was developed and posted online on August 2, 2017. Featuring three faculties with therapeutic expertise, the activity addressed: Distinguishing characteristics of various diagnostic methods; considerations when interpreting test results; and applying findings to patient care decisions. Educational effectiveness was assessed with a repeated-pairs pre-/post-assessment study design, in which each individual served as his/her own control. Responses to three multiple-choice, knowledge/competence questions and self-efficacy confidence question were analyzed. Significant improvements were observed overall (P = 0.0002; V = 0.156) and in several specific areas of assessment (figure). Following activity participation, 29% of ID specialists indicated increased confidence in diagnosing meningitis and encephalitis using rapid molecular tests and 89% of ID specialists indicated a commitment to incorporate one or more changes into practice. Finally, the findings also uncovered educational needs that are the focus of ongoing interventions.

**Conclusion.** Participation in this online education significantly improved ID specialists’ knowledge and competence with regard to using rapid molecular tests to diagnose meningitis and encephalitis. These findings highlight the positive impact of well-designed online education.

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**Disclosure.** D. Hurst, BioFire Diagnostics: Independent Medical Education, Educational grant. S. Smith, BioFire Diagnostics: Independent Medical Education, Educational grant.

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**2018. Host Gene Expression Classifiers Distinguish Bacterial and Viral Infections in Sri Lankan Patients with Acute Febrile Respiratory Illness**

L. Gayani Tillekeratne, MD;2,3 Sunil Suchindran, PhD; Emily Ko, MD;3 Elizabeth Petzold, PhD; Champika K. Bodinayake, MBBS, MD, MRCP;4 Ajith Nagahawatte, MBBS, MD, MS;5 Vasanthi Devastri, MBBS, MD;2 Ravini Kurukulasooriya, RS, MS, MC;2 Megan E. Reller, MD, MPH, PhD;3,4 Braddy P. Nicholson, PhD;3 Thomas Burke, PhD;4 Micah T. Mcclain, MD, PhD;4,5 Ephraim L. Taslik, MD, MHS, PhD;1,4,5 Ricardo Henao, PhD;4 Geoffrey S. Ginsburg, MD, PhD;2 and Christopher W. Woods, MD, MPH, FIDSA;1,2,5 

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**Results.** We noted a marked decline in signature performance between younger and older individuals in both viral (AUC 0.90 vs. 0.64) and bacterial (AUC 0.91 vs. 0.50) infections. Incorporation of age-related genomic changes was able to restore much of the signature performance in older individuals. When examining the genomic differences driving the drop in signature performance, we found marked perturbations in expression of immunoglobulin genes and pathways driving known immunoregulatory mechanisms that provide novel insights into an age-related decline in ARI-focused immunity.

**Conclusion.** Pathogen class-specific host-based gene expression signatures offer great promise as diagnostic tools. However, altered immune responses in vulnerable populations such as the elderly are also manifested at the genomic level and can affect diagnostic signature performance. Age-specific alterations in the components of a diagnostic signature can minimize much of this effect, however this work highlights the need for careful consideration of age during biomarker development.

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

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**2020. Concordance of Direct vs. Indirect Pathogen Detection Using the BioFire® System**

Craig Gritzen, MS;2 Ted Wilson, BA;3 Jeff Nawrocki, MS;4 Maxcen Deneris, AS;5 Cheryl Baird, PhD;6 Elizabeth Ott, PhD;6 Jay Jones, MS;6 Jeffrey Basta, PhD;6 Hana Kim, BS;1 Stacy House, MD, PhD;2 Daniel Cohen, MD;4 Any Leber, PhD;5 Robert Crisp, PhD;5 and Andrew Hemmert, PhD;6 BioFire Diagnostics, LLC, Salt Lake City; Utah, 2Washington University School of Medicine, St. Louis, Missouri, 3Nationwide Children’s Hospital, Columbus, Ohio, 4Department of Laboratory Medicine, Nationwide Children's Hospital, Columbus, Ohio

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**Results.** Polymerase chain reaction (PCR) is a highly sensitive and specific method for pathogen detection. While direct methods enable rapid identification, they are limited by pathogen titer, available assays, or sample matrix. Transcriptomic analysis addresses these limitations by measuring systemic host gene expression changes to infections. The BioFire System uses sample-to-answer multiple PCR that was adapted to detect 42 transcripts differentially expressed during viral and bacterial infections. Here we report concordance between indirect detection of viral respiratory pathogens and the FDA-cleared BioFire® Respiratory Panel 2 (RP2).

**Methods.** Paired nasal pharyngeal swabs and blood samples were obtained by informed consent from patients with suspected acute respiratory illness. Swabs (COPAN FLOQSwab®) were collected and stored in viral transport media (BD) for BioFire RP2 testing and peripheral blood samples were collected in PAXgene tubes (Qiagen) for testing with the research use only human response (HR) panel. A logistic regression model was developed to classify viral and nonviral positive samples using normalized quantification cycles for each assay. Probabilities of viral infection for each Q(R) number of symptoms was 2 (1-2) for influenza, 2 (1-2) for dengue, 2 (2-3) for *Leptospira sp.*, and 1.5 (1-2) for *O. tsutsugamushi*. We observed high predictive accuracy in discriminating bacterial and viral infections: AUROC 0.91 for the bacterial and AUROC 0.81 for the viral model. At enrollment, 65% of viral and 50% of bacterial AFRI patients received antibiotics.

**Conclusions.** Host gene expression classifiers performed well in a Sri Lankan population with AFRI, even with nonrespiratory pathogens that may not be readily identified. Host-based diagnostics may play a critical role in improving diagnostic and antibiotic use globally.

**Disclosures.** E. L. Talia; Response, Inc.: Founder, Equity. G. S. Ginsburg, Host Response Inc.: Board Member, Founder, Scientific Advisor and Shareholder, Stock (currently worth <$100). C. W. Woods, Host Response, Inc.: Founder, Equity.

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**2019. Host Gene Expression Signatures for Diagnosis of Acute Respiratory Infections in the Elderly**

Shyan Bloom, BA;3 Sunil Suchindran, PhD; Anna Mazur, BA2 and Micah T. Mcclain, MD, PhD;4 Duke University School of Medicine, Durham, North Carolina, Center for Applied Genomics and Precision Medicine, Duke University, Durham, North Carolina, Division of Infectious Diseases, Duke University Medical Center, Durham, North Carolina

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**Results.** Despite advances in molecular techniques the etiology of acute respiratory infections (ARIs) is still often difficult to determine either at the point of care or with advanced microbiological techniques. There is growing interest in host biomarker assays, including those based on gene expression patterns in circulating cells, to aid in differentiation of viral and bacterial diseases. However, there are concerns about how such tests perform in vulnerable populations where host responses are often muted.

**Methods.** In order to assess performance of gene-expression-based biomarkers, we enrolled patients presenting to the emergency department with clinical ARI and selected 184 individuals aged 25-60 and 260 years old with either viral or bacterial ARI gene expression in blood was measured with Affymetrix microarrays. Published viral and bacterial signatures were applied to the data and Bayesian approaches were used to develop novel discriminative models.

**Results.** We noted a marked decline in signature performance between younger and older individuals in both viral (AUC 0.90 vs. 0.64) and bacterial (AUC 0.91 vs. 0.50) infections. Incorporation of age-related genomic changes was able to restore much of the signature performance in older individuals. When examining the genomic differences driving the drop in signature performance, we found marked perturbations in expression of immunoglobulin genes and pathways driving known immunoregulatory mechanisms that provide novel insights into an age-related decline in ARI-focused immunity.

**Conclusion.** Pathogen class-specific host-based gene expression signatures offer great promise as diagnostic tools. However, altered immune responses in vulnerable populations such as the elderly are also manifested at the genomic level and can affect diagnostic signature performance. Age-specific alterations in the components of a diagnostic signature can minimize much of this effect, however this work highlights the need for careful consideration of age during biomarker development.

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

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Craig Gritzen, MS;2 Ted Wilson, BA;3 Jeff Nawrocki, MS;4 Maxcen Deneris, AS;5 Cheryl Baird, PhD;6 Elizabeth Ott, PhD;6 Jay Jones, MS;6 Jeffrey Basta, PhD;6 Hana Kim, BS;1 Stacy House, MD, PhD;2 Daniel Cohen, MD;4 Any Leber, PhD;5 Robert Crisp, PhD;5 and Andrew Hemmert, PhD;6 BioFire Diagnostics, LLC, Salt Lake City; Utah, 2Washington University School of Medicine, St. Louis, Missouri, 3Nationwide Children’s Hospital, Columbus, Ohio, 4Department of Laboratory Medicine, Nationwide Children's Hospital, Columbus, Ohio

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**Results.** Polymerase chain reaction (PCR) is a highly sensitive and specific method for pathogen detection. While direct methods enable rapid identification, they are limited by pathogen titer, available assays, or sample matrix. Transcriptomic analysis addresses these limitations by measuring systemic host gene expression changes to infections. The BioFire System uses sample-to-answer multiple PCR that was adapted to detect 42 transcripts differentially expressed during viral and bacterial infections. Here we report concordance between indirect detection of viral respiratory pathogens and the FDA-cleared BioFire® Respiratory Panel 2 (RP2).

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