Hard Stop on Hospital Infections

Pitt Med clinical scientists, with partners at Carnegie Mellon University, have found that machine learning and whole genome sequencing surveillance can stop in-hospital infections in their tracks.

They published their findings in fall 2021 in Clinical Infectious Diseases. UPMC Presbyterian is now implementing their system, designed to save lives and cut costs, in real time.

Senior author on the study Lee Harrison is an MD professor of medicine at the School of Medicine and of epidemiology at the School of Public Health; he leads the team using the Enhanced Detection System for Healthcare-Associated Transmission (EDS-HAT). EDS-HAT couples genomic sequencing with computer algorithms connected to the vast trove of data in electronic health records. When sequencing detects that two or more patients have near-identical strains of an infection, machine learning quickly mines those patients' electronic health records for commonalities; it then alerts infection prevention-ists to investigate and halt further transmission.

Alexander Sundermann is a clinical research coordinator and a recently minted DrPH and assistant professor of medicine. He says the typical model hospitals use for detection is labor-intensive and often dependent on busy health care workers noticing a shared infection between patients. "These practices haven't changed significantly in over a century," adds Harrison.

From 2016 to 2018, UPMC Presbyterian ran EDS-HAT with a six-month lag (so as not to interfere with normal clinical practice) for several infectious pathogens often associated with health care–acquired infections. EDS-HAT detected 99 clusters of similar infections in that period and identified at least one potential transmission route in 65% of those clusters. During the same period, infection prevention used whole genome sequencing to aid in the investigation of 15 suspected outbreaks, two of which revealed genetically related infections.

If EDS-HAT had been running in real time, the team estimates as many as 63 transmissions of an infectious disease from one patient to another could have been prevented. It also would have saved the hospital up to $692,000.

Harrison says the current real-time implementation has detected one bronchoscopy-associated cluster and multiple nursing unit–based clusters. Hospital staff members were able to intervene for all of those. —*Michael Aubele*
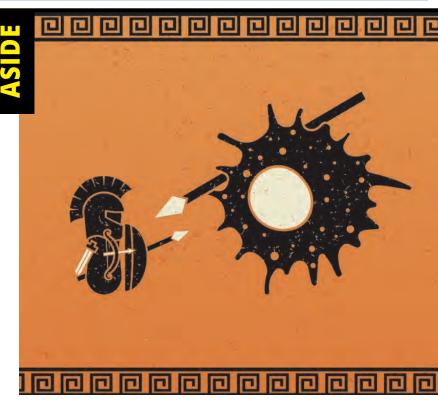
PRESBY EXPANSION

In June, UPMC broke ground on a 17-story addition to Presbyterian hospital that will transform the landscape of the Oakland campus, how care is delivered in Southwestern Pennsylvania and how medical education looks at Pitt.

The new building will make UPMC Presbyterian the largest academic hospital in the region. For Pitt Med students, the addition will translate to more learning and training opportunities in the heart of Oakland.

Twelve new operating rooms and 636 private patient rooms—many of them "acuity adaptable"—will create more spaces for specialized care and easier opportunities to keep patients in place, rather than transferring them to another unit or hospital as their condition changes. Teams will be able to ramp up support more seamlessly as needed in this patient- and family-centered care environment.

The new facility opens in late 2026. —*Micaela Fox Corn*

ASIDE

Bacteria battles, by Rachel Keeney.