

Researchers use computer simulations to find true cost of HIV screenings

November 19 2012

Introducing HIV screenings into the nation's emergency departments (EDs) leaves some doctors worrying about longer wait times, disrupted operations, and possible interference with necessary emergency services. Are their concerns unfounded? New research at the University of Cincinnati will use computer-based simulation modeling to determine how screening for HIV in the emergency department will affect how those departments operate.

UC [emergency medicine](#) researchers Michael Lyons, MD, MPH and Michael Ward, MD, MBA, are partnering with David Kelton, PhD, of UC's Lindner College of Business, on a five-year, \$1.25 million grant from the Agency for Healthcare Research and Quality to find out the costs—in terms of operational disruption and lost opportunity for other services—of introducing HIV testing into EDs.

"EDs are already overcrowded and in crisis, so physicians fear that time and resources spent on HIV testing will detract from their core mission," says Lyons, a UC assistant professor of emergency medicine and medical director of UC's HIV Early Intervention Program. "But we don't know the true opportunity cost of instituting HIV screening in departments. Knowing which methods are least disruptive could provide valuable guidance and help promote adoption of this important public health practice."

If hospitals and physicians were able to quantify the true costs of conducting HIV screening programs, Lyons says they can then either

look at options to minimize or avoid those costs, or work with policy makers and hospital administration to secure additional resources to compensate for those costs. Or, if the costs associated with the testing are found to be less than believed, Lyons hopes that providing that clarified information will encourage more hospitals to introduce such programs.

Lyons, who has spent more than a decade researching ED HIV screening, will work with Ward, assistant professor of emergency medicine and operations research fellow, to model the possible disruptions to an ED. In computer simulation modeling, researchers can use existing data to predict how adding something like HIV testing can affect a complex system like an [emergency department](#).

Ward has used this type of research to study the disruptions of implementing electronic health records in an ED, cost-effectiveness and accuracy of tests to diagnose pulmonary embolisms and admission strategies for chest pain patients.

"This approach to healthcare research is helping us to answer complex 'what if?' questions that would normally take years and much more money to answer," he says. "This approach is particularly advantageous because there are multiple methods for ED HIV screening and multiple types of EDs. Testing all the combinations in real-time research studies would be prohibitively costly and time consuming. Simulation promises to provide the answers much more rapidly. Our study will provide doctors with a tool that helps them decide how to include an HIV screening test into their care without having a negative impact on the emergency care they are providing to all their patients."

In order to create realistic simulations, Ward and Lyons will work with the national ED HIV Testing Consortium to create ten different computer models of ED HIV testing, as well as visit hospitals across the

country to measure the real time and resource requirements of the different methods.

Lyons says simulation modeling can have a broad effect on the future of medical and organizational research: "There's a lot of interest in what new things healthcare should be doing, but the real question is: 'How do we change the things we're already doing? How do you make healthcare do new things and do them better?' "

He says they are able to do this particular type of multi-disciplinary research because of Ward's unique background in both medicine and business, and the involvement of Kelton, professor of operations, business analytics, and information systems and an international expert in simulation modeling.

Kelton, who has studied simulation modeling for decades in areas like manufacturing, logistics, and military operations, says: "It's exciting to have this opportunity to help expand the power of computer-simulation modeling and analysis into the clearly critical realm of ED operations under [HIV screening](#)."

Provided by University of Cincinnati Academic Health Center

Citation: Researchers use computer simulations to find true cost of HIV screenings (2012, November 19) retrieved 23 April 2024 from

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