

Chapter 39

ICT4D and its Potential Role in the Detection, Surveillance, and Prevention of Novel Zoonotic Disease Outbreaks for Global, National, and Local Pandemic Prevention

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ABSTRACT

Information and Communication Technology for Development (ICT4D) and Information Technology for Development (IT4D) has been a strategy applied since the mid-1950s to support the work of advancing developing societies. There has been a range of technologies used for information collection, knowledge management, intercommunications, and information sharing. In recent years, ICT4D has evolved to include the uses of social media platforms and various analytical tools used for extracting information from such platforms to support disease prevention efforts. It involves the use of Geographical Information Systems (GIS) to help in epidemiology. Parsimonious simulations have been brought to bear to inform the policies to support pandemic prevention in countries where pharmaceutical-based interventions may be too expensive to deploy broadly. Work done in this area suggests that appropriate non-pharmaceutical interventions exist if government leaders and the broad public can be sufficiently aware of an occurring emergence of a novel pathogen (or re-emergence of a pandemic-potential pathogen) before this pathogen becomes endemic. This chapter asks, What is the relationship between Information and Communication Technology for Development (ICT4D) and global, national, and local prevention of zoonotic diseases with pandemic potential? This work provides some early thoughts on ways ICT4D and IT4D may be deployed to this end, and it offers some insights about open-source (and some commercial) technologies that may be used for the work of pandemic prevention and protection of human health.

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INTRODUCTION

According to a human rights point-of-view, a development agenda must necessarily consider the promotion and protection of human health and lives as a critical factor. Those who promote development endeavors often strive to shore up human nutrition, access to potable water, proper food handling, and sanitation. There are development projects to address chronic health issues like heart disease and obesity. Other organizations provide immunizations to the children of the world. Physicians and health professionals strive to extend primary medical care to more individuals. There are basic education endeavors to reach the broad public for individuals to promote their own health and well-being. Beyond these disparate measures to address fundamental supports for human health, though, are efforts to protect the world's people against the risks of pandemic threats, in part to protect the world's population. Combating infectious diseases is a core part of United Nation's Millennium Development Goals (MDGs) (2000) for improving human society and productivity. The eight goals include the following:

These goals include the eradication of extreme poverty and hunger; the achievement of universal primary education; the promotion of gender equality, empowerment of women; the reduction of child mortality; the improvement of maternal health; combating HIV/AIDs, malaria and other diseases; ensuring environmental sustainability; and developing global partnerships for the attainment of a more peaceful, just and prosperous world (United Nations, 2000). According to Zaidi (2005), economic development is "growth in GDP accompanied by relevant social and institutional changes by which that growth can be sustained". These changes include reducing absolute poverty, a better quality of life, high literacy levels, improved labour productivity, sophisticated techniques of production, development of physical and commercial infrastructure, higher savings,

increase in employment opportunities, a positive attitude towards life and work, and a stable political system. (Mutula, 2010, p. 6)

People live as physical animals in a physical universe. The functions of this world depend in large part on the work of numerous microbes, which are critical to the functioning of the Earth and its creatures. Some microbial agents, though, have deleterious effects on human health. Such biological agents have been the direct causes of mass deaths of people historically, through a number of various pandemics. The harsh reality of pandemics caused by contagious pathogens is that these affect developed and developing countries differently, with the latter projected to sustain much higher percentages of casualties and steeper loss of life than their peers in other better-resourced countries. The risk though does not just reside in the less-resourced countries.

Human health is one of those shared global interests that cross national boundaries. After all, contagious infections do not respect boundaries, and in the age of global trade and air travel, a non-native or newly emergent virus can make its way around the world in short order. The 2009-2010 H1N1 flu pandemic showed this mobility in action. As network science has shown, people are deeply interconnected with each other, and their "small world networks" mean that people are only a few connections away from anyone else. Public health work involves the promotion of health and the prevention of disease to improve quality and length of life—at the societal level. While many working in global public health in developing societies focus on fundamentals like sufficient nutritive food, access to clean water, inoculations against known childhood and other infections, proper sanitation, and other such endeavors, there has been increasing focus on possible "black swan" events like widespread pandemics (prevalent infectious diseases) from pathogenic agents, particularly zoonotic ones (animal infections transmissible to humans).

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