Preface

The vision and leadership of Dr. James D. Watson, the Nobel laureate in encouraging his team to characterize the human DNA by urging world leaders to financially support the Human Genome Sequencing Initiative is not only praiseworthy, but also led to the accomplishment of the project by March 25th, 2003. On-going scientific sequencing trends demonstrate how genomics is bound to revolutionize medicine, public health and the basic and behavioral sciences. Currently, the most astonishing breakthrough is the impact of precision medicine and pharmacogenomics. For the first time in preventive medicine, we have attempted to adopt the Health Belief Model (HBM), Social Ecological model (SEM) and the Innovation Diffusion Model (INDM) to describe the seamless linkages among clinical medicine, public health and human phenomenology.

Genomic medicine is being predicted to challenge not only the chronic and degenerative diseases but also the single gene and complex diseases. Even now, the latter diseases constitute the leading causes of death in the developed and many of the developing nations. After the successful completion of the HGSP by March 25, 2003, mapping all the over 2,500 genes in human body at a cost of about $2.98 billion, numerous inklings about single genes and complex diseases became well established scientifically. Significant factors which propelled the G-8 nations in their rapid advances in developing the technological infrastructures required for the commercialization of genomics services included their existing workforces, coupled with engineering resources and the existing well-established venture capitalists. These business entrepreneurs have expertise in commercialization and diffusion of innovative ideas into practical realities. To illustrate, DNA Vision (Charleroi, Belgium) promptly developed an increased technological platform using a next-generation sequencing FLX system (Roche) for genome shot gun sequencing, transcriptome and metatranscriptome and metatranscriptomics. The 454 gene sequencers were manufactures by Roche, and numerous other relevant sequencing techniques were innovatively developed. Many other progressive developing nations which include Brazil, Russia, India, China and South Africa (BRICS) developed De-NOVO sequencing and re-sequencing, whole genome sequencing, whole genome and exom sequencing among other innovative techniques.

Biotechnology has become the bedrock of innovation in genomic science and its applications in enhancing medicinal cash crops, vegetables and fruits have become limitless. Effective applications of these genome-associated technologies could trigger economic boom and massive youth employment initiatives worldwide. The implementation of this scientific program could lead to the avalanche of cash crops in several parts of the world.

Agronomic research in the various ecological biomes of developed and developing nations could create improved knowledge into the flora and fauna in these geographical areas and the broad spectrum of plants which have healing properties in this hitherto virgin forest in South East Asia and Sub-Sahara
Africa and other unexplored rural parts of the world. As we characterize heart disease and cancer as the leading causes of death in United States and many other parts of the world, intense knowledge about phytochemical nutrients which are present in fruits, vegetables and medicinal herbs which can be explored to either eliminate or reduce the incessant mortality associated with these diseases. The United States National Institutes of Health recently revealed the effectiveness of Dietary Assistance to Stop Hypertension-(DASH DIET). The role of these ubiquitous plants and vegetables were emphasized.

As a progressive, developing nation, China stands out as a leader among the G-20 nations, having invested S100billion for the commercialization of genomic technology. China had a glimpse of their sequencing innovation when Beijing Genomics Institute (BGI) sequenced a percent of the HGS initiative of March 25th, 2003. In the next few years, the Human Genome Scientific Community anxiously observes, anticipate the announcement of the return on investment by the Chinese venture capitalists and entrepreneurs. Besides, BGI, Brazil, Russia, and India are miracles which we all watch to see happen, regarding the incipient phase of innovations in genomic medicine.

Although heart disease became the leading cause of death in United States in 1940, the Framingham heart disease study proposed to assess the risk factors associated with the disease has created several insights into the role of family history and other risk factors. As we anticipate the numerous spinoff benefits associated with genomic science, we must applaud China’s philanthropic gesture in assisting other developing nations to appreciate and understand how to use genomic interventions to combat their prevalent economic challenges. The United States National Institutes of Health, the U.S Department of Energy and the U.K. Wellcome Foundation continue to play pioneering role in diffusion of genomic innovations regarding the H3Africa project.

In the twenty first century, the imminent facets involving commercialization of genomics include forensic science investigation, adoption of family history techniques, regarding knowledge about complex and single gene diseases, and the application of microbial agents for sequestration of greenhouse gases. The lived experiences of the unborn children are inextricably linked to their growth and development. Young adults must be retrained for preparation to become parents. Such innovative instruction must advocate not exposing the fetus to crack cocaine, alcohol, pica, lead and other intoxicants which could lead to a child’s inability to thrive. In recognition of this philosophical construct, the World Health Organization in 1978, at its Alma Ata Conference ingeniously integrated maternal and child health (MCH) as key components of the eight primary health care elements. In the age of genomic science, the human genome sequencing project has emphatically articulated personalized nutritional of children in the coming revolution in innovative medicine.

Although petrochemical products continue to improve intercontinental communication and pharmaceutical sciences among other technological ventures, the pollutants evolving from oil continue to damage the human ecosystem. Microbial genomics have been studied to confirm the natural remediation potential of microscopic agents. Even in catastrophic oil ridge breakages and associated with Karina in Louisiana and Mississippi in United States and the South East Asian Tsunami, microbial agents inconspicuously have been detected to sequester various carbon entities and their metabolites. It seems axiomatic that at the incipient stage of the coming revolution in genomic medicine epidemiologist, public health scientists and other behavioral scientists must become familiar with genetic nomenclature, elementary quantitative techniques pertinent to understanding diseases. These hitherto incurable diseases are among the health issues and challenges in which ongoing genomic medical revolution could provide humanity astonishing, unimaginable benefits in the annals of medical science.
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In this regard, nurses play crucial role medical profession. Educational revolution and reorganization will be needed to developing innovative nursing curriculum which must incorporate precision medicine, precision nutrition, family history techniques and various quantitative techniques and behavioral models. Succinct scientific revolution in nursing curriculum will demand the incorporation of community medicine, genomic epidemiology and clinical trial techniques with concerted efforts to expunge the ethical ills of yester years.

Barring all unforeseeable circumstances, diffusion of innovative genomic medicine will create global commercialization momentum which no one region could impede. Although the Venture Capitalists (VC) in the G-8 nations have crucial role to play, the establishment of Global Genomic Institute has become imperative to nip in the bud any iota of disparities.

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