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IDWEEK 2020: Highlighted Abstracts and DCASIP Research Presentation Synopsis

Antibiotic Use in Hospital Emergency Departments (ED) and Observation (OBS) Settings from 2012-2018 in a Large Cohort of US Hospitals - Preston LE et al.

Researchers from the Centers for Disease Control and Prevention described antibiotic use in the ED and OBS settings over a six-year period beginning in 2012. Data were obtained from the Premier Health database and only included encounters that were not associated with a subsequent inpatient stay.

A total of 198 million encounters, the majority of which occurred in the ED (n=181 million, 91.5%) were included. Antibiotic use was more common in OBS units, occurring in 26% of encounters compared to only 9% in the ED. High facility-level variability was noted with median antibiotic use rates (IQR) for ED (11.2% (4.9%)) and OBS (36.6% (14.2%)). The majority of antibiotic use was parenteral (53% and 88% in the ED and OBS, respectively). These trends were consistent for both settings from 2012-2016, but an increase in overall use was noted in OBS only beginning in 2016.

Prescribed agents also differed by setting with 3rd/4th generation cephalosporins being most common in the ED compared with 1st/2nd generation cephalosporins in OBS. Fluoroquinolones were the third most common class of agents used in OBS, but did not make the top three agent category in ED. This may reflect the inclusion of antibiotics only if administered while in the facility and not if provided as a discharge prescription.

The high rate of parenteral antibiotic use, rising rates of use in OBS units and the role of fluoroquinolones in OBS units highlight areas of expanded stewardship opportunities in these locations. For several years, DASON has been preparing a benchmark of ED antibiotic use for facilities reporting data from these locations. An updated version is in preparation and will be available from DASON liaisons in the near future.

Large Multi-Site Clinical Field Study Characterizing Contamination Levels in Patient Used Endoscopes After Manual Cleaning - Bommarito M, and Meyer M.

There is increasing concern regarding the effectiveness of high-level disinfection of endoscopes. Failure of reprocessing can lead to persistent bioburden, with negative consequences for patient safety, including institutional outbreaks. Researchers from 3M measured distal suction-biopsy channel Adenosine triphosphate (ATP) levels to assess the cleanliness of endoscopes following reprocessing.

A total of 702,768 ATP measurements were collected by reprocessing technicians in 2018 and 2019. Samples were collected from bronchoscopes (n = 59,289; 107 sites), colonoscopes (252,249; 229), duodenoscopes (123,697; 161) and gastroscopes (267,5233;223). In pairwise analysis of endoscope type, duodenoscopes and gastroscopes had significantly ($p<0.005$) higher levels of ATP when compared to colonoscopes and bronchoscopes. More alarmingly, 12% of reprocessed gastroscopes and 10% of reprocessed duodenoscopes had ATP measurements at levels above what is considered to reflect adequate reprocessing (200 relative light units. Additionally, a substantial number of endoscopes (n=1,063) demonstrated persistent ATP contamination despite multiple rounds of reprocessing.

These findings support the concern that high-level disinfection does not reliably result in bioburden elimination from endoscopes. Many factors likely contribute to this issue, including difficulties adhering to reprocessing protocols, device design, and endoscope overuse and acquired damage. To mitigate reprocessing failures, technicians should perform three steps with each reprocessing event: 1) a leak test to ensure endoscope integrity; 2) a cleaning verification test (such as ATP, hemoglobin, etc.) to evaluate bioburden, and 3) a magnified visual inspection to assess for external endoscope damage.

DCASIP Research Presented at IDWeek 2020

Platform Presentations

Measuring Empiric Antibiotic Spectrum Patterns Across Space and Time

Yarrington ME, Wrenn R, Sarubbi C, Spivey J, Anderson DJ, Moehring RW

We analyzed empiric inpatient antibiotic prescribing across hospital units to evaluate prescribing patterns based on the time of day and day of week. Antibiotic prescriptions were typically broader in the early morning hours (before 7 AM) and on weekends.

Link to Slides: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/yarrington_idw2020_oralslides.pdf

Posters

SARS-CoV-2 Preparedness among Community Hospitals in Southeastern United States

Advani SD, Baker E, Cromer A, Wood B, Crawford KL, Crane L, Adcock L, Roach L, Padgette P, Anderson DJ, Sexton DJ, for the CDC Prevention Epicenter Program

We performed a cross-sectional survey of infection preventionists in 60 US community hospitals between April 22 and May 8, 2020. Several differences in hospital preparedness for SARS-CoV-2 emerged with respect to personal protective equipment conservation strategies, protocols related to testing, universal masking, and restarting elective procedures.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/advani_covid_preparedness.pdf

Use of Statistical Process Control Charts for Early Detection of Healthcare Facility-Associated Nontuberculous Mycobacterial Outbreaks

Baker AW, Maged A, Haridy S, Stout JE, Seidelman JL, Lewis SS, Anderson DJ

We showed the potential for statistical process control (SPC) methods to improve nontuberculous mycobacterial (NTM) surveillance at healthcare facilities. In this study, a single SPC chart detected 3 prior hospital-associated NTM outbreaks an average of 6 months earlier than traditional surveillance methods.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/baker_process_control_charts.pdf

Development and Assessment of a Process to Describe the Timing of Antibiotic Changes in Adult Inpatients

Livengood S, Drew R, Moehring R, Wilson D, Spivey J

We developed and applied a method to characterize antimicrobial changes. In our institution, the reductions in the number of changes observed on weekends provide an opportunity for ASP involvement to be incorporated to help facilitate appropriate antimicrobial changes.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/livengood_timing_of_abx_changes.pdf

Correlation of International Classification of Diseases (ICD) codes to initial provider-selected antibiotic indications in hospitalized adult patients within the Duke Antimicrobial Stewardship Outreach Network (DASON)

Livengood S, Jones T, Moehring R, Spires SS, Johnson M, Dyer A, Davis A, Dodds Ashley E

We compared ICD-10 codes from discharge with prescriber indications at the time of antibiotic ordering. We observed a high rate of mismatch between prescriber-selected indications and ICD-10 codes. Prescriber-selected indications at the time of empiric antibiotic treatment were a poor indicator of ultimate diagnosis.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/livengood_icd10_and_indication_0.pdf

Pseudo-outbreak of Adenovirus in Bronchoscopy Suite

Seidelman J, Akinboyo I, Taylor B, McLay C, Smith B, Lewis S

Previously, very few pseudo-outbreaks of Adv have been linked to bronchoscopes. We identified a pseudo-outbreak of Adv associated with 2 bronchoscopes in a hospital-based bronchoscopy suite that stopped once we removed the associated bronchoscopes from the procedural unit. Bronchoscopy-related pseudo-outbreaks occur despite standardized procedures for HLD. Bronchoscopy clinics, particularly those with a high volume of immunocompromised patients, should prospectively review BAL cultures to identify unusual pathogen trends. These trends may be a sign of damaged equipment that would otherwise go undetected.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/seidelman_adenovirus.pdf

SSI Trends in Community Hospitals from 2013 to 2018

Seidelman J, Baker AW, Lewis S, Advani SD, Smith B, Anderson DJ

The complex SSI rate did not significantly decline in our cohort of community hospitals from 2013 to 2018. Baseline SSI rates were low, and statistically significant decreases in SSI rates may be difficult to achieve. However, the epidemiology of community hospital SSIs may be changing with a shift away from MRSA SSIs.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/seidelman_ssi_trends.pdf

Surgical Site Infections Following Colon Surgery in a Large Network of Community Hospitals

Seidelman J, Baker AW, Ge M, Lewis S, Advani SD, Smith B, Anderson DJ

In our cohort, we found that one-fourth of colon surgery SSIs were categorized as PATOS, which are no longer publicly reported to the Centers for Medicare & Medicaid Services. While most SSI literature describes higher volume hospitals having lower SSI rates, high colon surgery volume was associated with increased SSI rates in our community hospitals.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/seidelman_colon_ssi_.pdf

Opportunities for Antimicrobial Stewardship in Febrile Neutropenia

Shoff C, Messina J, Baskett J, Baker A, Turner N, Spivey J, Wrenn R, Moehring R, Spires SS

Febrile neutropenia is a common complication of hematologic malignancies and their treatment. Most patients receive prolonged empiric antibiotics, despite increasing evidence that empiric antibiotics may be discontinued prior to neutrophil recovery. At DUHS, almost one-fifth of patients with hematologic malignancy, febrile neutropenia, and negative blood culture results received antibiotic courses of at least 14 days duration, accounting for nearly half of antibiotic utilization in that cohort.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/shoff_febrile_neutropenia.pdf

Antimicrobial Stewardship for Urinary Tract Infection in Three Emergency Departments Across a Health System

Shoff CJ, Funaro JR, Fischer KM, Boreyko J, Shroba J, Mando-Vandrick J, Liu B, Lee H-J, Spires SS, Turner NA, Theophanous R, Staton C, Moehring RW, Wrenn RH

We created a urine-specific antibiogram and guideline for the treatment of ambulatory cystitis and pyelonephritis in the emergency rooms in the Duke University Health System. Following education and implementation, guideline-concordant prescribing increased in all three emergency departments, although not to the level of statistical significance. More work is ongoing to identify factors to improve antibiotic prescribing in the ambulatory emergency department setting.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/shoff_uti_ed.pdf

Presentation: Pediatric Antibiotic Use in the North Carolina Medicaid Population

Young R, Lantos P, Smith M

At IDWeek this year, Dr. Smith expanded his work into the North Carolina (poster 1351) pediatric Medicaid population.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/smith_pediatric_antibiotic_use.pdf

Characterization of Isavuconazole Serum Concentrations with Various Administration Routes in a Hospitalized Cohort

Spivey J, Wrenn R, Liu B, Maziarz E, Kram B

This retrospective study characterized isavuconazole serum concentrations in patients receiving the drug by the intravenous route, oral administration of intact capsules, and opened capsule contents by enteral feeding tube. During 65 encounters from 55 unique patients, 93 isavuconazole concentrations were obtained with all patients having detectable isavuconazole serum concentrations (median 2.3 mg/dL). Similar concentrations were noted between IV and tube administration (1.9 mg/dL and 1.6 mg/dL, respectively) with oral administration (median 3 mg/dL) resulting in higher values.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/spivey_isavuconazole.pdf

Mini Root Cause Analysis Reveals Opportunities for Reducing Clostridioides difficile Infection Rates

Turner NA, Seidelman J, Wrenn RW, Anderson DJ, Lewis SS, Smith B

Mini root cause analyses help find opportunities for *C. difficile* prevention: By collecting data from on-site reviews by infection preventionists and/or pharmacists across 20 participating hospitals from DICON, patterns are beginning to emerge in *C. difficile* prevention. Nearly half of subjects had received laxatives before *C. difficile* testing (where guidelines would recommend holding laxatives for 24-48 hours before testing). Urinary tract infection was the single most common indication among inappropriate antibiotic uses associated with *C. difficile* cases in the network, with nearly half of all UTI prescriptions being potentially inappropriate - making a high-yield target for stewardship interventions!

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/turner_mini_rca.pdf

***Clostridioides difficile* environmental contamination in hospitalized patients with diarrhea: a pilot study**

Warren B, Turner N, Addison R, Nelson A, Marden S, Gamez I, Smith B, Polage C, Weber DJ, Rutala WA, Sickbert-Bennett EE, Anderson DJ and the CDC Prevention Epicenters Program

We performed a prospective cohort study of patients with diarrhea who were tested for *C. difficile* infection via PCR and enzyme immunoassay (EIA) to compare *C. difficile* environmental contamination by test result. The amount of environmental contamination of PCR^+/EIA^+ patients was higher than both PCR^+/EIA^- and PCR^- patients, however, the recovery rate of PCR^+/EIA^+ patients was similar to PCR^+/EIA^- patients. Subsequent larger trials are needed to expand on this pilot data to determine the difference, if any, between environmental contamination levels of these patient populations.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/warren_cdi.pdf

Effect of Easing Overnight Restrictions on Antimicrobial Starts

Yarrington ME, Wrenn R, Spivey J, Shoff C, Spires SS, Turner N, Smith M, Diez A, Anderson D, Moehring R

Summary: This project analyzed overnight meropenem and micafungin use after a restriction policy change that allowed the 'first dose free' between the hours of 11pm to 7am. We saw slight increases in early morning antimicrobial starts, however quality of life for ID consultants was improved and overall antibiotic use in days of therapy was largely unchanged.

Poster Link: https://dcasip.medicine.duke.edu/sites/dcasip.medicine.duke.edu/files/yarrington_overnight_restrictions.pdf