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Modeling the Impact of Antibiotic Resistance in Gram-Negative Bacteria. Preliminary report.

Drug resistance has been an emerging problem since the discovery of penicillin. Resistance is now seen not only in clinical settings, but also increasingly in the community. Bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) impacts healthy adults as well as patients in settings such as hospitals and nursing homes. MRSA is an example of a Gram-positive bacteria. More recently, antibiotic resistance in Gram-negative bacteria such as *Escherichia coli* and *Salmonella aureus* is an increasing problem. A primary difference between Gram-positive and Gram-negative bacteria is the composition of the cell walls. Gram-negative bacteria can become resistant to antibiotics through a genetic mechanism, granting them immunity to a wide range of treatments.

This talk will give an overview of some of our recent work on modeling of the development and spread of antibiotic resistance. Mathematical modeling and simulation are used to gain insight into the numerous issues that arise, both in terms of the development of resistance and the spread of the bacteria.

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