Chapter 4
Risks, Security, and Privacy for HIV/AIDS Data:
Big Data Perspective

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ABSTRACT

Big data has the potential to transform healthcare systems for the prevention and treatment of HIV/AIDS by providing analytic tools that are capable of handling huge and different types of data at very fast speeds. Big data's transformative potential is also introverted by privacy and security requirements for HIV/AIDS patients' sensitive data that restrict health information exchange. Electronic health records provide the opportunity for HIV/AIDS patients to receive improved coordinated care from healthcare providers and easier access to their health information. This chapter discusses the various legal frameworks governing health information, dispels misconceptions about privacy regulations, and highlights how these legal frameworks provide privacy, confidentiality, and security to this sensitive information, and shows how EHRs can maximize the utility of big data to improve HIV/AIDS prevention and treatment.

INTRODUCTION

HIV is the virus that is the reason for AIDS (acquired immunodeficiency syndrome). Today's AIDS has become one of the world's most severe health and development challenges. UNAIDS/WHO estimates show that the first cases were informed in 1981 and today, there are approximately 36.7 million people currently living with HIV and tens of millions of people have passed away of AIDS-related causes since the commencement of the epidemic. However, several new cases have been reported in all regions of the world, approximately two-thirds are in sub-Saharan Africa, with 46% of new cases in Eastern and Southern Africa. According to the World Health Organization (WHO), "The human immunodeficiency virus (HIV) infects cells of the immune system, destroying or impairing their function. Infection with

the virus results in progressive deterioration of the immune system, leading to "immune deficiency." The immune system is considered deficient when it can no longer fulfil its role of fighting infection and disease. Infections linked with severe immunodeficiency are known as "opportunistic infections" because they take benefit of a weakened immune system. AIDS is still a serious public health issue after three decades of prevention and treatment efforts. AIDS is the disease produced by destruction of the body's immune system from HIV. AIDS is a progressive step of HIV infection, originating when the immune system of the body no longer has the capacity to resist infections and other illnesses. Today's modern antiretroviral treatment (ART) is so effective and consistently used treatment at destroying HIV within a person's body.

Big data is revolutionizing the healthcare sector by providing effective data accessibility tools to healthcare analytics to support effective and predictive treatment. There are various big data technologies such as social networking, mobile applications any many other online tools which deliver the potential to be capable of using these data to design and develop HIV/AIDS monitoring technique.

In the United States, the Centers for Disease Control and Prevention (CDC) gather, analyzes, and distributes surveillance data on HIV infection. These huge amounts of data are one of the nation's primary sources of information on HIV. Big data tools provide reactive to proactive healthcare strategy which can result in a complete decrease in healthcare costs and eventually lead to economic growth. Big Data has the potential for significant financial and social benefits. Big data arises as a believable and cost-effective solution with the promise to transform the healthcare industry. Big data helps in prevention and control of HIV/AIDS but it also generates serious privacy, security and risk considerations. Security and privacy are always two different key concerns in information technology. In the big data era, the healthcare data volume is growing very fast. The healthcare data may contain structured EHR data, unstructured clinical data, medical imaging, genetic data and many other healthcare data. There are many severe security risks which are harmful to these healthcare data. The arrival of huge data sets from miscellaneous sources places an extra impediment to storage, processing, and communication. Security and privacy both are important to improving the public's health and maintaining the public's trust. Every stage of big data healthcare analytics in HIV/AIDS has several processes like the collection, combination, analysis, and practice has changed in current years in a way that could contemporary severe risks to individual privacy. HIV/AIDS patient faces high levels of discernment, avoidance, and disgrace around the world.

HIV/AIDS patient related all clinical and personal data are very sensitive nature of health data. Special attention should be paid to the security of data from vulnerability and dissemination of information on electronic format. Ensuring the security and privacy of HIV/AIDS personalized healthcare data are important to improving the public's health and maintaining the public's trust. Security and Privacy both are a vital concern for making the effort of prevention and treatment of HIV/AIDS successful. Sensitive health information like HIV/AIDS patient details could become more easily accessible and shareable as health records become fully automated, one can easily retrieve information over the internet. If sensitive health information is accessible by any unauthorized person, this would undoubtedly signify a breach of the HIV/AIDS patient's privacy. Healthcare providers, clinicians and other participants who are associated with such type of highly sensitive data, have a responsibility to preserve the confidentiality, privacy, and security of data and systems, and need to discourage access by unauthorized persons.

Implementation of big data analytics tools in HIV/AIDS treatment and prevention significantly increases security and patient privacy concerns. At the beginning, HIV/AIDS patient information is stored in databases with unpredictable levels of security. Furthermore, healthcare workers and clinicians

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