Chapter 14
The Global Genomics Research Initiatives and the H3Africa Project

ABSTRACT

This chapter focuses on the H3Africa genomic program and the moral sanctity for its implementation. The rationales for the implementation of the project were discussed and the prospects of associated potential risks and specific challenges were enunciated. The evolutionary rationales for involvement of African scientists in the H3Project were discussed. The issue of African professional workforce that requires additional training was discussed. Weak technological infrastructure is another major challenge for the introduction of H3Africa project. Compared to the World Health Organization-championed primary health care program, suggestions were made about the most effective mechanism of introducing genomics to African academic and research institutions.

PART I: THE IMPLEMENTATION OF THE H3AFRICA GENOMIC PROGRAM

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Although the health benefits of the Human Genome Project were predicted, and the technologically developed nations now reap the anticipated benefits in terms of massive economic return on investment, and a drastic reduction in the deadly impact of a broad spectrum of chronic and degenerative diseases. However, in the developing and least-developed nations, unemployment of high school and college graduates create restive, at-risk population of potential violent cohort. Human Genome scientists and modern genome epidemiologists had predicted the possibility of individualized disease prevention based on testing for genetic susceptibilities, and safer, more effective use of drugs based on pharmacogenomic testing (Collins, 1999; Roses, 2004;Austin, 2004), At present, owing to the advancement from research derived from genomic science, over 500 drugs have been developed based on the human DNA scientific assessment, and therapies targeted more precisely to the molecular mechanisms of disease(Austin, 2004). The other numerous benefits associated with genomic research involve the genetic testing,

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which can identify women at high risk for breast and ovarian cancer who may benefit from interventions such as breast screening by magnetic resonance imaging (MRI) and prophylactic oophorectomy (Nelson, Huffman, Fu, & Harris, 2005). Besides, pharmacogenomic testing offers a potential means to increase the safety of drugs with narrow therapeutic indices, such as mercaptopurines and warfarin, and genetic analysis of disease processes such as cancer has also provided benefit: over expression of the HER2/neu gene, which provides an important prognostic indicator in breast cancer, and identifies patients most likely to benefit from the groundbreaking drug, Herceptin. Similarly, imatinib mesylate, a novel cancer therapy, was developed as a result of analysis of the genetic changes in a specific type of leukemia (Emens, 2005; Krause &Van Etten, 2005).

The demonstrated evidence of these multiple benefits associated with genomic revolution should serve as the impetus to mobilize African leaders to provide the necessary funding to support collaborative scientific programs in African universities and other research institutes. Also, African governments need to aggressively commit themselves to indigenous and socially and epidemiologically relevant research studies in African nations.

Although several scientists have raised their critical assessment of genomic research pertaining to the timing of a genomics revolution in medicine; the relationship between DNA sequence and phenotype is far from simple, even for highly penetrant single-gene conditions. Most individual gene variants associated with common diseases will have low positive predictive value and associated attributable risk, raising questions about their precision of clinical utility. Also, an overemphasis on genetic contributors to disease may result in neglect of other factors, such as environmental exposures, social structure, and lifestyle (Emens, 2005; Krause&Van, Etten, 2005; and Holtzman &Marteau, 2000).

H3Africa

The other cogent criticisms of the ongoing genomic revolution with the potential to usher in economic prosperity for Europe, the United States, and Asia have been articulated by many world-renowned scientists. They include Hubbard, Lewontin, Vineis, Schulte, and McMichael et al. (2001). They argue:

As with other emerging technologies, the pressing challenge is to devise an efficient strategy to distinguish innovative advances from false leads. The stakes are high, as healthcare systems face increasing strains with growing elderly populations and chronic disease burdens. The potential benefits offered by the Human Genome Project and advances in related technologies need to be weighed against the resources required to implement them and the potential harms (World Health Organization, 2003).

Before introducing genomic research to the African institution of higher learning, the Draft of the H3Africa guidelines for informed consent for Human Genome Research V5 was circulated widely to African scientists in the United States and Europe for their feedback, at the time there was so much enthusiasm in critically assessing the initiative. My team and students at the Chicago State University, Department of Health Studies were challenged to view this critical assessment of H3African as scientific work in progress because we were whole-heartedly committed to this public health research initiative, which will have both foreseeable and unforeseen consequences on the African continent (Ebomoyi & Bonsu, 2014). In fact, a detailed account of their initial report is beyond the scope of this chapter, suffice it to insert additional observations after our initial published comments: