without any specific programming, the D clinic provides a training model for undergraduate dental students in the management of PWDs. All of these recommendations come at a cost, which is an important consideration for dental administrators looking to modify their predoctoral curricula.
7.0 Conclusions

1. The difference in comfort with providing dental care to PWDs was not significant between students at the beginning of their rotations in the D clinic and students near the end of their rotations. The interpretation of the word comfort may have affected this result. Subsequent evaluation should include defining the word comfort to standardize the students’ understanding.

2. Previous non-clinical experience with PWDs was a positive predictor of the students’ comfort with providing dental care to PWDs. Greater comfort was also predicted in students who:
   - reported that basic dental care was best provided by general dentists; and/or
   - ascribed higher capacity for treatment consent in individuals with lower IQs.
   Conversely, lesser comfort was predicted in students who had specific concerns with time pressure and/or poor patient cooperation. Educators can use these predictors to engage students who may be at risk for lesser comfort with providing dental care to PWDs at an earlier stage in the educational process.

3. Students near the end of their rotations in the D clinic, compared to students at the beginning, reported that they were less willing to provide dental treatment to persons with developmental delay. Targeting students who express interest in providing dental care to PWDs, and providing these students with elective training in the area of special care dentistry may be more practical than attempting to change the willingness of all dental students.
Students near the end of their rotations in the D clinic, compared to students at the beginning, also reported that:

- basic dental care for PWDs was better provided in the community over a hospital setting; and
- access to dental care for PWDs in the province of Ontario was inadequate.

Both changes demonstrate a greater appreciation among dental students regarding the oral healthcare needs of PWDs. Hospital-based dental departments have insufficient resources to treat the growing number of PWDs. Shifting the dental management of PWDs out of the hospital and into the community could ultimately improve access to dental care for PWDs.

4. The majority of the students found that the D clinic was a valuable experience, but desired additional clinical training to improve their comfort with providing dental care to PWDs. In order to further improve the students’ experience in the D clinic, future research should examine the factors that influence the students’ value of the D clinic.
8.0 References


9.0 Appendices
9.1 Appendix I - Focus Group Documents
9.1.1 Information Letter and Consent Form

Graduate Program in Pediatric Dentistry
Discipline of Pediatric Dentistry
University of Toronto

Information Letter and Consent Form (Focus Group)

Undergraduate dental students’ experience and perceptions in the provision of dental treatment to persons with disabilities

Investigator: Dr. Darsi Perusini Supervisor: Dr. Laura Dempster

Introduction

Please accept this invitation to participate in the proposed study. As dental students or recent graduates of the University of Toronto Faculty of Dentistry, you are exposed to a variety of didactic and clinical teaching during the pursuit of your professional degree. The purpose of this study is to specifically evaluate one of these modalities.

Part of your undergraduate dental experience includes rotations through the Mount Sinai Hospital Dental Program for Persons with Disabilities (or D clinic). The purpose of this focus group interview is to stimulate discussion, generate ideas and assess your experience in the D clinic. The interview will be recorded and transcribed for analysis. Please feel free to contribute as much or as little as you like. Data gathered from the interviews will also be used to develop a survey in the second part of this study.

Focus groups will be conducted at the Faculty of Dentistry, 124 Edward Street, University of Toronto and will run approximately 30 to 60 minutes in duration. You may keep this information letter for future reference.

Conditions for Participating

Participation in this study is voluntary and you may withdraw at any time. Feel free to leave the room during the focus group, or remain in the room and elect not to answer any questions or contribute to the discussion. Please be advised that we will not be able to delete any dialogue that you contribute prior to your withdrawal from an active focus group. There are no repercussions or negative consequences for non-participation. Furthermore, your academic standing will not be affected by participation or non-participation.

Risks and Benefits

Members of the dental faculty are part of the research team. You may feel uncomfortable or anxious about answering questions during the focus groups or survey, or fear that your academic standing or grades will be affected by participation or non-participation in this study. Please be reassured that your grades and academic standing will
not be affected by participation or non-participation in this study. As well, data collection will not involve any member of the dental faculty.

A potential benefit for you is the opportunity to critically evaluate one aspect of your undergraduate dental curriculum. Refreshments will also be served during the focus group as a gesture of appreciation for your time.

Access to Information, Confidentiality and Publication of Results

Recorded audio and transcribed interviews will be stored on a USB storage device that will be encrypted and password protected. Hard copy transcripts from the focus groups will be locked in a filing cabinet located in the Discipline of Pediatric Dentistry office. Only members of the research committee will have access to the files. Data will be published in a graduate thesis in 2013 for you to view in the Harry R Abbott Dentistry Library. After three years, all data files will be destroyed.

If you have any questions or concerns about the research, please feel free to contact Darsi Perusini at 647 966 3251. You may also contact the Office of Research Ethics at ethics.review@utoronto.ca or 416 946 3273, if you have questions about your rights as a participant.
Undergraduate dental students’ experience and perceptions in the provision of dental treatment to persons with disabilities

**Investigator:** Dr. Darsi Perusini  
**Supervisor:** Dr. Laura Dempster

**Consent Form (Focus Group)**

I have read the information provided for the above study as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study.

________________________________________________
Name of Participant

________________________________________________  ______________________
Signature of Participant                  Date

________________________________________________
Signature of Principle Investigator                  Date
9.1.2 Focus Group Guide (Phase One)

Introduction

Hello, my name is Darsi Perusini. I would like to thank you for taking the time to talk with me today. I am conducting research in an effort to get a better understanding of the Mount Sinai Hospital Dental Program for Persons with Disabilities (or D clinic) as an educational tool for undergraduate dental students at the University of Toronto.

Before we get started, there are a few things that I would like to tell you. The interview will be recorded and transcribed for analysis. No faculty member at the University of Toronto will be involved in the data collection. Your identity will remain anonymous. I will be sharing your comments, but not your identity, with other members of the research team.

Do you have any questions before we begin?

Previous Experience

1. Do you have any experience being or interacting with people who have special needs? Please describe.

   Probe
   Who would you define/describe as individuals with special needs?
   If so, in what context?

2. What have you heard about the Mount Sinai Hospital Dental Program for Persons with Disabilities (or D clinic) from other students or faculty members at the University of Toronto?

   Probe
   When did you hear this?
   How did it make you feel?
   Did this change your opinion of the D clinic?

3. How do you feel about your upcoming rotation to the D clinic?

   Probe
   Why do you feel this way?
   What are some reasons why you feel that the experience will be valuable?
   What are some reasons why you feel that the experience will not be valuable?

Expectations

4. Which aspect of the D clinic, if any, are you looking forward to?

   Probe
What are some of your expectations about the D clinic? Why are you looking forward to this?

5. **What do you feel will be the most challenging aspect of the D clinic?**

   *Probe*
   
   Why do feel this way?
   
   Is there anything that could help you overcome this challenge?

**Conclusion**

Thank you for your contribution to my research project. Your comments are much appreciated. Before we close, would any one like to make an additional comment? Does any one have a question they would like to share with the group?

Thank you again.
9.1.3 Focus Group Guide (Phase Two)

Introduction

Hello, my name is Darsi Perusini. I would like to thank you for taking the time to talk with me today. I am conducting research in an effort to get a better understanding of the Mount Sinai Hospital Dental Program for Persons with Disabilities (or D clinic) as an educational tool for undergraduate dental students at the University of Toronto.

Before we get started, there are a few things that I would like to tell you. The interview will be recorded and transcribed for analysis. No faculty member at the University of Toronto will be involved with data collection. Your identity will remain anonymous. I will be sharing your comments, but not your identity, with other members of the research team.

Do you have any questions before we begin?

Previous Experience

1. How did you feel about the clinical rotation through the Mount Sinai Hospital Dental Program for Persons with Disabilities (or D clinic)? Please describe.

   **Probe**
   Why did you feel this way?
   Did your feelings change? How so?
   What are some reasons why you feel that the experience was valuable?
   What are some reasons why you feel that the experience was not valuable?

2. Please describe your general reactions to the patients you treated/met in this clinic.

   **Probe**
   Did your reactions change as you progressed through the rotation? How so?

3. How did the faculty who demonstrated in the D clinic shape your experience?

   **Probe**
   Did they enhance your experience? How so?
   Did they detract from your experience? How so?

Expectations

4. If you could improve any aspect of the D clinic, what would you improve?

   **Probe**
   Why would you improve this aspect?
How would you improve this aspect?

5. **Which aspect of the D clinic did you enjoy the most?** Please describe or share an example of a situation you enjoyed the most.

   **Probe**
   Why did you enjoy this aspect?

6. **If you could speak with the third year class who are about to begin their rotation through the D clinic, what would you tell them?**

Outcome

7. **How do you feel about treating persons with special needs in your practice after graduation?**

   **Probe**
   Why?
   Would more rotations have enhanced your experience?
   What type of treatment are you willing to provide?
   Did the D clinic play a role in building your confidence?

Conclusion

Thank you for your contribution to my research project. Your comments are much appreciated. Before we close, would any one like to make an additional comment? Does anyone have a question they would like to share with the group?

Thank you again.
9.2 Appendix II – Survey Documents
9.2.1 Information Letter and Consent Form

Graduate Program in Pediatric Dentistry
Discipline of Pediatric Dentistry
University of Toronto

Information Letter and Consent Form (Survey)

Undergraduate dental students’ experience and perceptions in the provision of dental treatment to persons with disabilities

Investigator: Dr. Darsi Perusini
Supervisor: Dr. Laura Dempster

Introduction

Please accept this invitation to participate in the proposed study. As dental students at the University of Toronto Faculty of Dentistry, you are exposed to a variety of didactic and clinical teaching during the pursuit of your professional degree. The purpose of this study is to specifically evaluate one of these modalities. Part of your undergraduate requirement in Pediatric Dentistry requires that you rotate through the Mount Sinai Hospital Dental Program for Persons with Disabilities (or D clinic). Completing this survey will allow you to critically appraise your experience in the D clinic and, in turn, provide us with data to analyze the clinic as an educational tool.

You may keep this information letter for future reference.

Instructions

You will have the opportunity to complete two surveys, one prior to the start of the D clinic in May 2012, and again following your final rotation at the hospital in April or May 2013. Both surveys consist of approximately 20 questions and will take approximately five to seven minutes to complete. Surveys may be completed on your own time. Please be honest when answering the questions. Questions are formatted in one of two ways: multiple-choice and agreement scale. For the multiple-choice questions, please read the associated instructions and choose one or, in some cases, more options from the list of answers provided.

Example

1. Please specify your gender (choose one):

   1. Male
   2. Female

The agreement scale questions are written as statements. Please read the statement and click the verbal descriptor that best suits your feelings.
Example

1. Access to dental care for people with special needs in the province of Ontario is adequate (i.e. meet the needs of this population) (choose one).

   1. Strongly Disagree
   2. Disagree
   3. Neutral
   4. Agree
   5. Strongly Agree

Surveys can be completed and submitted online by following this link: https://www.surveymonkey.com/s/SML57YC

Conditions for Participating

Participation in this study is voluntary and you may withdraw at any time. You do not need to complete your survey or submit your survey if you wish to be excluded from this study. As well, you may decline to answer any question. There are no repercussions or negative consequences for non-participation. Furthermore, your academic standing in Pediatric Dentistry will not be affected by participation or non-participation.

Risks and Benefits

Members of the dental faculty are part of the research team. You may feel uncomfortable or anxious about answering questions during the focus groups or survey, or fear that your academic standing or grades will be affected by participation or non-participation in this study. Please be reassured that your grades and academic standing will not be affected by participation or non-participation in this study. As well, data collection will not involve any member of the dental faculty.

A potential benefit for you is the opportunity to critically evaluate one aspect of your undergraduate dental curriculum.

Access to Information, Confidentiality and Publication of Results

Survey data will be entered into a database and stored on a USB storage device that will be encrypted and password protected. Only members of the research committee will have access to the files. Data will be published in a graduate thesis in 2013 for you to view in the Harry R Abbott Dentistry Library. After three years, all data files will be destroyed.
If you have any questions or concerns about the research, please feel free to contact Darsi Perusini at 647 966 3251. You may also contact the Office of Research Ethics at ethics.review@utoronto.ca or 416 946 3273 if you have questions about your rights as a participant.
Undergraduate dental students' experience and perceptions in the provision of dental treatment to persons with disabilities

**Investigator:** Dr. Darsi Perusini  
**Supervisor:** Dr. Laura Dempster

**Consent Form (Survey)**

I have read the information provided for the above study as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study.

__________________________________________________________
Name of Participant

__________________________________________________________
Signature of Participant  Date

__________________________________________________________
Signature of Principle Investigator  Date
9.2.2 Survey (Phase One)

Student Experience in the Mount Sinai Hospital Disabled Clinic (Phase One)

Welcome

This survey asks about your beliefs and perceptions related to the Mount Sinai Hospital Dental Program for Persons with Disabilities (or D clinic).

Please answer each question as honestly as possible and click the answer that best applies to you.

If you have any questions about this survey, please do not hesitate to contact Darsi Perusini by email at darsi.perusini@utoronto.ca, or by telephone at 647 966 3251.

1. I have read the Information Letter for this study and agree to proceed with the survey.
   ○ Yes

Beliefs and Perceptions

For the purposes of this survey, people with special needs (those you will see and treat in the D clinic) are defined as individuals with mild to severe developmental delay and/or physical disabilities (such as being wheelchair-bound).

2. How much experience do you have (of any sort) with people who have special needs (choose one)?
   ○ No experience
   ○ Little experience
   ○ Some experience
   ○ Fair amount of experience
   ○ Great deal of experience

3. If you indicated any experience in question number 1, what was the context in which you interacted with people who have special needs (choose all that apply):
   ○ Family member
   ○ Friend
   ○ Counselor
   ○ Coach
   ○ Work-related
   ○ School-related
   ○ Other (please specify)
4. In your opinion, basic dental care (including examinations, preventive care, restorations and simple extractions) for people with special needs is best provided in (choose one):
   - Hospital
   - Private practice
   - Other (please specify)

5. In your opinion, basic dental care (including examinations, preventive care, restorations and simple extractions) for people with special needs is best provided by (choose all that apply):
   - General dentists
   - General dentists who completed a one-year general practice residency
   - Pediatric dentists
   - Other (please specify)

6. Access to dental care for people with special needs in the province of Ontario is adequate (i.e. meet the needs of this population) (choose one).
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

7. Oral health is important in relation to the overall health of an individual (choose one).
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree
8. What do you believe is the incidence of dental disease in the special needs population (choose one)?

- Low
- Moderate
- High

9. In your opinion, what is the lowest level of intelligence that an individual must possess in order to provide consent for dental treatment (choose one)?

- Normal intelligence (IQ level above 70)
- Mild developmental delay (IQ level 50-55 to approximately 70)
- Moderate developmental delay (IQ level 35-40 to 50-55)
- Severe developmental delay (IQ level 20-25 to 35-40)
- Profound developmental delay (IQ level below 20 or 25)

Concerns and Expectations

For the following questions, basic dental treatment would include examinations, preventive care, restorations and simple extractions.

Once again, people with special needs (those you will see and treat in the D clinic) are defined as individuals with mild to severe developmental delay and/or physical disabilities (such as being wheelchair-bound).

10. I am comfortable providing dental treatment for people with special needs (choose one).

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree
11. To what degree do you feel that each of the issues below (left column) is a concern you will have when it comes to providing dental treatment for people with special needs (choose one for each issue)?

<table>
<thead>
<tr>
<th>Issue</th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>Much</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to provide ideal treatment</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not enough time to treat</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Unable to communicate with the patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor patient cooperation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of injury (patient)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of injury (dental personnel)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

12. Should a person with special needs seek your services after graduation, the likelihood that you will attempt to treat him in your own practice is (choose one):

- ☐ Never treat, refer to a specialist or general dentist who treats people with special needs
- ☐ Attempt to treat, refer if complicated
- ☐ Always treat

13. If you are willing to provide dental treatment for an individual with special needs, which type of individual would you be willing to treat (choose all that apply)?

- ☐ Person with developmental delay (IQ level below 70)
- ☐ Person with physical disabilities

14. The disabled clinic at the Mount Sinai Hospital will be a valuable component of my undergraduate dental training at the University of Toronto (choose one).

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Neutral
- ☐ Agree
- ☐ Strongly Agree

Questions About You

15. What is your University of Toronto student identification number?
Student Experience in the Mount Sinai Hospital Disabled Clinic (Phase One)

16. What is your gender?
   - Male
   - Female

17. What is your age in years (please enter as a number)?

18. How many rotations have you completed in the Mount Sinai Hospital D clinic at this point?
   - 0
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6

19. Which academic program are you currently registered in (choose one)?
   - Four year DDS
   - Two year IDAPP
9.2.3 Survey (Phase Two)

**Student Experience in the Mount Sinai Hospital Disabled Clinic (Phase Two)**

**Welcome**

This survey asks about your beliefs and perceptions related to the Mount Sinai Hospital Dental Program for Persons with Disabilities (or D clinic).

Please answer each question as honestly as possible and click the answer that best applies to you.

If you have any questions about this survey, please do not hesitate to contact Darsi Perusini by email at darsi.perusini@utoronto.ca, or by telephone at 647 966 3251.

1. I have read the Information Letter for this study and agree to proceed with the survey.
   - Yes

**Beliefs and Perceptions**

For the purposes of this survey, people with special needs (those you will see and treat in the D clinic) are defined as individuals with mild to severe developmental delay and/or physical disabilities (such as being wheelchair-bound).

2. In your opinion, basic dental care (including examinations, preventive care, restorations and simple extractions) for people with special needs is best provided in (choose one):
   - Hospital
   - Private practice
   - Other (please specify)

3. In your opinion, basic dental care (including examinations, preventive care, restorations and simple extractions) for people with special needs is best provided by (choose all that apply):
   - General dentists
   - General dentists who completed a one-year general practice residency
   - Pediatric dentists
   - Other (please specify)
4. Access to dental care for people with special needs in the province of Ontario is adequate (i.e. meet the needs of this population) (choose one).

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

5. Oral health is important in relation to the overall health of an individual (choose one).

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

6. What do you believe is the incidence of dental disease in the special needs population (choose one)?

- Low
- Moderate
- High

7. In your opinion, what is the lowest level of intelligence that an individual must possess in order to provide consent for dental treatment (choose one)?

- Normal intelligence (IQ level above 70)
- Mild developmental delay (IQ level 50-55 to approximately 70)
- Moderate developmental delay (IQ level 35-40 to 50-55)
- Severe developmental delay (IQ level 20-25 to 35-40)
- Profound developmental delay (IQ level below 20 or 25)

Concerns and Expectations

For the following questions, basic dental treatment would include examinations, preventive care, restorations and simple extractions.

Once again, people with special needs (those you will see and treat in the D clinic) are defined as individuals with mild to severe developmental delay and/or physical disabilities (such as being wheelchair-bound).
### Student Experience in the Mount Sinai Hospital Disabled Clinic (Phase Two)

**8. I am comfortable providing dental treatment for people with special needs (choose one).**
- □ Strongly disagree
- □ Disagree
- □ Neutral
- □ Agree
- □ Strongly agree

**9. If you are willing to provide dental treatment for an individual with special needs, which type of individual would you be willing to treat (choose all that apply)?**
- □ Person with developmental delay (IQ level below 70)
- □ Person with physical disabilities
- □ Not applicable: I am not willing or interested in providing dental treatment for people with special needs

**10. To what degree do you feel that each of the issues below (left column) is a concern you have when it comes to providing dental treatment for people with special needs (choose one for each issue)?**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>Much</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to provide ideal treatment</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Not enough time to treat</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Unable to communicate with the patient</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Poor patient cooperation</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Fear of injury (patient)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Fear of injury (dental personnel)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**11. Should a person with special needs seek your services after graduation, the likelihood that you will attempt to treat him in your own practice is (choose one):**
- □ Never treat, refer to a specialist or general dentist who treats people with special needs
- □ Attempt to treat, refer if complicated
- □ Always treat
### Student Experience in the Mount Sinai Hospital Disabled Clinic (Phase Two)

12. If you are willing to provide dental treatment for an individual with special needs, what type of treatment would you be willing to provide (choose all that apply)?

- [ ] Examination
- [ ] Preventive care (scaling, polish, topical fluoride, sealants)
- [ ] Simple restorations (amalgam, composite resin, glass ionomer, stainless steel crowns)
- [ ] Simple extractions
- [ ] Endodontic therapy
- [ ] Dentures
- [ ] Definitive crowns and/or bridges
- [ ] I will not provide dental treatment for individuals with special needs
- [ ] Other (please specify)

13. I feel that I need more clinical experience to feel confident when providing dental treatment for people with special needs (choose one).

- [ ] Strongly Agree
- [ ] Agree
- [ ] Neutral
- [ ] Disagree
- [ ] Strongly Disagree

14. If you feel that you need more experience providing dental treatment for people with special needs, what type of experience would you want (choose all that apply)?

- [ ] Complete more rotations through the D clinic at the Mount Sinai Hospital
- [ ] Observe clinical demonstrators doing restorations and/or extractions on individuals with special needs
- [ ] Do simple restorations and/or extractions on people with special needs in the D clinic
- [ ] Take continuing education courses specific to providing dental treatment for people with special needs
- [ ] Complete a one year general practice residency with a focus on providing dental treatment for people with special needs
- [ ] Specialize in pediatric dentistry
- [ ] I do not need more experience providing dental treatment for people with special needs
- [ ] Other (please specify)
15. The disabled clinic at the Mount Sinai Hospital was a valuable component of my undergraduate dental training at the University of Toronto (choose one).

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Why? (if possible, please elaborate)

16. To what degree do you feel that each of the qualities or attributes below (left column) were practiced or embodied by your clinical demonstrator during your rotations in D clinic at the Mount Sinai Hospital (choose one for each quality/attribute)?

<table>
<thead>
<tr>
<th>Quality/Attribute</th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>Much</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provided constructive feedback</td>
<td></td>
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<tr>
<td>Provided specific instruction on the dental management of people with special needs</td>
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<tr>
<td>Modeled appropriate behavior (as an example of how to provide dental treatment for people with special needs)</td>
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<tr>
<td>Offered or provided assistance when needed</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Answered questions related to my patients and their treatment</td>
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<td></td>
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<tr>
<td>Were supportive</td>
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Other (please specify)
17. Which aspect(s) of the disabled clinic did you most enjoy (choose all that apply)?
- Patient interaction (e.g., positive challenge, a learning experience)
- Number of rotations
- Experience treating challenging patients
- Clinical demonstrators
- Opportunity to work in a hospital
- There was nothing about the experience that I enjoyed most
- Other (please specify)

18. Which aspect(s) of the disabled clinic did you least enjoy (choose all that apply)?
- Patient interaction (e.g., negative challenge, poor patient cooperation)
- Number of rotations
- Experience treating challenging patients
- Clinical demonstrators
- Having to use physical restraint
- Hectic and/or chaotic work environment
- Working under time constraints (limited time per patient)
- There was nothing about the experience that I enjoyed least
- Other (please specify)

Questions About You

19. What is your University of Toronto student identification number?

20. What is your gender?
- Male
- Female

21. What is your age in years (please enter as a number)?
22. How many rotations have you completed in the Mount Sinai Hospital D clinic at this point?
   - 0
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6

23. Which academic program are you currently registered in (choose one)?
   - Four year DDS
   - Two year IDAPP

24. Please provide any further comments on your experience in the disabled clinic at the Mount Sinai Hospital.