VIRTUO and 802(15.6%) for BACTEC (p=0.0003). TTD and proportion of aerobic/anaerobic bottles is shown in Table.

Hands-on-time was reduced by 15 minutes/day when using VIRTUO.
Table

Conclusion. We have compared on a large scale and in a "real world" setting the performance of two automatic blood culture incubators. TTD was significantly lower for the VIRTUO incubated samples, with differences in both systems depending on the type of bottle (aerobic vs. anaerobic). The number of positive results was significantly higher for the VIRTUO incubated samples, which might impact antimicrobial prescription and clinical outcomes.

		VIRTUO	BACTEC	P value (Log Rank Test)
		TTD (hours)		
All Positive	All bottles	15.2	16.7	<0.0001
	Aerobic	15.2	19.1	<0.0001
	Anaerobic	15.3	12.7	0.7867
Contaminants	All bottles	19.1	22.2	<0.0001
	Aerobic	17.1	21.4	<0.0001
	Anaerobic	25.5	25.3	0.0410
Significant Organisms	All bottles	11.0	11.9	0.0014
	Aerobic	11.8	15.3	<0.0001
	Anaerobic	1.2	11.0	0.9712

12. Evaluation of Rapid Phenotypic Testing for KPC Carbapenemase Producing klebsiella Pneumoniae Directly from Positive Blood Cultures by Use of "Hot Chocolate" Plates

Alexander Lawandi, M.D.[1]; Gleice C. Leite, PhD[2]; Brigitte Lefebvre, PhD[3]; Jean Longtin, MD[4]; Todd C. Lee, MD, MPH[5]; [1]Division of Infectious Diseases, McGill University Health Centre, McGill University, Montreal, Canada, Montreal, Quebec, Canada; [2]McGill University Health Centre, Montréal, Quebec, Canada; [3]Institut National de Santé Publique du Québec, Montreal, Quebec, Canada; [4]Université Laval, Montréal, Quebec, Canada; [5]McGill University, Montreal, Quebec, Canada

Session: O-3. Advances in Time to Test Results in the Bacteriology Lab

Background. Invasive infections with Carbapenemase Producing *Enterobacterales* are associated with considerable morbidity and mortality, in part due to the risk of inappropriate empiric therapy. Consequently, the rapid identification of carbapenem resistance is crucial to the management of these infections. We sought to evaluate possible reductions in turnaround time to identification of this resistance in blood cultures growing these organisms by applying rapid phenotypic test kits to growth from "hot chocolate" plates.

Methods. 30 blood cultures, spiked with carbapenem resistant *Klebsiella pneumoniae* isolates or susceptible controls, were inoculated onto chocolate agars that had pre-warmed at 37°C. These plates were incubated at 37°C for 3.5 hours. The resulting minimal growth was then identified using MALDI-TOF and underwent rapid phenotypic testing using three commercially available products (β-lacta and β-carba, from Bio-Rad, Marnes-la-Coquette, France, and Carba-NP, from bioMérieux, Durham, NC). The time to identification of carbapenem resistance using this method was then compared to that of the conventional laboratory workup.

Results. The identification was 100% accurate to the species level using MALDI-TOF paired to the 3.5 hour growth on the "hot choocolate" plates. The β-lacta kit identified resistance to 3rd generation cephalosporins for all ESBL and carbapenemase producing *Klebsiella pneumoniae* isolates, while the β-carba and Carba-NP kits identified carbapenem resistance only in the carbapenemase producers. The sensitivity of all assays was 100% (95% CI 0.87–1.0) and the specificity of carbapenemase detection was 100% (97.5% one-sided CI 0.4–1.0). The corresponding sensitivities and specificities of direct disc diffusion for ertapenem resistance detection were 88.5% (95% CI 0.70–0.98) and 100% (95%CI 0.40–1.0) respectively. The turnaround time for the rapid kits coupled to the "hot chocolate" plates was 4.25 to 5.1 hours as compared to 16 hours for the conventional workup.

Conclusion. Rapid phenotypic tests performed after inoculation of "hot chocolate" plates are highly sensitive for the presence of carbapenemase production and can be incorporated into the laboratory workflow for *Klebisella pneumoniae* with important reductions in turnaround time.

13. Evaluation of Etest for Antibiotic Susceptibility and Minimum Inhibitory Concentration (MIC) Agreement Against pseudomonas Aeruginosa (psa) from Patients with Cystic Fibrosis (CF)

Maxwell J. Lasko, PharmD[1]; Holly Huse, PhD. D(ABMM)[2]; Joseph L. Kuti, PharmD[3]; David P. Nicolau, PharmD[4]; [1]Center for Anti Infective Research and Development, Hartford, Connecticut; [2]Huntington Hospital, Pasadena, California; [3]Center for Anti-Infective Research and Development, Hartford Hospital, Hartford, Connecticut; [4]Hartford Hospital, Hartford, Connecticut

Session: O-3. Advances in Time to Test Results in the Bacteriology Lab

Background. CF acute pulmonary exacerbations are often caused by PSA, including multi-drug resistant strains. Optimal antibiotic therapy is required to return lung function and should be guided by *in vitro* susceptibility results. There are sparse data on the performance of Etest relative to reference broth microdilution (BMD) for many newer drugs against CF PSA. Herein, we describe Etest performance with 10 anti-PSA antibiotics against CF isolates.

Methods. Contemporary, clinical PSA (n=105) isolated during pulmonary exacerbation from patients with CF were acquired from 3 US hospitals. MICs were assessed by BMD (reference) and Etest for aztreonam (ATM), cefepime (FEP), ceftazidime (CAZ), ceftazidime/avibactam (CZA), ceftolozane/tazobactam (C/T), ciprofloxacin (CIP), levofloxacin (LVX), meropenem (MEM), piperacillin/tazobactam (TZP), and tobramycin (TOB). Each respective MIC was completed in at least triplicate using the same inoculum between methods. Modal MICs for each method were compared by rates of essential agreement (EA), categorical agreement (CA), minor error (miE), major error (ME), and very major error (VME) rates. All miE, ME and VME were adjusted if within EA.

Results. Of the 105 PSA, 46% had a mucoid phenotype. Results are summarized in the Table. Median modal Etest MICs read 0–1 dilution higher (IQR: 0–1) than BMD. CA and EA ranged from 64–93% and 63–86%, respectively. Single VMEs occurred for ATM (2.9%) and CAZ (4.2%). For CZA, 2 VMEs were observed and both were within EA. Major errors were ≤3% except for ATM (3.3%), MEM (3.3%), CZA (5.3% with adjusted ME 2.1%*), and FEP (13%). Minor error rates were < 10% except for TZP, CIP, LEV, TOB, and FEP (13–29%), for which majority of miE were within EA (3/14, 11/16, 10/18, 13/19, 20/31, respectively). Performance was similar for non-mucoid and mucoid populations.
Etest Performance

Conclusion. Etest methods performed well for most antibiotics against this challenging collection of PSA from CF patients. Laboratories should be cautious of miE and ME that may occur with certain antibiotics. Furthermore, our observations suggest laboratories confirm CZA results for isolates with MICs near the breakpoint.

Drug (%S, I, R)	EA	CA	VME	ME	miE	Adjusted miE*
ATM (57, 11, 32)	77%	87%	1 (2.9%)	2 (3.3%)	11 (10%)	5 (4.8%)
FEP (50, 20, 30)	72%	64%	0	7 (13%)	31 (29%)	11 (10.5%)
CAZ (68, 10, 22)	82%	90%	1 (4.2%)	0	9 (8.6%)	3 (2.9%)
CZA (90, -, 10)	78%	93%	2 (18%) 0* (0.0%)	5 (5.3%) 2* (2.1%)	NA	NA
CT (92, 2, 6)	86%	93%	0	1 (1%)	6 (5.7%)	1 (1.0%)
CIP (27, 14, 59)	79%	85%	0	0	16 (15%)	5 (4.8%)
LEV (24, 13, 63)	63%	83%	0	0	18 (17%)	8 (7.6%)
MEM (58, 6, 36)	86%	91%	0	2 (3.3%)	7 (7%)	3 (2.9%)
TZP (67, 13, 20)	77%	85%	0	2 (2.9%)	14 (13%)	10 (10.5%)
TOB (63, 13, 24)	82%	81%	0	1 (1.5%)	19 (18%)	6 (5.7%)

*Adjusted errors (excluding within EA errors) applied to miE and VME/ME for drugs without 'Intermediate' category

14. Outcomes from the AHRQ Safety Program for Improving Antibiotic Use Across 439 Long-term Care Facilities

Morgan Katz, MD, MHS[1]; Theresa A. Rowe, MD[2]; Sara E Cosgrove, MD, MS[3]; Pranita D. Tamma, MD, MHS[4]; Melissa A. Miller, MD, MS[5]; Prashila Dullabh, MD[6]; Kathleen Speck, MPH[7]; Roy Ahn, MPH, ScD[8]; Yue Gao, MPH[8]; Erik Scherpf, Ph.D.[6]; Robin Jump, MD, PhD[9]; Robin Jump, MD, PhD[9]; [1]Johns Hopkins University, pikesville, Maryland; [2]Northwestern University Feinberg School of Medicine, Chicago, Illinois; [3]Johns Hopkins University of Medicine, Baltimore, Maryland; [4]Johns Hopkins University School of Medicine, Baltimore, Maryland; [5]Agency for Healthcare Research and Quality, Rockville, Maryland; [6]NORC at the University of Chicago, Bethesda, Maryland; [7]Johns Hopkins, Baltimore, Maryland; [8]NORC, Chicago, Illinois; [9]VA Northeast Ohio Healthcare System, Cleveland, Ohio

Session: O-4. Antimicrobial Stewardship in Special Populations/Non-Acute Care

Background. Implementing effective antibiotic stewardship programs (ASPs) in long-term care (LTC) settings is challenging. We present the results of an intervention intended to change the culture of antibiotic prescribing in 439 United States LTC facilities (LTCF).

Methods. The LTC Safety Program assisted LTCFs with establishing and implementing ASPs from 12/2018 to 11/2019. Through webinars held 1–2 times per month and other educational content, the Safety Program emphasized 1) the science of safety to improve teamwork and identify antibiotic-associated harm and 2) clinical best practices in making antibiotic treatment decisions. Content was organized using the Four Moments of Antibiotic Decision Making Framework (**Figure 1**). All staff (e.g., physicians, nurses, nurse assistants) were encouraged to participate. LTCFs submitted monthly antibiotic days of therapy (DOT), numbers of new antibiotic starts, urine cultures (UCX) ordered, *Clostridioides difficile* LabID events, and census data. Generalized linear mixed effects models were used to calculate pre-post intervention changes at bi-monthly intervals for antibiotic DOT, antibiotic starts and UCX, each per 1,000 resident-days (RD), and *C. difficile* LabID events per 10,000 RD, comparing the beginning (1/2019 and 2/2019) and end (11/2019 and 12/2019) of the Safety Program.

Figure 1. Four Moments of Antibiotic Decision Making in the Long-Term Care Setting

Results. Of 439 LTCFs who completed the Safety program, the majority were mid-sized (75–149 beds; 229, 52.2%), most were non-hospital based and owned by a larger system (246, 56.0%), with similar distributions between urban and rural settings. Of these, 348 (79%) submitted both baseline and end-of-intervention data. Antibiotic starts decreased from 7.89 to 7.48 starts/1000 RD; P = 0.02). Days of therapy for all antibiotics decreased from 64.1 to 61.0 DOT/1,000 RD; P = 0.068) and for fluoroquinolones (an antibiotic targeted in the Safety Program) from 1.49 to 1.28 DOT/1,000RD; P=0.002). UCX decreased from 3.01 to 2.63 orders/1000 RD (P = 0.001). There were no significant differences in *C. difficile* LabID events **Table 1**.
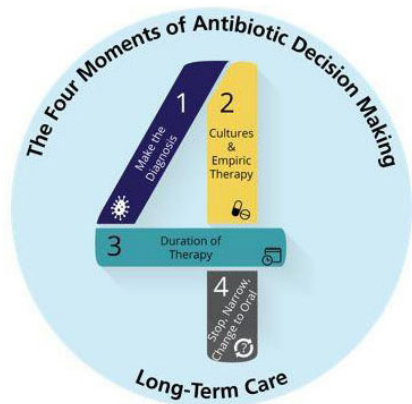
1 Does the resident have symptoms that suggest an infection?

2 What type of infection is it? Have we collected appropriate cultures before starting antibiotics? What empiric therapy should be initiated?

3 What duration of antibiotic therapy is needed for the resident's diagnosis?

4 Re-evaluate the resident and review results of diagnostic tests. Can we stop antibiotics? Can we narrow therapy? Can we change to oral antibiotics?

Table 1. Changes from baseline (Jan-Feb, 2019) to the end (Nov-Dec, 2019) of the AHRQ Safety Program

	Jan-Feb	Nov-Dec	Difference	P-value
Antibiotic Days of Therapy / 1,000 Resident-Days				
All antibiotics	64.1	61.0	-3.1	0.068
Fluoroquinolones	10.6	9.4	-1.2	0.014*
Piperacillin-tazobactam	2.18	3.01	0.83	0.10
Third-generation cephalosporins	5.48	4.72	-0.76	0.030*
Ceftazidime/Cefepime	1.41	2.19	0.78	0.031*
Antibiotic Starts / 1,000 Resident-Days				
All antibiotics	7.89	7.48	-0.41	0.020*
Fluoroquinolones	1.49	1.28	-0.21	0.002*
Piperacillin-tazobactam	0.09	0.11	0.02	0.13
Third-generation cephalosporins	0.80	0.74	-0.06	0.15
Ceftazidime/Cefepime	0.09	0.13	0.04	0.076
Urine cultures collected / 1,000 Resident-Days	3.01	2.63	-0.38	0.001*
C. difficile LabID Events / 10,000 Resident-Days	1.66	1.50	-0.16	0.52

Conclusion. By targeting both antibiotic prescribing culture and knowledge of best practices, the AHRQ Safety Program led to significant reductions in antibiotic use across a large cohort of LTCFs.

15. Leveraging Data to Explore the Consequences of Urine Testing and Antibiotic Use During the Spinal Cord Injury Annual Evaluation

Sarah B. May, MS, MPH[1]; Annette Walder, MS[2]; S. Ann Holmes, MD[1]; Ivy Poon, PharmD[3]; Charlesnika T. Evans, PhD, MPH[4]; Barbara Trautner, MD, PhD[5]; Felicia Skelton, MD, MS[1]; [1]Baylor College of Medicine, Houston, Texas; [2]Center for Innovations in Quality, Effectiveness and Safety, Houston, Texas; [3]Texas Southern University, Houston, Texas; [4]Northwestern University and VA, Hines, Illinois; [5]Michael E DeBakey VA Medical Center, Houston, Texas

**Session:** O-4. Antimicrobial Stewardship in Special Populations/Non-Acute Care

Background. The Veterans' Health Administration (VHA), currently mandates that every spinal cord injury and disorder (SCI/D) patient receives a screening urinalysis and urine culture (UC) during the annual evaluation (AE). Our pilot study at a single VHA center showed that 87% of the UCs obtained during the AE represented asymptomatic bacteriuria (ASB), and that 35% of those UC were treated with antibiotics unnecessarily. The objective of the current study is to determine the association between UC and antibiotic use using a national VHA sample of SCI/D patients.

Methods. Retrospective cohort of Veterans who presented to a VHA SCI/D clinic for their AE in FY18 or FY19. Demographic and clinical characteristics as well as information on primary outcomes (receipt of urine culture and antibiotics) were extracted from the VHA Corporate Data Warehouse. Associations between covariates and outcomes were assessed using logistic regression. P values < 0.05 were considered significant.

Results. 9447 veterans with SCI/D were included, of whom 5088 (54%) had a UC obtained. Of those with a UC, 2910 (57%) were classified as positive (Figure 1). 1054 (11%) veterans were prescribed antibiotics within 7 days of their AE. Of these, 515 had a positive UC, 202 had a negative UC, and 2878 did not have a UC obtained during the AE. Age, ethnicity, neurologic level of injury (NLI), comorbidity score, frequently identified organism on positive culture, and receipt of antibiotics within 7 days of AE were significantly associated with obtaining a UC during the AE. Race, NLI, bladder management strategy, comorbidity score, frequently identified organism on positive culture, and having a UC obtained during the AE were significantly associated with receipt of antibiotics within 7 days of AE.

Flowchart of SCI/D Veterans who had a urine culture and/or received antibiotics during their FY18/19 AE
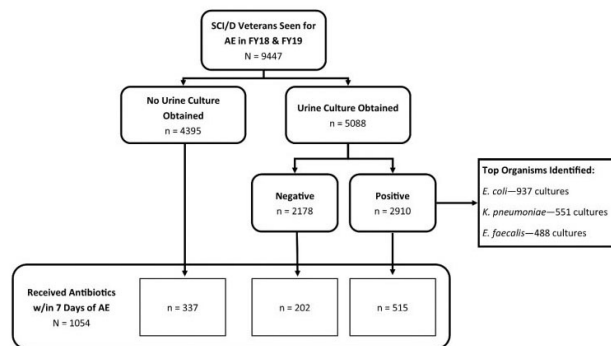
Conclusion. Over half of Veterans with SCI/D presenting for their AE receive a screening UC, contrary to other national guidelines recommending against this practice. Age and type or organism identified on UC drive antibiotic use, which was similar to our previous findings and reflect themes identified during our qualitative interviews with SCI/D providers. The knowledge gained from this national VA study will assist the development of interventions to reduce unnecessary urine testing and antibiotic use in the SCI/D population.

16. SCORE-UC: Antibiotic Stewardship in Urgent Care

Adam Hersh, MD, PhD[1]; Eddie Stenehjem, MD, MSc[2]; Nora Fino, MS[1]; Park Willis, MD[2]; Rajendu Srivastava, MD[2]; Whitney R. Buckel, Pharm D[2]; Kim Brunisholz, PhD[2]; Anthony Wallin, MD[2]; Naresh Kumar, MPH[2]; Matthew H. Samore, MD[3]; [1]University of Utah, Salt Lake City, Utah; [2]Intermountain Healthcare, Salt Lake City, Utah; [3]VA Salt Lake City Healthcare System, Salt Lake City, Utah

Session: O-4. Antimicrobial Stewardship in Special Populations/Non-Acute Care

Background. Urgent care (UC) is a rapidly growing site of healthcare delivery. The CDC developed Core Elements for Outpatient Antibiotic Stewardship to guide development of outpatient stewardship but little experience exists in applying Core Elements to UC settings. Our objective was to evaluate the effectiveness of a UC stewardship program in a health system.

Figure