INTRODUCTION

Lymphatic filariasis (LF) is a major cause of clinical suffering and disability (WHO, 2006a). More than 1.1 billion people in 83 countries and territories - approximately 18% of the world's population - live in areas at risk of infection with lymphatic filarial parasites (WHO/CDC/CPE/CEE, 2002).

Filariasis is endemic in eight governorates in Egypt (WHO, 2005a). Due to infrastructural and cost constraints, there is a lack of reliable statistics and disease reporting in Egypt. Egypt lacks public health information systems and population health databases as well as the development of appropriate public health tools that can be used in decision making and health services planning. Recent research findings on socio-economic impact of the disease and development of new diagnostic and control tools have given hope that LF is one of the communicable diseases that can be eradicated. In 1997 the 50th World Health Assembly passed a resolution to eliminate LF from the globe by 2020 (EMRO, 2000).

Unfortunately, data on the actual distribution of the disease are not widely available. New tools and procedures have recently been developed that allow the rapid assessment of the level of endemicity of filariasis and the generation of reliable information about the disease (Gyapongl and Remme, 2001).

Recent advances in geographic information and mapping technologies have created new opportunities for public health administrators to enhance their planning, management and monitoring capabilities (Boulos and Roudsari, 2000).

Geographic Information Systems (GIS) are used in many fields to create, store, analyze, and display data with a spatial component (i.e. location information). In recent years, the use of GIS by public health professionals has expanded rapidly, driven by the growing realization that, the majority of health data have a spatial component and graphical representations (Public Health Agency of Canada, 2006).

GIS adds a powerful graphical and analytical dimension to public health by bringing together the fundamental epidemiological triad of person, time, and the place. The analysis and mapping of data using Public Health GIS include: the spread of diseases over time, spatial patterns of diseases, population groups at risk, availability and access to health care, and program intervention planning and assessment (Public Health Agency of Canada, 2006).
Over the past four decades, simulation has proven to be a significant tool in the analysis of a wide variety of healthcare delivery systems (Ezzati et al., 2002).

Study of infectious diseases requires an ecological perspective. Understanding of the biology of the host and pathogen is essential to comprehension of the transmission of infection and consequently patterns of disease. The medical perspective of infectious disease is directed largely at the consequences of infection to the individual host, and tends to overlook the importance of population-level transmission processes (Anderson and May, 1991).

The spatial modeling capacity offered by GIS is directly applicable to understanding the spatial variation of disease, and its relationship to environmental factors and the health care system (Tanser and le Sueur, 2002). Simulation is a technique whereby physical processes of the real system can be mimicked using a model which preserves the essential features of these processes (Pruss et al., 2001). The purpose of simulation is to obtain results on the behavior of complex processes. In addressing epidemiological problems, simulation probabilistic (stochastic) models have the obvious advantage that they enable large-scale processes which involve the relationship between man, vector and the environment to be modeled (Ezzati et al.,2002).

The study is trying to use these recent tools to build a GIS – based information system related to filariasis disease in Kalyobiya Governorate that can help to map the risk of disease distribution and predict the needs to control it.