A Conceptual Framework for Improving Isolation Awareness in Pennsylvania Acute Care Hospitals

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ABSTRACT

In Pennsylvania, two distinct statements guide the management of healthcare worker exposure to pathogens. The Occupational Safety and Health Administration's bloodborne pathogen standard provides information to mitigate the risk of healthcare worker exposure, while Pennsylvania's Medical Care Availability and Reduction of Error Act (MCARE) addresses the safety of patients and healthcare workers. MCARE stresses patient screening for multidrug-resistant organisms (MDROs) and isolation precautions, including the use of personal protective equipment to protect healthcare workers and other patients they encounter from exposure to these organisms. Herein, the authors examine the relationship between achievement, avoidance of failure, and personal risk in terms of worker compliance with isolation and related procedures. The authors explore situational and isolation precaution awareness, to describe healthcare-worker behavior in an environment where isolation precautions are indicated. Review of 2013 and 2014 National Healthcare Safety Network infection events demonstrated a decrease in the number of MDRO events during this time period. Event narratives, reported through the Pennsylvania Patient Safety Reporting System, identified isolation precaution breaches during this period that suggest gaps in knowledge, communication, and administrative engagement. Gaps identified in the qualitative data were used to develop a conceptual framework for simulation and other activities designed to improve facility-wide isolation precaution awareness.(Pa Patient Saf Advis 2016 Mar;13[1]:24-28.)

INTRODUCTION

Antibiotics, powerful tools for treating bacterial infections, have been widely used since the 1940s. However, many of the organisms antibiotics were designed to kill have become resistant, making these drugs less effective.[1] Bacterial resistance to antibiotics has become a leading concern for those responsible for protecting public health. According to the Centers for Disease Control and Prevention, "each year in the United States, at least 2 million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die as a direct result of these infections."[1] With a dwindling antibiotic arsenal, healthcare workers must rely on personal protective equipment (PPE), isolation precautions, and environmental controls to protect themselves, other staff, patients, and the public from the spread of resistant pathogens. PPE, isolation precautions, and environmental controls are considered so foundational for protection from infectious pathogens that federal and some state agencies have developed standards for their use.

The Occupational Safety and Health Administration (OSHA) 29 C.F.R. 1910.1030 bloodborne pathogen standard states, "Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after institution of these controls, PPE shall also be used."[2] This phrase and others within 29 C.F.R. 1910.1030 make it evident that the standard was written to protect workers from contracting bloodborne pathogens from the patients for whom they care. Last amended in 2012, OSHA's 29 C.F.R. 1910.1030 standard has been in place for more than 20 years.

Pennsylvania hospitals are required to screen patients for multidrug-resistant organisms (MDROs), mainly methicillin-resistant *Staphylococcus aureus*, because of the Medical Care Availability and Reduction of Error Act (MCARE) – Reduction and Prevention of Health Care-Associated Infection and Long-Term Care Nursing Facilities Act of July 20, 2007, P.L. 331, No. 52. MCARE also requires hospitals to establish protocols, including isolation procedures, based on nationally recognized standards.[3] During this time, in compliance with MCARE, Pennsylvania hospitals have screened and isolated patients. In contrast to the OSHA standard, MCARE seeks to establish a culture in which engineering controls, work practice controls, and PPE use focus on protecting the healthcare worker and the next patient encountered.

Failure and Personal Risk

If healthcare workers are overwhelmed with tasks, production pressure, or other time-related workplace stressors, they may knowingly accept personal risk and fail to comply with isolation precautions so they can quickly perform patient care and other tasks. This may result in imminent (e.g., exposure) or latent failure (e.g., subsequent disease onset). In terms of MCARE, when healthcare workers accept personal risk by failing to comply with proper PPE use, those workers fail not only themselves, but also their patient and the next patient they care for, by risking personal exposure and translocation of MDROs and other bacteria or viruses between patients.

METHODS

In an attempt to increase knowledge about isolation precaution–related performance failure and risk-taking behavior, Authority analysts queried the Pennsylvania Patient Safety Reporting System (PA-PSRS) database for events associated with breaches in isolation procedures reported from January 1, 2013, through December 31, 2014. Analysts also queried the National Healthcare Safety Network (NHSN) for the prevalence of

MDROs reported from January 1, 2013, through December 31, 2014. Analysts examined the NHSN data to determine whether there was any relationship between reported breaches in isolation precautions and the number of MDRO infections. PA-PSRS event reports include a narrative section, so the reporter can provide free-text information that augments the event report. The narratives provide a clearer description of the reported event. Recurrent themes sometimes emerge when these narratives are compared.

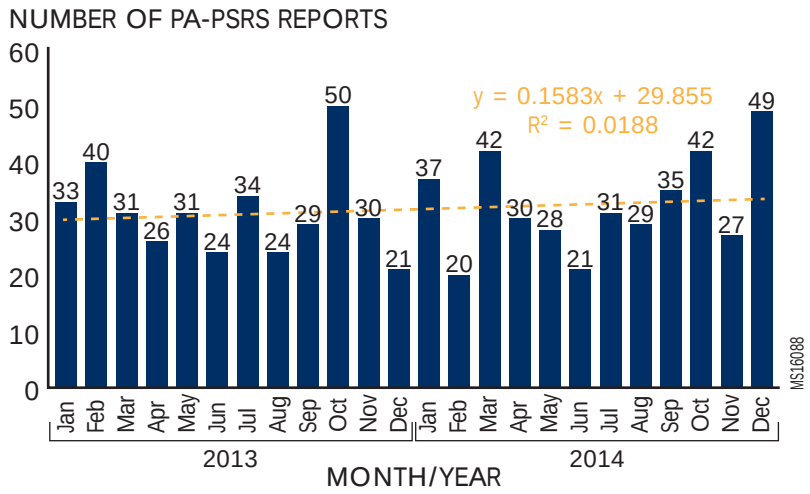
RESULTS

Figure 1 shows the number of reports related to isolation precaution breaches by month and suggests an increase in event reporting over time. When analysts reviewed MDRO events in NHSN by month, a decrease in reported events over time was noted (Figure 2).

Themes were derived from qualitative analysis of the event narratives. PA-PSRS report narratives regarding isolation precaution breaches suggest gaps that include knowledge, communication, and administrative engagement. The following narratives from PA-PSRS event reports demonstrate systematic performance gaps and risk-taking behavior among healthcare workers:*

> *Nurse was in the patient room without gloves and isolation gown. Asked her if she knew that the patient was in isolation. She stated that yes, but she wasn't touching the patient.*
>
> *Patient's family member was seen coming out of an isolation room. The nurse in the room asked him to step out and put on isolation gown and gloves. Patient's family member stated, "Why do I have to wear it when the physician did not?"*
>
> *A patient who required airborne isolation with placement in a negative pressure room was admitted to a standard room. Miscommunication by staff was the contributing factor. Bed reassignment was made within a few hours of admission.*
>
> *Physician at bedside performing procedure; housekeeping arrived on unit to change curtains. Previous patient was on contact isolation; curtains were never changed prior to admitting [the next] patient.*
>
> *The disposable isolation gowns and PPE were in low supply. Washable cloth gowns were provided for isolation protection. Due to miscommunication, staff utilized the same gown for patients multiple times.*
>
> *Patient in isolation for contact. Agency staff sitting with patient had no PPE on.*
>
> *Patient is not in isolation; however, is roomed with a patient on respiratory droplet precautions.*
>
> *Patient admitted to rule out C-Diff colitis, patient not placed in proper isolation precautions until 3 days after admission.*
>
> *Physician did not gown, glove, or wear a mask to remove a dressing on an isolated patient.*
>
> *Patient is on isolation precautions all staff except CRNA [certified registered nurse anesthetist] followed standard isolation protocol. CRNA was asked to put a gown on and refused.*
>
> *Physician was observed entering the isolation room without wearing proper isolation garb. Physician did not wash his hands when entering or exiting the room (touching patient's colostomy).*
>
> *Anesthesia [provider was] unable to find medication or blade needed to intubate pt. Anesthesia personnel in room [wearing] isolation gown and gloves [while] assisting at bedside came into the hallway without taking off gown and gloves or washing hands; went into anesthesia bag to retrieve equipment. When told patient is in isolation, [provider] threw dirty gloves on floor and continued to search bag until supplies [were] found. After intubation [unit] staff did not observe anesthesia personnel washing their hands.*

Figure 1. Number of Isolation Precautions Breach–Related Events Reported to the Pennsylvania Patient Safety Authority, January 2013 through December 2014



* The details of the PA-PSRS event narratives in this article have been modified to preserve confidentiality.

Nurse brought the patient to the unit and stated patient is isolation. I then stated, "Why don't you have gloves on?" They responded "it [doesn't] matter."

DISCUSSION

The concept of situational awareness (SA) may provide a useful framework for interpreting the data from this analysis. Situational awareness has been described as involving three levels of understanding:[4,5,6]

- Level 1 SA: Perception. This is the fundamental beginning of SA. Without basic perception and correct interpretation of cues, the odds of forming incorrect perceptions and conclusions increases.
- Level 2 SA: Comprehension. At this level, a worker must integrate multiple pieces of information and determine their relevance to the outcome.
- Level 3 SA: Projection. The highest level. At level 3, a worker may forecast future situation events and dynamics. Essentially, the worker has the highest level of ability to understand the situation and its implications.

Healthcare workers functioning only at the perception level (1 SA) are typically aware of the OSHA bloodborne pathogen standard and may comply with it, or they may take personal risk by choosing not to comply. This behavior may result from production pressure, perceived expediency, lack of appreciation of the seriousness of the hazard, or other causes. Healthcare workers functioning at the comprehension level (2 SA) have the ability to process information and comprehend compliance with isolation precautions and the potential outcomes. They may conceptually balance the hazards of non-compliance–to the patient and themselves–with the desire to accomplish patient care tasks expediently. Projection level (3 SA) healthcare workers understand the immediate situation as well as the fiscal implications and patient and healthcare worker harm that can result from spreading MDRO and other organisms in the environment.

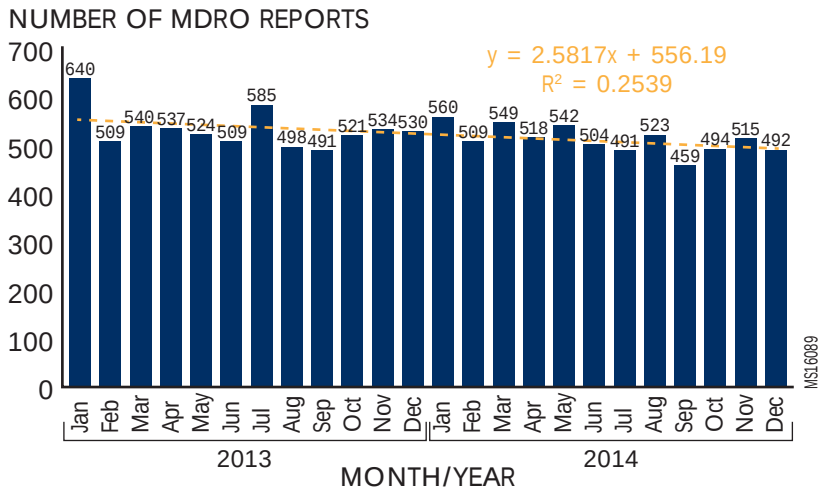
If the concepts of SA are applied to our results, the increased number of isolation-precautions breach reports in the PA-PSRS database may signal increased staff SA related to the importance of isolation precautions, and perhaps increased intolerance of isolation-precautions breaches, resulting in improved awareness of isolation precautions. The decreased number of MDRO event reports in NHSN may signal more appropriate use of PPE and isolation precautions, which may also be related to SA. Limitations of this analysis include a lack of information about concurrent antibiotic stewardship programs or other efforts to prevent infections or improve the safety culture within reporting institutions.

Isolation-Precautions Awareness

Because the complications that may result from isolation-precautions breaches are not immediately evident to the healthcare worker or patient, it is intuitively appealing to implement interventions aimed at improving SA, including improving healthcare workers' ability to project the delayed consequences of their actions. As with SA, isolation-precautions awareness requires healthcare workers to possess cognitive levels that make them truly aware within a situation or environment. That is, each level builds upon the previous level of isolation-precautions awareness. A healthcare worker cannot achieve isolation-precautions awareness without first having perception, then comprehension, then projection; each lower level is a prerequisite to the next level. Figure 3 is a conceptual model based on our thematic analysis of PA-PSRS narratives that shows how situational awareness levels translate into isolation-precautions awareness levels and may be used to mitigate gaps in information, communication, and administrative engagement, to facilitate organizations' progress toward infection prevention.

Administrative engagement. Leaders responsible for resource allocation can support environments so healthcare workers have the necessary resources to conveniently and efficiently comply with

Figure 2. Number of Multidrug-Resistant Organism (MDRO) Infections Reported to the Pennsylvania Patient Safety Authority through National Healthcare Safety Network, January 2013 through December 2014

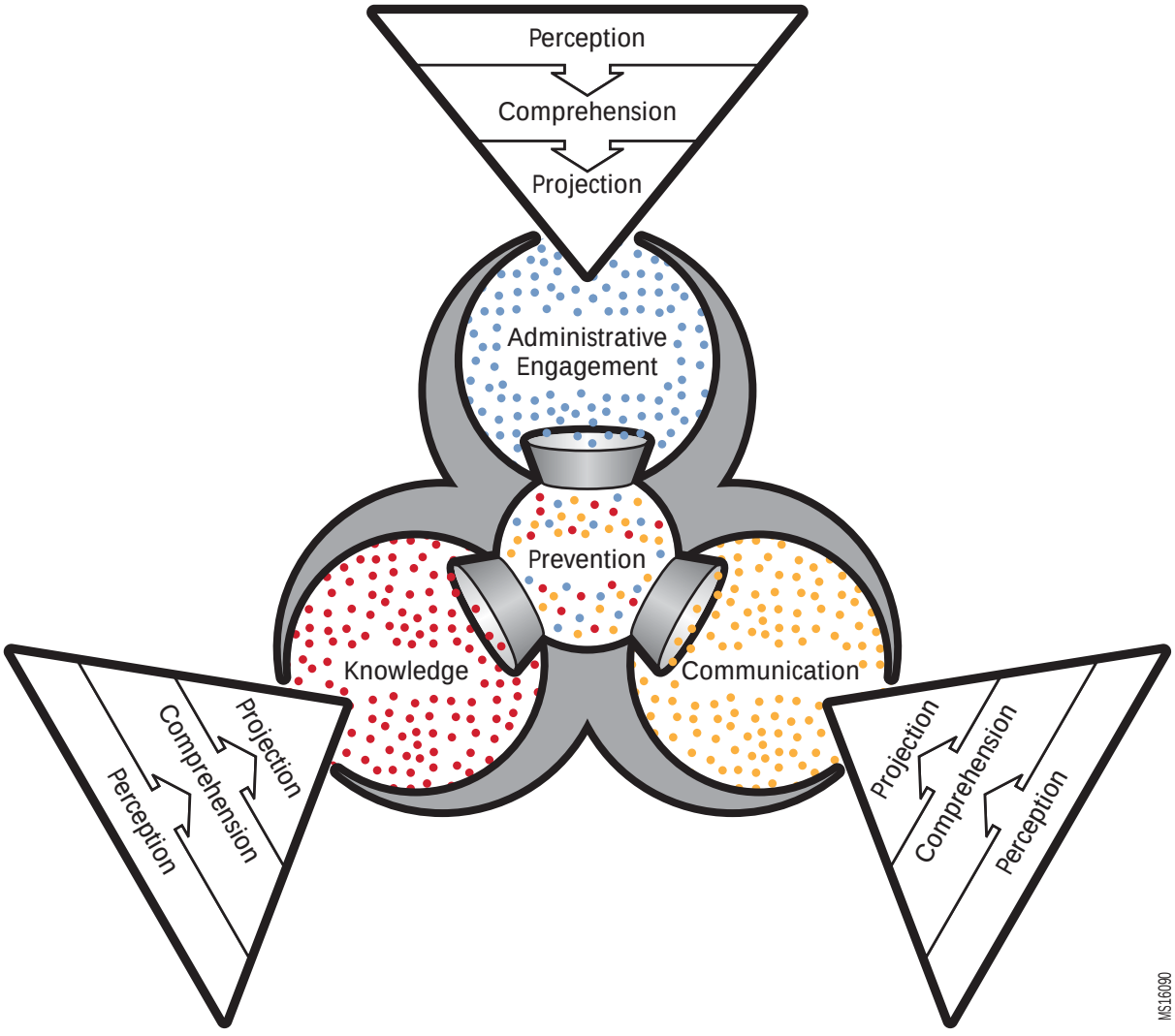


isolation precautions. Considerations may include financial planning for day-to-day isolation precautions and screening activities, disaster preparedness planning, human resources management, and noncompliant or disruptive behavior interventions.

Knowledge. Providing information and education may help healthcare workers and families understand the importance and process of isolation precautions to prevent infection. Knowledge pertaining to the appropriate use of isolation precautions and related equipment should be current and aligned with nationally recognized standards. Information and education about isolation precautions would be available to all healthcare workers (including ancillary personnel) who may be responsible for interacting with patients or environments where there is a threat of contamination to themselves or others.

Communication. Communication pathways could be developed to inform administration, healthcare workers, and educators about clinical successes and failures. Information from performance audits may reinforce high levels of performance or alert both leadership and front-line staff about system or individual opportunities for improvement.

Figure 3. A Conceptual Framework for Improving Isolation Awareness



CONCLUSION

Effective use of isolation precautions is important to protect healthcare workers, the next patient, other staff, and the public. Analysis of PA-PSRS narrative reports indicates that gaps exist in terms of isolation-precautions awareness. Healthcare workers who function in environments where isolation precautions are necessary may benefit from improved situational awareness, contributing to isolation-precautions awareness, to help protect themselves, patients, and others within that environment. Facilities may want to assess their isolation precautions and related activities through in-situ and laboratory-based simulation utilizing the conceptual framework presented herein to assure that the facility and staff are functioning at the highest levels of isolation-precautions awareness, thereby preventing MDRO infection and the spread of other pathogenic organisms.

NOTES

1. Centers for Disease Control and Prevention. Antibiotic / Antimicrobial Resistance. [online] [cited 16 Jan 2016]. http://www.cdc.gov/drugresistance/
2. U.S. Department of Labor. Occupational Safety and Health Administration. Regulations (Standards – 29 C.F.R.) 1910.1020. Bloodborne pathogens. [online] [cited 11 Jan 2015]. https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051
3. Medical Care Availability and Reduction of Error (MCARE) Act – Reduction and Prevention of Health Care-associated Infection and Long-term Care Nursing Facilities Act of July 20, 2007, P.L. 331, No.52 (Act 52). [online] [cited 11 Jan 2015]. http://patientsafetyauthority.org/PatientSafetyAuthority/Governance/Pages/Act52.aspx
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5. Wright MC, Taekman JM, Endsley MR. Objective measures of situational awareness in a simulated medical environment. *Qual Saf Health Care* 2004;13(suppl 1): i65-i71.
6. Kaber DB, Endsley MR. Team situation awareness for process control safety and performance. *Process Safety Progress* 1998;17(1):43-48.

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