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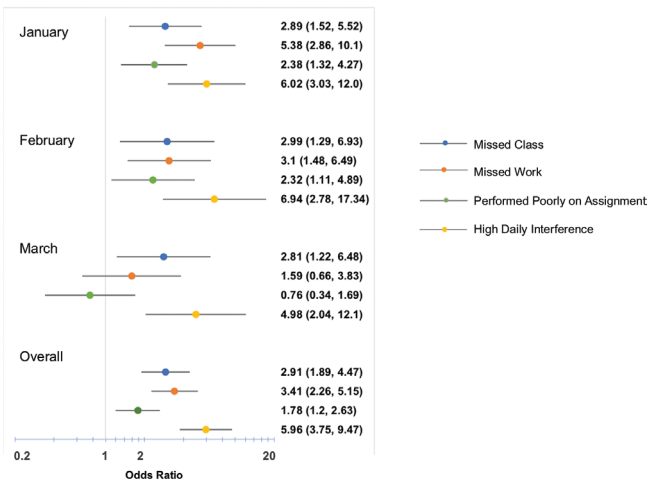
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those with ILI and those with non-ILI. Having symptoms of ILI was associated with reports of missing work (OR 2.9; 95% CI: 1.9, 4.5), missing class (OR 3.4; 95% CI: 2.3, 5.2), performing poorly on assignments and exams (OR 1.8; 95% CI: 1.2, 2.6), and having high interference with daily life (OR 6.0; 95% CI: 3.8, 9.5) as compared with individuals with a non-ILI illness. These impacts were strongest during January and February.

**Conclusion.** A high prevalence of ILI was observed on campus. These symptoms were found to have a substantial impact on academic and occupational productivity. This demonstrates the need for greater illness prevention efforts on college campuses during influenza season.

**Figure 1. Odds ratios of performance outcomes among those with ILI compared to those with other illness symptoms stratified by enrollment month.**



**Disclosures.** All Authors: No reported Disclosures.

#### 96. Human Papilloma Viruses Associated Diseases in a Cohort of Patients with Idiopathic CD4 Lymphopenia

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**Session:** 34. Virus Infections - Host, Pathogen, and Impact of Intervention  
Thursday, October 3, 2019: 11:19 AM

**Background.** Idiopathic CD4 Lymphocytopenia (ICL) is a rare immunodeficiency characterized by an absolute CD4<sup>+</sup> T count of < 300 cells/ $\mu$ L, in absence of HIV-infection or any other known cause. Patients with ICL have an increased risk of opportunistic infections. The prevalence, natural history, and spectrum of Human Papillomaviruses (HPV) associated diseases in ICL patients are unknown.

**Methods.** ICL patients were enrolled in a prospective observational study (N = 90). Demographic, clinical, and immunologic data were analyzed by nonparametric Methods. Immunophenotyping was performed by flow cytometry.

**Results.** The median age of ICL patients was 48 years, 47% were women, and 92% were Caucasian. Sixty-five percent of patients had at least one opportunistic infection, with HPV being the most prevalent (34.4%), followed by cryptococcal disease (22%), shingles (15.5%), molluscum contagiosum (8.8%), *Histoplasma capsulatum* (4.4%), *Mycobacterium avium* complex (4.4%), and progressive multifocal encephalopathy (2.2%). HPV-related diseases were identified in 18 women and 13 men. ICL patients with HPV disease were younger compared with those without (median age 34 vs. 53.5 years,  $P < 0.0001$ ). Nine (29%) had anogenital, 9 (29%) had a cutaneous disease (verruca plana, verrucous carcinoma, squamous cell carcinoma) while 13 (42%) had both anogenital and cutaneous disease. Patients with HPV-related disease were also more likely to have history of cryptococcal disease, shingles or molluscum ( $P = 0.036$ ,  $P = 0.22$  and  $0.11$ , respectively). Thirteen patients had HPV-associated cancers: 7 both mucosal and skin and 3 either skin or mucosal malignancies. Patients with HPV-disease had lower CD4<sup>+</sup> T cells (median CD4 70 vs. 114 cells/ $\mu$ L,  $P = 0.036$ ). No differences were observed in the numbers of CD8<sup>+</sup> T cells, B cells, NK cells, and levels of IgG between patients with and without HPV disease.

**Conclusion.** HPV-related disease represents the most common opportunistic infection in ICL patients. Patients with ICL and HPV disease are younger, have lower CD4s and high prevalence of HPV-associated malignancies. Therefore, for patients presenting early in life with severe HPV disease further immunological workup should

be considered and for patients with ICL excessive screening for HPV-related malignancies should be a priority.

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#### 97. Competition Experiments for the Baloxavir-Resistant I38T Influenza A Mutant

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**Session:** 34. Viral Infections - Host, Pathogen, and Impact of Intervention  
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**Background.** Baloxavir marboxil (BXM), a cap-dependent endonuclease inhibitor, has been recently approved in the United States for the treatment of influenza infections. It is superior to oseltamivir for reducing the time of viral shedding but is reported to have a low barrier of resistance. We sought to evaluate the viral fitness of the predominant BXM-resistant I38T PA mutant in the A/H1N1 and A/H3N2 viral backgrounds.

**Methods.** Recombinant A/Quebec/144147/2009 (H1N1) and A/Switzerland/9715293/2013 (H3N2) influenza viruses and their respective I38T PA mutants were generated by reverse genetics. Standardized inoculums (500 PFUs) of wild-type (WT) and mutant mixtures were inoculated on  $\alpha$ 2,6 MDCK cells. On day 3 post-infection (pi), the supernatants were collected and the ratios of WT/mutant viruses were determined by droplet digital PCR using specific LNA probes. Single infections and competitive experiments were also performed in C56/BL6 mice with quantification of lung viral titers on days 3 and 6 pi.

**Results.** *In vitro* A/H1N1 studies showed similar total copy numbers for the WT and mutant viruses on day 3 pi ( $1.2 \times 10^9$  and  $1.3 \times 10^9$  copies/mL, respectively). The initial 50%/50% mixture became 70%/30% (WT/mutant) after one passage in cells. For A/H3N2, the total copy numbers were  $8.1 \times 10^9$  and  $1.0 \times 10^9$  copies/mL for the WT and mutant viruses. The initial 50%/50% mixture became 94%/6% (WT/mutant) after one passage. The I38T mutants remained stable after 4 passages in  $\alpha$ 2,6 MDCK cells. In mice, the A/H1N1 WT and I38T mutant induced similar weight loss and generated comparable lung titers on days 3 and 6 pi. In contrast, the weight loss of the A/H3N2 mutant was greater than that of the WT between days 3 and 7 pi with comparable lung titers on days 3 and 6. Following infection with 50%/50% mixtures, the mutant virus predominated over the WT on day 3 pi (73% A/H1N1 and 58% A/H3N2).

**Conclusion.** The BXM-resistant I38T PA mutant replicates well both *in vitro* and *in vivo* in the A/H1N1 and A/H3N2 backgrounds. Surveillance for the emergence and transmission of such mutant in the community is required.

**Disclosures.** All Authors: No reported Disclosures.

#### 837. Prior Hospitalizations Among Cases of Community-Associated Clostridioides difficile Infection—10 US States, 2014–2015

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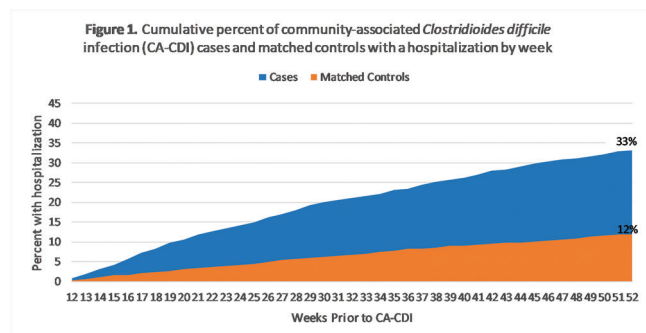
**Session:** 81. Clostridium difficile  
Thursday, October 3, 2019: 1:45 PM

**Background.** Despite overall progress in preventing *Clostridioides difficile* infection (CDI), community-associated (CA) infections have been steadily increasing. Although the incubation period of CDI is thought to be relatively short, gastrointestinal microbial disruption from remote healthcare exposures (e.g., inpatient antibiotic use) may be associated with CA-CDI. To assess this potential association, we linked CA-CDI infections identified through CDC's Emerging Infections Program (EIP) to Medicare claims data to describe prior healthcare utilization.

**Methods.** We defined an EIP CA-CDI case as a positive *C. difficile* test collected in 2014–2015 from an outpatient or inpatient within 3 days of hospital admission, provided there was no positive test in the prior 8 weeks and no admission to a health-care facility in the prior 12 weeks. We linked EIP CA-CDI cases aged  $\geq 65$  years to a Medicare beneficiary using unique combinations of birthdate, sex, and zip code. Cases were included if they maintained continuous fee-for-service coverage for 1 year prior to the event date. To calculate exposure odds ratios for previous hospitalizations, each case was matched to 5 control beneficiaries on age, sex, and county of residence. We used logistic regression to calculate adjusted matched odds ratios (amOR) that controlled for chronic conditions.

**Results.** We successfully linked 2,287/3,367 (68%) EIP CA-CDI cases. Of these, 1,236 cases met inclusion criteria; the median age was 77 years and 63% were female. We identified 69 (5.6%) cases with misclassification of prior healthcare exposures, most of whom (48, 70%) were hospitalized in the 12 weeks prior to their event. Among the 1,167 true CA-CDI cases, 33% were hospitalized in the prior 12 weeks to 1 year. The median number of weeks from prior hospitalization to CDI was 27 (IQR 18–38, Figure 1). Cases had a higher risk of hospitalization than matched controls in the prior 3–6 months (amOR: 2.33, 95% CI: 1.87, 2.90) and 6–12 months (amOR: 1.43 95% CI: 1.18, 1.74).

**Conclusion.** Remote hospitalization in the previous year was a significant risk factor for CA-CDI, especially in the 3–6 months prior to CA-CDI. Long-lasting prevention strategies implemented at hospital discharge and enhanced inpatient antibiotic stewardship may prevent CA-CDI among older adults.



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### 838. Oral Vancomycin Prophylaxis Works!

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**Session:** 81. *Clostridium difficile*

**Thursday, October 3, 2019: 2:00 PM**

**Background.** *Clostridium difficile* infections (CDI) cause approximately 500,000 cases a year with an estimated cost that exceeds \$4.8 billion. Despite interventions that addressed environmental disinfection, antibiotic stewardship, and infection control, many institutions continue to have a significant burden of disease. Public reporting and “pay for performance” have increased the impetus for better control of CDI. We describe the use of an unpublished scoring system to assess the risk of CDI with subsequent use of OVP to prevent expuloriation and infection in high-risk groups.

**Methods.** A large urban hospital in the Chicago area of approximately 400 beds, after following recommended guidelines for prevention of *C. difficile*, instituted an assessment tool to predict the risk of developing *C. difficile* infection. This is an observational, cohort study reviewing the pre- and post-implementation of OVP (oral Vancomycin prophylaxis) in hospitalized patients. From January 2017 to December 2017, eligible patients were assessed for risk of *C. difficile*. The intervention period, from January 2018 to December 2018, we prospectively gave eligible patients oral vancomycin (OVP) 125 mg twice daily if the risk score was 13 or above. No changes in environmental cleaning, antimicrobial stewardship, or restriction of testing were instituted during the periods of enrollment. The analysis was approved by the institutional review board.

**Results.** In 2017, 82 patients had a score of 13 or over. Of the 82 patients, 72 (87.8%) developed CDI. In 2018, 62 eligible patients had a score of 13 or over and were given OVP. Of the 62 patients, 5 (8%) developed CDI. The relative risk comparing *C. difficile* in  $\geq 13$  vs.  $< 13$  patients (RR = 19.2652; 95% CI = 7.3656, 50.3899). The tool is associated with a specificity of 88.54% and sensitivity of 94.67%, along with a negative predictive value of 95.51% and positive predictive value of 86.59%. Fisher’s exact test was performed between OVP and no OVP in relation to the development of CDI in high-risk patients ( $P < 0.01$ ). VRE rates reported on the antibiogram remained

consistent throughout the study period. No significant differences in baseline characteristics were noted.

**Conclusion.** In institutions where appropriate infection control measures and antibiotic stewardship have been implemented, the use of a prediction tool to guide OVP is effective in preventing *C. difficile*.

#### Protocol for OVP in high risk patients

History of CDI within 1 year	13 pts
History of CDI greater than 1 year	8 pts
High-risk antibiotics use	5 pts
Hospital length of stay > 7 days	3 pts
Immunosuppressed	3 pts
Age > 65 years of age	2 pts
Long-term care facility resident	1 pt
Hypoalbuminemia (<3 g/L)	1 pt
Age $\geq 80$ years of age	1 pt
PPI/H2RA use in hospital	1 pt
Recently hospitalized (within 90days)	1 pt

**\*\*High risk antibiotics:** 3<sup>rd</sup> cephalosporin (ceftriaxone (IV), cefotaxime (IV), ceftazidime (IV), cefdinir (PO), cefepime (PO)), 4<sup>th</sup> cephalosporin (cefepime (IV)), Zosyn (IV), meropenem (IV), ertapenem (IV), imipenem (IV), levofloxacin (PO or IV), ciprofloxacin (PO or IV), moxifloxacin (PO or IV), clindamycin (PO or IV)

**\*\*\*Immunosuppressed defined as:**

- Disease states including:
  - Active malignancy receiving some form of immunosuppression
  - Lupus
  - Rheumatoid arthritis
  - Multiple sclerosis
  - Allogeneic transplant
  - Solid organ transplant
- Immunosuppressive drugs including:
  - tacrolimus, sirolimus, mycophenolate, cyclosporine
  - steroids (at least Prednisone 20mg or equivalent for 20 days)
  - biologics
  - monoclonal antibodies

**Disclosures.** All Authors: No reported Disclosures.

### 839. Effect of Clostridioides difficile (C. difficile) Toxin Test Reporting on Clinical Treatment and Outcomes of Toxin-Negative PCR-Positive Patients at Five California Hospitals

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**Session:** 81. *Clostridium difficile*

**Thursday, October 3, 2019: 2:15 PM**

**Background.** Guidelines support the use of toxin tests after *C. difficile* antigen detection or nucleic acid amplification tests (e.g., PCR) to help clinicians distinguish colonization from infection and reduce overdiagnosis but the safety of toxin-based diagnostic approaches remains controversial.

**Methods.** Five California hospitals monitored hospitalized adults with *C. difficile* testing before and after operational changes to reduce test-related overdiagnosis (2016–2018). Four added a toxin test to an existing GDH antigen/PCR-based approach and/or changed reporting to encourage the use of toxin results for clinical decision-making (i.e., “toxin-dominant reporting”). One used the same test (toxin only) and reporting strategy throughout. All used a standardized tool to document clinical outcomes and treatment four days after testing (i.e., Day 5).

**Results.** In total, 1,034 patients had a Day 5 assessment with PCR-dominant reporting (pre-operational changes); 2,511 patients had a Day 5 assessment with toxin-dominant reporting (post-operational changes and single facility with no test change). Fewer Toxin-negative/PCR-positive (Toxin-/PCR+) patients received treatment with toxin-dominant reporting (median change = -52.1% [interquartile range (IQR): -35.1%, -69.1%]; aggregate  $P < 0.001$ ). Day 5 outcomes were similar or better with toxin-dominant reporting despite less treatment. Patient discharge rates and in hospital diarrheal recovery was greater in the subset of Toxin-/PCR+ patients during the toxin-dominant reporting period: median discharge rate change = 8.8% [IQR: