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# New study shows way to reduce catheter-associated urinary tract infections

May 22, 2017

They're a double-edged sword for nursing home residents and staff – making it easier and safer to handle a basic bodily function, but putting frail patients in danger of infections that can lead to confusion, falls and death.

Now, a new study shows a way to keep urinary catheters from posing such a risk to the 1.4 million Americans currently in long-term and post-acute care.

The research shows that urinary tract infections related to catheters fell by 54 percent in 404 nursing homes in 38 states that took part in a national patient safety effort. The drop in catheter-associated UTI, or CAUTI, happened across the board, with 75 percent of nursing homes seeing at least a 40 percent drop.

The rate of infection dropped even though the same percentage of patients used catheters to empty their bladders – about 4.5 percent of all patients in the nursing homes. The results are published in *JAMA Internal Medicine* and were presented at the American Geriatrics Society annual meeting.

A broad team of researchers, coaches, and content experts helped the nursing homes adopt a specially designed toolkit of training materials. It's designed to help staff understand -- and effectively and consistently use -- proven infection-prevention practices, and best use of catheters and lab tests, while empowering teams to implement changes and engage patients and family members. The toolkit is available online for free from the Agency for Healthcare Research and Quality (AHRQ), the federal agency that funded the study.

At the same time that infection rates were dropping, the number of lab tests that clinicians ordered to check patients for infections dropped by 15 percent – indicating that they were using urine culture tests more appropriately.

"When we first looked at the results, we were pleasantly surprised to see that our strategy was so effective. Our study shows that with the right thoughtful mix of education, training, coaching and local empowerment, we can apply evidence-based practices consistently, for the benefit of patients and staff

alike," says Lona Mody, M.D., M.Sc., first author of the new paper. Mody is a professor of internal medicine at the University of Michigan and VA Ann Arbor Geriatric Research, Education and Clinical Center.

The study reported results from the AHRQ Safety Program for Long-Term Care which focused on reducing CAUTI and other healthcare-associated infections. The project adapted principles and methods from AHRQ's Comprehensive Unit-based Safety Program, previously found to be effective in hospitals, to the long term care setting. The project enrolled nursing homes over the course of two and a half years, and provided a toolkit of materials to help their leaders and staff implement and sustain use of evidence-based practices for infection prevention.

Conducted by the Health Research and Educational Trust, the research arm of the American Hospital Association, the effort included faculty from U-M and other partners including Abt Associates, the Association for Professionals in Infection Control and Epidemiology, Baylor College of Medicine, Contrast Creative, Qualidigm, and the Society of Hospital Medicine; federal agency partners included the Centers for Disease Control and Prevention.

The study built on the previous success of two other efforts to reduce CAUTI. The first was a National Institutes of Health-funded randomized clinical trial that Mody led, which was published in *JAMA Internal Medicine* in 2015 and showed a 31 percent reduction in CAUTI using a multi-component strategy in a consortium of Michigan nursing homes. The other was a national AHRQ-funded effort to reduce CAUTI in hospitals described in a study led by her U-M colleague, Sanjay Saint, M.D., M.P.H. That effort published results in the *New England Journal of Medicine* last year, showing a 32 percent drop in CAUTI in non-intensive care unit inpatients in hospitals that used a similar implementation strategy.

### **More about the results**

CAUTI, Mody notes, are typical of the healthcare-acquired infections that nursing home residents face. Such infections factor heavily into the "revolving door" that sends 1 in 4 nursing home residents to the hospital for infections each year, costing the healthcare system \$4 billion.

Mody notes that public reporting of catheter use rates in nursing homes over

the past decade and a half has driven down catheter use markedly. The federal government's Nursing Home Compare website allows anyone to see catheter use rates for long-term residents at any nursing home that accepts Medicare.

Currently, when they are used, urinary catheters stay in patients for prolonged periods of time. Infections in those patients continue to be a major and costly issue. Before the nursing homes started participating in this study, their residents experienced 6.4 CAUTIs per 1,000 catheter days. That is, for every 1,000 days of catheter use by all the catheter-using patients, 6.4 infections occurred.

As the nursing homes started implementing specific infection prevention strategies, that rate dropped to 3.33 per 1,000 catheter days. These results incorporate adjustment for factors that made the nursing homes different from one another.

Through monthly content training and coaching calls, the project team taught staff techniques grounded in research about which patients need catheters, how to care for and maintain catheters in people who have them, which patients are appropriate candidates for lab tests and antibiotics, as well as how to improve communication, leadership and staff engagement, and safety culture to promote consistent use of these practices.

During these calls, they received simplified information sheets, slide sets, interactive hands-on activities and more for nursing home clinical leaders to use, and to adapt to their institution's culture. Importantly, the facilities received personalized monthly data feedback to evaluate if these strategies were effective or not.

Urine lab cultures were performed 3.52 times for every 1,000 patient days at the start of the project, but went down to 3.09 per 1,000 at the end of the project. Too much testing can lead to false-positive results, and the use of antibiotics when they aren't needed, which can encourage drug-resistant "superbugs" to evolve and spread.

Instead of relying on urine culture results, staff received education to help them recognize the early symptoms of a UTI, including in people with dementia who cannot always communicate that they are experiencing pain or burning during urination.



This allowed staff to use standardized criteria for defining UTIs in catheterized nursing home patients, and rule out other issues like dehydration that can also cause the confusion that often accompanies UTIs in older and medically fragile people.

Co-author Sarah Krein, Ph.D., R.N., adds, "Overall, several implementation teams indicated that the program was extremely valuable. It is an industry that so desperately needs these resources. A specific benefit identified was greater staff empowerment. Staff felt more knowledgeable and thus, empowered to speak with physicians and other team members regarding the necessity of catheters and the ordering of urine cultures."

Mody notes that the next horizon is to reduce other healthcare associated infections in institutionalized older adults – and that the combination of technical and socio-adaptive tools implemented with external facilitation created for CAUTI reduction could be replicated for other patient safety hazards.

"CAUTI is a model for other adverse events, and shows the way to develop an implementation model to enhance safety and reduce harm," she says. "Translating the basic evidence from laboratory-based and patient-oriented research to a full-scale nationwide implementation is possible."

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