**Cover Story**

# NJ tackles hospital infections

*By Naida Grunden*

Eddy Bresnitz, M.D., MS

Three major, statewide programs to control the spread of health care-acquired infections (HAIs) are showing promise in New Jersey. A two-year project to lower central line-associated bloodstream infections (CLABs) and ventilator-associated pneumonias (VAPs) was just completed; another, in the area of catheter-associated urinary tract infections (UTIs), has just begun. The third initiative involves antibiotic-resistant infections and introduces a strategic plan for reducing them.

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The two HAI-reduction projects, run under the banner of Institute for Healthcare Improvement (IHI) Breakthrough Collaboratives, emphasize the process measures known to reduce infection and halt its spread—such as encouraging hand hygiene compliance and removing lines from patients as soon as practicable. The cumulative outcomes of these measures over a number of participating hospitals over a two-year period are tracked. Participating hospitals agree to the confidential collection of infection data through the New Jersey Hospital Association's (NJHA) Quality Institute, which aggregates the data and periodically reports back to each institution for each project's two-year duration.

The Collaborative just ended, which focused on CLABs and VAPs, posted impressive reductions in both areas, and hope and enthusiasm are high for the new UTI Collaborative. Sustaining and building upon successes once the official Collaborative—and its confidential data reporting—end, is seen as a challenge.

Complicating the HAI picture is the emergence of antibiotic-resistant organisms, such as methicillin-resistant *Staphylococcus aureus* (MRSA). These organisms, which defeat most antibiotics in the medical arsenal, are spread through contact, usually by the hands of health care workers. Overuse and misuse of antibiotics are believed to exacerbate this resistance, as shown by the rise of distinct strains of MRSA in the community. Now ironically, community-acquired strains are also being transmitted within hospitals.

"Reducing all infections reduces antibiotic-resistant ones as well," said **Eddy Bresnitz, M.D., MS,** Deputy Commissioner/State Epidemiologist for the Public Health Services Branch of the New Jersey Department of Health and Senior Services (NJ DHSS). "Preventing central line infections and catheter-associated urinary tract infections will go a long way toward preventing antibiotic-resistant infections."

To begin to address the problem of antibiotic resistance specifically, the NJ DHSS teamed with the NJHS and other organizations in 2005 to create the New Jersey Careful Antibiotic Use Strategies and Education (NJ CAUSE) Task Force. The Task Force released its *Strategic Plan to Combat Antimicrobial Resistance in New Jersey* in August. Chief among the Task Force's recommendations is a plan to improve surveillance of antibiotic-resistant infections across New Jersey.

The degree of openness that allows confidential data-sharing for learning purposes has become more routine under the auspices of programs like IHI's; however, far more sweeping reporting requirements appear to be on the horizon. To date, 43 states either have enacted or are considering legislation to require hospitals to

report HAI rates publicly. Pennsylvania has already begun to do so. These and other factors are converging to make HAIs a mainstream *cause celebre*, not only among clinical patient safety advocates, but among consumer groups and the general public. Calls for full public disclosure of infection rates, and for the eradication of infections in the nation's hospitals have appeared in lay literature as diverse as *Consumer Reports* and *Slate Magazine*.

"You keep hearing of high-level discussions about anthrax, SARS and the bird flu. But MRSA is a real killer that's raging right now," says Lisa McGiffert, who spearheads the Consumer Union's *Stop Hospital Infections* campaign. "Stopping MRSA is that important."

In addition to MRSA, "imipenem-resistant strains of *Klebsiella pneumoniae* and *Acinetobacter baumannii* have been identified in several NJ hospitals," says a DHSS grant application to the Health Care Foundation of New Jersey. "In June 2004, the latter bacterium was responsible for an outbreak associated with substantial morbidity and mortality in one of the state's premier medical centers."

"Hospital-acquired infection becomes more visible with increased surveillance and reporting," says Lisa McGiffert, who spearheads the Consumers Union's *Stop Hospital Infections* campaign. "You have to know the scope of the problem to adequately tackle it. Most states, as they bring on mandated reporting systems, find it gives them a way to define the problem so they can work on it. That's why Consumers Union is calling for states to require hospitals to report all infections acquired in hospitals."

New Jersey's HAI response does not yet include public reporting legislation. Currently the most creative approaches to limiting the spread of HAIs involve collaborative efforts like the NJ CAUSE Task Force. Nevertheless, determining the prevalence of HAIs in New Jersey, and finding a way to track them in a systematic and actionable way, appear to be long-term challenges that New Jersey will continue to face.

**Expanding Collaboration to Reduce Antibiotic Resistance**

Patients often move between acute, ambulatory, and long-term care environments, in essence, moving antibiotic-resistant infections around with them. Because the entire community needs to share information on combating, isolating, treating and preventing these infections, broad collaboration among health organizations becomes imperative.

NJ CAUSE Task Force membership encompasses public and private health organizations, including: NJ DHSS, NJHA, the Association for Professionals in Infection Control and Epidemiology (APIC), St. Barnabas Health Care System, and the Peer Review Organization of New Jersey. The Task Force states as its mission: "to foster working partnerships between hospitals, long-term care facilities and home health agencies to achieve, in 24 months, improvement in infection control and antimicrobial use practices."

Now, less than two years into its collaboration, The Task Force has published its Strategic Plan to Combat Antimicrobial Resistance in New Jersey, and received a $95,000 grant from the Centers for Disease Control and Prevention (CDC), in part to follow through on its five recommendations.

The recommendations were determined before publication of new federal guidelines regarding management of multidrug-resistant organisms (MDRO) – proposed by the CDC, U. S. Department of Health and Human Services, and Healthcare Infection Control Practices Advisory Committee (HICPAC). The Task Force plans to meet and review the new guidelines, with an eye toward incorporating some of its findings into the recommendations.

The Task Force’s first recommendation is to improve surveillance of antimicrobial-resistant organisms. The term "surveillance" is used variously when discussing antibiotic-resistant microorganisms. Surveillance over a wide geographical area can help determine the overall scope of the problem, such as where infections already exist and where outbreaks are occurring. To be

useful, the data need to be as close as possible to real-time. A second type of surveillance, the active surveillance culture (ASC), provides more actionable information to individual health care teams. Knowing which patients are colonized or infected with the target organisms can help them prevent their spread. The "intensified" tier of the new CDC guidelines calls for ASC on patients and health care workers deemed at risk of being colonized or infected with a targeted antibiotic-resistant organism.

New Jersey plans proactive improvements to its electronic statewide surveillance, even in the absence of mandatory reporting legislation. However, especially when compared to more aggressive active surveillance efforts in other states, New Jersey faces a challenge.

*Statewide surveillance.* Discovering the dimension of the problem of antimicrobial resistance in New Jersey is a problem itself. In 2001, a total of 3,903 methicillin-resistant Staphylococcus aureus (MRSA) blood isolates were reported to NJ DHSS, representing a 1.1 percent increase from 2000. More recent data are hard to come by, since reports are still generated on paper and aggregated retrospectively. The Task Force supports more electronic data reporting through enhancements to the existing Communicable Disease Reporting System (CDRS).

"New Jersey doesn’t require all HAIs to be reported," says Dr. Bresnitz. "Unusual events must be reported through New Jersey’s Patient Safety Act. Certain antibiotic-resistant infections must be reported under communicable disease reporting regulations. But antibiotic-resistant infections are not reportable to the state of New Jersey unless there’s an outbreak in hospital."

NJ DHSS has on occasion taken extraordinary measures to define and control perceived outbreaks of non-reportable infections. For example, *Clostridium difficile*-associated disease (CDAD) is not a reportable infection in New Jersey. In the absence of formal surveillance data, authorities at the DHSS, acting on anecdotal evidence that CDAD was on the rise,

surveyed 58 acute care hospitals across New Jersey. The survey, which used standardized definitions, showed an approximate doubling of CDAD cases in the hospitals surveyed between 2002 and 2004. The survey also showed lower rates at hospitals employing more infection control practitioners, adhering to known precautions for patient encounters, and using proper environmental cleaning solution and procedures. Follow-up education and other strategies are resulting in lowered CDAD infection rates. Yet the increase in CDAD went undetected for some time, and was only brought to light through an ambitious and cumbersome paper survey process. Authorities sought a way to receive information closer to real-time, making it easy for people to enter data and interpret it.

Toward that end, under the Strategic Plan, upgrades to the state's lauded secure, web-based Communicable Disease Reporting System (CDRS) will provide a way to measure the dimensions of antibiotic resistance in New Jersey. Since its introduction as an automated, web-based system in 2001, the CDRS has led to substantial improvements in reporting of disease outbreaks as compared to the prior paper-based system. A new version released in January 2006, the Communicable Disease Reporting and Surveillance System (CDRSS), has the capacity to function eventually as an outbreak management tool.

"The major enhancement to CDRSS is that it is a patient-centric—as opposed to case-centric—system, a design which has improved its user-friendliness," said Dr. Bresnitz. In the patient-centric system, unique records are stored by patient, not by incidence.

"Before CDRS, cases of notifiable diseases might have required several months for entry of data in the NJ DHSS system because of delays in reporting, postal service, and data entry," stated an August 2005 MMWR article. "However, timeliness has improved substantially. In 2003, NJ DHSS determined that cases were entered into CDRS an average of 28 days after illness onset. In 2004, that average had been reduced to 3-4 days. In addition, cases can now be updated in minutes and are available statewide to authorized persons in seconds."

*Active Surveillance*. The NJ Strategic Plan does not specifically address ASC, although plans are under way to document and disseminate "best practices" widely. In the October 2006 edition of *Clinical Infectious Diseases*, a study concludes that routine ASC and subsequent contact isolation precautions resulted in a 75% decrease in incidence density of MRSA bacteremia in ICUs and a 40 percent decrease elsewhere in the hospital. "In contrast, no similar decrease was attributable to the other infection control interventions," concludes the article.

Some institutions elsewhere are aggressively pursuing ASC, including 17 VA hospitals across Pennsylvania, which now require ASC for MRSA on all patients at admission, transfer and discharge, according to David Cowgill, Public and Community Relations Coordinator for the VA Pittsburgh Healthcare System. This approach essentially codifies as standard practice more stringent surveillance than the "intensified" tier of the new CDC guidelines. This level of ASC can reveal which patients are colonized or infected with MRSA, and whether the colonization or infection occurred in the hospital. Each participating hospital knows its current MRSA rate. Patients can be isolated, and health care workers can take contact precautions when caring for them, reducing the chance of transmission. In addition to reducing morbidity and mortality among patients, the VA believes that the cost of testing all patients will be less than the cost of treating MRSA infections.

According to CU’s McGiffert, Maryland is considering legislation that would make ASC standard policy, as it is in Belgium and the Netherlands, where MRSA has become rare.

"Hospitals are free to swab now," said Dr. Bresnitz. "It’s an added expense, and insurance companies might not pay for it. But long-term, to the extent that it can reduce HAIs and prevent prescription of unnecessary antibiotics, it could be a good thing."

The Task Force’s second recommendation is to promote appropriate antibiotic use through educational activities and measures to prevent infection in general.

The plan calls for a public awareness campaign, in English and Spanish, based on the CDC's program "Get Smart: Know When Antibiotics Work." The NJ DHSS created a public website devoted to issues of antimicrobial resistance at http://nj.gov/health/cd/mrsa/index.shtml. The NJ DHSS Handwashing Task Force will promote hand hygiene in community settings like daycare centers. Pamphlets will be developed about managing skin infections (especially MRSA) in contact sports.

However, most antibiotic-resistant organisms are passed in the hospital on the hands of health care workers. Some of the most successful infection-reduction techniques, including New Jersey's IHI Collaboratives, focus on educating staff on the appropriate uses of hand washing and alcohol rub, before and after every patient contact. The NJ Strategic Plan does not specifically address these process measures, but emphasizes appropriate antibiotic use.

To promote awareness of appropriate antibiotic use among health care providers, including staff at long-term care facilities, a coalition of professional medical societies is set to form a working group to initiate antibiotic-resistant-related educational activities. NJ CAUSE will also partner with surrounding states and cities to evaluate ways to promote appropriate antibiotic use. A follow-up survey will measure the impact of these activities.

"There's no push among drug companies to develop new and ever-stronger antibiotics," says Bresnitz. "Even if drug companies were developing new antibiotics left and right, we would eventually find ourselves in the same situation. Preventing infection and using antibiotics judiciously are still the best tactics against infection."

The third recommendation is to control the emergence and spread of antimicrobial-resistant organisms through appropriate use of antimicrobials and effective infection control practices.

To encourage all health care institutions to institute

"best practices" for controlling the spread of antimicrobial-resistant organisms, NJ CAUSE will develop a guidance document that considers evidence-based recommendations from the CDC, Association for Professionals in Infection Control and Epidemiology, Society for Healthcare Epidemiology of America, and Healthcare Infection Control Practices Advisory Committee. NJ CAUSE will partner with professional societies (e.g., New Jersey chapters of APIC, the Medical Society of New Jersey, the Infectious Diseases Society of New Jersey, and the NJ Chapter of the American College of Physicians) to disseminate this information.

The fourth recommendation is to standardize antimicrobial susceptibility testing methods to improve accuracy of results and ability to compare trends across institutions.

"To inform stakeholders about the burden of antimicrobial-resistant organisms in New Jersey," NJ CAUSE has already surveyed laboratories to assess the feasibility of creating a statewide antibiogram, and partnered with Aculabs, the largest provider of laboratory services to long-term care facilities in New Jersey, to investigate the prevalence of antimicrobial-resistant organisms in the state’s long-term care facilities.

Building on that knowledge, through awareness and training programs, NJ CAUSE will move ahead to ensure that clinical laboratories perform antibiotic sensitivity testing (AST) according to Clinical and Laboratory Standards Institute (CLSI) guidelines.

The fifth recommendation is to calculate the cost of antibiotic-resistant infections and use economic analyses to educate health care providers, health care executives, politicians and the public about the high costs of antimicrobial-resistant infections and the inappropriate use of antimicrobials.

Using available data, NJ CAUSE plans to calculate and disseminate such information. Reducing infections by appropriately using antimicrobials, and by increasing prevention techniques, will reduce

morbidity and mortality for patients – and it will also reduce financial costs, which in turn should increase funding for antimicrobial stewardship programs.

**NJHA Breakthrough Collaborative Reduces ICU Infections**

On another front, New Jersey has posted major gains in reducing two types of HAIs. Working together voluntarily as a Breakthrough Collaborative through the Boston-based Institute for Healthcare Improvement, 18 NJHA member hospitals worked to reduce central line-associated bloodstream infections (CLABs) by 73 percent and ventilator-associated pneumonias (VAPs) by 55 percent in their ICUs.

Under the leadership of physicians from the Johns Hopkins University School of Medicine and CriticalMed Inc., the hospitals held periodic learning sessions where clinicians shared information about their protocols, their successes and failures. Instituting process measures—such as increased hand hygiene, standardized insertion and care of central lines, elevation of the patient's head, and improved communication at shift change—meant changing the work culture and drawing attention to the effort.

Participating hospitals agreed to the confidential collection of infection data through the NJHA's Quality Institute, which aggregated the data and periodically reported back to each institution. The NJHA Quality Institute, a partnership of diverse health care professionals, organizes task forces and advisory committees, each with its own charges, goals and objectives and time frames.

"Performance improvement data collected through our Quality Institute is kept confidential," said Aline Holmes, RN, NJHA's Senior Vice President of Clinical Affairs. "We agree to collect the data for educational sessions and work groups to improve patient safety, not to report publicly or use competitively."

In the summer of 2006, at the end of the two-year effort, the CLAB reduction saved an estimated 137

lives and the VAP reduction saved another 79. The effort, which concluded in 2006, is estimated to have saved over $11 million in costs. Maintaining and building on these improvements now depends on the individual hospitals.

"We are no longer tracking these data through our Quality Institute," said Holmes, "but we are spreading and sustaining the CLAB and VAP work through a listserv, website, news bulletins and updates, and a one-day annual conference. The Hospital Association will convene yearly to keep this effort on the front burner."

**New Breakthrough Collaborative Begins**

With a $181,900 grant from the Health Care Foundation of New Jersey, a new IHI Breakthrough Collaborative effort, led by NJ DHSS and NJHA, aims to reduce the catheter-related urinary tract infections (UTIs) in the state's hospitals, nursing homes and home health care.

"People think of catheters as being low-risk," said Holmes. "But catheter-associated UTIs account for about 40 percent of hospital-acquired infections."

CU's McGiffert agrees that counting UTIs is one place to start. "When hospitals really start looking at the number of UTIs—mainly in states where they are going to have to start reporting publicly—they are shocked to find how prevalent they are."

Two areas of focus emerge in New Jersey's UTI collaborative: 1) making a concerted effort to remove catheters as soon as possible, as with all other medical devices; and 2) culturing the organism if infection is suspected, and then treating with specific antibiotics, instead of broad-spectrum antibiotics thought to foster antibiotic-resistance.

"UTIs may be over-treated," says Bresnitz, who chairs this project. "Appropriate steps need to be taken to ensure there's actually an infection. It's not as clear cut as you might think."

For example, Bresnitz cites a situation where a long-term care facility with no physician on-site. Perhaps a nurse calls to report that a patient's urine is discolored. That may represent colonization, but not infection. Antibiotics in these situations need to be carefully evaluated, according to Bresnitz.

According to Holmes, hospitals will roll out strategies in stages, working in teams to institute best practices to reduce incidence. To start, on a predetermined day in November, all members of the Collaborative will note every patient with a Foley catheter. This information will be used as a benchmark from which the region will work. Then each facility in the Collaborative will begin collecting and reporting catheter-associated UTI rates to the Quality Institute confidentially. The Institute will aggregate the data and report back to the facilities. Over the next two years, the group expects to see a dramatic decline in UTIs, as was the case with the CLAB collaborative.

"By reducing UTIs," says Holmes, "we believe we can minimize use of antibiotics and reduce antibiotic-resistance as well."

All involved in these efforts agree that reducing hospital-acquired infection is an urgent goal, and that doing so will require a collaborative effort across New Jersey, including appropriate antibiotic stewardship, and increased surveillance and prevention efforts. The goal is fewer infections (which translate to fewer antibiotic-resistant infections as well), fewer deaths and complications for patients, and dramatically reduced costs for institutions and insurers.