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**Session:** 226. Clinical Practice Issues: OPAT  
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**Background.** The use of outpatient parenteral antimicrobial therapy (OPAT) is expanding, and although a significant proportion of OPAT patients are treated for prosthetic joint infections (PJIs), research on this population is limited. This study examined characteristics associated with 90-day hospital readmission rates for patients receiving OPAT for PJIs.

**Methods.** This retrospective study identified patients who received OPAT for hip and knee PJIs. Inclusion criteria included patients over 18 years who were discharged from 2015 to 2017 and had follow-up scheduled for OPAT. Patients with a planned readmission or a readmission unrelated to OPAT within 90 days were excluded. The primary outcome of interest was 90-day readmission.

**Results.** A total of 53 patients were identified. Patient characteristics were as follows: 57% male, 92% Caucasian, median age of 69, median BMI of 32; 34% had diabetes mellitus, and the median Charlson comorbidity score was 4 (IQR 0–5). Fifty-one percent were treated for hip infections and 49% for knee infections. Methicillin-susceptible *Staphylococcus aureus* PJIs were the most common, accounting for 28% of infections, whereas 6% were treated for methicillin-resistant *S. aureus*; 36% were discharged to home, 64% to skilled nursing facilities (SNFs); 66% attended their initial OPAT appointment, and the clinic received laboratory results for safety monitoring in 56% during their first week of OPAT. A total of 14 (26%) patients were readmitted within 90 days for OPAT-related complications. Of those readmitted, 57% were for worsening infections, 22% for adverse drug events, 14% for vascular access complications, and 7% for *Clostridium difficile* infection. None of the patient characteristics were significantly associated with greater readmission risk, and readmission was not associated with a missed initial outpatient appointment or initial safety laboratories.

**Conclusion.** Patients discharged on OPAT for PJI are at high risk of readmission. Overall, we found low rates of adherence with initial appointments and safety laboratories. Most readmissions were due to worsening infection, but it is not clear whether this was related to early hospital discharge, lapses in monitoring, or communication breakdown during transitions of care. More research is warranted in this population at risk for readmission.

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#### 1945. Making the EMR Work for You: Modifications to Epic to Improve Management of Outpatient Parenteral Antibiotic Therapy (OPAT) Patients

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**Background.** Our institution uses Epic as its electronic medical record (EMR), and managing the complex needs of OPAT patient's has been challenging and also time-consuming with our EMR. It became imperative that the EMR be modified to capture all OPAT patients and manage them efficiently. We describe the development of EMR tools to facilitate OPAT management.

**Methods.** The infectious diseases (ID) physician and pharmacist identified multiple ways in which OPAT patient care could be improved by modifying the EMR. In 2016, a multidisciplinary team at UPMC created software modifications in Epic to meet the needs of the OPAT program.

**Results.** A shared system list and communication tools used by ID physicians, nurses, and pharmacists were created. As soon as an inpatient is identified as an OPAT discharge, an OPAT "Plan of care" note is created by an ID fellow, note is sent to the OPAT team members (OPAT nurse, nurse practitioner, and ID pharmacist) and the patient is added to the shared list. An order set was built to facilitate accurate electronic prescribing of antimicrobials, supplies for home infusions, and pertinent laboratory tests. The order set sends an automatic message to OPAT team members, a back-up method for identifying OPAT patients. A comprehensive patient report, the "OPAT monitoring" view, was designed to facilitate patient care. The view displays OPAT relevant data from multiple sections of the patient chart onto one screen (ID notes, laboratory results, medications, appointments, free text box, etc.) without entering each patient's chart. These EMR modifications significantly reduced the time needed for weekly case reviews and facilitates more efficient management of 90–100 patients weekly.

**Conclusion.** Modifications made to the Epic EMR at our institution have improved patient safety and efficiency of the OPAT program. Fewer patients are missed, patient monitoring is enhanced, clinician time is saved, and ordering is more accurate. Physician satisfaction was improved by creating tools that were designed with workflow efficiency in mind. These modifications were independent of and predate the recommendations made in the Epic "OPAT setup and support guide," and provide more enhancements for efficient patient management, and could easily be made by other Epic users.

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

#### 1946. Heterogeneous Hospitalization Outcomes of People Who Use Drugs: The Type of Drug(s) Used Matters

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**Background.** US hospitals are experiencing an increase in admissions for persons who use drugs (PWUD). We examined predictors of two outcomes—leaving AMA and 30-day readmission—among PWUD.

**Methods.** We limited the 2013 National Readmissions Database to admissions of PWUD (age 18 to 65; ICD-9 codes for illicit drugs). Diagnoses and severity (Elixhauser comorbidity index (ECI)) were defined by ICD-9 codes. Uni- and multivariable logistic regression were performed.

**Results.** Predictors of AMA included younger age, male gender, bacterial infection, overdose, and using more than one drug. Use of opioids with stimulants was associated with the highest rate of AMA discharge (AOR 1.81, 95% CI 1.76–1.86). Leaving AMA was not found to be associated with 30-day readmission (OR 0.99, 95% CI 0.96–1.03).

**Conclusion.** PWUD represent a heterogeneous patient population with hospital outcomes influenced by different patterns of drug use. Further exploration into these differences could have implications for predicting and intervening to prevent AMA discharges as well as 30-day readmissions, which are associated with worse outcomes and significant healthcare costs.

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	Median [IQR] or N(%) N = 1,773,194	AMA, N = 1,211,883*		30-Day Readmission, N = 1,211,883 <sup>‡</sup>	
		OR	AOR	OR	AOR
Age	44 [32, 53]	0.98 (0.98, 0.98)	0.983 (0.98, 0.98)	0.999 (0.99, 1.00)	–
Female	777,920 (44%)	0.71 (0.70, 0.72)	0.64 (0.63, 0.66)	0.93 (0.91, 0.95)	0.93 (0.91, 0.95)
Bacterial infection	506,557 (29%)	1.15 (1.13, 1.17)	1.15 (1.12, 1.17)	0.99 (0.97, 1.02)	–
Overdose	105,291 (6%)	1.18 (1.15, 1.21)	1.15 (1.11, 1.19)	0.91 (0.88, 0.95)	0.90 (0.86, 0.95)
AMA	122,447 (7%)	NA	NA	0.99 (0.96, 1.03)	–
Death during first admission	15,728 (1%)	NA	NA	NA	NA
Drug used					
Opioids only	356,363 (47%)	REF	REF	REF	REF
Stimulants only	269,654 (35%)	0.91 (0.89, 0.93)	0.94 (0.92, 0.96)	1.06 (1.03, 1.10)	1.05 (1.02, 1.08)
Opioids/alcohol	264,887 (8%)	1.17 (1.14, 1.21)	1.14 (1.11, 1.18)	0.97 (0.92, 1.01)	0.96 (0.92, 1.00)
Opioids/sedatives	58,875 (8%)	1.41 (1.37, 1.46)	1.37 (1.32, 1.41)	1.02 (0.97, 1.07)	1.03 (0.98, 1.08)
Opioids/stimulants	204,767 (27%)	1.95 (1.89, 2.00)	1.81 (1.76, 1.86)	0.84 (0.80, 0.88)	0.84 (0.80, 0.88)
Elixhauser Comorbidity Index					
0–1	466,653 (26%)	REF	REF	REF	REF
2–3	889,381 (50%)	0.87 (0.86, 0.88)	0.90 (0.88, 0.92)	1.02 (0.99, 1.04)	0.99 (0.96, 1.02)
>3	417,159 (24%)	0.66 (0.64, 0.67)	0.70 (0.68, 0.73)	1.05 (1.02, 1.08)	1.00 (0.96, 1.03)

\*Patients who died during index admission were removed from the logistic regression.

**1947. Influenza Vaccination via Oral Tablet is Protective and Induces a Unique Mucosal Immune Response**

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**Background.** Oral vaccines delivered as tablets offer several advantages over traditional injection-based vaccines including ease of distribution and administration as well as temperature-stable formulation options. Oral vaccination is also advantageous because it directly induces a strong mucosal response, which is thought to be critical for preventing future infections. Here we present results from a phase II clinical challenge study comparing efficacy of an oral recombinant adenovirus-based vaccine expressing hemagglutinin (HA) from A/California 04/09 to that of a commercial injectable quadrivalent (QIV) influenza vaccine.

**Methods.** In this 2016–2017 clinical trial (NCT02918006), subjects were immunized with either oral vaccine, QIV, or placebo and then challenged 90 days post-immunization with wildtype influenza A H1 virus to measure vaccine efficacy and durability. Protection was assessed by measuring changes in HAI titres, microneutralization, and IgA/IgG ASC assays. Additionally, exploratory flow cytometry evaluated quantitative and qualitative aspects of immunogenicity including markers of activation and mucosal homing on B cells. Analysis was performed on days 0 and 7 post-immunization and 0 and 6 days post-viral challenge. Plasmablasts sorted from PBMCs were then isolated for genomic DNA and sequenced for heavy chain receptor sequencing using NGS analysis.

**Results.** Of the subjects immunized with Vaxart's oral tablet vaccine, 48% were protected. QIV, by comparison, protected 38% of immunized individuals. Only 37% of Vaxart subjects developed influenza infection compared with 44% of QIV subjects and 71% of placebo subjects. While both vaccines induced a humoral immune response, FACS analysis and NGS revealed that Vaxart subjects had more activated plasmablasts expressing surface mucosal homing markers and a more diverse B cell population than QIV subjects.

**Conclusion.** Vaxart's oral influenza tablet vaccine protected against influenza infection as well or better than injectable QIV. However, the mechanism of protection appears to be unique to the route of immunization; oral immunization allows for specific homing of influenza specific B cells to sites of infection and produces a more diverse antibody repertoire.

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**1948. A Host-Response Assay Distinguishes Between Simple Influenza Patients and Influenza Patients With Bacterial Coinfection**

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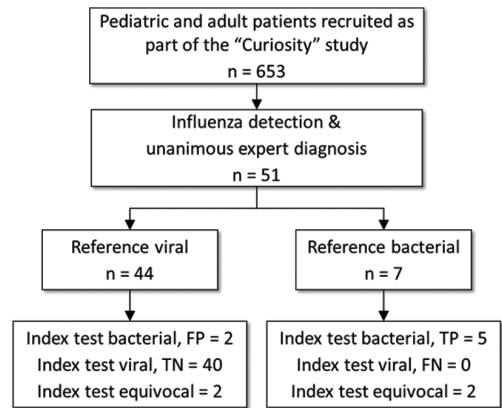
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**Background.** Identifying bacterial coinfection in influenza patients can be difficult as the symptoms of simple influenza vs. mixed infections are often similar, leading to antibiotic overuse. A new host-response assay (ImmunoXpert™) that integrates the levels of three proteins (TRAIL, IP-10, and CRP) was shown to exhibit high performance in distinguishing between bacterial and viral disease in two double-blind validation studies. Here we sought to evaluate its ability to differentiate between simple influenza and influenza with bacterial coinfection.

**Methods.** The study population included 653 febrile pediatric and adult patients prospectively recruited in the “Curiosity” study. Patient etiology (simple viral vs. mixed infection) was determined by unanimous expert adjudication based on comprehensive clinical, laboratory and radiological assessment. Influenza strains (A or B) were detected using multiplex PCR applied to nasal swabs (Seeplex-RV15). We compared the expert panel diagnosis with the assay that gives three possible outcomes: viral, bacterial (including viral with bacterial coinfection) or equivocal. An equivocal outcome does not provide diagnostic information and is observed in ~10% of cases.

**Results.** Out of 653 patients, 51 had positive influenza detection and unanimous expert diagnosis: 44 simple viral infections and seven influenza with bacterial coinfections (Figure 1). Antibiotics were prescribed to all seven cases of influenza with bacterial coinfection and to 20/44 cases adjudicated as simple viral infections, indicating an overuse rate of 45%. The assay correctly classified 40 of the 44 simple viral cases (out of the remaining four, two were assigned viral with bacterial coinfection, and two received equivocal outcomes) as well as five of the seven viral with bacterial coinfection cases (the remaining two received equivocal outcomes) supporting the assay's potential to reduce antibiotic overuse 5-fold (from 45% to 4/44 = 9%,  $P < 0.001$ ).

**Conclusion.** The host-response assay can differentiate between simple influenza and influenza patients with bacterial coinfection, with potential to reduce antibiotic overuse. Utility studies are warranted to demonstrate that the assay can safely assist physicians in correct management of influenza patients.



**Figure 1. Flow through of febrile patients with positive influenza detection.** FP, false-positive; TN, true-negative; TP, true-positive; FN, false-negative. The index test is available in Europe as ImmunoXpert™ (CE-IVD), not yet cleared by the FDA.

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**1949. Safety and Efficacy of Ambulatory Outpatient Treatment of Febrile Neutropenia in Children With Cancer in Mexico: A Multicenter Randomized Controlled Trial**

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**Background.** Fever and neutropenia (FN) are frequent complications in children with cancer who receive chemotherapy. Although there is evidence of the efficacy of outpatient treatment, inpatient treatment is the standard of care in Mexico City. We aimed to determine whether sequential parenteral-oral outpatient treatment is non-inferior to intravenous inpatient treatment for children with FN in a middle-income setting.

**Methods.** Randomized controlled clinical trial in subjects 1 to 18 years old with low-risk FN in three hospitals in Mexico City. After 48 to 72 hours of cefepime inpatient treatment, subjects were eligible to participate if they were afebrile for at least 24 hours, had negative cultures and no source of infection. Subjects were randomly assigned to either continue receiving cefepime (inpatient arm) or start receiving cefixime (outpatient arm). Primary end point was treatment failure define as new onset fever, new source of infection or necessity of change antibiotic. Estimated sample size was 68 FN episodes per group. Parametric and nonparametric statistical analyses were performed for comparisons between groups.

**Results.** Between July 2015 and September 2017, a total of 1,237 episodes of FN were evaluated, of which 469 episodes were eligible. From these, 388 were excluded: 337 due to not meeting the inclusion criteria, eight parents refused to participate, four were evaluated after 72 hours of treatment and three were excluded for other reasons. Of the 117 randomized episodes, 59 were allocated into the outpatient arm and 58 into the inpatient arm. After randomization, demographic and clinical variables did not differ between groups. Treatment failure occurred in 6.9% (4) of patients in the inpatient arm vs. 0% in the outpatient arm ( $P = 0.05$ ). Failures were associated to influenza B infection, catheter related blood stream infection and fever without a source. Mean duration of antibiotics was 4.6 days [SD (standard deviation) 4.5 days, C.I. 95% 3.5–5.8 days] in the outpatient arm and 4.4 days (SD 2.5 days, CI 95%, 3.7–5.0 days) in the inpatient arm ( $P = 0.70$ ).

**Conclusion.** In our population, outpatient sequential, parenteral-oral treatment with cefixime seems to be as safe and efficacious as parenteral inpatient treatment of low-risk FN episodes.

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