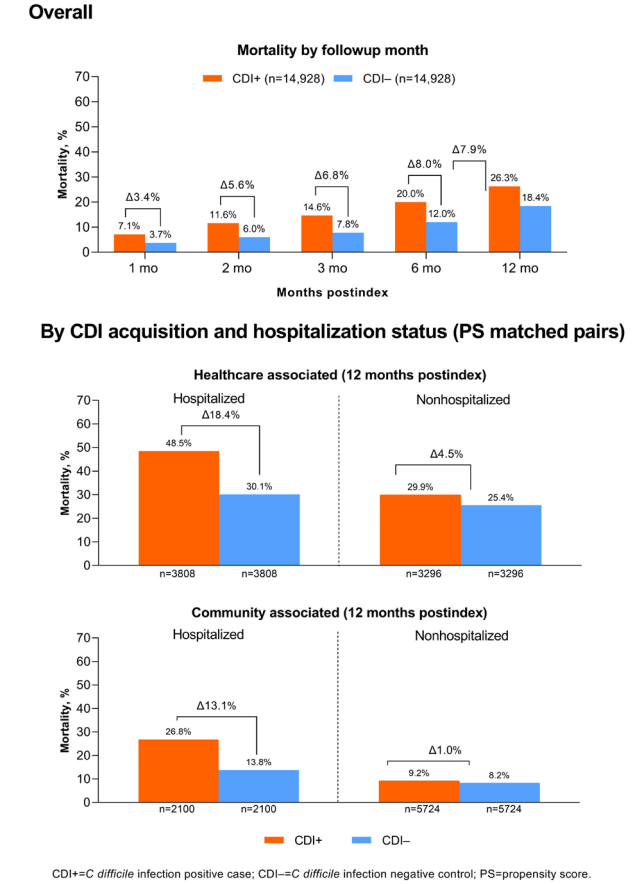
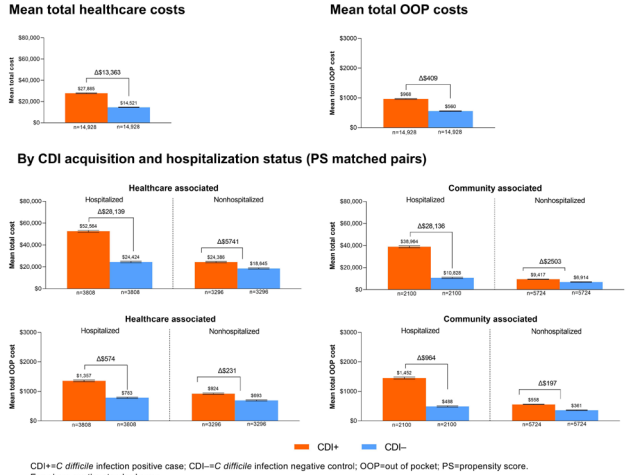
than for nonhospitalized CDI+ patients (HA, $5741; CA, $2503). CDI-associated excess mean OOP cost was $409 for CDI+ cases at the 2 mo followup. Total excess mean OOP cost was highest in CA hospitalized CDI+ cases, followed by HA hospitalized CDI+ cases, HA nonhospitalized CDI+ cases and finally CA nonhospitalized CDI+ cases ($964, $574, $231 and $197, respectively).

Figure 1. Attributable all-cause mortality



CDI+=*C difficile* infection positive case; CDI–=*C difficile* infection negative control; PS=propensity score.

Figure 2. Excess costs (2 months followup)



CDI+=*C difficile* infection positive case; CDI–=*C difficile* infection negative control; OOP=out of pocket; PS=propensity score.
Error bars are the standard error.

Conclusion. CDI is associated with major mortality and total healthcare and OOP costs. Preventing CDI in the elderly may improve outcomes and reduce costs for healthcare systems and patients.

Disclosures. **Holly Yu, MSPH**, **Pfizer Inc** (Employee, Shareholder) **Jennifer L Nguyen, ScD, MPH**, **Pfizer Inc.** (Employee) **Tamuno Alfred, PhD**, **Pfizer Inc.** (Employee) **Jingying Zhou, MA, MEd**, **Pfizer Inc** (Employee, Shareholder) **Margaret A. Olsen, PhD, MPH**, **Pfizer** (Consultant, Research Grant or Support)

17. Comparative Assessment of a Machine Learning Model and Rectal Swab Surveillance to Predict Hospital Onset *Clostridioides difficile*

Erkin Ötleş, MS[1]; Jeeheh Oh, PhD[1]; Alieysa Patel, MPH[1]; Micah Keidan, BS[1]; Vincent B. Young, MD, PhD[1]; Krishna Rao, MD, MS[2]; Jenna Wiens, PhD[1]; [1]University of Michigan, Ann Arbor, Michigan; [2]Department of Internal Medicine, Infectious Diseases Division University of Michigan, Ann Arbor, Michigan, Ann Arbor, MI

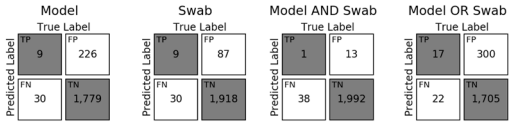
Session: O-04. Challenges in C. difficile

Background. Hospital onset *Clostridioides difficile* infection (HO-CDI) is associated with significant morbidity and mortality. Screening individuals at risk could help limit transmission, however swab-based surveillance for HO-CDI is resource intensive. Applied to electronic health records (EHR) data, machine learning (ML) models present an efficient approach to assess patient risk. We compare the effectiveness of swab surveillance against daily risk estimates produced by a ML model in detecting patients who will develop HO-CDI.

Methods. Patients presenting to Michigan Medicine's ICUs and oncology wards between June 6th and October 8th 2020 had rectal swabs collected on admission, weekly, and at discharge from the unit, as part of VRE surveillance. We performed anaerobic culture on the residual media followed by a custom, multiplex PCR on isolates to identify toxigenic *C. difficile*. Risk of HO-CDI was calculated daily for each patient using a previously validated EHR-based ML model. Swab results and model risk scores were aggregated for each admission and assessed as predictors of HO-CDI. Holding sensitivity equal, we evaluated both approaches in terms of accuracy, specificity, and positive predictive value (PPV).

Results. Of 2,044 admissions representing 1,859 patients, 39 (1.9%) developed HO-CDI. 23.1% (95% CI: 11.1–37.8%) of HO-CDI cases had at least one positive swab. At this sensitivity, model performance was significantly better than random but worse compared to swab surveillance—accuracy: 87.5% (86.0–88.9%) vs. 94.3% (93.3–95.3%), specificity: 88.7% (87.3–90.0%) vs. 95.7% (94.8–96.6%), PPV: 3.8% (1.6–6.4%) vs. 9.4% (4.3–16.1%). Combining swab AND model yielded lower sensitivity 2.6% (0.0–8.9%) compared to combining swab OR model at 43.6% (27.3–60.0%), and yielded PPV 7.1% (0.0–25.0%) vs. 43.6% (27.3–60.0%) respectively (**Figure 1**).

Figure 1. Surveillance & risk score performance.



	Model	Swab	Model AND Swab	Model OR Swab
Accuracy	87.5	94.3	**97.5**	84.2
Sensitivity	23.1	23.1	2.6	**43.6**
Specificity	88.7	95.7	**99.4**	85.0
PPV	3.8	**9.4**	7.1	5.4
NPV	98.3	98.5	98.1	**98.7**
F1	6.6	**13.3**	3.8	9.6

Binary classification performance metrics of ML model (Model), toxigenic C. difficile rectal swab surveillance (Swab), and combination approaches (Model AND Swab and Model OR Swab), reported in terms of percentage points. Bold numbers highlight the best performing approach for a given performance metric. The combined approach of monitoring the Model AND Swab yielded the highest accuracy 97.5% (95% confidence interval: 96.8%, 98.1%), it also had the highest specificity 99.4% (99.0%, 99.7%). The combined approach of monitoring the Model OR Swab yielded the highest sensitivity 43.6% (27.3%, 60.0%) and negative predictive value (NPV) 98.7% (98.2, 99.2%). Using the Swab alone yielded the highest PPV 9.4% (4.3%, 16.1%) and F1 score 13.3% (6.2%, 21.8%). These results highlight the complementarity of the model and swab-based approaches.

Conclusion. Compared to swab surveillance using a ML model for predicting HO-CDI results in more false positives. The ML model provides daily risk scores and can be deployed using different thresholds. Thus, it can inform varied prevention strategies for different risk categories, without the need for resource intensive swabbing. Additionally, the approaches may be complimentary as the patients with HO-CDI identified by each approach differ.

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18. Global Surveillance of *Clostridioides difficile* Demonstrates High Prevalence in Non-Healthcare Settings

Jinhee Jo, PharmD[1]; Anne J. Gonzales-Luna, PharmD[2]; Kevin W. Garey, Pharm.D., M.S., FASHP[2]; [1]University of Houston, Houston, Texas; [2]University of Houston College of Pharmacy, Houston, Texas

Session: O-04. Challenges in C. difficile

Background. *Clostridioides difficile* is a Gram-positive, spore-forming, toxin-producing organism that is the leading cause of healthcare-associated infections. However, past studies have isolated *C. difficile* spores from the community, suggesting an environmental reservoir that may play a role in transmission. This study aimed to examine the prevalence and strain types of *C. difficile* isolated from the United States (US) and internationally.