1067-92-2381   **Mohammed Yahdi*** (`myahdi@ursinus.edu`), Department of Mathematics & Computer Science, Ursinus College, Collegeville, PA 19426, and **Sara Abdelmageed**, **Jon Lowden** and **Lloyd Tannenbaum**. *Modeling, Analysis and Outbreak Risk of Vancomycin-Resistant Enterococci.* Preliminary report.

We developed and analyzed a new deterministic mathematical model of Vancomycin-Resistant Enterococci (VRE) infested intensive care unit (ICU). This model consists of five non-linear differential equations with five variables based on the patient stages of VRE infection: susceptible, colonized, colonized with preventative care, infected, and infected undergoing treatment. We investigated the dynamics between those five infection stages under the effect of nineteen independent parameters. The parameters include colonization rate, fitness cost, plasmid transfer, antibiotics use, preventive care, treatment schedule and infection factors. The parameter values vary within determined specific ranges to account for any ICU scenario.

Simulations were created and normalized impacts of the parameters were measured revealing strategies to control VRE infections. Furthermore, disease free analysis was performed to compute the basic reproduction rate, related sensitivity analysis, and bifurcation diagrams to investigate the outbreak risk and the best preventive strategies without the risk involved in clinical testing. The model highlighted the parameters with the largest impact and quantified the values that minimize outbreak risk. (Received September 23, 2010)