1758. Impact of Accelerate Pheno™ Rapid Blood Culture Detection System on Laboratory and Clinical Outcomes in Bacteremic Patients

Ryan Dare, MD, MS[1]; Kelsey McCain, PharmD[2]; Katherine Lusardi, PharmD, BCPS-AQ ID[2]; Kay Daniels, BS[3]; Jacob Painter, PharmD, MBA, PhD[4]; Mrinmayee Lakkad, MS[4]; Nicole Emery, BS M(ASCP)[5]; Eric Rosenbaum, MD, MPH[5] and J Ryan Bariola, MD[6], [1]Division of Infectious Diseases, University of Arkansas for Medical Sciences, Little Rock, Arkansas, [2]Hospital Pharmacy, University of Arkansas for Medical Sciences, Little Rock, Arkansas, [3]College of Pharmacy, University of Arkansas for Medical Sciences, Little Rock, Arkansas, [4]Division of Pharmaceutical Evaluation and Policy, University of Arkansas for Medical Sciences, Little Rock, Arkansas, [5]Department of Pathology, University of Arkansas for Medical Sciences, Little Rock, Arkansas and [6]Division of Infectious Diseases, University of PIttsburgh Medical Center, Pittsburgh, Pennsylvania

Session: 211. Diagnostics Making a Difference
Saturday, October 6, 2018: 10:30 AM

Background. Molecular-based automated systems for the rapid diagnosis of bacterial infections have potential to improve patient care. The Accelerate Pheno™ blood culture detection system (ACCEL) is an FDA approved platform that allows for identification (ID) and antimicrobial susceptibility testing (AST) 8 hours following growth in routine culture.

Methods. This is a single-center retrospective chart review of bacteremic adult inpatients before and after implementation of ACCEL. Laboratory and clinical data were collected February–March 2018 (intervention) and compared with a January–April 2017 historical cohort (standard of care). Standard of care ID and AST were performed using VITEK® MS (MALDI-TOF MS) and VITEK®2, respectively. An active antimicrobial stewardship program was in place during both study periods. Patients with polymicrobial cultures, off-panel isolates, previous positive culture, or who were discharged prior to final AST report were excluded. Primary outcome was length of stay (LOS). Secondary outcomes were inpatient antibiotic duration of therapy (DOT) and time to optimal therapy (TTOT). Nonparametric unadjusted analyses were performed due to non-normal distributions. Statistics were performed using SAS 9.4.

Results. Of the 143 positive cultures performed on ACCEL during intervention, 118 (83%) were identified as on-panel organisms. Seventy-five (64%) of these 118 cultures and 79 (70%) of 113 reviewed standard of care cultures met inclusion criteria. Patient comorbidities (P = NS), MEWS severity score (P = 0.10), source of bacteremia (P = NS), and pathogen detected (P = 0.30) were similar between cohorts. Time from collection to ID (28.2 ± 12.7 hours vs. 53.8 ± 20.9 hours; $P < 0.001$) and AST (31.9 ± 11 hours vs. 71.8 ± 20 hours; $P < 0.001$) were shorter in the intervention arm.

Clinical Outcomes	Standard of Care (Mean ± SD) N = 79	Intervention (Mean ± SD), N = 75	P-value
LOS (days)	12.1 (11.9)	9.1 (7.6)	0.03
TTOT (hours)	73.5 (50.2)	37.5 (32.7)	<0.001
Total antibiotic DOT (days)	9.0 (7.5)	7.0 (4.6)	0.05
Meropenem DOT (days)	6.6 (3.7)	3.7 (2.1)	0.03

Conclusion. Compared with standard of care, ACCEL shortens laboratory turnaround-time and improves clinical outcomes. The use of this system has resulted in decreased mean antibiotic DOT, TTOT, and LOS. Further studies are needed to verify these findings.

Disclosures. **All authors:** No reported disclosures.

1759. High Proportion of Discordant Results in Culture-Independent Diagnostic Tests (CIDT) for Shiga Toxin, Foodborne Disease Active Surveillance Network (FoodNet), 2012–2017

Kelly A. Barrett, MPH[1], Danielle Tack, DVM, MPVM, DACVPM[2], Carlota Medus, PhD, MPH[3], Katie N. Garman, MPH, CHES[4], John Dunn, DVM, PhD[5], Sharon Hurd, MPH[6], Julie Hatch, MT[7], Karleys Parada, MPH[8], Siri Wilson, MPH[9], Elisha Wilson, MPH[10], Kathryn Wymore, MPH[11], Patricia M. Griffin, MD, FIDSA[12] and Aimee L. Geissler, PhD, MPH[13], [1]National Center for Emerging and Zoonotic Infectious Diseases, Division of Foodborne, Waterborne, and Environmental Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia, [2]Centers for Disease Control and Prevention, Atlanta, Georgia, [3]Minnesota Dept Health, St. Paul, Minnesota, [4]Tennessee Department of Health, Nashville, Tennessee, [5]Division of Communicable and Environmental Diseases and Emergency Preparedness, Tennessee Department of Health, Nashville, Tennessee, [6]CT EIP, New Haven, CT, [7]OR Dept of Human Services, Portland, Oregon, [8]Georgia Emerging Infections Program, Atlanta, Georgia, [9]Georgia Department of Public Health, Atlanta, Georgia, [10]Colorado Department of Public Health and Environmental, Denver, Colorado, [11]California Emerging Infections Program, Oakland, California, [12]Division of Foodborne, Waterborne, and Environmental Diseases, CDC, Atlanta, Georgia and [13]National Center for Emerging Zoonotic Infectious Diseases, Division of Foodborne, Waterborne, and Environmental Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia

Session: 211. Diagnostics Making a Difference
Saturday, October 6, 2018: 10:30 AM

Background. FoodNet conducts active laboratory-based surveillance for 9 pathogens transmitted commonly through food, including Shiga toxin-producing *E. coli* (STEC). Adoption of CIDTs has allowed for rapid identification of Shiga toxin or Shiga toxin genes, but incorporating multiple test results with differing sensitivity and specificity complicates treatment decisions and public health surveillance. Between 2007 and 2017, FoodNet reported increases in the use of CIDTs and decreases in rates of confirmation by culture.

Methods. We examined STEC cases reported to FoodNet during 2012–2017 with a positive immunoassay (IA) or polymerase chain reaction (PCR) test performed at a clinical laboratory, followed by positive or negative test at a state public health laboratory. Three test type combinations were assessed (IA/IA, PCR/PCR, and IA/PCR) by state, symptoms, test discordance, and culture (cx) result.

Results. During 2012–2017, 8,298 (76% of all STEC reported) specimens were tested by IA or PCR at both a clinical and a public health laboratory, 58% by IA/PCR, 27% by IA/IA, and 25% by PCR/PCR; some specimens had more than one test at each laboratory. Among these, 8,132 (98%) were also tested by cx. Among the IA/PCR test results, 20% were discordant and 75% of these were cx-negative. Even more of IA/IA (27%) and PCR/PCR (24%) results were discordant, and 75% of these were cx-negative. A median of 24% of test results were discordant (range by state, 13%–44%). Persons with discordant test results were less likely to have diarrhea (91% vs. 97%) and bloody diarrhea (33% vs. 57%). During 2012–2017, discordant results increased for IA/PCR (14% to 22%), IA/IA (17% to 34%), and PCR/PCR (6% to 25%). Most (85%) specimens with discordant results were cx-negative and 8% did not have a cx.

Conclusion. Almost a quarter of results were discordant, with marked variation by state, and most of these infections could not be confirmed by culture at the public health laboratory. Discordant results can pose problems for patient management. Including or excluding patients with discordant results also affects our ability to measure trends. Sensitivity and specificity of test types, test targets, and specimen transport must be considered when interpreting test results.

Disclosures. **All authors:** No reported disclosures.

1760. Interferon Gamma Release Assay for Diagnosis of Lyme disease

Yosefa Hefter, MD[1]; Christina D'Arco, BS[2]; Travis Shute, MS[2]; Raymond Dattwyler, MD[2,3]; Paul Arnaboldi, PhD[2,3] and Sheila Nolan, MD, MSCE[4], [1]Pediatrics, Westchester Medical Center, Valhalla, New York, [2]New York Medical College, Valhalla, New York and [3]Biopeptides Corporation, East Setauket, New York, [4]Pediatric Infectious Diseases, New York Medical College, Valhalla, New York

Session: 211. Diagnostics Making a Difference
Saturday, October 6, 2018: 10:30 AM

Background. The sensitivity of current antibody detection assays against *Borrelia burgdorferi* in the early stage of Lyme disease is very low. In children especially, who commonly have febrile viral illnesses, manifestations of early Lyme disease can be misdiagnosed. We previously demonstrated that IFNγ secretion could be detected in whole blood collected from Lyme disease patients at first clinical presentation following overnight incubation of the blood with peptides derived from *B. burgdorferi*. In the present study, we further evaluated the utility of IFNγ release for the laboratory diagnosis of Lyme disease in children with varying stages of the illness.

Methods. Children ages 2–18 years with no prior history of Lyme disease and with manifestations of Lyme disease at any stage were enrolled in the study. Sick and healthy controls were enrolled for comparison. We collected history and physical examination data and blood samples at the time of enrollment, at 1 month, and at 6 months. Standard 2-tier testing with ELISA (whole cell sonicate [WCS] and C6) and western blot were run in parallel to the IFNγ release assay for all blood samples. Sensitivity and specificity of the study assay were determined for presentation at all stages of Lyme disease. Clinical data were summarized.

Results. Blood samples from 22 patients with Lyme disease and 7 controls (4 sick, 3 healthy) were obtained at the first visit. The IFNγ release assay detected early and early disseminated Lyme disease with 78% sensitivity compared with 59% sensitivity of 2-tier testing in our study. For patients presenting with a single erythema migrans (EM) lesion, the IFNγ release assay detected Lyme disease with 63% sensitivity compared with 14% sensitivity with 2-tier testing. The IFNγ release assay had only 25% sensitivity for detecting late disease. A single control patient was positive for both the IFNγ release assay and 2-tier serology.

Conclusion. A novel IFNγ release assay demonstrated significantly increased sensitivity when compared with 2-tier testing in the laboratory diagnosis of Lyme disease in patients presenting with a single EM lesion. Future study is needed to determine its utility in detecting early Lyme disease in patients with nonspecific febrile illness in the absence of erythema migrans.

Disclosures. **R. Dattwyler**, Qiagen: Collaborator, Research support. **P. Arnaboldi**, Qiagen: Collaborator, research materials.

1761. Effect of Carbapenem-Resistant Enterobacteriaceae (CRE) Surveillance Case Definition Change on CRE Epidemiology—Selected US Sites, 2015–2016

Nadezhda Duffy, MD, MPH[1]; Sandra N. Bulens, MPH[1]; Hannah Reses, MPH[1]; Maria S. Karlsson, PhD[1]; Uzma Ansari, MS[1]; Wendy Bamberg, MD[2]; Sarah J. Janelle, MPH, CIC[2]; Jesse T. Jacob, MD[3]; Chris Bower, MPH[4]; Lucy E. Wilson, MD[5]; Elisabeth Vaeth, MPH[6]; Ruth Lynfield, MD, FIDSA[7]; Medora Witwer, MPH[8]; Erin C. Phipps, DVM, MPH[9]; Ghinwa Dumyati, MD, FSHEA[10]; Rebecca Pierce, PhD, MS, BSN[11]; P. Maureen Cassidy, MPH[12]; Marion A. Kainer, MBBS, MPH[13]; Daniel Muleta, MD, MPH[14] and Isaac See, MD[1], [1]Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia, [2]Colorado Department of Public Health and Environment, Denver, Colorado, [3]Division of Infectious Diseases, Emory University School of Medicine, Atlanta, Georgia, [4]Georgia Emerging Infections Program, Decatur, Georgia, [5]Maryland Department of Health and Mental Hygiene, Baltimore, Maryland, [6]Infectious Disease Epidemiology and Outbreak Response Bureau, Maryland Department of Health, Baltimore, Maryland, [7]State Epidemiologist and Medical Director for Infectious Diseases, Epidemiology and Community Health, Minnesota Department of Health, St. Paul, Minnesota, [8]Minnesota Department of Health, St. Paul, Minnesota, [9]New Mexico Emerging Infections Program, University of New Mexico, Albuquerque, New Mexico, [10]NY Emerging Infections Program, Center for Community Health and Prevention, University of Rochester Medical Center, Rochester, New York, [11]Acute and Communicable Disease

Prevention, Oregon Health Authority, Portland, Oregon, [12]Oregon Health Authority, Portland, Oregon and [13]Communicable and Environmental Diseases and Emergency Preparedness, Tennessee Department of Public Health, Nashville, Tennessee, [14]Tennessee Department of Health, Nashville, Tennessee

Session: 212. Healthcare Epidemiology: You Can try this at Home - Innovative Epi Abstracts

Saturday, October 6, 2018: 10:30 AM

Background. Carbapenem-resistant Enterobacteriacae (CRE) are an urgent US public health threat. CDC reported CRE incidence to be 2.93/100,000 population in 2012–2013 in selected sites but changed the CRE surveillance case definition in 2016 to improve sensitivity for detecting carbapenemase-producing (CP) CRE. We describe CRE epidemiology before and after the change.

Methods. Eight CDC Emerging Infections Program sites (CO, GA, MD, MN, NM, NY, OR, TN) conducted active, population-based CRE surveillance in selected counties. A case was defined as having an isolate of *E. coli*, *Enterobacter*, or *Klebsiella* meeting a susceptibility phenotype (figure) at a clinical laboratory from urine or a normally sterile body site in a surveillance area resident in a 30-day period. We collected data from medical records and defined cases as community-associated (CA) if no healthcare risk factors were documented. A convenience sample of isolates were tested for carbapenemase genes at CDC by real-time PCR. We calculated incidence rates (per 100,000 population) by using US Census data. Case epidemiology and the proportion of CP-CRE isolates in 2015 versus 2016 were compared.

Results. In total, 442 incident CRE cases were reported in 2015, and 1,149 cases were reported in 2016. Most isolates were cultured from urine: 87% in 2015 and 92% in 2016 ($P < .001$). The crude overall pooled mean incidence in 2015 was 2.9 (range by site: 0.45–7.19) and in 2016 was 7.48 (range: 3.13–15.95). The most common CRE genus was *Klebsiella* (51%) in 2015, and in 2016 was *Enterobacter* (41%, $P < 0.001$). Of the subset of CRE isolates tested at CDC, 109/227 (48%) were CP-CRE in 2015 and 109/551 (20%) were CP-CRE in 2016. In 2015, 52/442 (12%) of cases were CA CRE, and in 2016, 267/1,149 (23%) were CA CRE ($P < 0.001$). In 2016, 3/111 (2.7%) of CA CRE isolates tested were CP-CRE.

Conclusion. A large increase in reported CRE incidence was observed after the change in the case definition. The new case definition includes a substantially larger number of *Enterobacter* cases. A decrease in CP-CRE prevalence appears to be driven by an increase in non-CP-CRE cases. Although CP-CRE in the community still appear to be rare, a substantial proportion of phenotypic CRE appear to be CA, and CDC is undertaking efforts to further investigate CA CRE, including CP-CRE.

Figure: Comparison of 2015 and 2016 CRE case phenotypic definition

Surveillance Year	Species	Carbapenem/cephalosporin susceptibility phenotype*
2015	*Escherichia coli* *Klebsiella pneumoniae* *Klebsiella oxytoca* *Enterobacter cloacae* *Enterobacter aerogenes*	Intermediate or resistant to: Imipenem (MIC ≥2), Meropenem (MIC ≥2), or Doripenem (MIC ≥2) AND resistant to (if tested): Ceftazidime (MIC ≥16), Ceftriaxone (MIC ≥4), and Cefotaxime (MIC ≥4)
2016	*Escherichia coli* *Klebsiella pneumoniae* *Klebsiella oxytoca* *Enterobacter cloacae* *Enterobacter aerogenes*	Resistant to: Imipenem (MIC ≥4), Meropenem (MIC ≥4), Doripenem (MIC ≥4), or Ertapenem (MIC ≥2)

*Based on 2012 Clinical Laboratory Standards Institute (CLSI) MIC breakpoints

Disclosures. **G. Dumyati**, Seres: Scientific Advisor, Consulting fee.

1762. The Adjusted Ranking Metric (ARM) and Its Use in Composite Measures for HAI Prevention in the National Healthcare Safety Network (NHSN)

Mathew R. P. Sapiano, PhD, Jonathan R. Edwards, MStat and Daniel Pollock, MD, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia

Session: 212. Healthcare Epidemiology: You Can try this at Home - Innovative Epi Abstracts

Saturday, October 6, 2018: 10:30 AM

Background. The National Healthcare Safety Network (NHSN), developed and used by the Centers for Disease Control and Prevention (CDC) for surveillance of healthcare-associated infections (HAIs), provides benchmark measures, such as standardized infection ratio (SIRs), that CDC and its partners in healthcare and public health use for prevention purposes. NHSN provides benchmarks for each HAI measure separately, but a composite HAI measure could provide a more rounded assessment of HAI problems and prevention opportunities.

Methods. Several issues must be addressed to produce a sound HAI composite measure, the most of which is that the SIR can be inaccurate for facilities with low HAI exposure (e.g., low device days, operative procedure volume). We remedy this issue with the Adjusted Ranking Metric (ARM), a new measure that reliability-adjusts the SIR using a Bayesian mixed effects model. The ARM is particularly useful in the production of a composite measure because ARMs are well-suited to comparison between facilities. The composite was therefore produced by applying adjustments to the ARMs to account for (1) differences between exposure to separate HAI types within facilities and (2) differences in frequency and severity between HAIs. The composite is calculated for 6 HAIs based on 2015 data.

Results. Case studies of 3 facilities (table) show that the new composite measure provides a meaningful measure of overall facility performance that is less prone to the biases that afflict simple combinations of SIRs.

Conclusion. We introduce a framework for calculating a composite HAI measure that is flexible, customizable, and transparent. The current implementation of the framework is intended to assist in prevention efforts and can be easily modified to include cost weights, if desired. Flexibility in weighting the HAIs provides an opportunity for different stakeholders to customize the composite measure to their own needs.

HAI	Adjusted Ranking Metric (ARM)					
	Facility 1		Facility 2		Facility 3	
	SIR	ARM	SIR	ARM	SIR	ARM
CAUTI	0.86	0.85	0.98	0.97	1.33	1.28
CLABSI	0	0.79	0.35	0.37	1.31	1.19
CDI	0	0.51	0.91	0.9	60.99	8.73
MRSA	0	1.03	0.62	0.68	382.9	3.52
SSI (abdominal hysterectomy)	0	0.65	3.13	1.58	1.68	1.16
SSI (Colon surgery)	0	0.39	2.02	1.62	0.92	0.95
Arithmetic mean of ARMs	**-**	**0.71**	**-**	**1.02**	**-**	**2.80**
Prototype composite	**-**	**0.52**	**-**	**0.84**	**-**	**1.18**

Table: Example of SIRs, ARMs for 6 HAIs with Composite Measures for 3 Sample Facilities

Disclosures. **All authors:** No reported disclosures.

1763. Estimating Median Survival Time to Central Line-Associated Bloodstream Infection (CLABSI) Among Patients in Intensive Care Units Reported to National Healthcare Safety Network (NHSN)

Minn Soe, MBBS, MPH[1] and Jonathan R. Edwards, Mstat[2], [1]Centers for Disease Control and Prevention, Atlanta, Georgia and [2]Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia

Session: 212. Healthcare Epidemiology: You Can try this at Home - Innovative Epi Abstracts

Saturday, October 6, 2018: 10:30 AM

Background. Duration free of central line-associated bloodstream infection (CLABSI) in a hospital may vary by type of patient population. We estimated patients' median time to CLABSI by intensive care unit (ICU) type among acute care hospitals.

Methods. The study population was ICU patients whose CLABSI data were reported to National Healthcare Safety Network (NHSN) in 2016 under the reporting requirement of the Centers for Medicare and Medicaid. The unit of analysis was ICU location, not an individual patient. We conducted counting process survival analysis method to compute time (day) to a CLABSI beginning from day 1 of first reporting month in 2016 in a given ICU location. Once a CLABSI occurred in a location, the start time of follow-up was reset to day 1 after the date of event. The Cox regression method was used to explore the hospital and location-level characteristics that are potentially associated with the daily hazard of CLABSI for an ICU. We also assessed the proportionality hazard assumption of these factors. Adjusting for the vector of means of covariates, we then estimated median time to CLABSI by ICU location type, which is defined as follow-up time (days) by which 50% of events have happened in a given ICU type.

Results. In 2016, 6,935 ICUs at 3,384 hospitals reported CLABSI data to NHSN, with a total of 10,985 CLABSIs and 2,449,361 follow-up time in days. Factors associated with an increased daily hazard of CLABSI were the following: admission to a hospital with a large bed size, major teaching status, and admission to a patient care location with a higher device utilization ratio (Table 1). Adjusted survival curves showed that median time to event (median CLABSI-free time) among ICUs ranged from 66 days (level III neonatal ICU), 90 days (burn units) to 275 days (oncology units), and 284 days (cardiothoracic units) (Table 2, Figure 1).

Conclusion. The study demonstrated that ICUs with level III care for neonatal patients and ICUs with burn patients were least likely to achieve the target of "zero" infection in a defined period and may warrant further targeted interventions. Similar research to investigate infection control performance through estimating median infection-free time is needed beyond ICUs and across multiple HAI types and facility settings.

Table-1: Facility and location-level characteristics associated with daily hazard of CLABSI and their parameter estimates from Cox regression model, NHSN, 2016

Facility and location-level characteristics	Parameter Estimate	p-value	Hazard Ratio	95% CI
ICU Location type				
• Burn unit	1.111	<.0001	3.036	(2.655, 3.473)
• Cardiac unit	0.549	<.0001	1.731	(1.558, 1.923)
• Cardiothoracic Pediatric unit	0.821	<.0001	2.274	(1.991, 2.596)
• Medical	0.691	<.0001	1.996	(1.833, 2.174)
• Medical-surgical	0.527	<.0001	1.693	(1.565, 1.832)
• Neuromedical	0.439	<.0001	1.552	(1.259, 1.912)
• Neurosurgical	0.587	<.0001	1.799	(1.579, 2.049)
• Neonatal ICU Level-III	1.488	<.0001	4.427	(4.011, 4.887)
• Oncology unit	0.029	0.9300	1.030	(0.534, 1.986)
• Other pediatric units	0.887	<.0001	2.429	(2.194, 2.688)
• Respiratory	0.946	<.0001	2.574	(1.742, 3.805)
• Surgical	0.597	<.0001	1.817	(1.653, 1.997)
• Neonatal ICU level-II/III	0.939	<.0001	2.558	(2.275, 2.875)
• Trauma	0.800	<.0001	2.226	(1.976, 2.508)
• Cardiothoracic	reference			
Device utilization ratio (at location level)	2.807	<.0001	16.561	(15.075, 18.194)
Being a major teaching hospital	0.519	<.0001	1.680	(1.612, 1.751)
Hospital beds	0.0000446	<.0001	1.000	(1.000, 1.000)