

# PROJECT SNAPSHOT

## 3G: Impact of the Cefazolin Inoculum Effect in Patients with Methicillin Susceptible Staphylococcus Aureus Infections in Alberta

Pillar: Treatment Optimization

Theme: Education & Societal Impact

Keywords: Cefazolin Inoculum Effect; Antimicrobial Resistance; Staphylococcus Aureus



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### AIM

To understand the impact of the cefazolin inoculum effect (CIE) in methicillin-susceptible Staphylococcus aureus (MSSA) on clinical outcomes of Alberta patients.

### WHY IS THIS IMPORTANT?

MSSA infections are associated with significant morbidity and mortality. Anti-staphylococcal penicillins, such as cloxacillin, and cefazolin remain the primary treatments for MSSA infections including bacteremia and infective endocarditis. The CIE is an antimicrobial resistance mechanism found in some MSSA isolates harbouring the BlaZ B-lactamase enzyme. When present, the CIE causes minimum inhibitory concentrations to cefazolin to be elevated in proportion to the number of bacteria present in the inoculum. The presence of the CIE can cause treatment failure and has been associated with increased disease severity and mortality in a handful of studies. In a recent study testing sterile-site MSSA isolates from 7 laboratories across North America for the CIE, 0-26% of isolates were positive depending on site (n=307, manuscript in preparation by T. Dingle). The only Canadian site, the University of Alberta Hospital, had the highest positivity rate at 26% (11/43 isolates). The impact of the presence of the CIE in North American MSSA isolates is unknown as laboratories do not routinely perform testing for the CIE.

### OUTCOMES

The primary outcome will be a better understanding of the prevalence of the CIE in Alberta sterile-site MSSA infections and how that impacts clinical outcomes.

### RESEARCH QUESTION

Sterile-site infections with MSSA isolates that are positive for the cefazolin inoculum effect are associated with increased patient morbidity and mortality compared to infections caused by MSSA isolates without the cefazolin inoculum effect in Alberta patients.

### OUR APPROACH

Our approach to this project will be two-fold: 1) Test additional sterile-site MSSA isolates for the CIE to increase the power of the clinical outcomes portion of the study. Additional isolates will be pulled from the UAH Microbiology Laboratory. In addition, an APL-Calgary collaborator will be identified in order to incorporate Calgary patients into the study. 2) Assess clinical outcomes by performing a chart review of patients with sterile-site MSSA infections with and without the CIE. Charts from the patients with characterized isolates from the previous study (UAH patients) will be reviewed in addition to those identified in 1).

### ALIGNMENT WITH THE AMR - ONE HEALTH CONSORTIUM

### LEVERAGED SOURCES OF SUPPORT

MSSA isolates will be provided in-kind from both Calgary and Edmonton laboratories for CIE characterization.

### KNOWLEDGE & TECHNOLOGY EXCHANGE AND EXPLOITATION

- Results from this project will be shared in peer-reviewed publication and infectious diseases colleagues.

### TRAINING OF HIGHLY QUALIFIED PERSONNEL

- Postdoctoral Fellow (hired under Project 3D & 3E)
- Summer student

### AFFILIATIONS:

