Title:

Nationwide efforts to reduce and optimize management of neonatal ventilator-associated pneumonia (VAP) and urinary tract infection (UTI)

Background:

Neonatal VAP is an important healthcare-associated infection with significant morbidity, ranging from 1.1 to 10.9 episodes per 1,000 ventilator-days or up to 25% of neonates in NICU, and remains a leading cause of antibiotic use in the NICU. Barriers to improvement in neonatal VAP practices include the lack of standardization or guidelines for definition and surveillance, variable reliability of microbiological results for diagnosis, and uncertainty regarding the optimal empiric antibiotics and duration of antimicrobial treatment.

UTIs are significant bacterial infections in neonates with incidence of UTI ranging from 3%–25% in preterm infants. There is wide variation in the colony counts considered to be diagnostic for UTIs in the literature.

Problems

1. National surveys have demonstrated inconsistencies in the diagnoses and management of these two important hospital-associated infections. At least THREE different definitions are being utilized for each of VAP and UTI nationally.
2. Currently there is no surveillance for VAP and UTI in major neonatal databases including CNN, NICHD-Neonatal Research Network, Australian and New Zealand Neonatal Network, and Vermont Oxford Network.

Existing knowledge gaps:

1) Lack of standardized definitions of VAP and UTI in neonatal intensive care populations

2) Lack of knowledge regarding long term adverse neonatal outcomes associated with VAP or UTI

3) Lack of data on antimicrobial use and prevalence of multi-drug resistant organisms in VAP or UTI

4) Lack of NICU-specific antimicrobial best practices and prevention bundles for VAP or UTI

Five-year Research Plan:

AIM 1 – Baseline information, capacity building (data collection, analysis & reporting) and engagement of all Canadian NICU key stakeholders (Years 1-2)

Ask individual sites to report their UTI and VAP rates according to their local definitions

AIM 2 – Determination of NICU-specific VAP and UTI definitions as an ultimate goal (Years 1-3) after obtaining the two-year baseline data, though a round of survey & face-to-face/virtual workshop among stakeholders.

AIM 3 – Development of best practice of VAP prevention and VAP & UTI management strategies, followed by Integrated Quality Improvement (QI) & Knowledge Translation (KT) and Implementation (Years 1-3)

AIM 4 – Evaluation of impact of QI efforts on the incidences at individual sites and nationally; as well as the amount of antimicrobials utilized for VAP and UTI (Years 3-5)