American Journal of Infection Control ■■ (2016) ■■-■■

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Practice forum

Infection preventionists and laboratorians: Case studies on successful collaboration

Maureen Spencer RN, BSN, Med, CIC [a], Denise Uettwiller-Geiger PhD, DLM (ASCP) [b], Jennifer Sanguinet MBA-HCM, BSIS, CIC [c], Helen Boehm Johnson MD [d,*], Denise Graham [e]

[a] *Corporate Director of Infection Prevention, Universal Health Services, King of Prussia, PA*
[b] *Director of Laboratory Services and Clinical Trials, John T. Mather Hospital, Port Jefferson, NY*
[c] *Director of Infection Prevention, West Hills Hospital and Medical Center, West Hills, CA*
[d] *Freelance Medical Writer, Vero Beach, FL*
[e] *Founder and CEO, DDG Associates, Alexandria, VA*

Key Words:
Infection prevention
infection control
clinical laboratory
hospital-acquired infection
polymerase chain reaction

Efforts to reduce the incidence of hospital-acquired infection (HAI) remain a significant focus for health care facilities, particularly in this era of drug-resistant organisms. With as many as 1 in every 25 hospitalized patients acquiring an infection, the need to minimize the risk of HAIs is widely recognized as critical. Advances in the fields of biomedical technology, microbiology, pharmacology, and infection control and prevention, among others, have played a tremendous role in these efforts. However, evidence suggests that a key element in this battle against HAIs is missing: collaboration and communication between these groups in health care facilities—particularly in microbiology and infection prevention. The need for collaboration between infection preventionists (IPs) and laboratorians has been addressed in the literature; however, a survey conducted by the APIC and the American Society for Microbiology demonstrated that both IPs and laboratorians feel they lack the tools to engage in this collaboration. This article addresses strategies for a working partnership between IPs and laboratorians and reports 3 case studies on successful collaborations at major medical centers.

Efforts to reduce the incidence of hospital-acquired infection (HAI) remain a significant focus for health care facilities, particularly in this era of drug-resistant organisms. With as many as 1 in every 25 hospitalized patients acquiring an infection,[1] the need to minimize the risk of HAIs is widely recognized as critical. In addition, HAIs are associated with an annual cost of approximately $9.8 billion to the U.S. health care industry.[2] Advances in the fields of biomedical technology, microbiology, pharmacology, and infection control and prevention, among others, have played a tremendous role in these efforts. However, evidence suggests that a key element in this battle against HAIs is missing: collaboration and communication between these groups in health care facilities—particularly microbiology and infection prevention.[3] A 2012 survey of infection preventionists (IPs) and laboratory professionals conducted by the Association for Professionals in Infection Control and Epidemiology (APIC) and American Society for Microbiology revealed that 70% of those surveyed "would value assistance in relationship building between the two groups," 83% would like to hear "about other facilities' experience in creating partnerships," and 78% would like "more education about best practices."[3] A recent focus group of IPs and laboratorians convened during the 2015 APIC conference and corroborated these sentiments with one IP stating that his IP colleagues "had never been to a laboratory. . .these were nurses that were on the floors for years and they were scared to death" (J. Sutton, personal communication, June 28, 2015).

IPS AND LABORATORIANS: PAST TO PRESENT

The laboratory has always been an integral part of infection prevention efforts, despite not getting formal recognition as such until the Society for Healthcare Epidemiology of America published their 1996 consensus panel report on requirements for infrastructure and essential activities of infection control and epidemiology in hospitals.[4] The role of the laboratorian in infection prevention remains at the core of what it has always been: to provide timely analysis of specimens for infection detection. However, in this era of multidrug-resistant organisms, that role has grown far beyond simply

* Address correspondence to Helen Boehm Johnson, MD, 1321 Sea Hawk Lane, Vero Beach, FL 32963.
E-mail address: HBoehm705@aol.com (H.B. Johnson).
Conflicts of Interest: None to report.

0196-6553/
http://dx.doi.org/10.1016/j.ajic.2016.02.011

identifying the presence or absence of a pathogen. Today's laboratorian, for example, is responsible for molecular typing of pathogens, recognition of patterns of antimicrobial resistance, antibiogram development, and surveillance and application of new technologies, among others.[5,6] Although their statement predated some of the most modern laboratory technologies and multidrug-resistant organisms, Peterson and Brossette articulated the significant role laboratorians play in infection control when they wrote:

> The necessary contribution from the laboratory includes surveillance, providing for a systematic observance and measurement of disease, as well as molecular typing of microbial pathogens." Present and future needs for laboratory-based surveillance will require reliable detection of new pathogens that emerge as causes of important health care-associated infections, which implies accurate identification of microbial organisms; recognition of new or emerging antimicrobial agent resistance; and participation in active surveillance for outbreaks. This contribution dictates a strong collaboration between the hospital epidemiologist and the clinical microbiologist, with a consequent positive impact on both the infection control program and the diagnostic laboratory. Such cooperation will be needed as we move to a future where pathogens of concern not only spread within the hospital but have the potential to affect both inpatients and outpatients, healthcare workers, and their households.[7]

The relationship between laboratorians and IPs has also changed significantly since the advent of electronic medical records. Traditionally, IPs would begin their days rounding in the laboratory to gather information on the most recent positive cultures and susceptibility results. This face-to-face time facilitated a natural opportunity for communication between the 2 departments. Advances in information technology and the widespread adoption of electronic medical records, although inarguably beneficial to the delivery of health care at large, have ironically made communication between the laboratory and the infection prevention department significantly less interactive. If results can be accessed by computer without any direct interface between IPs and laboratorians, the opportunity for the prompt exchange of information regarding early signs of potential cluster outbreaks is lost unless either group initiates communication with the other. Additionally, many facilities have consolidated laboratory services off-site, creating yet another obstacle for direct communication.

Laboratorians face their own internal need for collaboration as the lines of distinction between the clinical chemistry and clinical microbiology laboratories blur. The implementation of new technologies, ranging from chemiluminescent immunoassays to molecular diagnostics, has created significant overlap between the 2 fields, requiring the 2 departments to work cooperatively in maximizing testing efficiency and minimizing redundancy.[8] Although the theoretical need for improved communication and collaboration between IPs and laboratorians has been widely recognized throughout the health care community, many hospitals find themselves struggling to achieve this goal. Some facilities, however, have been successful in these efforts, and the results have been striking.

CASE IN POINT: J.T. MATHER HOSPITAL

In 2008, J.T. Mather Hospital, a 248-bed community hospital in New York State, initiated a campaign against methicillin-resistant *Staphylococcus aureus* (MRSA) that was initially a product of the partnership between their laboratory and infection prevention team and, ultimately, all levels of the hospital infrastructure, from the c-suite to the environmental services department. Recognizing that each medically incurred MRSA infection costs a hospital between $35,000 and $60,000,[2] the hospital wanted to address the most efficient and effective means of MRSA prevention. The goals identified by the laboratory and the infection prevention department were to rapidly identify colonized and infected patients, implement appropriate contact precautions and isolation, reduce turnaround times, streamline laboratory processes, and create a proactive rather than reactive environment.

Working together, the laboratory and infection prevention department evaluated the hospital's existing testing algorithms and isolation protocols and determined that they needed to initiate a rapid active surveillance program targeting high-risk groups using on-demand polymerase chain reaction (PCR) technology. They agreed that the sensitivity and specificity of the test along with the fact that results could be made available in <2 hours were key to providing actionable information to clinicians as rapidly as possible. Armed with statistics regarding the incidence and costs of MRSA infections along with the data supporting the use of rapid active surveillance with on-demand PCR, the departments successfully lobbied their c-suite in the acquisition of the on-demand PCR equipment. They then embarked on an education campaign with every department from nursing to pharmacy to environmental services, recognizing that these were the individuals on the front lines of collecting samples, advising treatment options, and performing the end terminal cleaning of rooms.

The campaign, entitled "The Bug Stops Here," launched in 2008 and has had significant clinical and financial results. The hospital has seen an 84% reduction in MRSA infection rates (74 infections in 2007; 12 infections in 2014) and an 84% reduction in hospital costs attributed to MRSA infection.[9] Between 2008 and 2014, approximately 13,000 patients were tested using on-demand PCR (available 24 h/d, 7 d/wk) at a fully burdened cost of roughly $51 per test, resulting in a total cost to the laboratory of $650,000 over those 7 years. However, using the low end estimate of each MRSA infection's cost to a hospital ($35,000), the savings to the hospital for the 62 fewer infections was >$1.5 million.[9] Additionally, the hospital saw its average length of stay in the intensive care unit or coronary care unit reduced from 4.4 days to 3.3 days over the course of the campaign, resulting in another $500,000 in annual savings.[9]

Overall, the hospital saw an increase in operational efficiency, patient safety, and patient satisfaction, with a decrease in delays, labor, readmissions, Centers for Medicare and Medicaid Services (CMS) penalties, and MRSA HAIs. These results, according to Dr. Denise Uettwiller-Geiger, Clinical Chemist and Director of Clinical Trials at J.T. Mather Hospital, were realized because "all stakeholders saw open communication and collaboration as being paramount to achieving success."

She went on to say,

> "By coming together and breaking down those silos. . .we've been able to decrease hospital acquired infections. . .to improve operational efficiency because we know how to cohort our patients more effectively and also how to move them more effectively through the organization to the appropriate level of care from the moment they hit the portal of the emergency room where 80% of our patients come from all the way down to discharge planning. We've been able to improve patient safety. . .decrease. . .or avoid those penalties from CMS (Centers for Medicare and Medicaid Services). . . [and] decrease laboratory labor because we have integrated this technology of molecular diagnostics into an existing workstation" (D. Uettwiller-Geiger, personal communication, June 2015).

CASE IN POINT: WEST HILLS HOSPITAL AND MEDICAL CENTER

As a 250-bed, semi-private room, community hospital surrounded by a number of long-term care facilities, West Hills Hospital