

PENNSYLVANIA PATIENT SAFETY ADVISORY



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OBJECTIVE

The *Pennsylvania Patient Safety Advisory* provides timely original scientific evidence and reviews of scientific evidence that can be used by healthcare systems and providers to improve healthcare delivery systems and educate providers about safe healthcare practices. The emphasis is on problems reported to the Pennsylvania Patient Safety Authority, especially those associated with a high combination of frequency, severity, and possibility of solution; novel problems and solutions; and problems in which urgent communication of information could have a significant impact on patient outcomes.

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Family Members Advocate for Improved Identification of Patients with Dementia in the Acute Care Setting

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ABSTRACT

A family member of a patient with dementia contacted the Pennsylvania Patient Safety Authority and described several “near miss” patient safety events in which hospital staff obtained inaccurate information from the patient, unaware of the patient’s dementia diagnosis. Healthcare facilities reported 3,710 events through the Pennsylvania Patient Safety Reporting System between January 2005 and December 2014 involving patients with dementia or potentially unrecognized dementia. Analysts reviewing these reports found 63 similar events in which hospital staff obtained inaccurate information or consent from these patients. Five failure modes were identified: (1) failure to recognize preexisting dementia; (2) failure to assess competence and decision-making capacity of patients with dementia; (3) failure to identify a reliable historian or surrogate decision maker for patients with dementia; (4) failure to contact a reliable historian or surrogate decision maker when information or consent was required for care; and (5) failure to communicate the patient’s dementia diagnosis, competence, and decision-making capacity with all members of the healthcare team. Risk reduction strategies targeting these failure modes include screening for dementia, assessing capacity, identifying and communicating with surrogate decision makers, and standardizing communication of a patient’s dementia diagnosis with all hospital staff. (Pa Patient Saf Advis 2016 Mar;13[1]:1-10.)

INTRODUCTION

Pam Tripaldi’s father received a diagnosis of Alzheimer disease in 2007. Tripaldi served as her father’s primary caregiver for the final four years of his life, during which he received care at several different hospitals. During these hospitalizations, she encountered near-miss patient safety events in which staff did not recognize her father’s dementia. Tripaldi contacted the Pennsylvania Patient Safety Authority in 2015 and recounted examples of situations in which hospital staff either obtained inaccurate information from her father or failed to provide the assistance necessary to support her father in activities of daily living, such as feeding himself.

Tripaldi said, “If you asked my dad his name and date of birth—sure, he knew that. But they would ask him things like ‘Have you had surgery?’ and he would say no. Well yes he did, he had quadruple bypass surgery!” She also described situations in which her father did not get out of bed or did not eat, because the staff asked him if he wanted to or if he needed assistance and he would say no. “And sometimes I just couldn’t be upset with the staff, because I am not sure what information they were privy to because of HIPAA [Health Insurance Portability and Accountability Act].”*

In looking for solutions to this problem, Tripaldi considered colored wristbands. “He wore a wristband for fall risk and another one for allergies.” Tripaldi asked, “Couldn’t he wear a wristband so that everyone would know that he had dementia?” Tripaldi blogs about this experience, communicates with other patients and family members with similar hospital experiences, and works with a chapter of the Alzheimer’s Association to raise awareness about the issue. Initially, she proposed using a purple wristband to identify patients with dementia, because that is the color for Alzheimer disease. After discovering that purple is the color used to indicate DNR (i.e., do not resuscitate), Tripaldi began to advocate for use of a black wristband because, “Alzheimer’s is a disease that is dark, fearful and lonely to the patient, family members and caregivers. It also brings to mind the POW and MIA flag, which like our loved ones, are lost but never forgotten.”

In response to this inquiry, Authority analysts queried the Authority’s Pennsylvania Patient Safety Reporting System (PA-PSRS) database for reports of events similar to those described by Tripaldi to determine what events had been reported for patients with dementia. Analysts were particularly interested to learn whether any reports mentioned use of colored wristbands to communicate a diagnosis of dementia, because the Authority has written about the risks involved in using colored wristbands to communicate clinical information, other than patient identification, and has suggested that hospitals limit the number and standardize the meanings of specific colors used for patient wristbands.^{1,2} The Authority has also warned of potential risk associated with the use of colored community wristbands (e.g., yellow Livestrong bracelets) not sanctioned for hospital use.³

Authority analysis of events revealed similar instances in which inaccurate information or consent was obtained from patients with dementia or potentially unrecognized dementia. Risk reduction strategies were identified through a review of the literature

* The HIPAA Privacy Rule can be misinterpreted as prohibiting the communication of patient medical information between healthcare providers and hospital staff. The rule allows for disclosure of this information for treatment purposes, and requires that hospitals develop policies to identify staff that require access to this information and the minimum amount necessary to carry out their job duties and provide care to the patient. For more information please see <http://www.hhs.gov/hipaa/for-professionals/privacy/guidance/minimum-necessary-requirement/index.html>



and dementia care guidelines. Other ideas to improve patient identification were gathered from interviewing hospital staff, family members of patients with dementia, and dementia advocacy groups.

Background

Dementia is a neurocognitive disorder characterized by an insidious onset and gradual decline in cognitive function that results in an inability to carry out activities of daily living independently. Multiple causes for dementia exist; the most prevalent form is Alzheimer disease, which comprises 60% to 80% of cases.⁴ See “Recognizing Dementia and Dementia Due to Alzheimer Disease.”

The prevalence of dementia increases with age, with estimates ranging from 1% to 2% of adults at age 65 up to a high of 30% by age 85.⁴ The Alzheimer’s Association estimates that 270,000 adults age 65 or older received a diagnosis of Alzheimer disease alone in Pennsylvania in 2015, and there will be 320,000 by 2025. Nationally this number was 5.1 million in 2015 and is expected to increase to 7.1 million by 2025. Because of the large number of aging baby boomers and extended life expectancy of the general population, this number is predicted to reach 13.8 million by 2050.⁵

Despite increasing prevalence of dementia, many individuals with this condition do not have a documented diagnosis. In fact, investigators estimate that physicians fail to recognize dementia in 19% to 67% of patients in the outpatient setting—particularly in patients in earlier stages of disease with milder forms of cognitive impairment.^{6,7} In these patients, cognitive deficits may not be detected, or when they are, they are incorrectly attributed to normal aging^{8,9} or mild cognitive impairment.¹⁰

Deficits in the cognitive domains of memory and learning (present in all cases of possible or probable Alzheimer disease),

RECOGNIZING DEMENTIA AND DEMENTIA DUE TO ALZHEIMER DISEASE

According to the American Psychiatric Association, the following criteria must be present to establish a diagnosis of dementia (i.e., major neurocognitive disorder) and dementia due to Alzheimer disease.

Dementia

- Significant deficits are identified in one or more of the following cognitive domains: complex attention, executive function, language, memory and learning, perceptual-motor skills, or social cognition.
- Cognitive deficits impair the individual’s ability to carry out everyday activities independently (e.g., paying bills, managing medications).
- These deficits are not attributable solely to delirium or better explained by another mental disorder.

Dementia due to Alzheimer disease

- Criteria for dementia are met AND an Alzheimer disease genetic mutation is identified from family history or genetic testing.
- Cognitive decline occurs slowly over time, with deficits seen in memory and learning and at least one other cognitive domain.
- Cognitive function declines steadily over time, without extended plateaus.
- These cognitive deficits are not better explained by other physiologic or psychiatric causes (e.g., cerebrovascular disease, substance abuse, other mental disorders).

Source: Neurocognitive disorders. In: American Psychiatric Association. *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington (VA): American Psychiatric Publishing; 2013:591-643.

language, and complex attention can directly impede an individual’s ability to recall, communicate, or understand information necessary to participate in medical decision-making, especially in later stages of dementia.¹¹⁻¹² For these reasons, it is important to obtain information from a family member or other reliable informant when assessing or treating a patient with dementia.¹³⁻¹⁴

A diagnosis of dementia does not preclude a patient from actively participating in his or her own decision making and care; many are able to express values and preferences relevant to medical decisions. However, with advanced dementia, a shift to shared decision making (i.e., involving the patient and a family member or other

surrogate), and ultimately delegated decision making (i.e., reliance on a surrogate decision maker) becomes necessary.¹¹⁻¹²

METHODS

Pennsylvania Patient Safety Authority analysts identified events involving patients with dementia by querying the Authority’s PA-PSRS database for events containing the terms “dement” and “Alzheimer” (including misspellings) that were reported over a 10-year period, from January 2005 through December 2014. Analysts also queried the PA-PSRS database for events reported for patients age 65 or older that contained the term “poor historian” to identify events involving patients with possibly unrecognized

dementia. Together, these reports constituted a dataset of events involving patients with dementia or potentially unrecognized dementia that was used for further analysis.

First, analysts categorized reports using PA-PSRS event type and harm score. Then, analysts queried the dataset for reports containing the keywords “historian,” “wrong,” “said,” “aware,” “consent,” “didn’t,” and “know” to find examples of events similar to those described by Tripaldi (i.e., events in which hospital staff obtained inaccurate or incomplete information, or consent, from patients with dementia or potentially unrecognized dementia). Analysts then conducted an iterative thematic analysis of event-report narratives to identify failure modes described in this subset of similar events.

Further, analysts queried the dataset of events involving patients with dementia or potentially unrecognized dementia using the terms “band” (as in “wristband”), “gown,” “sign,” and “notify” to find event reports that may have described a method to identify patients with dementia.

RESULTS

According to the query of PA-PSRS, Pennsylvania healthcare facilities reported 3,710 events involving patients with dementia or potentially unrecognized dementia, including 96 reports for patients age 65 or older, that contained the term “poor historian” without mention of dementia or Alzheimer disease.

Event Type and Harm Score

Falls were the most frequently reported event type (n = 1,710, 46.1%), followed by impaired skin integrity (n = 958, 25.8%). The majority of events were reported as Incidents without harm to patients (n = 3,194, 86.1%).

Keywords, Similar Events, and Failure Modes

Analysts identified 627 event reports that contained the keywords “historian,” “wrong,” “said,” “aware,” “consent,” “didn’t,” and “know.” Of these, 63 event report narratives described events similar to those described by Tripaldi; the majority were reported as errors related to procedures, treatments, or tests (n = 47). Five failure modes were identified through iterative thematic analysis of these 63 event report narratives (see Figure).

PA-PSRS Events

The following is an example of a patient safety event in which inaccurate information and informed consent was obtained from a patient who was not initially recognized as having dementia by members of the healthcare team.*

A [male older than 80 years] identified himself and stated that he was to get injections in his left lower back for left low back and leg pain. The surgical consent signed by the patient stated right low back, as well as paperwork in his chart. I notified the surgical resident who then changed the consent to the left side. Upon entrance to the operating room, I informed the attending surgeon of this situation and he said that the patient has dementia and his son signs his paperwork. The surgical resident called the patient's physician to clarify, then returned to say that we would be now doing the patient's right side.

The following two reports describe instances in which informed consent was obtained from patients with an established diagnosis of dementia, without the input of family members.

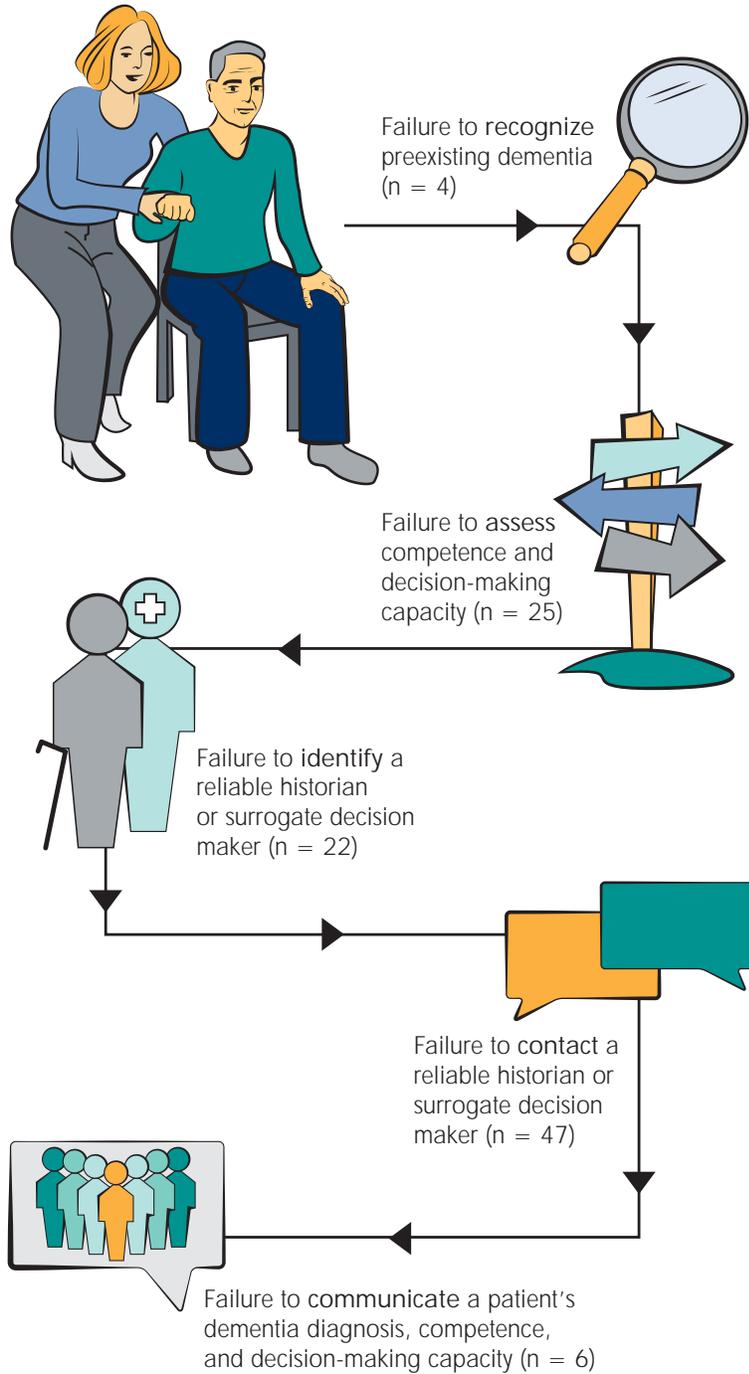
When reviewing the chart of a [male older than 75 years] before doing a surgical procedure, I discovered that there was no consent. My managers called the unit and the consent was sent down to them from the floor. The patient was on contact isolation precautions, so I was unable to leave the room to look at the consent. My managers called into the room to say that it was okay to proceed. After the case ended I looked at the consent and found that it had been “signed” by the patient who has Parkinson’s and dementia and was not very responsive. His signature looked like a scribbled line on the paper. The consent was not signed by next of kin or any person capable of giving consent for the procedure.

A [female older than 90 years] with a history of dementia was scheduled for an interventional radiology (IR) procedure. The family left to get something to eat and returned to find the patient had been sent down to IR. The nurse taking care of patient called IR to report that the consent for the procedure had not yet been signed and was told that consent would be obtained in their department. The nurse was told that the patient needed to be sent down because the physician was there and ready to proceed. The family returned and was very upset. IR was called and told to stop until the family could come down. The consent was signed by the son. The family spoke with a patient representative about this near miss and concern about confused patients signing consents.

The following report describes an event in which information was obtained from a patient older than the age of 80 who was noted to be a “poor historian” but does not mention a diagnosis of dementia or Alzheimer disease. Though reported as an Incident without harm to the patient, this event involved a surgical procedure that

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

Figure. The Sequence of Failure Modes In Events Involving Patients with Dementia (N = 63), Reported to the Pennsylvania Patient Safety Authority, 2005 through 2014



Note: Illustrated modes categorize 63 events in which hospital staff obtained inaccurate or incomplete information or consent from patients with dementia or potentially unrecognized dementia. Failure mode total exceeds event total because some events involved multiple failure modes.

did not proceed as expected because of inaccurate information provided by the patient.

A [male older than 80 years] is a poor historian who denied having hardware in his leg prior to surgery. During surgery to amputate the leg, the surgeon encountered an intramedullary rod. Orthopedic surgery was consulted and an x-ray was done to see the extent of the rod. Under the supervision of the orthopedic surgeon, the attending surgeon cut the rod. The surgery was completed without further incident.

Lack of Methods to Identify Patients with Dementia

Two hundred fifty-two event reports for patients with dementia or potentially unrecognized dementia (N = 3,710) described the use of colored wristbands to communicate fall risk. Five described using fall-risk signs, and three described using colored wristbands or gowns to communicate risk for wandering or elopement. Although cognitive impairment contributes risk for each of these events, no reports described the use of these methods to identify patients with dementia or other cognitive impairment, independent of these indications.

DISCUSSION

Events reported through PA-PSRS suggest that failing to communicate a patient's dementia diagnosis to all members of the healthcare team is a valid concern in Pennsylvania hospitals. However, it is only one of the aforementioned five failure modes (see Figure), all of which are worthy of attention.

Failure to Recognize Preexisting Dementia

PA-PSRS event reports describe situations in which members of the healthcare team failed to recognize that a patient had dementia. Factors that may contribute

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to a missed diagnosis of dementia include the following:

Cognitive aging. Some cognitive changes are to be expected with normal aging. These changes are associated with structural and functional changes in the brain that occur over a person's lifetime. The types and rates of these cognitive changes are influenced by a multitude of factors (e.g., genetics, educational level, health status) and vary widely among individuals.^{8,9} In general, as people age, gradual declines occur across all domains of cognitive functioning, and steeper declines are seen with advanced age. As a result, cognitive declines can be expected in the majority of the oldest members of society.¹⁵⁻¹⁶

Mild cognitive impairment. Mild cognitive impairment is an interim clinical diagnosis that bridges the gap between cognitive aging and dementia.¹⁷ It is diagnosed when a person's cognitive function is impaired beyond what would normally be expected for their age and educational level, but this impairment does not interfere with instrumental activities of daily living. Once the ability to carry out these activities independently is impaired, criteria for dementia are met. People with mild cognitive impairment are at high risk for developing subsequent dementia.^{4,10,15}

Education level and cognitive reserve. When asked why she thought hospital staff did not recognize her father as having dementia, Tripaldi said, "My father was a brilliant man, and he could hide it well."

Cognitive declines can be smaller and less noticeable among patients with higher educational levels and good baseline cognitive functioning.¹⁵⁻¹⁶ The theory of cognitive reserve suggests that higher levels of education, occupational complexity, reading ability, and IQ protects the brain, allowing it to function at a high level for a longer period of time and compensate for the pathologic changes that cause dementia. However, once a threshold

of structural changes has been reached, symptoms become noticeable, and cognitive function usually declines rapidly.¹⁸⁻²⁰

Protocols for screening and diagnosis. "You would never know my father had dementia, unless you were asking him specific screening questions," Tripaldi said.

A large number of tools exist to screen for cognitive impairment, but none are recognized as the gold standard for screening and diagnosis of dementia.²¹⁻²³ The Mini-Mental State Examination (MMSE) has been widely researched and is the screening tool most commonly used by primary care providers and geriatric specialists. The MMSE takes 10 minutes to administer and is used to assess cognitive ability within five domains: orientation, registration, attention and calculation, recall, and language.²³

The Clock Drawing Test (CDT) and the Mini-Cog are two brief screening tools that have become more widely used, either alone or in conjunction with the MMSE.²³ The CDT takes about one minute to administer; the patient follows specific instructions to draw the face of a clock and cognitive impairment is identified through application of scoring criteria to elements in the patient's drawing.²⁴ The Mini-Cog takes about three minutes to administer and combines the CDT with a three-item delayed word recall test.²⁵⁻²⁷

Failure to Assess Competence and Decision-Making Capacity

Analysis of PA-PSRS event reports suggests that in some events in which information or consent was obtained from patients with dementia, staff did not recognize impaired competence and decision-making capacity. Although it is important to preserve autonomy and agency through engaging patients with dementia in decision-making,²⁸⁻²⁹ it is also important to assess their capacity to do so.³⁰⁻³¹ Competency is the legal term for this ability, and capacity is the clinical

term.³² In Pennsylvania, "incapacitated adult" is the legal term used to describe a person "whose abilities to receive and evaluate information effectively and communicate decisions in any way are impaired to such a significant extent that they are partially or totally unable to manage their financial resources or to meet essential requirements for their physical health and safety."³³

Ideally a patient who is deemed competent would have the capacity to understand treatment options (including risks and benefits), make a decision, and explain the rationale or values that support their decision. In patients with memory impairment, this decision may be forgotten, but the patient may still be judged to have decision-making capacity if he or she makes the same decision when presented with the same information at another point in time.³²

Drane outlined a sliding scale model to determine competence in patients with dementia. According to the model, awareness of one's medical condition and assent (i.e., "going along with") may be sufficient when a medical decision has low potential to result in harm. As the potential for harm increases, a deeper understanding or appreciation of risks and benefits, along with the ability to provide a rationalization for a decision, may be required.³⁴

Failure to Identify a Reliable Historian or Surrogate Decision Maker

Events have been reported through PA-PSRS in which hospital staff have failed to identify a reliable historian or surrogate decision maker for a patient with dementia or other cognitive impairment. If a patient with dementia arrives unaccompanied, clinicians may struggle to identify the appropriate historian or surrogate decision maker or even to determine whether one exists.



In the event that a patient with dementia is deemed to be an “incapacitated adult” and has not established a surrogate decision maker, Pennsylvania law allows for a court-appointed guardian. Any person concerned about the welfare of an incapacitated person may initiate this process. The orphan’s court will then appoint a guardian, giving preference to someone named by the incapacitated person. In urgent situations a temporary guardian may be appointed for a 72-hour period, with extensions for up to 20 days.³³ In emergencies, healthcare providers may deliver necessary medical care without consent or guardianship, if it can be determined that a reasonable person would have consented to such treatment.³⁵

Failure to Contact a Reliable Historian or Surrogate Decision Maker

Tripaldi expressed frustration with “a lot of little things” that happened when she was not by her father’s side and hospital staff failed to contact her. “I tried to be there as much as I could. Nothing terrible happened, thank goodness. But I am sure there are people who have had things happen with disastrous results.”

Events have been reported through PA-PSRS in which a reliable historian or surrogate decision maker for a patient with dementia was known to exist but was not contacted by hospital staff. In some event reports it is unclear whether an attempt was made to contact this person, and in other reports attempts to contact the person were unsuccessful. Some events resulted in delayed or missed patient care. In other events care was provided, but family members or other members of the healthcare team raised concerns or questioned the appropriateness of proceeding without this communication.

Failure to Communicate the Patient’s Dementia Diagnosis, Competence, and Decision-Making Capacity

Analysis of event reports suggests that even in cases in which a patient’s dementia diagnosis is established and their competence and capacity for decision-making has been evaluated, this information is not consistently communicated to members of the healthcare team. Ideally, this information would be communicated during patient hand-off, defined by Cohen and Hilligoss as “the exchange between health professionals of information about a patient accompanying either a transfer of control over, or of responsibility for, the patient.”³⁶ But even when communicated during hand-off, this information may not be made known to other hospital staff.

THE ALZHEIMER’S/DEMENCIA HOSPITAL WRISTBAND PROJECT

Gary LeBlanc is the founder of the Alzheimer’s/Dementia Hospital Wristband Project.³⁷ Like Tripaldi, LeBlanc served as primary caregiver to his father, who had Alzheimer disease. LeBlanc said, “One day I looked at my dad and realized, ‘My goodness, I know this man better than he knows himself.’ He didn’t know where he grew up, he didn’t know any of his brothers or sisters, he didn’t recognize any of his friends. And, when he went to the hospital, who were they asking for the answers to questions? Him!”

LeBlanc said, “There’s nothing that happens in the hospital that *doesn’t* involve a question. ‘How do you feel? Where do you hurt? What do you want for lunch?’ These questions are the root of all evil for people with dementia.”

In response, he developed the Wristband Project in collaboration with Bayfront Health of Brooksville hospital leadership and the local chapter of the Alzheimer’s

Association (Brooksville, Florida). Like Tripaldi, LeBlanc originally wanted to use a purple wristband to identify patients with dementia, but learned that this could be confused with DNR in some hospitals. Hospital staff were also concerned with using wristbands to communicate a diagnosis, because of HIPAA privacy rules that prohibit sharing personal health information. Ultimately, the team decided to use the purple angel logo, a symbol used internationally to raise awareness of dementia and to recognize dementia-friendly communities.³⁸

Nurses screen patients for cognitive impairment upon admission using the Mini-Cog and place a dime-sized sticker with the purple angel logo on the identification wristband and a purple angel sign outside the room for patients who screen positive. “The purple angel does not say that this person has a specific diagnosis,” LeBlanc said. “It is simply an ‘at-risk’ symbol that says that this patient has, or possibly has cognitive issues, and that all information provided by the patient needs to be verified.”

Margaret Gordon, chief quality officer and interim chief nursing officer at Bayfront Health of Brooksville, further clarifies: “The purple angel indicates cognitive impairment, but we do not use it for patients with delirium. We do not want staff to assume that an older person has dementia, when in fact they have delirium due to an acute cause that should be identified and corrected.”

Gordon reports success in improving care and preventing adverse events for patients with dementia since implementing the wristband project in 2013. When asked whether the wristbands were the key, she said, “The real key is education.” LeBlanc and his team provide education to all hospital staff, both clinical and non-clinical, as well as volunteers and first responders. “We have raised awareness. But,” Gordon said, “only hospitals with a strong patient safety culture and a commitment to

improving care for patients with dementia may be able to maintain this awareness.”

LeBlanc echoes Gordon’s emphasis on education, “The truth of the matter is that the training is at the heart of this program. And with the number of individuals with dementia that we see coming in the future, we are going to have a major problem in five years if we don’t start preparing right now.” (For more information on the Alzheimer’s/Dementia Hospital Wristband Project, go to www.common-sensecaregiving.com.)

RISK REDUCTION STRATEGIES

The following strategies are suggested to hospitals seeking to improve care for patients with dementia and their family members:

Lay the Groundwork

- Assemble a multidisciplinary team to design improved care processes for patients with dementia. Suggested members include a physician and nurse with dementia expertise (i.e., specialization in geriatrics, neurology, or psychiatry), a social worker, and administrative staff.^{13,39-41}
- Solicit input from patients with dementia and their family members to identify challenges and guide improvement efforts.^{37,42}
- Form partnerships with dementia advocacy groups, such as local chapters of the Alzheimer’s Association, to identify resources and educational materials available for patients, their family members, and hospital staff.^{13,37}
- Educate hospital staff (both clinical and non-clinical), volunteers, and first responders about dementia, including signs and symptoms, problems commonly faced in the healthcare setting, communication strategies, and resources available to support patients, their family members, and staff.^{13,37,41}

Screen for Cognitive Impairment and Assess Capacity

- Screen all patients for cognitive impairment upon admission.^{14,37}
- Refer patients who screen positive for cognitive impairment for further evaluation by a dementia specialist or team.³⁹⁻⁴¹
- Assess patients with dementia for competency and capacity for decision making.^{11,13,30-34,43}

Identify and Communicate with Surrogate Decision Makers

- Identify existing surrogate decision makers by communicating with patient family members and other care providers and reviewing all medical and legal documents.¹³
- Obtain informed consent from surrogate decision makers for patients deemed to lack competency or capacity for decision making.⁴³
- Provide resources to help patients and families seeking to create advanced directives or designate surrogate decision makers. (The American Bar Association Commission on Law and Aging⁴⁴ and the Alzheimer’s Association⁴⁵ provide a comprehensive array of resources to assist patients with dementia and their family members with these tasks.)
- Consult hospital legal counsel and social work department for patients deemed to lack competency or capacity for decision making who do not have a designated surrogate decision maker.^{33,43-44}
- Engage family members or surrogate decision makers in developing a plan of care for the patient with dementia.⁴²
- Ask family members to verify all information provided by patients with dementia whenever possible.³⁷

Standardize Communication with Hospital Staff

- Communicate the patient’s dementia diagnosis and all relevant information necessary to provide care for the patient, during each patient handoff³⁶ (e.g., competency determination, assistance required with activities of daily living, contact information for the patient’s family member or designated surrogate decision maker).
- Consider using visual indicators that allow all hospital staff to readily identify patients with cognitive impairment and provide appropriate care.³⁷

CONCLUSION

Dementia is a common condition in older adults that is often overlooked by clinicians and other hospital staff. Family members have expressed frustration and fear of adverse events that could result from this failure to recognize dementia and from obtaining inaccurate information or consent from patients with dementia. The Authority has received event reports through PA-PSRS and information through direct communication from family members of patients with dementia to suggest that such events do occur in Pennsylvania. Strategies to improve care and safeguard patients with dementia in the hospital include screening for dementia, assessing competency and capacity for decision making, identifying and communicating with surrogate decision makers, and standardizing communication of a patient’s dementia diagnosis with all hospital staff.

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NOTES

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LEARNING OBJECTIVES

- Identify strategies to improve care for hospitalized patients with dementia.
- Identify factors impacting the recognition and diagnosis of dementia.
- Recall the predominant failure modes for events involving patients with dementia, as identified in reports to the Pennsylvania Patient Safety Authority.
- Recognize assessment findings that correlate with diagnostic criteria for dementia.
- Distinguish between situations in which it may or may not be necessary to communicate with family members or surrogate decision makers for patients with dementia.

SELF-ASSESSMENT QUESTIONS

The following questions about this article may be useful for internal education and assessment. You may use the following examples or develop your own questions.

1. All of the following are risk-reduction strategies that a hospital can use to improve care for patients with dementia *except*:
 - a. Solicit input from patients with dementia and their family members to identify challenges and guide improvement efforts.
 - b. Screen all patients for cognitive impairment upon admission.
 - c. Limit communication of a patient's dementia diagnosis to clinical staff only.
 - d. Obtain informed consent from surrogate decision makers for patients deemed to lack competency or capacity for decision making.
2. Each of the following statements regarding dementia is false *except*:
 - a. The number of Pennsylvanians diagnosed with Alzheimer disease is expected to double between 2015 and 2025.
 - b. Physicians may fail to recognize dementia in up to two-thirds of patients in the outpatient setting.
 - c. The Mini-Mental State Examination is recognized as the gold standard for screening and diagnosis of dementia.
 - d. The Health Insurance Portability and Accountability Act Privacy Rule prohibits the sharing of patient diagnoses with non-clinical hospital staff.
3. Complete the following sentence: The failure mode most frequently identified in events reported to the Authority involving patients with dementia was _____.
 - a. failure to recognize preexisting dementia
 - b. failure to assess competence and decision-making capacity
 - c. failure to identify a reliable historian or surrogate decision maker
 - d. failure to contact a reliable historian or surrogate decision maker
 - e. failure to communicate a patient's dementia diagnosis, competence, and decision-making capacity



An 87-year old man is admitted with anemia and a possible gastrointestinal bleed. During the history and physical, the patient tells you that he is a retired mechanical engineer and his wife passed away two months ago. When assessing his orientation, you notice he pauses a long time before telling you the date and then laughs it off, saying "all the years run together when you're my age!" Later, you notice a calendar on the wall behind you, within the patient's direct line of sight—but you dismiss this as a coincidence. When reviewing his medication list, the patient tells you that he takes an aspirin, a multivitamin, and a "water pill." When asked about timing and dosages, he tells you that he doesn't really have a schedule and that he doesn't feel like he really needs "all these pills." Later, when looking at notes in the electronic health record from his most recent hospital stay two months ago, you read that his wife passed away three years ago, and that he was discharged on 10 medications, including metoprolol and omeprazole.

4. In the above scenario, which combination of assessment findings is MOST suggestive of dementia?
- Age older than 85 and high level of education
 - Age older than 85 and deficits in memory
 - Deficits in memory and high level of education
 - Deficits in memory and inability to manage his medication regimen

A diagnosis of dementia is established for the patient described above, and he is deemed to have decision-making capacity; however, he asks that his son be included in any healthcare decisions. Three days into his hospital stay his hemoglobin drops to 7g/dL and the patient becomes lethargic and confused. The attending physician has decided that he requires an emergent transfusion because his hemoglobin continues to drop and he is symptomatic, but the patient is now unable to provide consent. The patient's son cannot be reached by phone over multiple attempts.

5. Which of the following BEST describes the appropriate actions to be taken in this scenario?
- Transfuse the patient, despite the lack of consent.
 - Delay the transfusion until the son can be reached to provide consent.
 - Administer haloperidol to treat the patient's superimposed delirium so that he can provide informed consent.
 - Ask hospital legal counsel to contact the orphan's court to establish temporary guardianship before transfusing the patient.

On the day of discharge for the patient described in the preceding scenarios, the day shift nurse is prepared to review the discharge instructions with the patient and his son before the end of her shift; however, the son is running late. The patient has a friend visiting—an older woman who hasn't visited before. Just as the day shift nurse finishes giving report to the evening shift nurse, the son calls the unit to say that he is downstairs with the car, and asks if his father can just be sent down to the lobby.

6. Which of the following BEST describes the appropriate actions to be taken by the day shift nurse?
- Review the discharge instructions with the patient and tell him to make sure he gives his son the paper copy.
 - Review the discharge instructions with the patient's friend and ask her to convey the instructions to the patient's son.
 - Send the patient down to the lobby and ask the patient transporter to give a paper copy of the discharge instructions to the patient's son and to tell him to call you if he has any questions.
 - Ask the patient's son to come to the unit so that the day shift nurse can review the discharge instructions with the patient and his son.



Missed Respiratory Therapy Treatments: Underlying Causes and Management Strategies

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INTRODUCTION

Respiratory care helps provide relief for patients who have difficulty breathing or cannot breathe on their own.^{1,2} Treatments that are not given may adversely affect a patient's respiratory health, safety, and outcome.³ Treatment delays could reduce the effectiveness of medications and lead to clinical deterioration.³ Stoller et al. estimate that 3.5% of ordered respiratory treatments are missed.⁴ Stacked treatment (e.g., giving treatments to multiple patients concurrently) can interfere with monitoring patients as they receive treatments, which could contribute to an adverse side effect.^{3,5}

Missed respiratory treatments have been reported to the Pennsylvania Patient Safety Authority through its Pennsylvania Safety Reporting System (PA-PSRS). Patients in Pennsylvania who have missed ordered inhalation treatments have experienced acute respiratory failure. One patient who did not receive therapy as ordered said he felt like he was jogging all day.*

In their analysis of events reported through PA-PSRS, Authority analysts noted several event types involving workflow breakdowns that resulted in missed respiratory treatments. No reason was provided in almost a quarter of the event reports.

A literature query revealed an apparent scarcity of published research on this topic. Analysts contacted the Pennsylvania Society for Respiratory Care (PSRC), whose members include respiratory therapy administrators and clinicians, and conducted interviews of other respiratory leaders in Pennsylvania to gain perspective. Analysts determined that a survey of Pennsylvania respiratory therapists could offer further insights into the PA-PSRS event reports.

METHODS

Analysts queried the PA-PSRS database to identify (1) missed respiratory treatment and (2) medication dose omission error events that occurred from January 2010 through December 2014. For the medication dose omission error event narrative, an additional filter was applied to identify reports that contained at least one of the following respiratory medications:

- Beta2 adrenergic agonists: albuterol (i.e., Ventolin, Proventil, Accuneb, Proair), levalbuterol (i.e., Xopenex)
- Anticholinergic: ipratropium
- Anticholinergic combination/beta2 adrenergic agonist: ipratropium/albuterol (i.e., Duoneb, Combivent)
- Anticholinergic inhaler: tiotropium (i.e., Spiriva)
- Corticosteroid/beta2 adrenergic agonist long-acting combination inhalers: budesonide/formoterol (i.e., Symbicort), fluticasone/salmeterol (i.e., Advair)

The Authority and PSRC developed a survey to determine the most common factors contributing to missed respiratory treatments, from the perspective of Pennsylvania respiratory therapists. The 11 survey questions, available exclusively online with this article, were based on the PA-PSRS event report analysis, a literature search, and conversations with hospital-based respiratory managers. Two themes in the PA-PSRS event reports are not included in the survey results: the "Other" category and no identifiable reason. The survey questions also referenced a 3.5% benchmark for missed respiratory treatments based on the study published by Stoller et al.⁴

* The details of the PA-PSRS event narratives in this article have been modified to preserve confidentiality. None of these event narratives came from facilities interviewed for this article.

ABSTRACT

For patients who suffer from respiratory ailments, a missed treatment may exacerbate an existing condition and contribute to the patient requiring a higher level of care. Respiratory therapy is ordered for reasons including treatment of chronic obstructive pulmonary disease or cystic fibrosis; treatment of an acute illness such as pneumonia or bronchiolitis; or for monitoring after surgery or other procedures. Events submitted to the Pennsylvania Patient Safety Reporting System identified 8,745 missed respiratory treatments reported over a 5-year period; 22.8% of the event reports did not provide a reason. Respiratory therapists in Pennsylvania were surveyed to determine the most common factors contributing to missed respiratory treatments. Survey analysis revealed treatments were missed due to patient unavailability because of other therapies or tests; patient refused treatments; or the respiratory therapist was unavailable because of an emergency situation or increased workload. Strategies to address missed respiratory treatments include coordinating care using the electronic health record and team management, taking time to explain treatments to patients, and using assessment protocols to help define treatment frequency and modality. (Pa Patient Saf Advis 2016 Mar;13[1]:11-17.)

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The PSRC distributed the survey to 6,976 member e-mail addresses on November 18, 2015. The respondents had until November 25, 2015, to answer the questions. Survey questions were not mandatory. Surveys from respondents that answered 60% or more of the nine specific reasons for missed treatments were included. All other survey responses were excluded.

RESULTS

PA-PSRS Event Report Demographics

Analysts identified 8,745 event reports. Patients age 61 through 90 were affected in the majority of the reported missed respiratory treatments (68.0%, n = 5,943 of 8,745). See Figure 1.

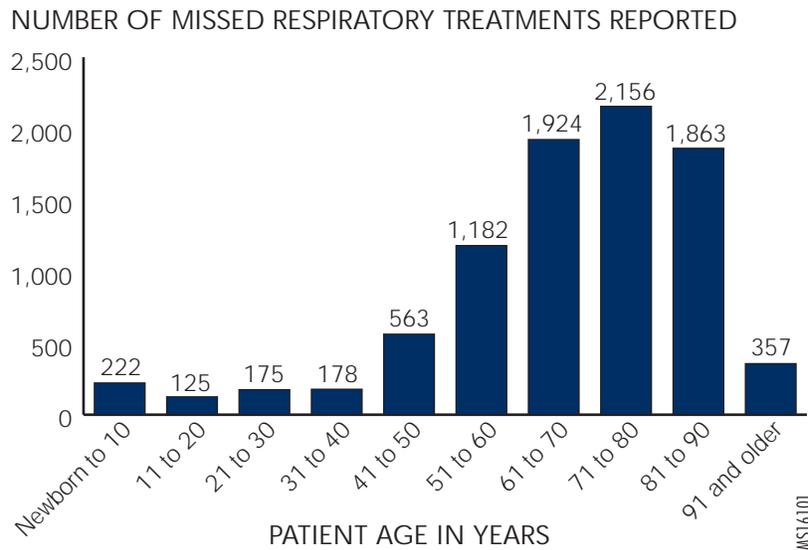
All events occurred in a hospital. Only three event reports were reported as Serious Events, with harm scores E and F; 86.7% (n = 7,579 of 8,745) were reported with a harm score C (i.e., an event reached the patient but did not cause harm and did not require increased monitoring) and 9.7% (n = 850) were reported with a harm score A (i.e., unsafe conditions, circumstances that could cause adverse events). The Pennsylvania Patient Safety Authority Harm Score Taxonomy is available at [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2015/mar;12\(1\)/PublishingImages/taxonomy.pdf](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2015/mar;12(1)/PublishingImages/taxonomy.pdf).

Reasons for Missed Treatments

Analysts grouped events into 11 different themes based on event report narrative descriptions (Figure 2).

The two most frequently reported reasons for missed treatments were related to therapist availability: therapist not available (i.e. variation in demand, staff unavailable; 20.0%, n = 1,754 of 8,745) and therapist called away emergently (18.3%, n = 1,596). The next most frequently reported reason was related to

Figure 1. Number of Missed Respiratory Treatments Reported to the Pennsylvania Patient Safety Authority, 2010 through 2014, N = 8,745



patient availability; patients were not in their rooms and unavailable when the therapist arrived to provide treatment (15.9%, n = 1,389 of 8,745). Close to one quarter of the reports (22.8%; n = 1,998) provided no specific reason for the missed treatment.

Survey Results

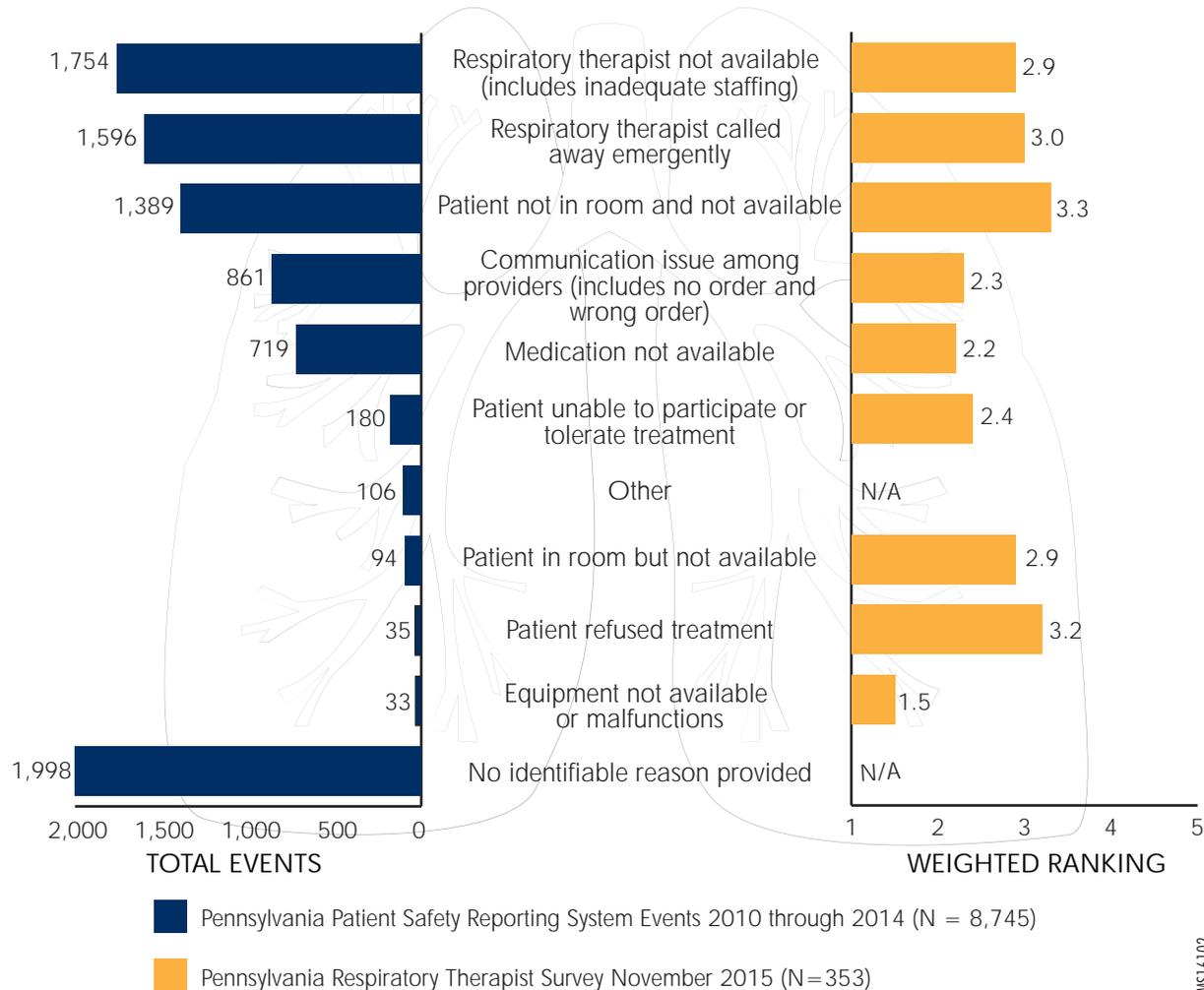
The survey was emailed to 6,976 respiratory therapists who returned 353 surveys that met the inclusion criteria, for a 5.1% response rate (see Table 1 for demographics).

More than half of respondents (52.4%, n = 185 of 353) were unaware of the percentage of missed treatments per month in their facilities, 30.3% (n = 107) indicated 3.5% or fewer respiratory treatments were missed per month, and 17.3% (n = 61) indicated more than 3.5% of respiratory treatments were missed per month. When asked about how often a respiratory therapist missed one or more treatments during a typical shift, 37.7% (n = 133 of 353) of respondents indicated

2 or more times a week. The next most frequent response was once a day (24.1%, n = 85), followed by once a week (19.8%, n = 70), and more than once a day (18.4%, n = 65). Respondents were also asked how often respiratory treatments were “stacked” (see Table 2).

Figure 2 compares event reports from PA-PSRS to survey results. About 43.3% (n = 153) of respondents indicated that an emergency coverage policy was in place, of which 61.4% (n = 94 of 153) indicated that the policy did not limit the number of missed treatments, 22.9% (n = 35) did not know whether the policy limited missed treatments, and 15.7% (n = 24) said their policy did limit missed treatments. When asked if there was a policy for non-respiratory therapists (e.g., registered nurses) to administer treatments, 57.5% (n = 202 of 351) indicated no, 27.9% (n = 98) indicated yes, and 14.5% (n = 51) did not know.

Figure 2. Reasons for Missed Respiratory Treatments



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Types of Respiratory Therapy Events

The following are six deidentified examples of events reported to the Authority involving missed respiratory treatments:

Respiratory treatment was not administered by respiratory therapy. Patient short of breath; pulse oximeter is 85% on room air. Patient was placed on non-rebreather. Patient's clinical condition deteriorated and a rapid response was called.

Found patient's [respiratory medicine] in med room, but there was no record of the patient getting [the respiratory medication]. Went to administer medication to patient, but found patient unresponsive. Airway emergency called and patient transferred to medical intensive care unit (ICU).

Patient was ordered bilevel positive airway pressure (BIPAP)/continuous positive airway pressure (CPAP). [Several hours later,] no BIPAP or

CPAP was running. Patient became less responsive during the afternoon; rapid response called and patient sent to ICU.

Patient refused four aerosol treatments. I found the patient diaphoretic, tachypneic with very little air movement, and complaining of trouble breathing.

After lunch, patient complained of chest pain and shortness of breath. Patient stated that she did not have

Table 1. Survey Respondent Demographics (N = 353)

CATEGORIZATION	RESPONSES	PERCENTAGE
ROLE		
Staff respiratory therapists	267	75.6%
Respiratory managers/directors	57	16.2%
Other roles (e.g., clinical coordinator, respiratory clinical specialist)	17	4.8%
Respiratory supervisors	12	3.4%
Total	353	100%
FACILITY TYPE		
Acute care hospital, 300+ beds	103	29.2%
Acute care hospital, 101 to 200 beds	78	22.1%
Acute care hospital, 201 to 300 beds	72	20.4%
Acute care hospital ≤100 beds	42	11.9%
Long-term acute care hospital	20	5.7%
Rehabilitation hospital	17	4.8%
Children's hospital	10	2.8%
Critical access hospital	7	2.0%
Long-term care/group home	4	1.1%
Total	353	100%
FULL-TIME EQUIVALENT (FTE) EMPLOYEES IN THE RESPIRATORY DEPARTMENT		
40 or more	92	26.1%
31 to 40	29	8.2%
21 to 30	53	15.0%
11 to 20	98	27.8%
1 to 10	78	22.1%
Unknown	3	0.8%
Total	353	100%

a breathing treatment for the past 24 hours. Patient was given a breathing treatment.

Patient did not receive his inhalation treatments as ordered. He experienced acute respiratory failure, required intubation, and was transferred to the critical care unit. Investigation of the workflow revealed a breakdown in communication causing missed treatments.

DISCUSSION

The role of the respiratory therapist has grown more complex over the years. Respiratory therapists help patients by administering medications during respiratory treatments, communicating with the patient, providing education about treatments and therapies, checking oxygen saturation levels, measuring pulmonary function, monitoring and managing therapy, and providing life support and other critical care in emergencies.⁶

A variety of factors contribute to the complex problem of missed respiratory treatments,^{1,2} such as staffing adequacy, variation in demand, promotion of teamwork by organizational culture, patient education, and protocols for benchmarking and assessing patients.^{5,7,8}

Missed Treatment Studies

Two studies found in the literature address missed respiratory treatments. Researchers at the Cleveland Clinic Hospital (Cleveland, OH) identified the patient's absence from the room at the time of the therapist's visit as the most common reason, followed by the patient refusing treatment and the patient being unavailable because of ongoing activities or therapy such as physical therapy.⁴

A study at Barnes-Jewish Hospital (St. Louis, MO) looked at missed medication doses, separated into two categories: operational and non-operational. Operational missed doses were missed because of situations that could be controlled by respiratory care, such as limited staffing and lack of medication availability. Non-operational doses that were missed were because of situations beyond the control of respiratory care, such as the patient not being available, patient refusing treatment, or the physician advised not to administer. The study revealed missed-dose rates of 1.1% for operational and 4.5% for non-operational causes.⁹

Common Themes

Common themes that emerged from statewide survey responses did not fully align with analysis of the event reports. Patient refusal of treatment was a prominent theme in the survey but not in event reports (see Figure 2). The following themes are the four most frequently identified reasons for missed respiratory treatments identified in the survey, presented in descending order of frequency.

Table 2. Survey Respondents: Delivery of Stacked Respiratory Treatments (N = 353)

CATEGORIZATION	RESPONSES	PERCENTAGE
Very often (more than once a day)	177	50.1%
Often (once a day)	40	11.3%
Sometimes (2 or more times a week)	48	13.6%
Rarely (once a week)	31	8.9%
Never	57	16.1%
Total	353	100%

Patient not in room and not available. Respiratory therapists usually travel to the patient’s room to administer treatments in a scheduled timeframe. However, the timing of respiratory and other treatments are not always coordinated among caregivers.¹⁰

“The patient may not be available for a multitude of reasons,” said Thomas Lamphere, BS, RRT-ACCS, RPFT, FAARC, executive director of PSRC. “They may be receiving nursing care, their dinner just delivered, or they may be out of the room getting a CT [computed tomography] scan. The therapist may make three separate attempts to administer treatments but is not always successful.”¹⁰

Patient refused treatment. Non-adherence can occur when patients’ treatment plans are too complex, they feel well at the time the intervention is offered, they lack understanding about the importance of the treatment, or the treatment may be scheduled at inconvenient times (e.g., in the middle of the night).¹¹ Patients have the right to refuse treatment and do not always feel there is a need for a respiratory treatment, Lamphere said. “Patients feel they are breathing fine, so they believe they do not need treatment,” he said.¹⁰

A key factor in patient refusal is whether patients were given enough information to make an informed decision, said Lester Cash, MBA, BSM, RRT, Division Director Respiratory Care, Reading

Hospital, Reading Health System.¹² “The therapist is an advocate for patients’ safety,” Cash said. “The therapist has to take the time to explain the consequences of going without treatment and not just walk away.”¹²

Respiratory therapist called away emergently. Therapists are faced with many responsibilities during their shifts that are challenged when emergencies occur. The therapist administers treatments during a shift, usually guided by a worksheet or schedule. If a rapid response or a cardiac arrest occurs, the therapist assigned to attend the emergent situation has to deviate from the schedule.¹⁰ “Emergencies happen in healthcare,” Lamphere said. “The best way to handle these situations is for the therapists to work as a team. But sometimes despite good teamwork, you may still not have enough staffing. Supervisors may help. Other therapists can kick in and help. Every hospital differs in how they handle these situations.”¹⁰

Respiratory therapist not available. Respiratory managers, and other professional services, have experienced the problems and frustration of workload increases, according to Cash. Cash uses a statistically valid activity time standard defined by the American Association for Respiratory Care (AARC) for respiratory services to determine staffing levels. The time standards take into account all clinical and support activities that respiratory

therapists perform for a procedure, which then determines appropriate staffing, he said. “Using unweighted metrics such as patient days does not give an accurate assessment of staffing needs,” he said.¹²

The AARC guidelines also allow time for the therapist to provide direct oversight of care one patient at a time. The AARC states that concurrent therapy or “stacking” treatments leads to reporting erroneously high productivity values and potentially places the patient at risk because therapists cannot directly monitor the patient throughout the treatment.^{5,13} However, the survey responses of PSRC members show that this practice is common among respondents, with 75% of them indicating they perform concurrent therapy at least one or more times a week.

The role of the reporter may influence both what is observed and what is understood about the incidence and causes of missed treatments; the role of the reporter is generally not available in PA-PSRS reports. Other studies have reported varying numbers and types of event reports obtained by using different methods of reporting or investigation.¹⁴ Facilities may consider evaluating information from both PA-PSRS reports and the survey to provide a more complete analysis.

Limitations

Several of the PA-PSRS event descriptions could not be categorized because they contained limited information such as “respiratory treatment missed” and did not offer additional insights into why the treatment was missed. The low response rate for the survey may be the result of a one-week completion date with no reminder. Events resulting in harm may not have been reported as an outcome of a missed treatment.



RISK REDUCTION STRATEGIES

The following risk-reduction strategy suggestions address the four most common reasons for missed respiratory treatments identified from the survey results and are based on recommendations found in the literature, AARC best practices, and expert opinions of practicing respiratory therapists.

Appropriateness of Care

Assessment protocols. Use assessment and treatment protocols that allow respiratory therapists to evaluate patients, interact with physicians to minimize unnecessary care, and optimize care ordered by the physician.⁸ Initiate or modify a patient's care plan following the set of physician orders, including instructions or interventions that the respiratory therapist can adjust as the patient's medical condition dictates. Protocols are generally written in algorithmic form, are based on scientific evidence, and include guidelines and options at decision points along with clearly stated outcome objectives.¹⁵⁻¹⁷

Track missed treatments. Track reasons for missed treatments to gain a better understanding of why they occur. Review information with staff and patient safety committee or management team, and post statistics in an easy-to-read area such as a break room.¹²

Benchmarking. Consider participating in the AARC benchmarking website (<http://www.aarc.org/resources/tools-software/benchmarking>) to exchange information and identify best practices.¹⁸⁻²⁰ The site allows hospitals to provide accurate data to support administrative staffing decisions, identify and promote best professional practices, and define comparison groups.¹⁸

Rounding. Include respiratory therapists in patient rounds with physicians, case managers, and nurses to discuss patient care and discharge disposition. Rounding as a team helps to coordinate care in a timely manner.^{10,21}

Interdisciplinary Coordination

Check electronic health records (EHRs). If the hospital's EHR has the ability to provide patient locations, identify a computer terminal where respiratory therapists can check patients' location when patients are not in their rooms.¹²

White boards. Use patient whiteboards hung in the patient's room to communicate what and when tests or treatments are scheduled for the patient on a given day. Whiteboards improve teamwork, communication, and patient care.²²

Interdisciplinary teamwork. Develop other communication systems, such as a communication wheel that can be dialed to indicate when the patient will return to the room.²³

Patient Education

Explain treatment. Ensure that patients are involved in the treatment plan when possible and understand the rationale behind the medication, the side effects, and dosing frequency.²⁴

Listen to the patient. Listen to the patient's perspective and concerns.²⁴

Mode of delivery. Consider working with the patient and physician to change the mode of delivery to make it easier and quicker for the patient. For example, the patient may prefer inhaler use rather than a nebulizer treatment.¹⁰

Productivity and Staffing

Triage. Use a triage system to reassign patient-care needs when therapists are unable to accomplish duties. For example, a respiratory therapist could contact a shift charge therapist to communicate potential missed therapy, which could then be reassigned.⁹

"Surge" position. Consider establishing a "surge" position. This position could be an unassigned therapist who assists with unscheduled activity such as patient emergencies, as well as scheduled therapy during peak administration times.⁹

Partner for the day. Plan for shift partners who can help relieve duties between respiratory therapists when days become busy.¹²

CONCLUSION

PA-PSRS reports and a statewide survey of respiratory therapists provided a foundation to understand why missed respiratory treatments occur. Reasons for missed treatments in the two data sources were similar, with the exception that the survey of respiratory therapists suggested a greater incidence of patient refusal of treatment. Tracking the reasons for missed treatments is the first step to better understand facility-based trends and may guide managers as they consider methods to coordinate care and develop time-driven standards. Further studies of this topic, including the clinical consequence of missed therapies, may help to guide further interventions.

Acknowledgment

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Medication Errors Involving Healthcare Students

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ABSTRACT

Students acquire vital clinical experience while participating in patient care, but they can become involved in medication errors. The extent of this problem is relatively unexplored. Analysts reviewed medication-error events mentioning students submitted to the Pennsylvania Patient Safety Authority from July 2010 through June 2015. Of the 711 events identified, 87.3% (n = 621) reached the patient. Analysts also found that students caught or discovered the error in 16.2% (n = 115) of reports. The most common node of origin for the medication error was administration (75.9%, n = 540). The most common event types were extra dose (16.6%, n = 118), dose omission (13.2%, n = 94), and wrong time (11.4%, n = 81). High-alert medications, including insulin, opioids, and anticoagulants, were reported in 40.9% (n = 291) of events. Professional organizations, healthcare facilities, and professional schools can help reduce the risk of student-involved errors by implementing key strategies, including incorporation of didactic and experiential medication safety content into school curricula and on-site training programs. (Pa Patient Saf Advis 2016 Mar;13[1]:18-23.)

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INTRODUCTION

Nursing, pharmacy, medical, and other healthcare students have a large presence in U.S. hospitals while they engage in clinical experiences to meet the requirements of their professional education and learn the principles of clinical practice. Direct patient-care experiences are vital for students to prepare for the real world.^{1,2} This hands-on experience places them in a position to be involved in errors as well as catch potential or actual errors. Nursing student errors remain largely unreported,³ potentially because of fear of liability.⁴ The literature about nursing student errors focuses predominantly on the student's ability to perform calculations and numeracy skills, rather than a broader range of practical clinical skills.^{1,4} Literature focusing on pharmacy students discusses prevention of medication errors.⁵ There is little information on other healthcare student involvement in medication-related events and even less literature about students preventing errors.

Pennsylvania is home to 85 nursing programs, 7 pharmacy schools, and 7 medical schools.^{6,7,8} Students from these schools, as well as students from other states, will be involved in the medication-use process. Students ranging in experience from first-year healthcare students to students in their final year before graduation will be involved, either directly or indirectly, in the care of patients in Pennsylvania. Pennsylvania Patient Safety Authority analysts have not previously explored the role students play in contributing to and intercepting medication errors reported through the Authority's Pennsylvania Patient Safety Reporting System (PA-PSRS). This analysis identified events that mention the involvement of students, including those that reached the patient, and some in which the student detected the error.

METHODS

Analysts queried the PA-PSRS database for medication errors that occurred from July 2010 through June 2015 that included the word "student" in the narrative. This query yielded 808 event reports. Events that included students but also mentioned that the instructor was involved in an error were included in the analysis. In this context, an instructor is defined as the healthcare professional overseeing the student's work while in the hospital, whether school faculty or an on-site preceptor.⁹ Event reports that mentioned students, but indicated that the student was not involved in the error (e.g., the patient woke up while student was in the room) were excluded, leaving 711 reports for analysis. The medication name, route of administration, patient care area, and harm score, adapted from the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) harm index,¹⁰ were provided by the reporting facility. When a medication-name data field was left blank but the name was provided in the event description, an analyst adjusted the medication name field. The reports were evaluated to determine the factors associated with medication errors involving students. Analysts classified reports by the type of student involved, node of origin, presence of the instructor, and whether the student caught or was involved in the error. Analysts made note of events involving high-alert medications, based on the Institute for Safe Medication Practices (ISMP) List of High-Alert Medications in Acute Care Settings.¹¹

RESULTS

Reports were categorized by harm score; 87.3% (n = 621) of the events reached the patient (harm score = C through I) and only 0.6% (n = 4) of the events resulted in patient harm (harm score = E through F; no events with harm scores G, H, or I were reported; see Figure 1). Overall, 63 unique patient care areas were associated with

Figure 1. Harm Scores for Student-Related Medication Errors, as Reported to the Pennsylvania Patient Safety Authority, July 2010 through June 2015 (N = 711)

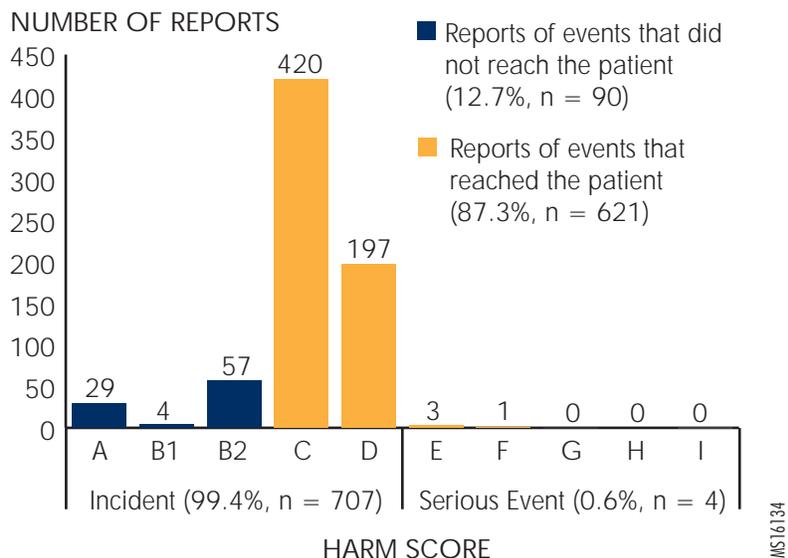


Table 1. Care Areas Most Commonly Reported in Student-related Medication Errors, as Reported to the Pennsylvania Patient Safety Authority, July 2010 through June 2015 (N = 711)

CARE AREA	NO. OF REPORTS	% OF REPORTS
Medical/Surgical unit	203	28.6
Telemetry	87	12.2
Medical unit	48	6.8
Medical/Oncology unit	25	3.5
Emergency department	23	3.2
Orthopedic unit	22	3.1
Medical/Surgical/Oncology unit	20	2.8
Cardiac unit	20	2.8
Pharmacy	19	2.7
Pediatric unit	19	2.7
All other care areas	225	31.6

student-involved events and event reports; the most common areas are shown in Table 1. The most common nodes of origin for the reported events, as identified by the analysts, are shown in Figure 2.

The most common types of events reported by facilities were extra dose (16.6%, n = 118), dose omission (13.2%, n = 94),

wrong time (11.4%, n = 81), wrong dose/overdosage (9.8%, n = 70), and wrong patient (5.9%, n = 42). Following are examples of extra dose, wrong dose/overdosage, and wrong patient event reports:*

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

Student gave medication at 4:30 p.m. (4 p.m. scheduled dose); however, was unaware that the medication was given previously at 3:30 p.m. causing the next dose (due at 10 p.m.) to appear as given as an off schedule dose. Student nurse and instructor relied on paper MAR [medication administration record], which did not reflect medication signed off as given, without checking the computer system to determine if medication had previously been given. Upon further investigation, found students do not have access into the computer system, they work directly under the supervision of their instructor. Physician notified of incident, patient's vital signs assessed, orders reviewed, 10 p.m. dose of medication held. No harm reached the patient.

The nurse was precepting a nursing student. The nurse handed the student a 30-unit insulin syringe. After seeing this syringe, the student indicated that he gave the prior patient the wrong dose using a 100-unit syringe. The student had administered 90 units instead of 9 units. The attending physician was notified; ordered IV [intravenous] fluids with dextrose and hourly finger-stick glucose checks.

Instructor and student nurse administered a dose of Neurontin® [gabapentin] 400 mg to the wrong patient. Attending physician alerted. Per the student nurse and instructor, name band checked.

High-alert medications pose an increased risk of patient harm when involved in medication errors.¹¹ High-alert medications were reported in 40.9% (n = 291) of events. Insulin (33.3%, n = 97), opioids (24.1%, n = 70), and anticoagulants (15.8%, n = 46) were the three most common drug classes involved in events. These three classes represented 73.2% (n = 213 of 291) of all events involving a

high-alert medication (see Figure 3, available exclusively online with this article at [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2016/Mar;13\(1\)/Pages/home.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2016/Mar;13(1)/Pages/home.aspx)) and 30.0% (n = 213 of 711) of all reported events.

More than two-thirds (69.8%, n = 496) of reported events occurred during peak academic periods – February, March, and April and September, October, and November (see Figure 4).

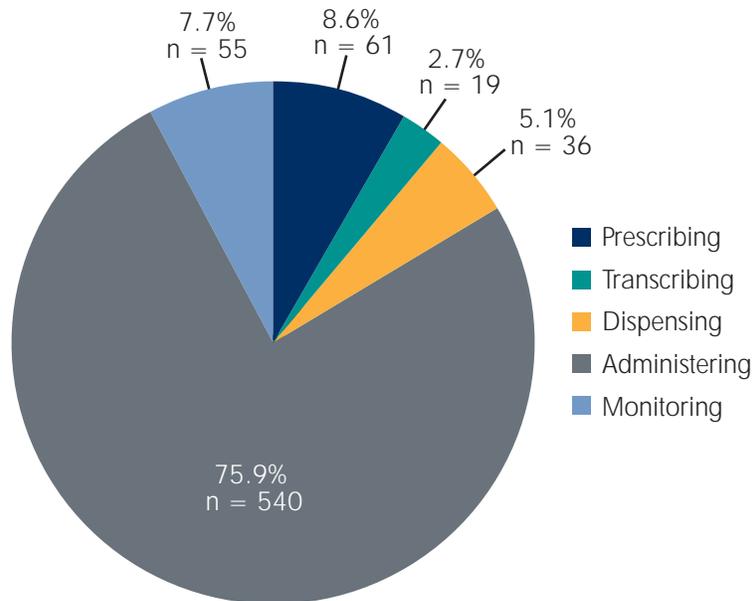
The majority of students involved in errors were nursing students (see Table 2). Nearly 4% (n = 28) of reports did not involve students, but rather involved instructors. Following are examples of events involving instructors and nursing or pharmacy students:

Nursing instructor removed the wrong patient's medication and tubing from the patient medication bin, and the student nurse scanned the dose [barcode], flushed the syringe pump tubing, and connected the Rocephin® (cefTRIAxone) dose to the IV. Instructor noted the wrong patient name on another medication removed from bin and stopped the Rocephin [infusion]. Syringe pump with wrong tubing was running for approximately two to three minutes at 0.3 mL/min before being stopped and the correct tubing applied. Both patients were receiving same dose of Rocephin.

One Percocet® [oxyCODONE and acetaminophen] tablet was given to the wrong patient by an unattended nursing student. Physician notified. Medication policy was reviewed with the student nurses.

Primary nurse administered the patient's 10 a.m. medications [and did not complete] computer documentation that this occurred. Student nurse assigned to the patient administered 10 a.m. medications. The patient was confused and unable to

Figure 2. Nodes of the Medication-Use Process in Which Student-Related Medication Errors Originated, as Identified in Events Reported to the Pennsylvania Patient Safety Authority, July 2010 through June 2015 (N = 711)



communicate that she received duplicate medications.

Patient told pharmacy student that she was taking fluticasone nasal spray. Pharmacy student accidentally logged fluticasone as fluticasone 50 mcg inhalation powder instead of the nasal spray. Student was unaware that there is an inhaler and nasal spray both with a 50 mcg strength. Student picked the first 50 mcg product she saw. When the physician reconciled [the patient's medications], because fluticasone inhaler is not a formulary item, the physician chose a therapeutic alternative of Flovent® [fluticasone propionate] 220 mcg/inhalation BID. Pharmacist caught error when she was reviewing medication history for another issue.

Students were involved in the medication error in 79.9% (n = 568 of 711) of the events. When a healthcare professional student was found to have been involved

in the error, the instructor or preceptor was noted to be involved or present 28.9% of the time (n = 164 of 568). In the subset of nursing students, instructors were commonly present when these students were involved in medication errors (92.1%, n = 151 of 164). When a student was found to be involved in the error, the most common node in which the event originated was administration (84.2%, n = 478 of 568) followed by monitoring (8.5%, n = 48). Following are examples of reports of student-involved events:

Patient received medication in error. Medication was ordered for another ED patient. Patient medicated improperly by nursing student working under this RN's supervision.

Nursing student documented giving oxyCODONE but the documentation was not co-signed by the instructor. When this occurs, no one can document medications on that order. There was a delay

Figure 4. Student-Related Medication Error Events by Month, as Reported to the Pennsylvania Patient Safety Authority, July 2010 through June 2015 (N = 711)

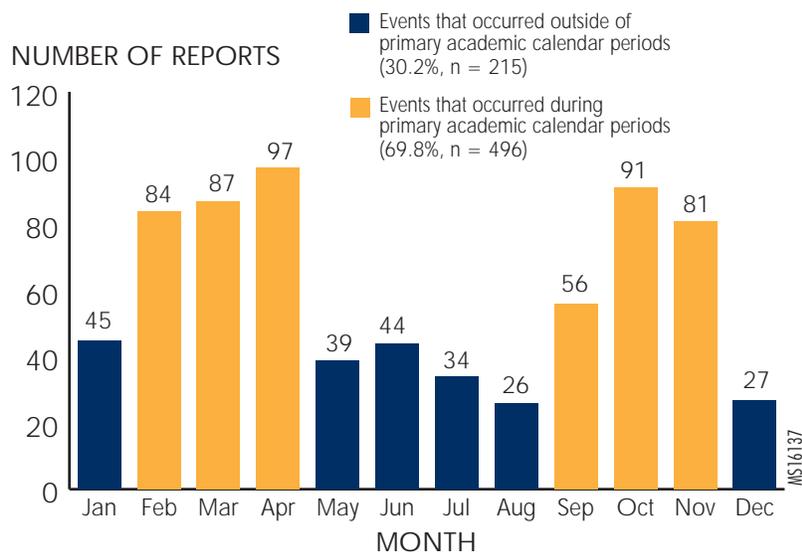


Table 2. Type of Student Identified in Student-related Medication Error Reports, as Reported to the Pennsylvania Patient Safety Authority, July 2010 through June 2015 (N = 711)

TYPE OF STUDENT	NO. OF REPORTS	% OF REPORTS*
Nursing	597	84.0
Pharmacy	44	6.2
Medical	21	3.0
Other students	21	3.0
Not a student (i.e., instructor or preceptor)	28	3.9

*Does not equal 100 because of rounding.

in documenting the next dose of oxyCODONE.

Of note, analysts identified that students caught or discovered the error in 16.2% (n = 115 of 711) of reports. Most errors were caught by nursing students (60.9%, n = 70 of 115), followed by pharmacy students (33.0%, n = 38; see Figure 5, available exclusively online with this article at [http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2016/Mar;13\(1\)/Pages/home.aspx](http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2016/Mar;13(1)/Pages/home.aspx)). Analysts identified that the most common nodes of origin for student-caught errors were prescribing (35.7%, n = 41) and administering (32.2%, n = 37; see Figure 6).

Following are examples of events caught or discovered by students:

MetroNIDAZOLE 500 mg IV q8h order not profiled by pharmacy on the [appropriate] therapy order. Missed order recognized by medical student while pre-rounding on patient. Medical student notified pharmacy of error and MetroNIDAZOLE order was promptly profiled.

Nursing student was preparing to hang meropenem dose and noticed that the wrong patient name and

wrong dose was on the previously administered meropenem dose.

Patient who was on peritoneal dialysis was started on enoxaparin 30 mg q12. The pharmacy reviewed and approved this dose. A pharmacy student was on the team and identified the dosing error prior to the patient getting the second dose and therefore the patient received the appropriate amount based on renal status. Patient had no harm.

DISCUSSION

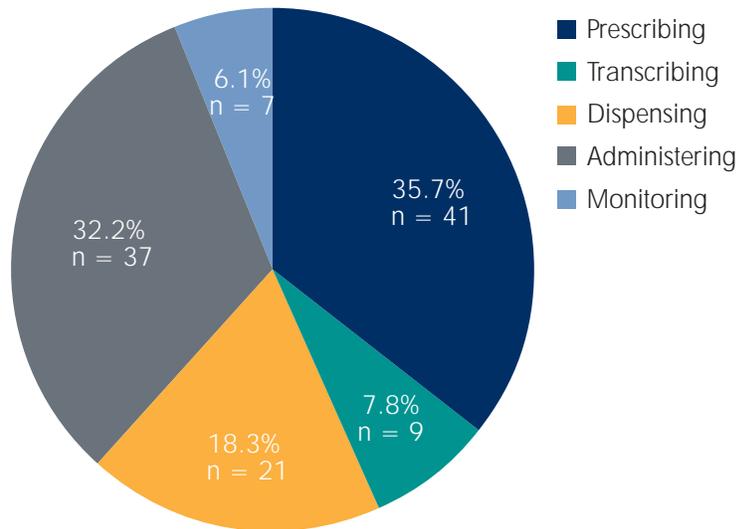
Although healthcare students may not intend to harm a patient, they are sometimes involved in medication errors that require intervention. Reid-Searl et al. validated that almost one-third of nursing students reported involvement in a near miss or actual medication error.³ A study published in 2006 by Wolf et al. examining data reported to MEDMARX®, the U.S. Pharmacopeia's (USP's) medication-error reporting database, found fewer than 3% of errors involving students resulted in patient harm and 2.1% of student nurses' errors resulted in patient harm.⁴ This is similar to the finding herein that 0.6% (n = 4) of reported errors caused patient harm.

The level and depth of a student's experience and academic preparation may play a role in some of the events reported to the Authority. It has been reported that students' inexperience and distractions contribute to medication errors.^{4,12} Students have also reported being inadequately prepared for medication administration.¹³

The number of error reports mentioning students was higher in the months of February, March, and April as well as September, October, and November. These three-month time periods coincide with the academic calendar.

It is standard for healthcare students to be overseen by faculty or preceptors during their clinical experiences.^{2,14} However,

Figure 6. Medication-Use Process Node in Which Student-Caught Medication Errors Originated, as Identified in Reports Submitted to the Pennsylvania Patient Safety Authority, July 2010 through June 2015 (N = 115)



AMST16139

Reid-Searl et al. reported in 2010 that many students do not receive appropriate supervision while performing clinical responsibilities.³ The same study reported that preceptors cannot always be physically present with a student because they supervise multiple students. When the preceptor is with another student, the responsibility of supervision often falls to the staff nurse.³ This responsibility, added to typical patient care responsibilities, may create situations in which direct student supervision may not be realistic. Even though medication errors have occurred when the preceptor is in the room with the student, medication errors are more likely to occur when the proper supervision is not provided.³

Patients who are assigned to student nurses are also assigned to staff nurses; these dual assignments can cause confusion. Communication breakdowns regarding who will administer the prescribed medications, what medications have been administered, and which medications should be held, have resulted in dose omissions and the administration of extra doses. Communication

between students, nursing instructors, and facility staff needs to be planned carefully to ensure a model that considers the safety hazards associated with dual assignments.¹⁵

Numerous additional conditions exist in the hospital setting that may contribute to medication errors involving students. A few include communication and documentation issues, monitoring issues, preparing drugs for multiple patients, and medication administration records (MARs) not referenced.^{12,15-16} Improper or limited access to the electronic health record (EHR) may limit students' ability to read about or document patient-care activities. Inconsistent use of the MAR, whether due to limited access or other reasons, can introduce risk when preparing and administering medications.¹⁵ Because of a lack of experience, knowledge, or guidance, students may not be aware of vital signs or laboratory values that must be checked prior to administering or verifying a medication.

Healthcare students can and do play a role in catching and uncovering medication errors. A retrospective study confirmed

the involvement of pharmacy students in catching errors.⁵ On an internal medicine service, pharmacy students clarified 67% of orders with a medication or dose omission.⁵ In the data set analyzed for this article, analysts identified that students, including nursing, pharmacy, and medical students, caught the error in 16.2% (n = 115 of 711) of reports.

To address students' involvement in medication errors and error prevention, one institution provided students with a "Medication Safety Day." Nursing students received education on causes of medication errors, along with awareness of the numerous contributing factors in such errors.¹⁷ This initiative aimed to raise awareness of causes and risk of medication errors, along with prevention strategies among student nurses.¹⁷

Limitations

The retrospective review of reported errors is limited by the information reported through PA-PSRS, including the event descriptions and explanations. As with all reporting systems, the type and number of reports collected depend on the degree to which facility reporting is accurate and complete. The reporting cultures and patterns in each facility, and their interpretations of what occurrences are reportable, can lead to reporting variations.

RISK REDUCTION STRATEGIES

Professional organizations, healthcare facilities, and professional schools can strive to identify system-based causes of errors involving healthcare students and instructors and implement effective types of risk-reduction strategies to prevent harm to patients. Consider the strategies described below, which are based on a review of current literature, events reported to the Authority, and observations from ISMP.

- Ensure students participating in the medication-use process are appropriately supervised by faculty or preceptors during their clinical

rotations.^{3,4} This includes having the instructor or preceptor present at the bedside during the time of medication administration.

- Verbally confirm actions of medication administration in presence of instructor or preceptor.
- Ensure that staff complete documentation in a timely fashion if students are involved in patient care. Provide students with the ability to review and document medication-administration information in the paper or electronic MAR.¹⁵
- Share the facility's list of high-alert drugs and associated error-reduction strategies with instructors and students to ensure the same level of attention to safe systems and practices occurs when students handle these drugs.¹⁵

- Incorporate medication safety throughout student curriculums.^{4,12} Employ both didactic and experiential methodologies.

- Design healthcare professional education programs to include multidisciplinary clinical simulation training before clinical rotations to develop the ability to work in teams and reduce medication errors.^{3,4,18}
- Establish an orientation and training process for students and faculty. Include a review of relevant electronic systems (e.g., EHR, barcode scanning, automated dispensing cabinets). Also include review of the location (e.g., patient care area) where they will be involved in the medication-use process.⁴
- Establish a non-punitive reporting culture to encourage discussion of

error-prone conditions with students and preceptors.^{4,15}

CONCLUSION

To develop their clinical reasoning abilities, students engage in experiential training in U.S. hospitals.⁴ Students not only learn how to care for patients and operate as a member of a team, but often enrich the patient's experience during hospitalization.¹⁵ Any participation in the medication-use process places students in a position to be involved in medication errors, as well as a position from which to identify potential or actual errors.⁵ Professional organizations, healthcare facilities, and professional schools should work collaboratively to address factors that may contribute to errors involving students (and instructors) while maximizing the students' ability to intercept and prevent errors.

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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 health-care 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:*

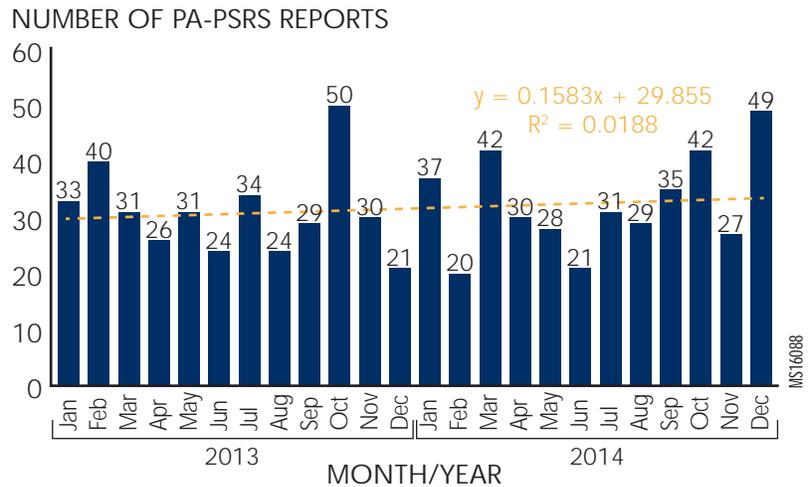
Nurse was in the patient room without gloves and isolation gown. Asked her if she knew that the patient was in isolation. She stated that yes, but she wasn't touching the patient.

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

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

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



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.



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.

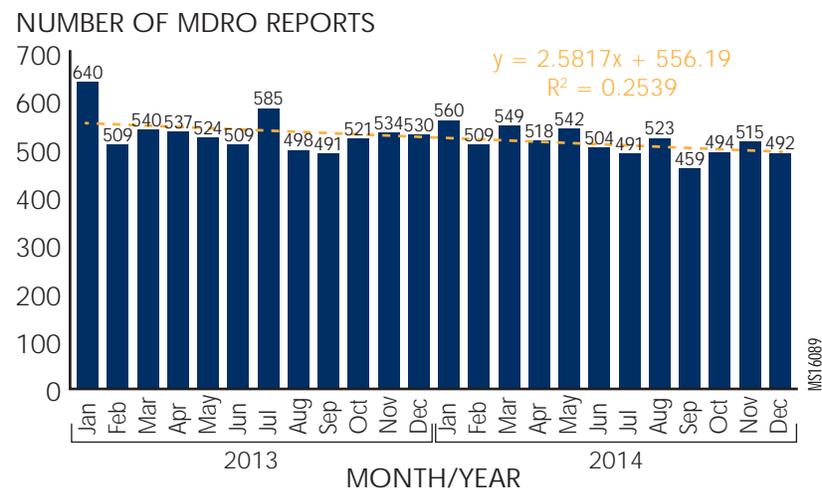
Isolation-Precautions Awareness

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



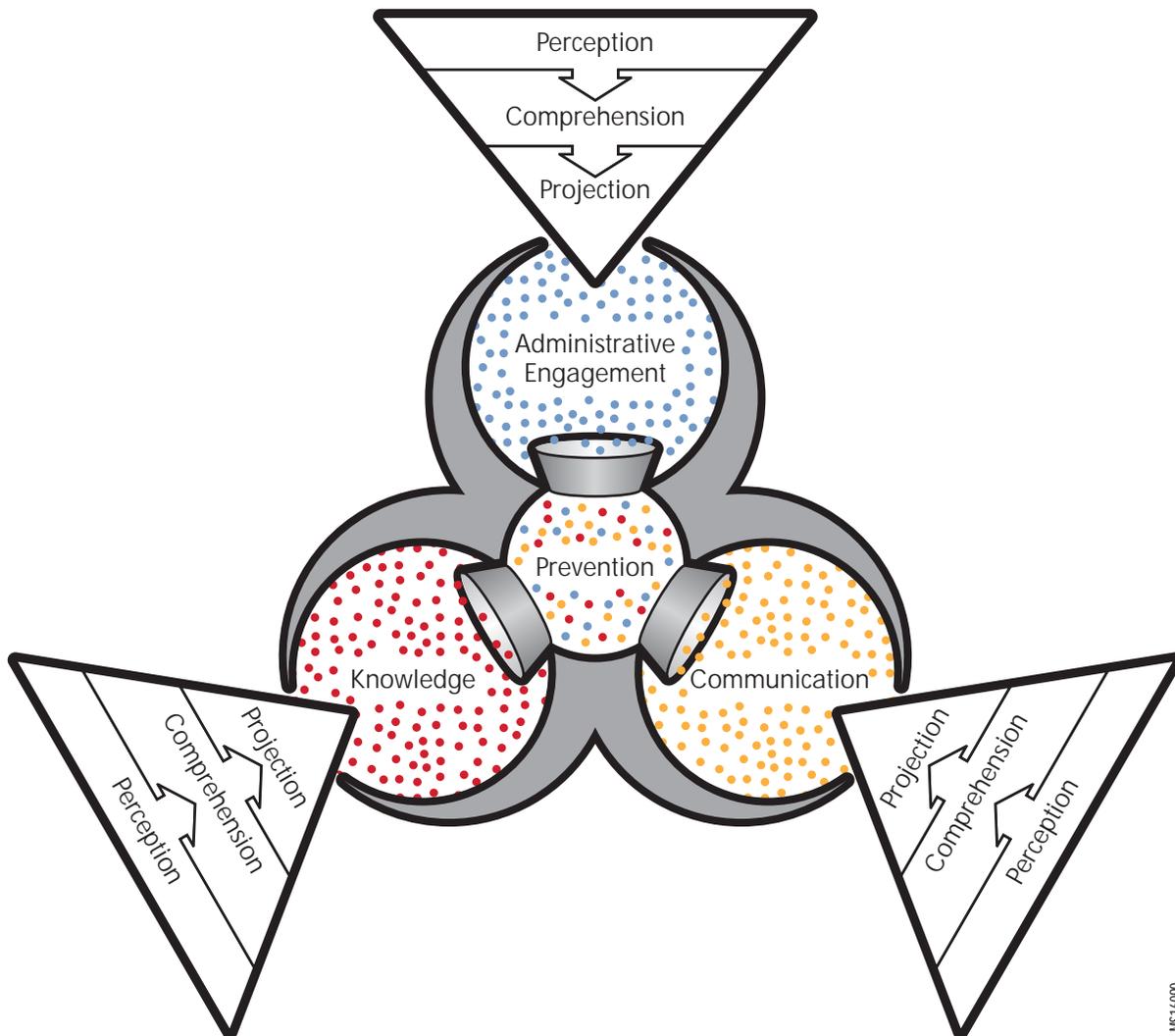
isolation precautions. Considerations may include financial planning for day-to-day isolation precautions and screening activities, disaster preparedness planning, human resources management, and noncompliant or disruptive behavior interventions.

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



MS16090



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.

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Decline in Serious Events and Wrong-Drug Reports Involving Opioids in Pennsylvania Facilities

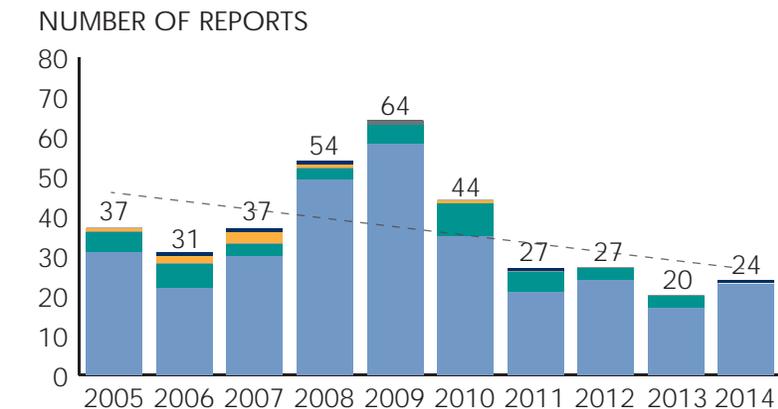
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As a class of high-alert medications, opioids bear a heightened risk of causing significant patient harm when used in error.¹ Errors with opioids have led to serious adverse events, including allergic reactions, failure to control pain, oversedation, respiratory depression, seizures, and death.² According to data from various error reporting programs, opioids—particularly morphine, HYDROmorphine, and fentaNYL—are among the high-alert medications that most frequently cause patient harm.^{3,5}

Similarity in drug names or the mistaken belief that HYDROmorphine is the generic name for morphine have led to inadvertent mix-ups between morphine and HYDROmorphine.⁶ In 2007, analysis of 8,400 wrong-drug events reported through the Pennsylvania Patient Safety Reporting System (PA-PSRS) showed that mix-ups between morphine and HYDROmorphine outnumbered all other medication-pair errors.⁷ In 2010, analysis of reports involving HYDROmorphine found that 70% involved mix-ups with morphine.⁸ When errors occur with these two medications and the same milligram dose is given (e.g., HYDROmorphine 2.5 mg IV given instead of morphine 2.5 mg IV), the potential for harm exists because 1 mg of HYDROmorphine is roughly equivalent to 7 mg of morphine. So, in this example, 2.5 mg of parenteral HYDROmorphine would be equal to about 17.5 mg of parenteral morphine.

In 2015, Truven Health Analytics (on behalf of the Agency for Healthcare Research and Quality) asked the Pennsylvania Patient Safety Authority about trends in events involving opioids evident in the PA-PSRS database. Authority analysts queried the PA-PSRS database for medication errors that included any opioid as the medication prescribed or administered. The query of reports submitted from January 2005 through December

Figure 1. Reports of Serious Events Involving Opioids Reported to the Pennsylvania Patient Safety Authority, January 2005 through December 2014 (N = 365)



Harm Score

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
E	31	22	30	49	58	35	21	24	17	23
F	5	6	3	3	5	8	5	3	3	0
G	0	0	0	0	1	0	0	0	0	0
H	1	2	3	1	0	1	0	0	0	0
I	0	1	1	1	0	0	1	0	0	1

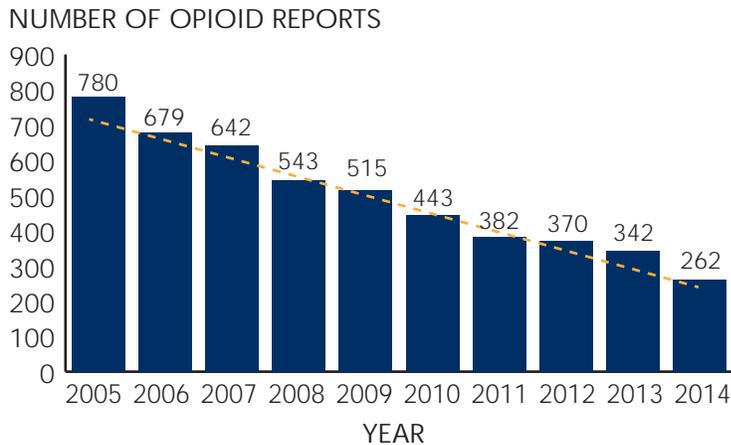
COUNT OF REPORTS AND YEAR

MS16114



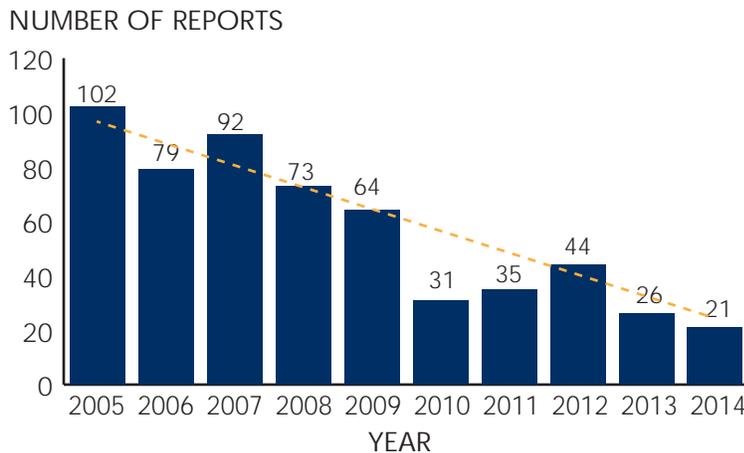
Scan this code with your mobile device's QR reader to access the Authority's toolkit on this topic.

Figure 2. Reports of Wrong-Drug Events Involving Opioids Reported to the Pennsylvania Patient Safety Authority, January 2005 through December 2014 (N = 4,958)



MS16112

Figure 3. Reports of Wrong-Drug Events that Mentioned HYDROMorphine and Morphine in the Same Report to the Pennsylvania Patient Safety Authority, January 2005 through December 2014 (N = 567)



MS16113

2014 identified 41,727 events. Facilities reported 0.9 % (n = 365) of these events as Serious Events, with a downward trend following a peak in 2009 (Figure 1).

Of the 41,727 events involving opioids, 11.9% (n = 4,958) were reported as wrong-drug events. From 2005 through 2014, there was a 66.4% reduction in the number of opioid wrong-drug events reported (Figure 2), and a 79.4% reduction in the number of wrong-drug events involving mix-ups between morphine and HYDROMorphine (Figure 3).

Since 2007, the Authority has published eight articles on opioid safety. From 2012 through 2014, the Authority coordinated the Pennsylvania Hospital Engagement Network’s adverse drug event project, which aimed to reduce and prevent harm related to opioid use. These efforts generated tools for facilities to improve the safe use of opioids. Please visit the Authority’s website (<http://patient-safetyauthority.org/EducationalTools/PatientSafetyTools/opioids/Pages/home.aspx>) for the full suite of information and tools, including the following:

- *Pennsylvania Patient Safety Advisory* articles based on analysis of opioid-related events submitted to the Authority
- An opioid-knowledge assessment tool that can be used to assess the general knowledge of opioids for practitioners who prescribe, dispense, or administer opioid products
- An opioid-assessment tool, designed to assess the safety of opioid practices in a facility and identify opportunities for improvement

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The Forgotten Tourniquet—An Update

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A tourniquet was inadvertently left on the patient's arm after phlebotomy, and the patient subsequently developed deep vein thrombosis in that arm.

*The patient had a regional anesthesia block prior to surgery on the arm. The patient was discharged a day later and returned to the hospital complaining of pain and numbness of the fingers. A tourniquet was found under the operative bandages. Once the tourniquet was removed, the patient's symptoms improved.**

INTRODUCTION

Challenges persist in ensuring the removal of tourniquets after procedures such as peripheral intravenous (IV) insertion, phlebotomy, and extremity surgery. The Pennsylvania Patient Safety Authority addressed this topic in *Pennsylvania Patient Safety Advisory* articles published in June 2005 and September 2010.^{1,2} Pennsylvania facilities continue to report these events through the Authority's Pennsylvania Patient Safety Reporting System (PA-PSRS), with varying degrees of harm to patients. With health-care's adoption of high-reliability strategies and safety behaviors (e.g., paying attention to detail) including patient-engagement initiatives, new techniques can be employed to help avoid such events.

METHODS

Analysts queried the PA-PSRS database for events occurring between January 1, 2012, and December 31, 2014, that contained the keyword and derivations of "tourniquet" reported under the following event types:

- Equipment, supplies, or devices
- Error related to a procedure, treatment, or test
- Complication of a procedure, treatment, or test
- Transfusion
- Skin integrity
- Other and miscellaneous

From this group of event types, the terms "IV," "IV start," "phlebotomy," and "blood draw" were used to analyze these reports. The three-year time frame was chosen to ensure an adequate sample size. Prolonged intraoperative tourniquet time and tourniquets intentionally left on the patient (e.g., temporary vascular control) were excluded from the sample.

A report was classified as an IV insertion in instances in which the narrative mentioned both IV insertion and phlebotomy as the precursor event or when tourniquets were left on after accessing dialysis catheters.

Events without enough detail to distinguish between IV insertion and phlebotomy were classified as "phlebotomy" (inferred) if, in the report, the event subtype "laboratory test problem" was selected, and as "IV start" (inferred) if the event subtype "IV site complication (phlebitis, bruising, infiltration)" or "extravasation of drug or radiologic contrast" was selected, regardless of the care area selected.

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

RESULTS

Classification

The query identified 1,448 events; review of report details determined that 369 were not applicable to IV insertion, phlebotomy, or surgical procedures, leaving 1,079 reports for further analysis (Figure 1).

Patient Age

The majority of patients, 61.8% (n = 667), were age 65 years or older; 35.6% (n = 384) were age 19 to 64; and 2.6% (n = 28) were age 0 to 18.

Duration

The duration of the tourniquet application was identified in 19.3% (n = 208) of the 1,079 events (Figure 2). The longest duration reported was 24 hours.

Harm

The majority of events, 99.5% (n = 1,074), were classified as Incidents and 0.5% (n = 5) as Serious Events. Of the five Serious Events, 80% (n = 4) were related to IV insertion or phlebotomy and 20% (n = 1) was related to regional anesthesia. Patient harm as described in the Serious Event narratives included limb paresthesia, weakness, pain, swelling, and deep vein thrombosis.

Event Discovery

Event reports indicate that the majority of events, 77.6% (n = 837) of the 1,079, were discovered by staff. The remaining 22.4% (n=242) events were accounted for as follows:

- Unidentified 10.6% (n = 114)
- Patient or family 10.1% (n = 109)
- Physician 1.5% (n = 16)
- Other (e.g., another facility) 0.3% (n = 3)

Contributing Factors

Contributing factors were mentioned in 9.5% (n = 103) of the 1,079 event narratives and are not mutually exclusive

Figure 1. Tourniquet Events by Procedure Classification Reported to the Pennsylvania Patient Safety Authority, January 2012 through December 2014 (N = 1,079)

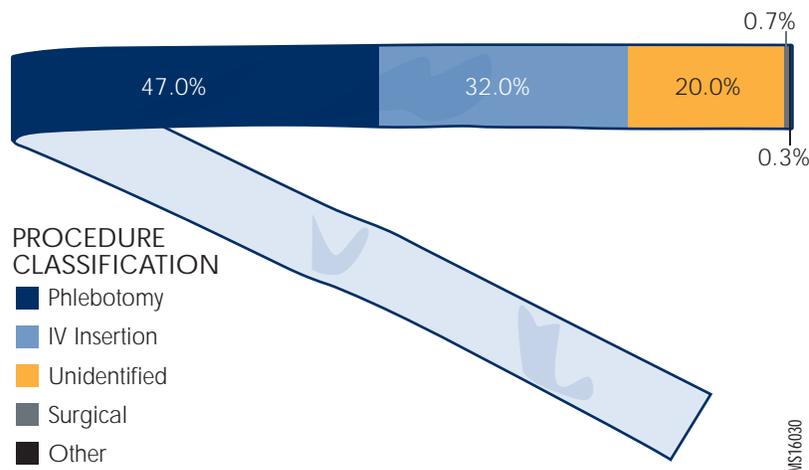
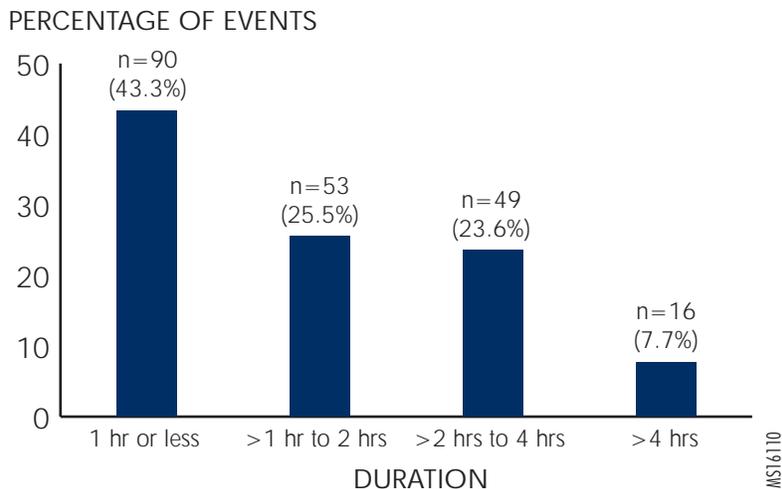


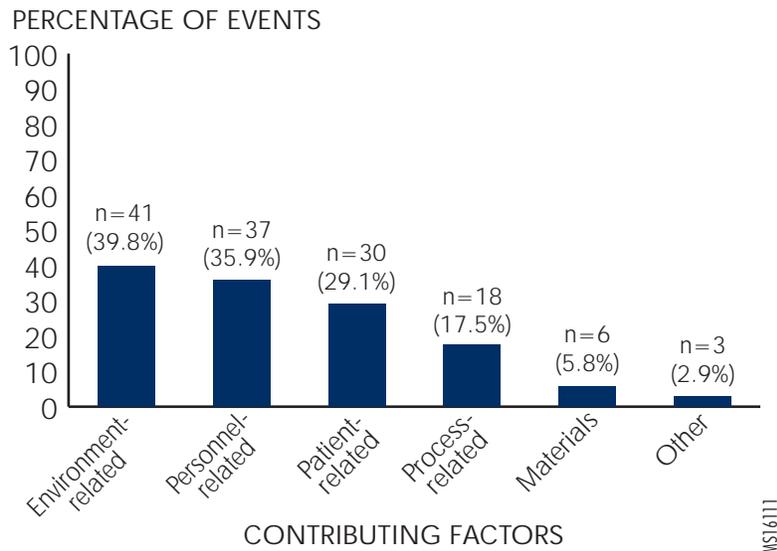
Figure 2. Tourniquet Duration Identified in Event Narratives Reported to the Pennsylvania Patient Safety Authority, January 2012 through December 2014 (N = 208)



(Figure 3). Analysts grouped like factors as follows:

- Environment-related (e.g., tourniquets found under gowns, drapes, blood pressure cuffs, restraints)
- Personnel-related (e.g., tourniquets applied by a clinician other than nurses or phlebotomists, such as physicians, IV team, students, orientees, contractors, multiple team members; and factors affecting performance such as distraction)
- Patient-related (e.g., limb paralysis, neuropathy, unconsciousness, dementia, conditions requiring dialysis, non-English speaking, nonverbal)

Figure 3. Contributing Factors Indicated within Tourniquet Event Narratives as Reported to the Pennsylvania Patient Safety Authority, January 2012 through December 2014 (N = 103)



Note: Data are not mutually exclusive.

- Process-related (e.g., using an alternative site such as the foot, ankle, or wrist)
- Materials-related (e.g., using an alternative material as a tourniquet such as a glove or blood pressure cuff)

DISCUSSION

Healthcare personnel are responsible for removing the tourniquet after IV insertion, phlebotomy, and anesthesia blocks are complete. Challenges persist in ensuring tourniquet removal and patients have experienced varying degrees of harm as a result.

Understanding the characteristics of forgotten tourniquets can be used as a risk assessment strategy for preventing forgotten tourniquet events.

RISK REDUCTION STRATEGIES

The Veterans Health Administration provides a list of recommendations intended to reduce the incidence of tourniquet-related events, including standardizing blood draw schedules, minimizing distractions, using checklists, and establishing

processes to ensure the tourniquet is released.³ The Infusion Nurses Society suggests two strategies:

1. Promote “an awareness campaign and have care settings be held accountable by tracking outcomes” as part of a quality improvement initiative and
2. Establish a “competency validation process” for staff that includes direct observation.⁴

Terry Baldridge, PBT(ASCP), phlebotomy supervisor at Nazareth Hospital in Philadelphia, stresses the importance of “paying attention to tourniquet time” (i.e., the duration of time the tourniquet remains tightened on the extremity), because time of more than 60 seconds affects laboratory results.^{5,6} Attending to tourniquet time *may* be more important than the successful IV insertion or phlebotomy and may help staff remember to remove the tourniquet. A staff phlebotomist at a free-standing laboratory agreed that in her practice the “most important thing” is to remove the tourniquet before

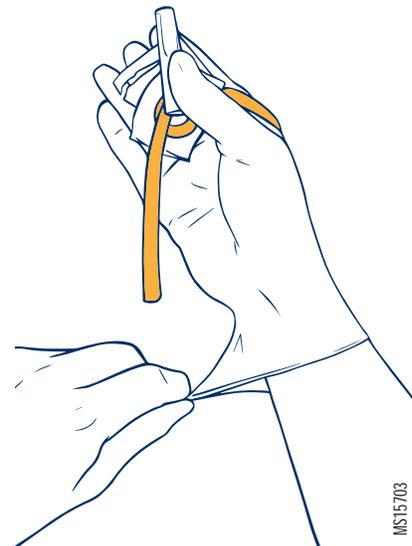
60 seconds regardless of outcome, thus ensuring the tourniquet is removed.⁷

Baldridge identified an additional key step in the phlebotomy procedure process that can be adapted to the IV insertion process: establish a standard location and disposal process for the phlebotomy equipment and debris. A process could be as follows: staff will remove the tourniquet as soon as blood starts to flow and upon completion of the procedure; hold the needle cap, alcohol wipe, and tourniquet in the gloved hand; pull the glove down over the debris and discard all of these components together.⁵ (See Figure 4 for an illustration of the process, or view a step-by-step video online with this article.) The needle or sheathed needle is discarded in a sharps container. At this point a final visual verification is made to ensure that the tourniquet has been removed. Baldridge performs random direct observations on staff to ensure ongoing competency with the phlebotomy procedure.⁵

Safety Behaviors

Paying attention to detail when performing a task can lead to a successful

Figure 4. Appropriate Discard Process



outcome. The safety behavior technique: stop, think, act, review (STAR) is designed to assist staff to do just that.⁸ Jennersville Regional Hospital, in West Grove, Pennsylvania, uses STAR to help reduce the incidence of tourniquets being left on patients after IV insertion and phlebotomy. According to Karen Stark, RN, BSN, director of risk management and patient safety officer, Jennersville practices high reliability and safety management through a collection of safety strategies: *support the team, ask questions, focus on the task, and communicate effectively.*⁹

In support of the *focus on the task* strategy, the STAR safety behavior is taught and practiced by all staff, and Stark said, “STAR is going through your head before you perform the task. You *stop*, almost like a time out, you *think* of the entire process ahead of time, *act* to perform the phlebotomy or IV start, and then *review* the task and process – do I have all of my materials?”⁸

Patient Engagement

Engaging patients in their care and treatment can lead to better outcomes.¹⁰ The PA-PSRS events showed two factors related to patient engagement:

- Patients may not always be aware that a tourniquet has been left on or they may assume that it was left in place intentionally.
- Patients and family members who discovered the tourniquet notified or questioned staff.

Some patients and families could be involved in IV insertion and phlebotomy procedures. Staff could inform the patient or family member that the tourniquet placement is temporary and as a safety measure, involve them in the removal step. Staff may encourage the patient and family member to always ask questions, not just when something seems incorrect. According to Christine Foore, MS, CPHQ, director of patient experience at Wellspan York Hospital, in York, Pennsylvania, “It’s not about remembering to take the tourniquet off, it’s about the culture; how do we engage patients in their care to make them feel free to speak up in the first place?”¹¹

CONCLUSION

Previously published strategies to reduce the incidence of tourniquet-related events remain applicable today.³ Since the Authority first reported on tourniquet events and prevention strategies in 2005 and 2010, Pennsylvania hospitals continue to report events in which a tourniquet is left on a patient after procedures such as IV insertion, phlebotomy, and extremity surgery.

Forgotten tourniquet events reported through the Authority’s PA-PSRS from 2012 through 2014 are more likely to happen to elderly patients, occur after phlebotomy, and involve sites hidden by a gown sleeve, drape, or blood pressure cuff. Forgotten tourniquets generally have not caused harm to the patient, have been left in place for an hour or less, and have been discovered by staff. Facilities may find this information helpful when developing their own risk assessment and mitigation strategies to prevent forgotten tourniquet events.

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Authority-Recognized Healthcare Providers are Committed to Patient Safety



*Michael C. Doering, MBA
Executive Director
Pennsylvania Patient Safety Authority*

INTRODUCTION

The Pennsylvania Patient Safety Authority's annual I Am Patient Safety contest promotes individuals and groups within Pennsylvania's healthcare facilities who have demonstrated an exceptional commitment to patient safety. The contest gives patient safety officers an opportunity to promote progress being made within their facilities to improve patient safety. As one of the judges for the competition, I am consistently encouraged by the attention individuals and groups give to patient safety throughout Pennsylvania.

This year we had more than 170 nominations, nearly twice as many as last year. Each year the judging becomes more challenging, but it remains inspirational to see all of the good work being done. The judging panel, comprised of Authority board members and management staff, evaluated submissions using the following criteria: the person or group (1) had a discernible impact on patient safety for one or many patients, (2) demonstrated a personal commitment to patient safety, and (3) demonstrated that a strong patient safety culture is present in the facility. The panel paid additional consideration to submissions that demonstrated initiative taken by an individual.

Winners' photos and patient safety efforts are highlighted on posters that can be displayed within their facilities in time for Patient Safety Awareness Week, March 13 to 19, 2016. They also received a certificate and an I Am Patient Safety recognition pin from the Authority. Winners were invited to attend the March 2016 Patient Safety Authority Board of Directors meeting and a luncheon to meet Authority board members and staff.

I want to thank everyone who participated in the contest. This year those who nominated an individual or group, but did not receive their own poster, received I Am Patient Safety posters in recognition of their efforts.

The next round of nominations begins May 2, 2016; please continue to nominate individuals or groups you think should be recognized for their patient safety efforts. The Authority board members and I appreciate the time taken for you to tell us what your colleagues are doing to improve patient safety in Pennsylvania.

I AM PATIENT SAFETY: 2016 WINNERS

The individuals and groups recognized for the I Am Patient Safety poster contest and their achievements are listed in alphabetical order by name of facility.*

Tania Hoyer, RN, BSN, CCRN-CSC

**Clinical Educator, Intensive Care Unit (ICU), Cardiovascular Intensive Care Unit (CVICU), Interventional Cardiology Unit (IVU), and Post Anesthesia Care Unit (PACU)
Doylestown Hospital**

As a Clinical Educator, Tania coordinated a comprehensive unit safety program to implement decreased sedation and early mobility protocols. Working with ICU nurses, respiratory therapists, and physical therapists, Tania helped ICU patients be more alert and more mobile without more restraints and without more adverse events (e.g., falls). Tania's efforts also helped the nursing culture shift from one in which all ICU patients were "too sick" to get out of bed to a culture of mobilizing all patients, as appropriate based on their medical condition. In the nonsurgical patient population, the average time on a ventilator decreased from 4.2 days to 3.5 days. In November 2013, the baseline ICU length of stay (LOS) in this same population averaged 5.6 days; in January 2015, the average LOS decreased to 3.8 days.

Brenda Prabhakar, RN

Emergency Department, Doylestown Hospital

As a nurse in the emergency department (ED), Brenda focused on reviewing each case to allow early detection of the septic (infection) state, proper collection of blood cultures,



*Scan this code
with your mobile
device's QR reader
to view all 2016
winners.*

* Any included numbers and/or results were provided for publication by the recognized healthcare facilities. The Pennsylvania Patient Safety Authority has not confirmed, and bears no responsibility or liability for, these numbers and/or results.

aggressive administration of intravenous fluids, routine ordering of lactate-level tests, and administration of clinically appropriate antibiotics. With her findings, Brenda educates clinical staff with best practices to improve patient outcomes and plans to expand education to include staff in Emergency Medical Services.

Mashiul Chowdhury, MD
Chief of Infectious Diseases, Director of Infection Control and Antibiotic Stewardship Program
Cancer Treatment Centers of America® (CTCA) at Eastern Regional Medical Center
As Chief of Infectious Diseases, Dr. Chowdhury developed and launched guidelines for surgical antibiotic prophylaxis, post-splenectomy vaccination, appropriate pneumococcal vaccination, and antibiotic prophylaxis and vaccination for patients undergoing stem cell transplants. He also improved the turnaround time for receiving all culture results and led a multidisciplinary Ebola task force. Dr. Chowdhury is described by a colleague as “singularly focused on achieving the best possible outcome for the patient. He has succeeded in bringing the principles of clinical medicine, antibiotic stewardship, and infection prevention together to meet this objective.”

Anne Gennaria, RN, BSN
Diagnostic Testing Nurse
Suzanne Popowicz, BSN
Einstein Medical Center Montgomery
Anne and Suzanne recognize the importance of positive patient identification and always take the time to follow the appropriate process for identifying patients in the surgical/procedural areas. Their commitment and diligence in adhering to this important procedure prevents wrong-site surgeries.

Tony Wise
Environmental Services
Einstein Medical Center Montgomery
As a member of the environmental services team, Tony stands out as someone willing to step outside his comfort zone to keep patients safe. Tony was buffing hospital floors with his “Zamboni-like” machine. As he was passing one of the rooms, a bed alarm began to ring and he

noticed an elderly patient trying to get up. Tony immediately stopped his machine and went to talk to the patient. He asked the patient to stay in bed until the nurse responded soon after. All agreed Tony’s quick thinking and engagement of the patient in a conversation helped to keep the patient safe from a fall. When he was later thanked for his quick action, Tony said, “That is what we do. We are here to help our patients and keep them safe.”

Dorothy Borton, RN, BSN, CIC
Infection Prevention Manager
Einstein Medical Center Philadelphia
Einstein Medical Center Elkins Park
MossRehab and Willowcrest
As Infection Prevention Manager, Dorothy (Dottie) focused on decreasing surgical site infections (SSIs) associated with hip and knee arthroplasty. When an increase in SSIs was identified, Dottie developed interventions within the facility that included establishing a multidisciplinary team from all areas across the continuum of care. She led the team to develop an electronic SSI database that was used as an audit tool to monitor process measures of surgical-site bundle. Dottie worked closely with the SSI team and joined the Surgical Unit Safety Initiative collaborative to address cultural and teamwork issues. The interventions resulted in fewer SSIs associated with hip and knee arthroplasty, from 2.85% (CY 2013) to 1.12% (CY 2014).

Tammie Moritz, PA-C
Surgical Physician Assistant
Forbes Hospital
Allegheny Health Network
A patient was scheduled to have surgery on the left side of her neck to prevent a stroke. Upon chart review and discussion with the patient, who was slightly confused, there was a question as to which side of the neck was to be operated on. As a surgical physician assistant, Tammie initiated a “hard stop” at this point and pulled the patient’s records so the surgeon could review them. It was discovered that the patient should have surgery on the right side of her neck to prevent a stroke, not the left.

Bonnie Morris, RN, MSN
Oncology Manager
Guthrie Robert Packer Hospital
Bonnie understands how important hand hygiene is to prevent healthcare-associated infections (HAIs), especially when caring for cancer patients. When an automated hand hygiene monitoring system showed below-average compliance levels within the unit, Bonnie encouraged the staff to do better. She posted monthly results of staff progress in meeting their goals of better hand hygiene. Using Halloween and football themes to encourage progress, Bonnie and the staff celebrated success at every turn. Today the unit boasts a consistent compliance rate of more than twice the national average. The unit had zero central line-associated bloodstream infections (CLABSIs) and zero catheter-associated urinary tract infections (CAUTIs) in 2015.

George Miller, RPh
Clinical Pharmacy Manager
Jeanes Hospital
As a Clinical Pharmacy Manager, George worked closely with physician leadership, nursing staff, and the hospital pharmacy and therapeutics committee to develop protocols to improve the efficiency of anticoagulant therapy and other medications. Because of George’s efforts, the protocols have resulted in an 80% reduction of adverse events related to warfarin. As a member of Jeanes Hospital Patient Safety Committee, George actively works with staff to reduce medication safety events by partnering with them, not blaming them. He also encourages staff to engage and is accessible at all times.

Adebola Onanuga, RN
Medical Surgery Geriatric
Lehigh Valley Hospital – Cedar Crest
A surgeon placed orders for an insulin drip for a patient being prepared for surgery. Adebola questioned the order because the patient did not have a history of diabetes. After reviewing the patient’s lab work, she discovered the patient’s glucose level was high. The notes also showed the patient was receiving glucose through IV fluids. Adebola tested the patient’s glucose level. She notified the surgeon of



the different readings. It was suspected the bloodwork performed in the morning may have been collected near the IV where the glucose was being infused into the patient, thereby causing a false reading for high glucose. The surgeon ordered another glucose test to confirm Adebola's findings, and it showed the patient's glucose level was normal, not elevated. The surgeon discontinued the insulin drip.

Lee Ann Hollingsworth
Patient Care Technician, Preadmission Testing Unit
Pennsylvania Hospital of the University of Pennsylvania

As a Patient Care Technician, Lee Ann works in the preadmission testing unit, where patients receive preoperative testing prior to surgery. While performing a routine electrocardiogram (EKG) on a patient scheduled for surgery, Lee Ann noticed an abnormal reading indicating a heart attack. The patient was scheduled for surgery unrelated to anything cardiovascular, and he told Lee Ann he felt fine. Lee Ann remained calm and tested the patient several more times. All of the EKGs read abnormal as well, and even though the patient said he felt fine and resisted going to the emergency room (ER), Lee Ann called ahead to the ER and assured the patient he would be taken right away. She even called his wife and together they encouraged him to allow Lee Ann to call 911. The patient was admitted to the hospital and had heart surgery the next morning.

Rachel Benensky, RN
Med/Surg Telemetry
Phoenixville Hospital

As an RN, Rachel received instruction from the off-going RN that the physician for a patient, who had just undergone a complex urological surgical procedure, verbally ordered that the patient be discontinued from his suprapubic tube. Rachel questioned the appropriateness of this order and whether this was in the scope of practice for an RN. Rachel called the physician to verify the order and receive clarification. The physician stated he wanted the patient's urinary bladder

catheter removed, not the suprapubic catheter, which would have compromised the patient's recovery. The next day, Rachel also reported her experience to the facility's Safety Huddle so that all staff could learn from the incident.

Jodi Cheeks, RN
Unit Coordinator
Kimberley DiBlassio, RN
Med/Surg Telemetry
Phoenixville Hospital

When a patient was admitted to the facility with uncontrollable hiccups, Kim questioned the medication prescribed to the patient because it was not the type of medication she knew to be prescribed for hiccups. When pharmacy staff was not readily available, she contacted her unit coordinator, Jodi, to ask if she had known of the medication being prescribed for hiccups. Jodi did not. The pharmacy staff checked with the physician and confirmed it was the wrong medication for the patient. The patient was given the correct medication. The information concerning the look-alike, sound-alike drug was shared with the facility's Safety Huddle as a "good catch."

Madonna Nowak, RN
Operating Room (OR)
Phoenixville Hospital

A patient who sustained a broken hip was admitted to the hospital for surgery. During preoperative testing, the patient was found to have a positive blood culture, which was reported directly to the ordering physician. At the same time, the patient was transported to the preoperative holding area and assessed by the surgeon and anesthesiologist. Upon completing patient identification, consent, and other assessments per hospital policy, the patient was moved to the OR suite to be prepared for surgery. Madonna, the circulating nurse that day, reviewed the patient's medical-record data and discovered the positive blood culture results. Recognizing the clinical significance and potential safety issue, she immediately notified the surgeon. He had not been notified of the positive blood culture results. The surgery

was postponed until the patient received treatment for the infection.

Lauren Bailey, Registered Dietitian
Becky Bryson, Dietary Hostess
Sally Loyd, Dietary Hostess
Julie Spickler, Dietary Hostess
Harrisburg Hospital – Pinnacle Health System

As members of the dietary staff, Lauren, Becky, Sally, and Julie have used their simulated falls prevention education to change the culture where they work. Each has taken ownership of falls prevention on the nursing units and fostered positive working relationships with clinical staff. Becky alone has saved at least eight patients from serious harm due to a fall. Whether responding to bed alarms or paying close attention to patients identified as a fall risk, the dietary staff is committed to preventing falls with harm.

Janice Reppert
Environmental Services Manager
St. Luke's University Health Network - Anderson Campus

As the Environmental Services Manager, Janice participates on the hospital's patient safety and quality infection control committees. She offered to be a TeamSTEPPS™ trainer and encouraged many team members to become "secret shoppers" in a program she helped develop to reduce *Clostridium difficile* (*C. diff*) infection among patients at the facility. Janice also coordinates the "bleach cycle" cleaning of all clinical units, with team huddles every day to discuss progress towards or barriers to keeping patients safe. She is always ready to lend a helping hand and does bedside environmental services rounds with patients to get feedback on hospital cleanliness.

CONCLUSION

Thank you, again, to all who participated in the I Am Patient Safety poster recognition contest, and join me in congratulating the individuals recognized for their efforts to improve patient safety in Pennsylvania's healthcare facilities. We applaud your commitment to patient safety.

More than Complicated, Healthcare Delivery is Complex, Adaptive, and Evolving

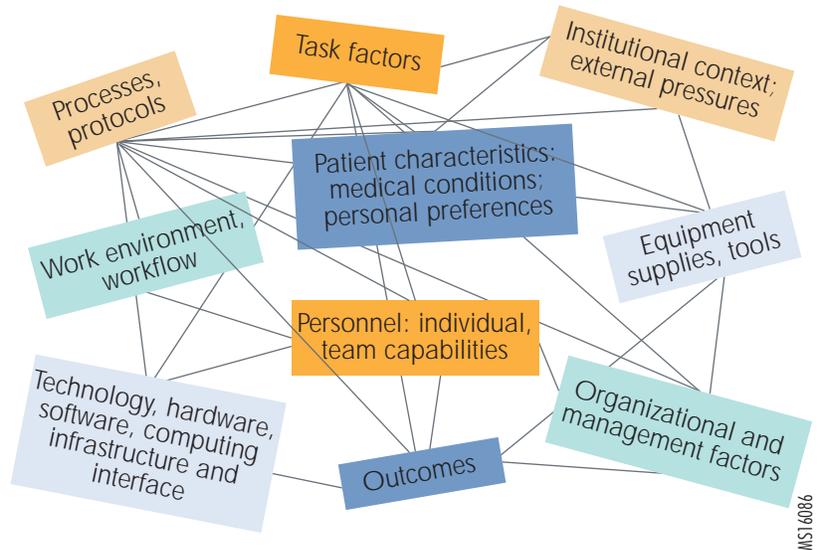
Ellen S. Deutsch, MD, MS, FACS, FAAP, CPPS
 Editor, Pennsylvania Patient Safety Advisory
 Medical Director, Pennsylvania Patient Safety Authority

Although great progress has been made¹, many challenges remain² as we strive to provide the safest and best healthcare for our patients. Why has this quest been so challenging?

It may help to recognize that healthcare delivery is not just complicated, it is a *complex adaptive system* that evolves over time.^{3,4} At the “person” level, complex adaptive systems include networks of agents—such as patients, healthcare providers, support personnel, and administrators—who constantly act and who interact with each other.^{3,4} Because their actions are interconnected, the actions of one agent change the context for other agents, so relationships and circumstances are dynamic and fluid.^{3,5} Agents, as individuals or as members of teams, may act in unpredictable ways.^{4,5} Interactions in healthcare delivery at the person level further intersect with multiple interactions at additional levels. Patients and care providers interface within the context of collaborations among the entire care team, the healthcare division or unit, the department, and the organization. These interactions are further influenced by, and, in turn, influence, the regional and national healthcare delivery systems, which includes payers and regulators, as well as community or societal desires and expectations. Expectations are affected by the evolution of resources and abilities. Motivations, incentives, rewards, and penalties are influenced at all levels. Consistent with the properties of complex adaptive systems, control is dispersed and decentralized.^{3,4,6}

Traditional processes, such as root cause analysis or the 5 Whys and Ishikawa diagrams,⁷ often seek to dissect and deconstruct events to understand, and potentially improve, each of the components of successful outcomes. Conventional reductionist scientific thinking assumes that we will eventually figure it all out and resolve all the unresolved issues; complexity theory is comfortable with and even values the inherent tension between different parts of the system.^{4,5} Although it is important to ensure that each component of the healthcare delivery system functions well, it is also important to

Figure. Components of Socio-Technical Healthcare Systems



Compilation of socio-technical models adapted from Vincent, Taylor-Adams and Stanhope⁹; Carayon et al.¹⁰; Harrison, Koppel and Bar-Lev¹¹; and Sittig and Singh.¹²

understand that each healthcare decision, each intervention, and each interaction occurs within a larger context.

Systems thinking may help to bridge the gap between analysis of the deconstructed parts of a system and synthesis of the parts into a complex whole greater than the sum of its parts.⁸ The constructs of *socio-technical systems*, in particular, can be used to negotiate the interplay between the parts and the whole. Several authors have described socio-technical systems and identified components that interact and impact healthcare delivery. The general concepts of healthcare socio-technical

systems are viewed through lenses that overlap but are not identical. The Figure presents a multi-faceted compilation of models developed by Vincent, Carayon, and Harrison and their respective colleagues and Sittig and Singh,^{9,12} that demonstrates the potential for innumerable multi-directional interactions. Healthcare delivery socio-technical systems in Pennsylvania incorporate multiple diverse interactions between patients and providers, technology and tasks, and organizations and the larger healthcare-delivery environment. Social, technical, and other factors influence each other as well as impacting patient care.¹⁰

A dynamic tension exists between analyzing and optimizing each component of a complex adaptive socio-technical system and understanding that properties such as safety, which emerge from the synthesis of these components, are not completely understandable or predictable. Individuals, or organizations, prioritize their improvement efforts by their needs, goals, and resources. The inherent paradoxes are inevitable and challenging but also offer opportunities for creative problem solving and advances as we strive to provide the safest and best healthcare possible for our patients.

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Join your fellow healthcare providers in funneling patient safety research and resources directly into hands of facility leaders, patient safety committee members, healthcare providers, and other patient safety-minded individuals. Visit the Pennsylvania Patient Safety Authority's website to:



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THE PENNSYLVANIA PATIENT SAFETY AUTHORITY AND ITS CONTRACTORS

The Pennsylvania Patient Safety Authority is an independent state agency created by Act 13 of 2002, the Medical Care Availability and Reduction of Error (MCARE) Act. Consistent with Act 13, ECRI Institute, as contractor for the Authority, is issuing this publication to advise medical facilities of immediate changes that can be instituted to reduce Serious Events and Incidents. For more information about the Pennsylvania Patient Safety Authority, see the Authority's website at <http://www.patientsafetyauthority.org>.



ECRI Institute, a nonprofit organization, dedicates itself to bringing the discipline of applied scientific research in healthcare to uncover the best approaches to improving patient care. As pioneers in this science for nearly 50 years, ECRI Institute marries experience and independence with the objectivity of evidence-based research. More than 5,000 healthcare organizations worldwide rely on ECRI Institute's expertise in patient safety improvement, risk and quality management, and healthcare processes, devices, procedures, and drug technology.



The Institute for Safe Medication Practices (ISMP) is an independent, nonprofit organization dedicated solely to medication error prevention and safe medication use. ISMP provides recommendations for the safe use of medications to the healthcare community, including healthcare professionals, government agencies, accrediting organizations, and consumers. ISMP's efforts are built on a nonpunitive approach and systems-based solutions.