INTRODUCTION

In 2016, the UK government announced an ambition to reduce healthcare-associated (HCA) Gram-negative bloodstream infections (GNBSI) by 50% by 2021/22. NHS Improvement (NHSI) mandated the reporting from April 2017 of Klebsiella species, and Pseudomonas aeruginosa BSI cases (in addition to E. coli) to Public Health England (PHE); enhanced mandatory surveillance. Guidance on the definition of healthcare associated GNBSI was issued by PHE and NHSI in July 2017.

According to this guidance, a healthcare associated GNBSI was defined as a case in a patient who had:
- received healthcare in either the community or the hospital in the previous 28 days, including but not limited to:
  - indwelling vascular access devices (insertion, in situ, or removal)
  - urinary catheterisation (insertion, in situ with or without manipulation, or removal)
  - other devices (insertion, in situ with or without manipulation, or removal)
  - invasive procedures (e.g. endoscopic retrograde cholangiopancreatography, prostate biopsy, surgery including, but not restricted to, gastrointestinal tract surgery)
  - neutropenia (<500/μL)
  - patients with urinary catheters as the focus related to a prior procedure or surgery.
- had an intervention up to 12 months earlier that remained operational during the previous 28 days period eg urinary catheter, and/or
- onset at least 48 hours after admission, and/or
- onset within 28 days of discharge, and/or
- been receiving nursing home care.

Opportunities to intervene “should not be lost”.

The presence of a healthcare associated risk factor is enough to assume that the GNBSI is healthcare associated.”

AIM

Here we review the epidemiology, root causes, and potential preventability of the first year of enhanced mandatory surveillance of cases detected at the Royal Free Hospital (RFH), a London teaching hospital, to inform infection prevention and control actions.

METHODS

Individual patient hospital and summary care records from the NHS Spine were reviewed. GNBSI were categorised as community-onset (CO), HCA, or hospital onset (HO), as per published guidance. All cases were reviewed by the microbiology clinical team and specifically reviewed for the root cause and potential preventability by a consultant microbiologist.

Potential preventability was assessed in keeping with the NHSI guidance for healthcare association so that “opportunities to intervene were not lost”. Examples of the broad criteria for classification as potentially preventable included:
- Focus related to a device such as a urine catheter, intravascular line, or endotracheal tube.
- Focus related to a prior procedure or surgery.
- Prior antibiotics ineffective against the causative organism.
- Patients on a pathway where more rapid or alternative management may have prevented the infection.

Antibiotic sensitivity results were obtained from the laboratory information system. Data was analysed in Microsoft Excel. Chi-squared tests were performed using Open-Epi version 3.01 (www.openepi.com).

RESULTS

From April 2017 to March 2018, 318 BSIs were detected, 219 (69%) E. coli, 62(19%) Klebsiella species, and 37(12%) P. aeruginosa. 171/318 (54%) of cases occurred in males. The predominance of males and females varied by age group (Figure 1).

79 cases (25%) were CO-non-HCA and 239 (75%) HCA: 94 (30% of total) HO, and 145 (46% of total) CO-HCA, of which 51 (16% of total) and 94 (30% of total) were associated with prior community and hospital care, respectively (Figure 2). Compared to CO cases, HO cases were more likely to be due to P. aeruginosa (17/94 versus 20/224, P=0.013) (Figure 2).

Compared to non-HCA cases, HCA cases were more likely to be due to P. aeruginosa (36/239 versus 1/79, P < 0.001) (Figure 3).

The most common primary foci were lower urinary tract (UT) 92 (29%), hepatobiliary 82 (26%), upper respiratory tract (UT), and lower respiratory tract (UT) 92 (29%), hepatobiliary 82 (26%), upper respiratory tract (UT), and lower respiratory tract (UT). The most common primary foci were lower urinary tract (UT) 92 (29%), hepatobiliary 82 (26%), and lower respiratory tract (UT) 92 (29%).

The most common HCA risk factors were: prior antimicrobial therapy 118 (37%), urinary catheter 84 (26%), vascular device 53 (17%), and prior surgery 47 (15%) (Figure 5).

DISCUSSION

The most common foci of infection were the urinary tract and hepatobiliary and gastrointestinal tracts. Compared to a recent study of E. coli BSI in England our cases were more likely to have a hepatobiliary focus (26% versus 16%, P<0.001) which may reflect our large tertiary hepatopancreaticobiliary surgery service.

These findings support our efforts to focus on infection prevention and control measures targeting these systems. This includes the use of bladder scanners and catheter passports, and audits of surgical prophylaxis and surgical site infection prevention bundles.

The criteria for potential preventability were deliberately broad. It is unlikely that all the potentially preventable cases could ultimately be prevented.

Beyond the acute Trust, collaborative work with community healthcare services to improve catheter care and UTI prevention and treatment could contribute to further reductions in GNBSI.

REFERENCES
