Background

- In January 2016, an increase in carbapenem-resistant Klebsiella pneumoniae (CR-Kp) isolates was observed in the open 8-bed surgical intensive care unit (SICU) at University of Pittsburgh Medical Center (UPMC) Presbyterian Hospital.
- Three new cases were identified on SICU in one month compared to the 2015 unit average of 0.5 new cases/month.
- Three additional cases were identified who had exposure to SICU in January but whose CR-Kp isolates were recovered on another unit.
- Preliminary review of the six cases found that, in addition to SICU exposure, all cases were exposed to the same CR gastroscopy (G5).
- An investigation was launched to determine the exposure source as well as the relatedness of CR-Kp strains.

Setting

UPMC-Presbyterian Hospital is a complex 757 bed tertiary care hospital affiliated with the University of Pittsburgh Schools of the Health Sciences. It is an adult medical-surgical facility that specializes in organ transplantation and is a recognized leader in cardiology.

Methods

Identify Additional Cases:
- Rectal swabs were collected on all current inpatients exposed to the SICU in January 2016 to assess for CRE carriage.
- Aside from the 6 cases, no patients exposed to G5 were still inpatient at the time of investigation.

Assess Scope G5:
- Removed scope from service and reprocessing records were reviewed.
- Conducted microbiologic assessment utilizing two scope culturing techniques.1,2
- A boroscopy was performed to examine the scope lumen for defects.

Environmental Controls:
- Moved patients out of SICU to thoroughly clean space and conduct ultraviolet (UV) light disinfection.

Molecular Typing:
- Sent all CR-Kp isolates to Microbial Genomics Epidemiology Laboratory (MiGEL) for pulsed-field gel electrophoresis (PFGE) typing and whole genome sequencing (WGS) to assess for relatedness.

Results

Identify Additional Cases:
- 43 patients (aside from cases) were exposed to SICU in January
- 19 still in house and available for rectal screen
- 17 rectal swabs obtained (2 patients discharged prior to obtaining swab)
- 1 positive for CR-Kp with same sensitivities as cases
- Patient never had exposure to G5
- Given positive pt, SICU asked to continue weekly screens until no new positives
- Next weekly screen consisted of 6 patients
- All negative for CRE, therefore weekly screenings stopped

Assess Scope G5:
- No deficiencies identified with scope reprocessing
- No organisms identified using either of the scope culturing methods
- Boroscopy of scope lumen revealed several deep scratches and luminal debris, despite undergoing high-level disinfection
- After boroscopy, scope lumen was removed and replaced with new lumen before being placed back in service
- Discovered a known CR-Kp patient with same sensitivities as case patients had used same scope at end of December 2015

Environmental Controls:
- All SICU patients moved from the unit and placed in a flex unit
- Environmental Support Services thoroughly cleaned the entire unit
- Used UV machine to further disinfect the space
- Entire unit is open with only partial walls and curtains separating bed spaces, therefore weekly screenings stopped

Conclusions

Molecular Typing:
- Six case isolates and new isolate identified via screen sent for typing
- December 2015 CR-Kp result sent as well as some other isolates identified in January that did not appear to be related to the cluster (controls)
- All seven new case isolates as well as the December 2015 isolate were determined to be related by PFGE and WGS

References