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Joanna Pressley* (j.pressley@vanderbilt.edu), 1326 Stevenson Center, Nashville, TN 37240, and **Erika M. C. D'Agata** and **Glenn F. Webb**. *The effect of co-colonization with community-acquired and hospital-acquired methicillin-resistant Staphylococcus aureus strains on competitive exclusion.*

We investigate the in-hospital transmission dynamics of two methicillin resistant *Staphylococcus aureus* (MRSA) strains: hospital-acquired methicillin resistant (HA-MRSA) and community-acquired methicillin resistant *Staphylococcus aureus* (CA-MRSA). Under the assumption that patients can only be colonized with one strain of MRSA at a time, global results show that competitive exclusion occurs between HA-MRSA and CA-MRSA strains. Because new studies suggest that patients can be concurrently colonized with multiple strains of MRSA, we extend the model to allow patients to be co-colonized with HA-MRSA and CA-MRSA. Using the extended model, we explore the effect of co-colonization on competitive exclusion by determining the invasion reproduction ratios of the boundary equilibria. In contrast to results derived from the assumption that co-colonization does not occur, the extended model rarely exhibits competitive exclusion. When transmission rates are assumed equal and decolonization measures act equally on both strains, competitive exclusion never occurs. Other interesting phenomena are exhibited. For example, solutions can tend toward a co-existence equilibrium, even when the basic reproduction ratio of one of the strains is less than one. (Received September 20, 2010)