The last decade was marked by exciting and epoch making advances in basic sciences, completion of the human genome project, in-vitro fertilization, cloning, stem cell research, and sequencing of microbial genomes to name a few. In the coming decade, it is expected that scientists will be involved in identification of molecules against which drugs will be targeted. This will be possible through genome, transcriptosome and proteome analysis. Advances in drug delivery systems will help achieve gene therapy and targeting drugs for greater efficacy and safety. Genomics in environmental health research will offer new opportunities and challenges. The linkage of genomics, proteomics and metabolomics to conventional toxicology and pathology databases holds great promise for elucidating mechanisms of gene - environment interaction in human health and disease. This understanding will result in tools for prevention of diseases. Microarrays and other advanced techniques will add to the available diagnostic armamentarium.

Medical research whether basic [pure research generally studying biological processes] or applied [problem oriented that could be on diagnostic or therapeutic modalities, agent host environment interaction or health assessment.] is conducted at various levels from the basic level at graduate or postgraduate stage to large scale multicentric studies at National and Internationals level and involves money, machinery and man-power ranging from a minimum to staggering quantities. Whatever be the level, the basic principles remain the same, this includes identification of the problem, collection and evaluation of existing information, formulating research objectives and identification of hypotheses, drawing up protocols, laboratory or clinical and includes study subjects, design, validated methodology, ethics] carrying out studies, analyzing, interpreting and finally writing the report.

Research is defined as the search for knowledge – generalizable knowledge should be directed to a country’s health needs. India faces a triple burden of disease, old unfinished set of infectious diseases, new set of diseases due to emerging infections and lifestyle related chronic diseases and diseases due to unequal distribution of healthcare. Globally it is recognized that 90% of resources go to 10% population and their health problems. It is expected that greater resources will be available for research into diseases of poverty. It is hoped that this trend is not a new fad that will achieve a nadir and then wane but one that will be sustained for the betterment of suffering millions.

The Indian Council of Medical Research [ICMR], which is the apex research body in India, has outlined its thrust areas for future research. Ethics and genomic research are important latest additions.

National Institute of Health [NIH] in a brainstorming session drew up a roadmap for research. They identified that - new pathways to discovery which involve study of interconnected network of molecules in cells and tissues, their interactions and regulations, will require wide access to technology and database. The scale and complexity of today’s biomedical research problems increasingly demand that scientists move out of their own discipline and form groups for team science. For e.g. imaging research requires radiologists, physicists, cell biologists and computer programmers to work together as an integrated team.

It is important to recognize that ideally basic research discoveries should get quickly transformed into methods of prevention, diagnostics, drug and treatments modalities. This requires collaboration between basic scientists, clinical medicine researchers and industry intelligentsia. Basic scientists should understand the need, clinical researchers to understand the science and what is being done. It is expected that teams of cell biologists and computer programmers to work together as an integrated team.

To encourage research, Govt. of India and ICMR give fellowships. A bright young GS Medical College undergraduate student recipient of this prestigious award worked on a simple but important project – quality of antiseptics. It was a well-planned and well-executed study with important observations. However two years later, this information has remained in his report and has not got translated into useful action.

In 1990, this institution received a research grant from Department of Biotechnology to develop liposomal drug delivery system for Amphotericin B. In eight years the product was developed, tested and ready to be made available at lesser cost than the imported alternative to needy patients. But it took a further six years to be actually marketed. This product was developed through partnership between basic science departments, clinical departments and the pharmaceutical industry.

It is being increasingly realized that lack of capacity building...
for clinical research will hamper the translation of discoveries in basic science into clinical practice. Clinical research is needed to evaluate new technologies. Independent studies are needed to show efficacy, risk, and cost benefit. Clinical research is needed not only for proof of concept, Phase I and II studies but also, for evaluation of new methods of diagnosis and characterization of phenotypes and surrogate markers of disease. Monitoring drugs and disease, genomic epidemiology, disease network are vital future areas of clinical research.

In UK, it is lamented that clinical research is on the decline. A substantial gulf remains between basic discoveries and converting such discoveries into innovation that can be applied to patients. Clinical research and participation of patients in such research is beneficial. It inevitably raises the standard of clinical practice, patients will benefit from this culture of inquiry and rigorous protocols that are put in place. Patients also get access to novel therapeutic interventions and clinicians can evaluate their benefits.

Expansion of clinical research will be successful only if public recognizes its value. There has to be advocacy, industry collaborations, political support and most importantly funds for such endeavors.

Thus in the next decade, discoveries will require technology and information database. Its translation from bench to bedside to the needy population will require clinical medicine research and partnership between basic science researchers, clinical medicine researchers and industry.

Plato has stated that a scholar teaches in the morning, practices during the day and researches in the evening. We need such committed clinical researchers. Henry Ford had said, ‘Coming together is a beginning; keeping together is progress; working together is success’. ‘We need lasting partnerships between basic and clinical researchers, industry, public and politicians’.

References