**Background**

- ExPEC is a leading cause of community-acquired and hospital-acquired bloodstream infections (BSIs) in North America, and is associated with significant patient morbidity and mortality.
- 20-45% of ExPEC are resistant to at least one first line antibiotic, and many isolates harbor multi-drug resistance including extended spectrum beta-lactamases (ESBLs).
- Epidemiological surveillance is essential to develop and maintain local antibiograms and inform empiric antibiotic choices.

**Methods**

Positive blood cultures for E.coli processed at a centralized laboratory in Calgary, Alberta, Canada dated Jan. 1, 2016 – Dec. 31, 2016

- Include: (1) All adult and pediatric samples (2) First positive blood culture in specified time frame (3) Antibiotic susceptibilities confirmed using CLSI breakpoints for Enterobacteriaceae
- 712 unique isolates identified

**Results**

**Antibiotic Resistance in non-ESBL producing (n=588) and ESBL-producing ExPEC isolates (n=123)**

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Non-ESBL</th>
<th>ESBL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin</td>
<td>270 (45.9%)</td>
<td>123 (100%)</td>
</tr>
<tr>
<td>Cefazolin</td>
<td>163 (27.7%)</td>
<td>123 (100%)</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>103 (17.2%)</td>
<td>97 (75.9%)</td>
</tr>
<tr>
<td>TMP-SMX</td>
<td>163 (27.7%)</td>
<td>69 (56.1%)</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>44 (7.5%)</td>
<td>49 (39.8%)</td>
</tr>
<tr>
<td>Ciprofloxacin + TMP-SMX</td>
<td>46 (7.0%)</td>
<td>58 (47.2%)</td>
</tr>
</tbody>
</table>

**Discussion**

Antibiotic resistance is increasing worldwide, and our antibiotic resistance rates for ExPEC BSIs are now higher than those previously reported in the literature.

**Patient-related factors to consider:**
- Broad spectrum antimicrobial use
- Increasing patient age, complexity, and extensive health care exposure
- Increasing global travel

**Microbiological factors to consider:**
- Global emergence of multi-drug resistant ExPEC clones such as ST131
- Selection pressure in medical, animal, and agricultural domains

**Conclusions**

- Antibiotic resistance is increasing in ExPEC isolates across all antibiotic classes in Calgary, Alberta, Canada.
- Nearly 60% of all ExPEC BSI isolates are resistant to one or more first line antibiotics.
- Ongoing vigilance is required to ensure empiric antimicrobial guidelines align with evolving local resistance profiles.

**Future Directions**

Further epidemiological studies to evaluate both clinical (patient-related) and microbiological factors driving the trends in antimicrobial resistance in our centre.

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This highlights a need for further detailed epidemiological data regarding patient risk factors for antibiotic resistant E. coli and a sustainable, well-developed antimicrobial stewardship program.

Application of this knowledge will result in more targeted strategies to manage the burden of antimicrobial resistance and decrease associated patient morbidity and mortality.