

other professionals (32, 13%) and physicians (31, 13%). All posttest questions except one indicated correct responses were selected by $\geq 80\%$. In all, 245 provided a course evaluation; 94% agreed the content and materials addressed a gap in their knowledge, and 84% agreed the knowledge gained from the activity could be applied to practice. Nearly all (96%) agreed the delivery methods used was appropriate and aided in learning the content. Suggested improvements included integration of case-based scenarios, Spanish-language materials, and more information on epidemiology and information on TBRDs in vulnerable populations.

Conclusion. Participation in this online toolkit led to improved knowledge and confidence among providers regarding timely diagnosis and treatment of TBRDs, highlighting the utility of online education in addressing gaps in provider awareness of TBRDs in the United States.

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2562. Implementation of Current Event Assignments to Engage Students and Enhance Public Health and Infectious Diseases Awareness in a Doctor of Pharmacy Program

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Session: 266. Medical Education: Medical School to Practice

Saturday, October 5, 2019: 12:15 PM

Background. The Accreditation Council for Pharmacy Education standards for Doctor of Pharmacy (PharmD) programs include a required Public Health element. An ID-related current event assignment series was introduced into the PharmD ID Integrated Pharmacotherapy course in 2018.

Methods. Students were required to submit one ID-related current event weekly for 3 weeks and one reflection. A written summary and opinion about the article was submitted using the on-line course system. Instructions suggested they consider the public health implications of the article and how the article may impact practice (significance). They were asked to include any errors in reporting and could also include how they might respond to questions from patients or practitioners about the topic. For the reflection, students were asked to consider whether the assignments impacted their view of ID, public health and reporting to the public. In addition, they were asked if the assignments influenced how they stay informed for their patients. Suggestions for improvement and comments regarding whether the assignment should be retained for future classes were solicited. Student responses for each of 2 years were evaluated and summarized into themes.

Results. Overwhelmingly, students felt the current events were beneficial to their appreciation of ID-related topics and public health awareness. Students noted the open-ended nature of the assignment encouraged their own curiosity. Many said their first impression was that it would be difficult to find an article, and were surprised how easily they found articles and spent additional time researching topics of interest. Student stated the requirement to add an opinion enhanced their effort in finding, reading, researching and writing about the topic. Students suggested more time for sharing and discussing articles with the class. Most stated the assignments should be continued for future classes.

Conclusion. The addition of an open-ended, ID-related current event assignment provided PharmD students with exposure to public health-related issues. These assignments were positively received by students and served as a simple means to engage the students in self-directed learning of ID-related topics. It also enlightened students toward global public health issues and encouraged many to stay informed.

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2563. The Impact of HCV Educational Training on HIV Providers' Attitudes, Knowledge, and Uptake of Treatment Initiation in HCV/HIV Co-infected Patients

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Background. Few HIV clinics train HIV providers on initiation of HCV treatment for their coinfected patients. We sought to evaluate the changes in comfort levels, attitude and knowledge of HCV evaluation and treatment among providers over time and track the uptake of treatment initiation.

Methods. Our program was implemented in an urban, Ryan-White outpatient clinic in 2018. Providers were given initial didactics and completed a survey that assessed their level of comfort and knowledge with treating HCV. We developed pocket cards and flow charts to help providers navigate the HCV cascade to cure. Additional training one year later through presentations and case-based discussions was given and the same survey was conducted again. We evaluated the number of HCV evaluation visits in 2018 and prescriptions written for HCV treatment.

Results. The first survey was completed by 21 and the second by 20 out of 28 providers; 70% attended at least one of the trainings. After the initial training, 38% of providers felt "confident" about discussing liver disease progression which increased to 50% after the second training. Similarly, 48% of providers felt "somewhat comfortable" talking about HIV/HCV drug interactions which increased to 80%. 33% of providers noted they were "not comfortable" discussing drug interactions which decreased to 15%. Approximately 1/3 providers felt "confident" talking about HCV treatment in both surveys. About 20% of providers disagreed with treating HIV/HCV patients with active substance use and this did not change. The median knowledge score was 7 (IQR) (6-9) after the first survey and changed to 8(5-9) after the second. Between

2018-2019, 81 HCV evaluation visits were scheduled and 64 (80% Male, 53% Black, 39% uninsured, 23% Medicaid, 73% with history of substance use) were completed and 69% of patients were prescribed HCV treatment. Among all HIV providers, 89% completed a median of 1 (1-3) HCV evaluation visits, and 71% prescribed treatment a median of 1 (1-2).

Conclusion. Implementation of HCV training to all HIV providers requires continued education and resulted in the initiation of HCV evaluation and treatment amongst the large majority of HIV providers who had previously never treated HCV.

Survey Questions	Answers	1st survey (n=21)	2nd survey (n=20)
Current Practices			
Do you care for any HCV/HIV coinfected patients?	Yes	18 (85.7%)	19 (95%)
Do you talk to patients about receiving HCV treatment?	Always/Mostly	17 (80.9%)	18(90%)
	Sometimes/Rarely	2 (9.5%)	1 (5%)
	Never	2 (9.5%)	1 (5%)
Comfort Level: How comfortable do you feel talking to your patients about:			
HCV treatments	Confident	7 (33.3%)	6 (30%)
	Somewhat comfortable	12 (57.1%)	12 (60%)
	Not comfortable	2 (9.5%)	2(10%)
HIV/HCV drug interactions	Confident	4 (19.1%)	1 (5%)
	Somewhat comfortable	10 (47.6%)	16 (80%)
	Not comfortable	7 (33.3%)	3 (15%)
Liver Cancer and Screening	Confident	12 (57.1%)	11 (55%)
	Somewhat Comfortable	7 (33.3%)	8 (40%)
	Not comfortable	2 (9.5%)	1 (5%)
Liver Disease Progression	Confident	8 (38.1%)	10 (50%)
	Somewhat Comfortable	12 (57.1%)	9 (45%)
	Not comfortable	1 (4.8%)	1 (5%)
Attitudes: HIV/HCV patients should be treated even if they are using:			
Alcohol	Agree	15 (71.4%)	14 (70%)
	Neutral	1 (4.6%)	2 (10%)
	Disagree	5 (23.8%)	4 (20%)
Cocaine	Agree	14 (66.7%)	12 (60%)
	Neutral	2 (9.5%)	2 (10%)
	Disagree	5 (23.8%)	6 (30%)
Knowledge in the areas of:			
Transmission (1)	Average Correct	66.6%	75%
Evaluation (3)		90.5%	88.3%
HCV drugs (5)		50.4%	55%
Cirrhosis monitoring (2)		57%	52.5%

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2564. What Predicts Journal Publication Tier and Audience Engagement in the Infectious Diseases Literature? A Review of 146 Publications

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Background. As part of an online medical education project (www.idjournal.club), we surveilled the infectious diseases (ID) literature, selecting subsets of what we deemed the most clinically impactful articles on a monthly basis using a prespecified search algorithm. We used this resource to perform a broad overview of articles published in the field and examine factors associated with publication in higher tier journals and higher rates of public and ID community engagement.

Methods. We examined articles reviewed on www.idjournal.club between June and September 2018. For each article, we recorded the publishing journal, subfield of ID, study type, nation and degree of the lead author, and sample size, and we assigned the paper up to three topic keywords. Our outcomes of interest were the publishing journal's Scimago Journal Rank (SJR), a surrogate for journal tier, and the article's Altmetric score, a surrogate for audience engagement.

Results. Of 146 articles included in the analysis, the most common study types were retrospective observational ($n = 47$), randomized controlled trial ($n = 23$), *in vitro* ($n = 20$), and prospective observational ($n = 19$). The median sample size was 238; median sample sizes were higher for randomized controlled trials ($n = 400$) and lower for *in vitro* and pharmacokinetic/pharmacokinetic studies ($n = 53$ and $n = 44$). Lead authors were based in the United States in 38% of cases and in North America or Europe in 86% of cases. Physicians accounted for 65% of lead authors, PhDs 23%, and PharmDs 10%. The most commonly referenced pathogens were HIV, MDR Gram-negative bacteria, *S. aureus*, and *C. difficile*; the most commonly referenced disease states were bacteremia, sexually transmitted infection, respiratory tract infection, and UTI. The mean SJR was 3.5 (SD 3.1) and the mean Altmetric score was 54.5 (SD 143). SJR and Altmetric score were associated with study type, sample size, and key topics; Altmetric score was also associated with publishing journal. In multivariate analysis,

SJR was associated with study type and sample size, and Altmetric score was associated with ID subfield, journal, and sample size.

Conclusion. We present a descriptive overview of the ID literature and identify article factors associated with journal tier and audience engagement after publication.

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2565. Initial and Recurrent Episodes of *Clostridioides difficile*: Online Education as a Tool to Improve Management Strategies

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Background. The most common cause of infectious diarrhea in hospitalized patients, *C. difficile* is responsible for nearly half a million infections annually. Among persons over the age of 65 years, 1 in 11 die within a month of diagnosis.

Methods. A CME-certified/ABIM MOC educational program was developed to evaluate and improve ID specialists' application of the latest guideline recommendations for the diagnosis and management of individuals with *C. difficile*. Modeled on the interactive grand rounds approach, the activity blended case-based presentation with multiple-choice questions. Using a "test then teach" approach to elicit cognitive dissonance, the activity provided evidence-based feedback following each learner response. Educational effectiveness was assessed with a repeated-pairs pre-/post-assessment study design; each individual served as his/her own control. A chi-square test assessed changes pre- to post-assessment. *P* values < 0.05 are statistically significant. Effect sizes were evaluated using Cramer's *V* (< 0.05 modest; 0.06–0.15 noticeable effect; 0.16–0.26 considerable effect; > 0.26 extensive effect). The activity launched on a website dedicated to continuous professional development on May 29, 2018. Data for this initial analysis were collected through March 27, 2019.

Results. To date, 3274 HCPs, including 2946 physicians have participated in the activity. Data from the subset of ID specialists (*n* = 82) who answered all pre-/post-assessment questions during the initial study period were analyzed. Following activity participation, significant improvements were observed in the proportion of ID specialists who answered all assessment questions correctly (4% pre vs. 74% post; *P* < 0.0001; *V* = .555). Improvements were also observed in several specific areas of assessment (table). Additionally, 50% of ID specialists indicated they planned to modify their treatment approach and 18% planned to modify their diagnostic strategies for *C. difficile*.

Conclusion. Participation in this online, interactive, case-based, educational intervention significantly improved ID specialists' management strategies for initial and recurrent episodes of *C. difficile*. These findings highlight the positive impact of well-designed online education.

Assessment of Educational Effectiveness			
Area of Assessment	% relative improvement (% of ID specialists selecting the correct response at pre- vs post-assessment)	<i>P</i> -value for change	Cramer's <i>V</i> for the magnitude of the change
Applying the most current IDSA guidelines for <i>C. difficile</i> testing	88% improvement (52% vs 98%)	<i>P</i> < .0001	<i>V</i> = .521 (Extensive)
Selecting an appropriate management strategy for an elderly patient with recurrent <i>C. difficile</i> infection	230% improvement (23% vs 76%)	<i>P</i> < .0001	<i>V</i> = .524 (Extensive)
Developing a step-wise treatment strategy for patients at increased risk for recurrence	232% improvement (28% vs 93%)	<i>P</i> < .0001	<i>V</i> = .660 (Extensive)

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2566. Infection Dynamics of *Pseudomonas aeruginosa* Bloodstream Infections

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Session: 267. Microbiome, Antibiotics, and Pathogenesis
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Background. *Pseudomonas aeruginosa* (PA) is a critically important healthcare-associated pathogen responsible for a variety of infections including bloodstream infection (bacteremia), pneumonia, and urinary tract infection. PA bacteremia is a significant cause of morbidity and mortality, especially in immunocompromised patients; However, little is known about the in-host infection dynamics of PA bacteremia and the impact of individually infected patients on transmission in the healthcare environment.

Methods. We utilized animal modeling in conjunction with sequencing technology to dissect the infection dynamics of PA bloodstream infections. BALB/c mice were challenged intravenously with a human bacteremia isolate, PABL012. At various time points post infection, organs were harvested and the surviving PA enumerated. In parallel, PABL012 engineered to express the luciferase cassette was used to track PA in live mice over time using the IVIS imaging system. STAMP (sequence tag-based

analysis of microbial populations) analysis was then applied to define the population dynamics of PA bloodstream infection.

Results. Bacterial enumeration and IVIS imaging revealed that systemically infected mice have a focus of bacterial expansion in their gallbladders (GB). Surprisingly, the same mice also shed PA in their gastrointestinal tract (GI), a phenomenon not previously appreciated following bloodstream infection. Finally, STAMP analysis revealed that (1) PA experiences a severe *in vivo* bottleneck when trafficking to the GB, (2) the population in the GB expands tremendously during infection and (3) this population is ultimately the source of excreted bacteria in the GI tract.

Conclusion. Our research, using murine models, provides the first evidence that the GB acts as a sanctuary site for PA replication following systemic infection and links replication with fecal excretion. Fecal excretion of PA from hospitalized patients is observed, but the direct link between acute infection, GI shedding, and transmission remains unclear. Our observations have significant implications on understanding how PA evades initial host clearance, the identity of protected expansion niches, and how PA might exit the human host in the healthcare environment facilitating a transmission event.

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2567. Effect of Broad vs. Narrow-Spectrum *Clostridioides difficile* Treatment on Human Stool Bile Acid Composition Over Time

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Session: 267. Microbiome, Antibiotics, and Pathogenesis
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Background. Secondary bile acid production by a diverse commensal flora may be a critical factor in preventing recurrence of *Clostridioides difficile* infection (CDI). Key enzymes involved are bacterial-encoded bile salt hydrolases (BSHs), felt to be "gatekeepers" to secondary bile acid synthesis. Ridinilazole, a novel narrow-spectrum drug for CDI, demonstrated superior sustained clinical response compared with vancomycin in Phase 2. Longitudinal sampling during this trial allowed for assessment of metabolites differentially present in stools during/after therapy with either broad or narrow-spectrum anti-CDI agent. Previous work characterizing subject's fecal microbiota in this trial showed that unlike vancomycin, ridinilazole has little effect on commensal flora during and after therapy. We hypothesized that ridinilazole's microbiota-preserving effect is associated with lack of accumulation of conjugated primary bile acids and/or reaccumulation/persistence of secondary bile acids over the course of CDI treatment, when compared with vancomycin-treated subjects. Furthermore, we hypothesized that we would observe correlations between bile acid profiles and predicted BSH gene abundances.

Methods. Sequential stool samples were obtained from 44 subjects treated with either ridinilazole or vancomycin (22 in each arm), ranging from time of CDI diagnosis, at end-of-therapy, and up to 40 days after diagnosis. Bile acids were quantitated by liquid chromatography-mass spectrometry. Using the PICRUSt algorithm, metagenomic predictions of BSH gene abundances were performed.

Results. Stool bile acid compositions differed between ridinilazole-treated and vancomycin-treated subjects at end-of-therapy. In vancomycin-treated subjects, stool composition became dominated by conjugated primary bile acids and decreased levels of secondary bile acids compared with baseline; the ratio of stool conjugated bile acids to secondary bile acids significantly predicted treatment arm. This ratio was also associated with predicted BSH gene abundance in ridinilazole-treated subjects.

Conclusion. Microbiota-preserving CDI treatment with ridinilazole preserves bile acid composition, which may decrease likelihood of recurrence.

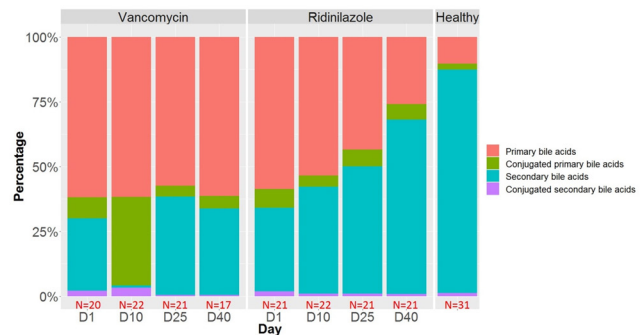


Figure 1. Changes in stool bile acid composition over time following treatment with vancomycin or ridinilazole, and in healthy subjects.

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2568. Mechanisms of a Specific Probiotic Comprised of *Lactobacillus acidophilus* CL1285, *L. casei* LBC80R and *L. rhamnosus* CLR2 that Interferes with *Clostridioides difficile* 20291 Toxin Production

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