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Q1 Faculty Information:

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Faculty Position:	**Associate Professor**
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Q2 Type of Research? **Translational Research**

Q3 Please describe your research interests:

Clostridium difficile is a Gram-positive, spore-forming, toxin-producing anaerobic bacterium. There are more opportunities for colonization with C. difficile among chronically ill individuals due to (1) high rates of colonization in patients who frequent hospital settings and rehabilitation centers, (2) the disproportionate number of chronically ill people who have severe illnesses in the intensive care unit, (3) more frequent extended courses of antibiotics, and (4) more common
underlying illnesses and immunosuppression. The C. difficile bacterium does not directly cause disease but the release of toxins is important in pathogenesis of C. difficile infection (CDI). The immune system can counteract the release of toxin by producing anti-toxin antibodies such as IgG and IgA. We hypothesize that patients with symptomatic, severe or recurrent CDI are
associated with significantly lower serum anti-toxin IgA and IgG specific for toxins A and B and
lower functional neutralizing antibodies when compared to patients who are asymptomatic
carriers or with mild sickness and recovery. A total of 225 non-CDI patient controls and 59
patients with hospital acquired CDI were enrolled into the prospective study. At study entry, day 3 post-onset of diarrhea, at day 12 post-onset, and at CDI recurrence, (or at study entry only for controls), a serum sample was obtained for anti-toxin antibody measurement. This is the first study to correlate functional anti-toxin antibodies with disease and recurrence in a prospective case to control study design that focuses on CDI specifically in an urban hospital setting.

A second aspect of this work is to study a microbiological aspect of the disease. Pathogenesis is mediated by C. difficile toxins (tcdA and
tcdB). Pathogenesis also depends on strain type. Hypervirulent strain, NAP1/BI/027, has been associated with increased severity and recurrence rates in patients. We hypothesize that hypervirulent strains are associated with increased CDI recurrence. We enrolled 58 patients with HA-CDI (defined as CDI onset following at least 72hrs of hospital stay). We obtained sequential sera and fecal samples from enrolled patients every two weeks after enrollment. These samples are assayed for C. difficile antibody (serum) and vegetative C.difficile bacteria
(fecal samples) following collection. The isolated bacteria are genotyped by Cepheid PCR for the presence of the NAP1/BI/027; our data indicate hypervirulent strains are present at Hahnemann University Hospital at similar rates reported nationally. Future studies will include using deep sequencing to analyze the diversity of bacterial species among CDI Cases and non-CDI control patients at Hahnemann University Hospital.

Q4 Please provide a brief description of research opportunity/project(s):

1) Title of project(s):	**Identification of patient risk factors for c. difficile infection and severe disease**
Brief Description:	**medical chart review; data entry into REDCAP; processing patient blood and stool specimens; growing C. difficile in an anaerobic chamber; immunology**
Duration:	**June to July 2019**
Time commitment:	**20-40 hours per week**
Funded or unfunded (yes or no):	**yes**

Q5 Please indicate the specific level of experience required, if applicable:

Open to all medical students
