MODELING BURULI ULCER TRANSMISSION: SEIR-SEI ANALYSIS WITH IMMUNITY LOSS AND ARSENIC CONTAMINATION

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Abstract: This article presents a novel mathematical model to explore the transmission dynamics of *Mycobacterium ulcerans (MU)* infection, focusing on the waterborne spread. Using SEIR and SEI models for human and water-bug populations, it considers factors such as disease-related deaths and arsenic-contaminated water. The analysis determines the basic reproduction number (R_0), which dictates the stability of disease-free and endemic equilibria. The study underscores the importance of controlling Buruli ulcer transmission, offering valuable insights for global health management.

Keywords and Phrases: Arsenic, *Mycobacterium ulcerens*, Waterbug, Basic reproduction number, Next generation matrix, Global stability analysis.

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1. Introduction

Buruli ulcer's story begins in 1897 at Mengo Hospital in Uganda, where surgeon Albert Ruskin Cook first observed its devastating effects. It wasn't until fifty years later that MacCallum and his team, based at Melbourne University, unveiled the culprit bacterium in patients from southeastern Australia. Despite decades of clinical insight, the disease's enigmatic nature persisted until 1948 [8, 21].