



# PENNSYLVANIA PATIENT SAFETY ADVISORY

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## About the Pennsylvania Patient Safety Advisory

### 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 those in which urgent communication of information could have a significant impact on patient outcomes.

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## Neuromuscular Blocking Agents: Reducing Associated Wrong-Drug Errors

### ABSTRACT

*Neuromuscular blocking agents (NMBAs) are commonly used to paralyze skeletal muscles during surgery conducted under general anesthesia and for patients requiring intubation for airway management. These medications are used in emergency departments, intensive care units, interventional radiology areas, and even medical and surgical units. NMBAs render patients unable to move or breathe and are considered high-alert drugs because misuse can lead to catastrophic injuries or death, especially when administered to patients who are not properly ventilated. Between June 2004 and March 2009, Pennsylvania healthcare facilities submitted 154 event reports that mentioned medication errors involving the use of NMBAs. Analysis reveals that the most common medication error event types associated with this class of medications were wrong-drug errors (37%) followed by wrong-dose/overdosage errors (16.2%). Further analysis showed that 47.4% of the intended medications were not NMBAs, including cases in which the patient was harmed. Strategies to address these problems include limiting access to NMBAs, segregating NMBAs from other medications, sequestering and affixing warning labels to vials of NMBAs stocked in the pharmacy, and requiring independent double checks before dispensing and administering NMBAs. (Pa Patient Saf Advis 2009 Dec;6[4]:109-14.)*

Neuromuscular blocking agents (NMBAs) are commonly used to relax skeletal muscles during surgery conducted under general anesthesia. These agents are also used in emergency departments (EDs), intensive care units (ICUs), interventional radiology areas, and even medical and surgical units for patients requiring intubation for airway management.<sup>1</sup>

NMBAs produce their effect at the neuromuscular junction by interacting with acetylcholine either by depolarizing the motor end plate or by competing with acetylcholine for binding sites on the motor end plate. This interaction prevents motor transmission, which then prevents patient movement. After a patient is administered a dose of NMBA, progressive paralysis develops, initially affecting the smaller muscle groups (e.g., face, hands). Paralysis then progresses to the medium to large muscles (e.g., mouth, extremities, torso) until all the muscle groups are paralyzed and respiration ceases. It is crucial for healthcare practitioners to remember that NMBAs *do not* affect a patient's level of consciousness, pain, or anxiety. These medications simply render the patient unable to move or breathe.<sup>2</sup> NMBAs are considered high-alert drugs because misuse can lead to catastrophic injuries or death, especially when they are erroneously

given to patients who are not properly ventilated. Therefore, this class of medications should only be administered by staff with experience in maintaining an adequate airway and respiratory support in facilities where intubation can readily be performed, oxygen can be administered, and respiratory support can be provided.

Due to the potentially devastating effects from the misadministration of NMBAs, clinical analysts reviewed medication error reports submitted to the Pennsylvania Patient Safety Authority in which an NMBA was listed as the medication prescribed or medication administered, as well as medication error reports in which an NMBA was mentioned in the description of the event.

### A Look at the Numbers

Pennsylvania healthcare facilities submitted 154 event reports through the Authority's reporting system from June 2004 to June 8, 2009, that mentioned medication errors involving the use of NMBAs. Further breakdown by harm score, which is adapted from the National Coordinating Council for Medication Error Reporting and Prevention harm index,<sup>3</sup> shows that 77.9% (n = 120) of the events reached the patient (harm index = C to I) and 9.1% (n = 14) of the events were indicated by the facility as resulting in harm to the patient (see Table 1), which is nearly 13 times greater when compared to *all* medication errors reported to the Authority (0.7%) in that time period. A review of medication errors submitted to the U.S. Pharmacopeia MedMarx® program in 2006 shows that 51% (n = 332) of errors reached the patient (categories C to I), and 9.4% (n = 61) resulted in some level of patient harm (categories E to I).<sup>1</sup>

Analysis of the reported ages of the patient involved in medication errors with NMBAs reveals that more than 17% (n = 27) of the reports involved pediatric patients (see Table 2). The care areas most often cited in these reports include the ED (13.6%, n = 21) and the operating room (OR) (12.3%, n = 19). (See Table 3.)

The predominant medication error event types associated with this class of medications (see Table 4) were wrong-drug errors (37%, n = 57) followed by wrong-dose/overdosage errors (16.2%, n = 25). A 2006 MedMarx study that looked at 599 MEDMARX records involving NMBAs in which at least 1 type of error was identified, with a total of 648 types of errors selected (more than 1 type of error was involved in some cases), showed that "improper dose/quantity" (28.2%) followed by "unauthorized/wrong drug" (27.7%) were the most common types of errors involving the use of NMBAs.<sup>1</sup>

**Table 1. Reports Involving Neuromuscular Blocking Agents Grouped by Harm Score (N = 154)**

HARM SCORE	TOTAL	% OF TOTAL REPORTS (N = 154)
A. Circumstances that could cause adverse events.	7	4.6%
B. An event occurred, but it did not reach the individual.	27	17.5%
C. An event occurred that reached the individual but did not cause harm.	55	35.7%
D. An event occurred that required monitoring to confirm that it resulted in no harm.	51	33.1%
E. An event occurred that contributed to or resulted in temporary harm and required treatment or intervention.	11	7.1%
F. An event occurred that contributed to or resulted in temporary harm and required initial or prolonged hospitalization.	2	1.3%
G. An event occurred that contributed to or resulted in permanent harm.	0	0%
H. An event occurred that resulted in a near-death event.	1	0.7%
I. An event occurred that contributed to or resulted in death.	0	0%

**Wrong-Drug Errors Involving NMBA**

Analysis of Authority reports focused on the predominant event type for this class of medication, as well as potentially the most devastating: wrong-drug errors. If an NMBA is given in error to a patient who is not intubated, the respiratory muscles may be paralyzed, potentially leading to serious harm or death. Analysis of the medications reported in the “prescribed medication” field (i.e., the intended medication the patient was to receive) showed that 47.4% (n = 27) of the intended medications were *not* NMBA and included a variety of medications. There were six cases in which the NMBA vecuronium was administered instead of the intended antibiotic cefazolin; all of these cases resulted in harm to the patient. Table 5 lists the intended (i.e., prescribed) medications involved in wrong-drug reports. It is important to note that 80.7% of the wrong-drug errors reached the patient (n = 46) and 22.8% (n = 13) resulted in harm to the patient. When looking at *all* wrong-drug medication errors during the reporting period under analysis, 64% (14,070 reports of 21,826 wrong-drug errors) reached patients, but only 0.93% (202 reports of 21,826 wrong-drug errors) resulted in harm.

Wrong-drug medication errors reported to the Authority include the following:

*A patient was admitted for a planned surgery. While in holding area of the OR prior to surgery, anesthesia staff started an IV [intravenous] infusion and administered what they thought was midazolam [Versed®] 1.6 mg IV. The patient immediately began flailing and reaching up to her face, and she became apneic. Ambu bag ventilation was initiated, and pulse ox was placed and was 90%. The patient was taken to the OR to be ventilated and monitored until patient awoke (approximately five minutes). The patient described being awake and paralyzed with vivid recollection.*

*A trauma patient was admitted to the ED. The ED physician was planning to intubate the patient, and the nurse brought in the requested medications for the intubation [midazolam, fentanyl, and succinylcholine]. The succinylcholine had been drawn up in a syringe and labeled. The physician decided not to intubate. An order was given to the nurse to give fentanyl for pain. The nurse picked up the syringe and administered 1 mL when she realized it was succinylcholine. The physician was in attendance and intubated the patient. The patient would have been intubated prior to flight. Intubation occurred earlier than planned.*

In the literature, other cases appear in which NMBA have been inadvertently administered to patients who were not receiving proper ventilatory assistance. While some of those errors have occurred in the OR, most have taken place in EDs, interventional radiology departments, ICUs, and other medical, surgical, and psychiatric units.<sup>4</sup>

**Contributing Factors to Wrong-Drug Errors**

Many wrong-drug errors can be attributed to one or more common contributing factors.

**Unsafe storage.** Unsafe, unnecessary, and unexpected availability of NMBA contribute to drug mix-ups. In some cases, patient care area refrigerators have been inadvertently stocked with NMBA. In other reports, vials of NMBA have been placed into adjacent or, at times, the wrong storage areas (i.e., anesthesia kits, automated dispensing cabinets [ADCs]) where the drug was previously not stocked. An example of a storage-related event reported to the Authority is as follows:

*A patient had a cesarean section and a healthy baby was delivered. The physician ordered IV Ancef® 2 gm prior to closing. The CRNA [certified nurse anesthetist] obtained [and administered] the medication*

from the anesthesia kit that he thought was Ancef, but the patient developed respiratory insufficiency and the CRNA noted that he had administered vecuronium not Ancef. The CRNA attempted to reverse the medication two times and was unsuccessful. The patient was then given anesthesia to enable intubation. The patient was sent to the ICU for recovery and monitoring.

In 2002, the Institute for Safe Medication Practices (ISMP) published a case in which atracurium was administered subcutaneously instead of hepatitis B vaccine to seven infants.<sup>5</sup> The infants developed respiratory distress within 30 minutes. Five infants recovered, one sustained permanent injury, and another died. NMBAs had never been available as part of the floor stock in the nursery. For convenience, an anesthesiologist from a nearby OR had placed the vial of atracurium in the unit refrigerator near vaccine vials of similar appearance.

According to the 2006 MedMarx report, a physician removed vials of midazolam and rocuronium from a medication cart in the OR, labeled two empty syringes with the respective drug names, and was interrupted while drawing up the two different drugs into the syringes.<sup>1</sup> When he returned, he administered the content of one of the syringes to his patient in the preoperative holding area. Shortly after, the physician was called away to answer a page. On his return, he found the patient unresponsive. The patient was resuscitated, given neostigmine to reverse the respiratory paralysis, intubated, and administered oxygen. It was later determined that the physician had administered the syringe containing rocuronium instead of the intended midazolam.

**Similar product labeling and packaging.** Vials of NMBAs have been confused with look-alike vials of products (e.g., normal saline, heparin, vaccines), especially when both are stored in the refrigerator. One example involving similar manufacturer labeling, as well as storage issues, submitted to the Authority is as follows:

*A patient was scheduled for an open reduction internal fixation for a fracture of the left hand. The patient had sedation and nerve block of the extremity. One gram of Ancef was ordered prior to start of surgery. After the Ancef was administered by the CRNA, the patient said he felt short of breath. The anesthesiologist came into the room at the time that the patient complained of being short of breath. The patient was immediately ventilated, anesthetized, and intubated. The surgery procedure was completed, and the patient was extubated and taken to the postanesthesia care unit with no sequelae. After the surgery was completed, a review of the trash and needle box led the anesthesiologist and the CRNA to believe that vecuronium (which was located next to Ancef in anesthesia cart) had been administered rather than Ancef (both require reconstituting and are similar shape vials).*

**Table 2. Patient Age Groups Associated with Reports Involving Neuromuscular Blocking Agents (N = 154)**

AGE GROUP	TOTAL	% OF TOTAL REPORTS (N = 154)
Younger than 17	27	17.5%
17 to 64	80	52%
65 or older	35	22.7%
Unknown	12	7.8%

**Table 3. Predominant Care Areas Involved in Medication Errors Involving Neuromuscular Blocking Agents (n = 120)**

UNIT	TOTAL	% OF TOTAL REPORTS (N = 154)
Emergency department	21	13.6%
Operating room	19	12.3%
Pediatric intensive care unit (ICU)	15	9.7%
Anesthesia	15	9.7%
Pharmacy	10	6.5%
Medical/surgical ICU	9	5.8%
Medical ICU	9	5.8%
Neonatal ICU	8	5.2%
Cardiac ICU	8	5.2%
Surgical ICU	6	3.9%

Other cases have been reported in the literature. For example, a number of nurses mistakenly reconstituted measles and Bacillus Calmette-Guérin vaccines with pancuronium, instead of sodium chloride, and administered the vaccines to healthy infants. One infant died after experiencing seizures and respiratory arrest. The pancuronium vial looked very similar to a vial of the correct diluent (i.e., sodium chloride injection).<sup>6</sup>

In another example, an ED nurse administered pancuronium instead of influenza vaccine to several patients. The vials were the same size, and the labels were quite similar. The look-alike vials had been stored next to each other in the refrigerator. The patients experienced dyspnea and respiratory depression but, fortunately, sustained no permanent injuries.<sup>7</sup>

**Look-alike drug names.** Wrong-drug errors have occurred due to similarities in the drug names. Reports submitted to the Authority include the following:

*Narcan® 0.5 mg was ordered, and the nurse prepared Norcuron®, which was caught and not given. In follow-up to the event, labels were placed on the medication drawers indicting both the generic and brand name.*

Norcuron 10 mg was ordered verbally. The first nurse asked another nurse to obtain the medication from the automated dispensing cabinet. The second nurse repeated back “Narcan 10 mg” and the first nurse stated, “yes.” The second nurse handed 5 x 2 mg syringes to the first nurse. Narcan was given by the first nurse.

**Table 4. Predominant Medication Error Event Types Associated with Neuromuscular Blocking Agents (n = 120)**

EVENT TYPE	NUMBER	% OF TOTAL REPORTS (N = 154)
Wrong drug	57	37%
Wrong dose/overdosage	25	16.2%
Prescription/refill delayed	7	4.5%
Wrong technique	6	3.9%
Extra dose	6	3.9%
Other	19	12.3%

**Table 5. Intended (Prescribed) Medications Involved in Wrong-Drug Medication Error Reports (n = 57)**

MEDICATIONS PRESCRIBED	TOTAL	% OF WRONG-DRUG ERRORS (n = 57)
Vecuronium (Norcuron®)*	7	12.3%
Neostigmine (Prostigmin®)*	7	12.3%
Succinylcholine (Anectine®; Quelicin®)*	6	10.5%
Cefazolin (Ancef®)	6	10.5%
Midazolam (Versed®)	5	8.8%
Phenylephrine (Neo-Synephrine®)	4	7%
Rocuronium (Zemuron®)*	3	5.3%
Cisatracurium (Nimbex®)*	3	5.3%
Fentanyl	3	5.3%
Pancuronium Bromide®*	2	3.5%
Etomidate (Amidate®)	2	3.5%
Propofol (Diprivan®)	2	3.5%
Diltiazem (Cardizem®)	1	1.8%
Glycopyrrolate	1	1.8%
Naloxone (Narcan®)	1	1.8%
Mivacurium (Mivacron®)*	1	1.8%
Acetazolamide	1	1.8%
Norepinephrine (Levophed®)	1	1.8%
No drug listed	1	1.8%

\* Medications that are neuromuscular blocking agents

Similar cases have been reported to ISMP involving mix-ups between the proprietary names Narcan (naloxone) and Norcuron (vecuronium). In one case, a pharmacist misheard a verbal order and dispensed the NMBA Norcuron when the opioid antagonist Narcan 1 mg IV was ordered. The patient experienced respiratory arrest and required intubation. In another case, a nurse transcribed a verbal order for Narcan as “1 amp Narcan,” but a pharmacist misread the handwritten transcription as “1 amp Norcuron.” When Norcuron was dispensed, another nurse thought Norcuron was the generic name for Narcan and administered it to the patient, who immediately stopped breathing. The patient was successfully resuscitated. In the third case, a physician wrote “Narcan 1 amp IV.” An ICU nurse tried to obtain the drug from an automated dispensing module where drugs were listed by their generic names. She confused Narcan with Norcuron. She asked a colleague, “What is the generic name for Norcuron?” When her coworker said vecuronium, she removed the NMBA from the cabinet and gave the patient an unknown quantity from the 10 mg vial. The patient experienced respiratory and cardiac arrest but was resuscitated, placed on mechanical ventilation, and transferred to the ICU.<sup>8</sup>

In an example involving look-alike generic drug names, a physician prescribed vancomycin 1.5 g IV every 12 hours for a patient, which the nurse transcribed correctly onto the medication administration record. However, the pharmacist misread the faxed copy of the handwritten order and entered vecuronium into the pharmacy computer. A technician prepared the 1.5 g dose in 250 mL using 15 vials (100 mg/10 mL) of vecuronium. The checking pharmacist did not recognize the error, so the bag was dispensed to the unit. Fortunately, the technician had affixed a vivid alert sticker stating, “Neuromuscular blocker, patient must be intubated” to the bag, which the nurse noticed, thereby averting a serious medication error.<sup>6</sup>

**Unlabeled syringes.** NMBAs have been accidentally administered when syringes containing the drug were either unlabeled or mislabeled. Although Pennsylvania facilities have not submitted reports specifically mentioning unlabeled syringes with NMBAs to the Authority, one example of a mislabeled syringe is as follows:

*The anesthesiologist thought he was administering Versed. The syringe had a label that indicated it was Versed. There was a second label underneath that indicated it was rocuronium. The patient was unable to speak for three to five minutes, and the anesthesiologist recognized that the wrong drug was given to the patient. This was reversed and the patient responded without any problem*

One example of an unlabeled-syringe-related error reported in the literature occurred in an ED. Commercially prefilled saline flush syringes were not available, so nurses prepared a supply of syringes

each day from multidose vials. Vecuronium had been prepared for a trauma patient in the ED, but it was not used. The syringe was not labeled and was inadvertently placed with the saline flush syringes. The syringe containing vecuronium was later used to flush the IV line of an alert three-year-old child. The child became flaccid, and respiratory efforts ceased. She was quickly intubated and ventilated, so permanent harm was averted.<sup>9</sup>

### Risk Reduction Strategies

To reduce the risk of harm from NMBA, consider multiple strategies, including both high- (e.g., limiting access to NMBA) and low-leverage (e.g., increasing awareness) strategies. These strategies include the following (listed high to low):<sup>1,4,10</sup>

**Limit access.** Based on the results of the 2004 ISMP Medication Safety Self-Assessment, NMBA were available as floor stock outside the OR in 80% of participating hospitals; 59% of respondents said that when available outside the OR, these drugs were not sequestered from other floor stock items or labeled with auxiliary warnings.<sup>6</sup> When possible, dispense NMBA from the pharmacy as prescribed for patients. Allow floor stock of these agents only in the OR, ED, and critical care units where patients can be properly ventilated and monitored.

**Segregate storage.** When NMBA must be available as floor stock, have pharmacy assemble the vials in a distinct, sealed box with warnings affixed as noted below. Sequester the boxes in both refrigerated and nonrefrigerated locations.

**Warning labels.** Affix fluorescent red labels that note: “Warning: Paralyzing Agent—Causes Respiratory Arrest” on each vial, syringe, bag, and storage box of NMBA.

**Safeguard storage in the pharmacy.** Sequester and affix warning labels to vials of NMBA stocked in the pharmacy. Be sure they do not obscure the vial label in any way.

**Standardize prescribing.** Include the need for ventilation support during and after administration as well as a protocol that stipulates automatic discontinuation of these agents after extubation and removal from a ventilator. Never accept orders to continue medications upon patient transfer.

**Computer reminders.** Build alerts in the pharmacy computer to verify the patient’s location when NMBA are entered. If the patient is not in a critical care unit, ED, OR, or invasive procedure area, question the order and verify ventilatory assistance before dispensing the drug. If possible, establish computerized crosschecking of the patient’s location when entering NMBA. Cautionary messages should also appear on ADC screens when applicable. Consider a pop-up box that asks, “Is the patient being ventilated?”

**Redundancies.** Consider an independent double check of these medications before dispensing and

administering. Ensure the medication is checked against the original order.

**Supervision during initial administration.** Require bedside attendance of a licensed practitioner who has experience with intubation and airway management during initial administration of an NMBA.

**Prompt removal of discontinued products.** Place vials, bags, and syringes of NMBA in a sequestered bin for immediate pharmacy pickup after the patient has been extubated or the drug has been discontinued.

**Increase awareness.** Educate staff about the risk of serious errors with these high-alert drugs. Provide staff with a list of both generic and brand names for all NMBA available at the facility.

**Communication of orders.** Always refer to NMBA as “paralyzing agents” rather than muscle relaxants. Orders should not be written “prn for agitation” but more specifically as part of an intubation procedure or to maintain a specific level of paralysis while the patient is on a ventilator only.

### Notes

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## Self-Assessment Questions

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

1. All of the following are true about neuromuscular blocking agents (NMBAs) EXCEPT:
  - a. They are commonly used to relax skeletal muscles during surgery conducted under general anesthesia.
  - b. They can be given to patients who are not properly ventilated.
  - c. They should only be administered by staff with experience in maintaining an adequate airway and respiratory support.
  - d. They are often used in emergency departments, intensive care units, and interventional radiology areas.
  - e. They interact with acetylcholine to prevent motor transmission, which then prevents patient movement.
2. The most commonly reported type of medication error event types associated with NMBAs are \_\_\_\_\_.
  - a. wrong-technique errors
  - b. extra-dose errors
  - c. wrong-drug errors
  - d. wrong-dose/overdosage errors
  - e. prescription/refill delayed errors
3. Wrong-drug errors associated with the use of NMBAs can be attributed to all of the following factors EXCEPT:
  - a. Patient care area refrigerators stocked with NMBAs
  - b. Confusion with look-alike vials
  - c. Similarities in the drug names (i.e., look-alike drug names)
  - d. Syringes containing the drug were either unlabeled or mislabeled.
4. Which of the following is the most effective strategy to reduce the risk of harm from NMBAs?
  - a. Apply warning labels to vials, syringes, and/or bags of NMBAs.
  - b. Educate staff about the risk of serious errors with NMBAs.
  - c. Conduct independent double checks of NMBAs before dispensing and administering.
  - d. Limit access to NMBAs by *only* storing them in care areas where patients can be properly ventilated and monitored.
  - e. Build alerts in the pharmacy computer to verify the patient's location when NMBAs are entered.
5. A patient had a cesarean section and a healthy baby was delivered. The physician ordered IV Ancef® 2 gm prior to closing. The certified registered nurse anesthetist (CRNA) obtained and administered a medication from the anesthesia kit that he thought was Ancef. The patient developed respiratory insufficiency, and the CRNA noted that he had administered vecuronium, a NMBA, not Ancef.
 

Select the most effective strategy to prevent this event from reoccurring?

  - a. Remove NMBAs from anesthesia kits in the labor and delivery unit.
  - b. Affix fluorescent red labels that note: "Warning: Paralyzing Agent—Causes Respiratory Arrest" on each vial of NMBA.
  - c. Build alerts in the pharmacy computer to verify the patient's location when NMBAs are entered.
  - d. Require an independent double check of NMBAs when retrieving and before administering the medication.
  - e. Educate staff about the risk of serious errors with these NMBAs.

## Does Your Admission Screening Adequately Predict Aspiration Risk?

### ABSTRACT

The National Quality Forum and the Agency for Healthcare Research and Quality identified aspiration risk assessment as a practice to reduce the risk of harm to patients. Pennsylvania healthcare facilities submitted 133 nonanesthesia aspiration event reports to the Pennsylvania Patient Safety Authority from June 2004 through January 2009. Seventy-three (55%) of these event reports indicated that swallowing or aspiration assessments had been completed before the event occurrence. The remaining 60 (45%) reports of nonanesthesia aspiration indicated patients had not received aspiration risk screenings or assessments before the aspirations. Thirty-eight (29%) of the nonanesthesia aspiration reports describe instances in which barriers were identified during aspiration risk screening and as aspiration precautions were implemented. While video fluoroscopic swallow evaluation is considered the “gold standard” for predicting aspiration, aspiration screening of patients on admission can help determine whether a more detailed aspiration assessment and fluoroscopic swallow evaluation are indicated and help to identify dysphagia and patients at risk for aspiration. (Pa Patient Saf Advis 2009 Dec;6[4]:115-21.)

### The Problem

The National Quality Forum and the Agency for Healthcare Research and Quality (AHRQ) identified the aspiration risk evaluation of each patient upon admission and regularly thereafter as a suggested patient care practice.<sup>1</sup> Patients who aspirate are at greater risk of developing serious respiratory complications such as airway obstruction or aspiration pneumonia. Aspiration pneumonia is one of the most common forms of hospital-acquired pneumonia among adults and occurs in 4 to 8 of every 1,000 admitted U.S. patients.<sup>2</sup> Patient conditions that present a high risk for aspiration include stroke or other neurologic impairment that affects swallowing, tracheostomy or endotracheal intubation, advanced age, changes in the oropharyngeal anatomy due to trauma, surgery complications, neoplasm, pneumonia, unexplained weight loss, or even body position.<sup>3</sup> Routine bedside aspiration risk assessments are noninvasive, typically evaluate patient symptoms, and are designed to be administered quickly. Invasive diagnostic procedures such as the fiberoptic endoscopic evaluation of swallowing (FEES) or a videofluoroscopic swallow evaluation (VSE) visualize the anatomy and physiology of a patient’s swallowing and are frequently used when a suspected swallowing disorder has been identified by a routine bedside aspiration screening. Many aspiration risk assessment

tools are already available to assist anesthesia providers with aspiration prescreening criteria for patients receiving anesthesia, but there are few such tools for the newly admitted hospital patient. The benefit of adopting aspiration risk screening tools will provide organizations with the ability to promptly identify those patients who are experiencing dysphagia and may be at risk for aspiration. This screening may also provide healthcare providers with baseline information to complete a more detailed aspiration assessment to assist in the identification and treatment of patients with aspiration, to prevent aspiration events, to provide optimal patient care, and to ensure accurate patient information exchange through all levels of care.

### Pennsylvania Patient Safety Authority Reports

Of the 133 nonanesthesia aspiration Incidents and Serious Events reported to the Pennsylvania Patient Safety Authority’s reporting system from June 2004 through January 2009, 73 (55%) of the events indicated that patients had been assessed for aspiration risk before the nonanesthesia aspiration event. Fifteen (11%) of the aspiration events required transfers to a higher level of care, and 7 (5%) resulted in patient death.

Events that resulted in transfer to higher levels of care include the following:

*The patient began to cough, followed by vomiting, developed worsening respiratory symptoms, and was transferred to the ICU [intensive care unit] with shortness of breath and aspiration.*

*The patient was found with cyanotic face and lips upon entering the room to complete an assessment. The rapid response team was called. The patient began coughing up whole pieces of chicken. The patient was transferred to the ICU.*

*The patient was eating a sandwich and began to choke. Heimlich attempts were unsuccessful. The food particles [were manually] removed, and the patient [was transferred to the ICU] and intubated.*

Events that resulted in patient deaths include the following:

*A patient vomited during the night and [the order to administer the patient nothing by mouth] NPO [was written]. In the morning [the patient was] found unresponsive. Despite aggressive resuscitation [efforts], the patient ceased to breathe. Silent aspiration is considered the cause of death.*

*A patient had moderate to severe dysphagia [following a] stroke. Family [members] brought in solid food, which the patient ate and [immediately began] to*

choke. Despite immediate resuscitation efforts, the patient expired.

*A patient with recent history of stroke was placed on pureed dysphagia diet after nutrition and speech evaluations. After being fed [a meal] by [a family member], the patient became [short of breath]. Suctioning [the patient] produced the [meal] contents. The patient was intubated, transferred to the cardiac care unit, [and died as a result] of aspiration.*

The remaining 60 (45%) reports of nonanesthesia aspiration indicated patients had not received aspiration risk screening or assessments before the aspiration events.

Of the 55% of reports indicating patients had been assessed for aspiration risk before a nonanesthesia aspiration event, analysis identified the following contributing factors:

- Patients received inappropriate nutrition in 28 (38%) of the events, including delivery of incorrect nutrition to patients who were NPO (nothing by mouth), family members who fed patients who were NPO, or missed patient bedside NPO alerts.
- Miscommunication occurred between healthcare providers and departments in the hospital in four (5%) of the events (e.g., NPO notification between patient care areas and the dietary department).
- Medication-related issues were evident in three (4%) of the events, including some patients who received unauthorized medication doses and incidence of staff knowledge deficit (e.g., NPO clarification between prescribers and nurses when patients are NPO except for medications versus exclusively NPO).
- Tubing insertion misplacement issues occurred in three (4%) of the events involving endotracheal, nasogastric, or gastrostomy tubes.

## The Complexity of Swallowing

It is important for healthcare providers to understand the complexity of normal swallowing in order to recognize, identify, and treat patients with swallowing difficulties and aspiration. Furthermore, provider knowledge will assist in prevention efforts, help provide optimal patient care, ensure accurate communication and patient information exchange through all levels of care, and aid in educating patients and family members about abnormal swallowing.

### Normal Swallowing

Normal swallowing is a complicated act that relies on independent cognition, upper extremity mobility, oral mobility, taste, smell, and vision capabilities. It involves more than 26 muscles that control facial, palatal, suprahyoid, and pharyngeal structures, whose actions are coordinated by the cerebellum.<sup>4,5</sup> Normal swallowing also depends on the intact function of the trigeminal, facial, glossopharyngeal, vagus, and hypoglossal cranial nerves.<sup>5</sup> Successful swallowing occurs with the completion of the oral preparatory,

oral propulsive, pharyngeal, and esophageal phases of swallowing.<sup>2,3,4</sup>

Impairment to the oral phase of swallowing may result in difficulty retaining the food or liquid bolus in the oral cavity or chewing or moving the material toward the oropharynx. Associated symptoms with impairment in the oral phase of swallowing may include drooling, pocketing of food in the buccal cavity, poor tongue movement, leakage of food or liquid from the mouth, or difficulty initiating the swallowing process.<sup>5</sup>

The pharyngeal phase of swallowing is under involuntary neuromuscular control and triggers the swallowing reflex as the food or liquid moves with a progressive contraction wave from top to bottom. Impairment to the pharyngeal phase of swallowing can result in the food or liquid material being retained in the oropharynx and overflow aspiration after swallowing. Associated symptoms with impairment in the pharyngeal phase of swallowing include nasal regurgitation, coughing, choking, hoarseness, or food sticking in the throat.<sup>5</sup>

The esophageal phase of swallowing begins after the food or liquid passes through the upper esophageal sphincter.<sup>4,5</sup> Impairment to the esophageal phase of swallowing may result in ineffective movement and retention of the bolus of food or liquid in the esophagus. Associated symptoms with impairment in the esophageal phase of swallowing may include burping, indigestion resulting from esophageal reflux, heartburn, chest pain, or silent aspiration.<sup>5</sup>

Anything that interferes or impairs with any of the normal swallowing phases is defined as dysphagia, which may cause morbidity and mortality.<sup>4</sup>

### Dysphagia

Dysphagia, or difficulty swallowing, may cause problems that range from symptoms of mild throat discomfort to an inability to eat.<sup>6</sup> Dysphagia may be a symptom of one or more underlying pathologies and may include complications related to age, structure, neurologic and neuromuscular impairment, medication side effects, surgery, infections, iatrogenic conditions, and irradiation effects of the head and neck. Fifty percent of adult patients in acute care facilities are reported to experience dysphagia, while 66% of those in long-term care facilities have swallowing difficulties.<sup>7</sup> Dysphagia makes a patient more prone to malnutrition, dehydration, aspiration, aspiration pneumonia, subsequent respiratory failure, and possible death.<sup>8</sup> Normal aging has subtle effects on all four stages of swallowing.<sup>5</sup> Presbyphagia, or normal changes in the swallowing mechanism secondary to aging, compounds the risk for aspiration.<sup>9,10</sup> Aging causes changes in the structure, motility, coordination, and sensitivity of the swallowing process.<sup>5,9,11</sup>

McCullough et al. used an 8-point penetration-aspiration scale incorporating thin liquid, puree, and solid and bolus sizes from 5 mL to 3 ounces in 79 normal adults ranging in age from 21 to 103 years old. This

study found that laryngeal penetration is common for older individuals, often resulting in retained material in the laryngeal vestibule after swallowing, which is consistent with changes in the swallowing physiology that occur with the aging process. Increase in the time to swallow has the potential to create problems, including aspiration. Penetration-aspiration was more common with older participants. Over- or under-managing these changes may present unnecessary restrictions on nutritional intake or negative consequences that affect the quality of life, even though this study provided some data that supports that aspiration in small quantities is normal for some older adults.<sup>11</sup> This makes it even more difficult for healthcare providers to assess aspiration risk for these patients.

Common presenting symptoms of oral or pharyngeal dysphagia include coughing or choking with swallowing, difficulty initiating swallowing, food sticking in the throat, drooling, unexpected weight loss, change in dietary habits, recurrent pneumonia, change in voice or speech, and nasal regurgitation. Signs of esophageal dysphagia include the sensation of food sticking in the chest, oral or pharyngeal regurgitation, food sticking in the throat, drooling, unexpected weight loss, change in dietary habits, and recurrent pneumonia.<sup>4,5,10</sup>

### Aspiration

Aspiration is the passage of food or liquid through the true vocal cords and is often caused by impaired laryngeal closure but may also occur because of the overflow of food or liquids retained in the pharynx. Cervical spine surgery increases aspiration risk by more than 40%.<sup>2</sup> Factors that influence aspiration include quantity, depth (material in the distal airways is more dangerous than aspirating material in the pharynx), physical properties of the aspirate, and pulmonary clearance mechanisms.<sup>4</sup> The bedside swallowing assessment provides the early identification of those patients at greatest risk for dysphagia and aspiration. The VSE is the “gold standard” for predicting aspiration, and aspiration screening of patients on admission can help determine whether a more detailed aspiration assessment and fluoroscopic swallow evaluation are indicated; therefore, an accurate and valid risk assessment tool is vital.<sup>2,4,12</sup> This will help identify dysphagia and patients at risk for aspiration.

Sitoh et al.’s prospective study of 65 geriatric patients used a bedside swallowing assessment that incorporated criteria known to be associated with aspiration risk, including cough upon swallowing, delay in swallowing, and drooling. The study found the simple assessment swallowing protocol was useful in helping to identify patients at risk for swallowing dysfunctions and those at risk for developing chest infections. Fourteen of the 65 patients subsequently contracted hospital-acquired pneumonia; 13 of those had been identified as having swallowing dysfunctions, based on the bedside swallowing assessments. One limitation to the study was the lack of video-fluoroscopic or endoscopic confirmation of aspiration.<sup>13</sup>

Overt aspiration may occur with patients who have dysphagia. Aspiration pneumonia is the second most common healthcare-acquired infection in hospitalized patients.<sup>3,14</sup> Patients with endotracheal tubes have a high risk for aspiration and may also experience prolonged swallowing dysfunction after extubation.<sup>3</sup> The presence of a nasal or oral feeding tube, gastroesophageal reflux, or those patients tube fed in the supine position may have increased swallowing dysfunction, thereby increasing aspiration risk.<sup>3,14</sup> The right lower lobe is the most frequent site of aspiration due to its larger caliber and straighter orientation of the right mainstem bronchus. The left lung is more difficult to suction secondary to the fact that the left bronchus is narrower, longer, and has a more horizontal angle than the right lung, making it more difficult to suction the intubated patient.<sup>3</sup> There are also patients who may regularly experience silent aspiration when food or liquid material is inhaled without a discernable gag reflex, cough, or other identifiable apparent difficulties.<sup>10,12</sup>

### Silent Aspiration

Silent aspiration is the occurrence of aspiration before, during, or after swallowing in the absence of cough or other apparent signs of distress.<sup>2,12,15</sup> Patients with silent tracheobronchial aspiration have a 13-fold increased risk for developing pneumonia.<sup>2,12</sup> Silent aspiration cannot be diagnosed without the aid of instrumentation, since patients do not display overt signs (coughing) and often deny swallowing difficulty; thus, silent aspiration requires a higher index suspicion. As a result, the healthcare prescriber may elect to incorporate the assistance of a speech language pathologist (SLP) who may recommend performing a modified barium swallow study or FEES to rule out silent aspiration in these at-risk patients. At-risk patients who have been found to silently aspirate include those with altered mental status and decreased awareness; decreased sensation due to stroke, neurological disorders, or head and neck cancers; gastrointestinal problems; and those who are generally weak or deconditioned. Researchers have found that very young and elderly patients are more susceptible to silent aspiration.<sup>11,12</sup>

Contraindication for use of VSE includes lethargy, absent swallow response, abnormal upper airway sounds, need for frequent oral/pharyngeal suctioning, those patients unable to cooperate, tachypnea, and some critically ill patients.<sup>2</sup> Clinical identifiers that may predict the need for a swallowing evaluation include a new cough, sputum, fever, rigors, breathlessness, wheezing, pleuritic chest pain, sore throat, and head cold symptoms. However, classic symptoms are often absent, diminished, or nonspecific in the elderly and may include tachypnea, lethargy, functional decline, incontinence (new onset), alteration in sleep-wake cycles, loss of appetite, and increased confusion or agitation.

Due to the high incidence of silent aspiration in acute care settings, SLPs do not rely solely on the absence

of signs or symptoms to rule out silent aspiration. Patients determined to be at risk, but who are without cough or complaint, warrant further evaluation. Many factors predispose patients to silent aspiration, including altered level of consciousness, enteral feeding, cerebral vascular accident, increased age, gastroparesis, gastrophageal reflux, seizure, neurologic dysfunction, structural lesions, psychiatric disorder, connective tissue diseases, iatrogenic causes, neurologic disorders, and medication side effects.<sup>2,3,4,10,12</sup> Ramsey et al. suggest that silent aspiration likely occurs in healthy individuals during sleep and in many disease states.<sup>12</sup> This make it more difficult for healthcare providers to assess aspiration risk for these patients.

Smithard et al.'s prospective study concluded that bedside assessment alone lacks the necessary sensitivity to use as the sole screening tool in predicting acute stroke complications such as aspiration. In this study, 94 patients who had been admitted to 1 of 2 hospitals with a diagnosis of stroke underwent video-fluoroscopy, medical bedside assessments by physicians, and bedside assessments by SLPs. Twenty patients were identified to be aspirating on video-fluoroscopy. Twenty-one percent of these patients had not been recognized as actively aspirating from their medical bedside assessments. The medical bedside assessment sensitivity was 70% compared to the SLPs' bedside assessment of 47%. VSE is considered the gold standard in identifying aspiration risk, and the video-fluoroscopy is one portion of this assessment but may be cost prohibitive for predicting acute stroke complications such as aspiration. The study results suggest that the hospitals involved revise and simplify their aspiration bedside assessments to adequately predict aspiration risk following acute stroke diagnosis.<sup>16</sup>

## Guidelines

In 2006, the American College of Chest Physicians (ACCP) developed 15 evidence-based clinical practice guidelines for cough and aspiration of food and liquid due to oral-pharyngeal dysphagia.<sup>2</sup> These guidelines address conditions that have a high risk for aspiration and silent aspiration. The conditions include neurologic impairment (e.g., cerebrovascular disease, head trauma, cervical spine injury, anoxia, seizure disorder, Parkinson's disease, Alzheimer's disease); surgery related (e.g., vocal fold paralysis, brain surgery, coronary artery bypass grafting, cervical spine surgery); structural (e.g., glossectomy); gastrointestinal problems; pulmonary problems (e.g., bronchitis); intubation for greater than 48 hours; ventilated patients; and medication side effects (e.g., sedatives, neuroleptics).<sup>2</sup>

The guidelines suggest that those patients with high-risk conditions be referred for an oral-pharyngeal swallowing evaluation. Patients experiencing cough should be questioned regarding their perception of choking or fear of choking while eating or drinking and a chest x-ray, and a speech assessment may be considered to rule out aspiration. The evaluation of those patients with oral-pharyngeal dysphagia, cough,

and those conditions associated with aspiration may include an oral-pharyngeal swallow evaluation. Those patients at high risk for aspiration, with reduced level of consciousness, should be kept NPO until there is an increase in sensorium. The guidelines also suggest that alert patients with medical diagnosis and conditions associated with aspiration be assessed while drinking small sips of water. If the patient exhibits clinical signs of aspiration, the patient may be referred for a detailed swallowing evaluation. These guidelines suggest that those patients with dysphagia have VSE or FEES evaluation of their swallowing ability to determine appropriate treatment. An aspiration assessment relies on the clinician's subjective evaluation, while the VSE and FEES provide direct visualization of the anatomy and physiology of swallowing. Limited economic and staffing resources make the regular use of VSE and FEES nearly impossible on every admitted patient, so dependence on the bedside aspiration assessment alone becomes essential when determining aspiration risk.<sup>2</sup>

The guidelines also suggest that the management of patients with dysphagia be the responsibility of an organized multidisciplinary team, including a physician, nurse, an SLP, dietitian, and physical and occupational therapist. The goals of this team include focusing on aspiration reduction, improving swallowing ability in order to optimize the patient's nutritional status and quality of life, determining compensatory strategies for those at high risk for aspiration patients to enable safe swallowing, and providing dietary recommendations.<sup>2</sup>

## Mitigation Strategies

The development of mitigation strategies continues to be a priority when identifying patients with swallowing difficulties and those at risk for aspiration and silent aspiration upon admission. These strategies may include bedside swallowing screening and assessment, radiologic swallowing assessment, individualized swallowing treatment plan, and assessment for medications that affect swallowing.

### Bedside Swallowing Screening and Assessment

Aspiration screening and assessment are two distinct procedures, conducted at separate times by different healthcare providers. The preliminary aspiration screening is typically performed by a nurse during the patient admission assessment. The full bedside swallowing assessment is typically conducted by the SLP after the preliminary screening identified the patient as high risk for aspiration.<sup>15,17</sup> There are various types of full bedside swallowing assessments in the clinical literature, but the literature reports very few preliminary bedside screening tools. Many of the preliminary bedside swallowing screening tools do not contain the sensitivity and specificity to identify dysphagia or aspiration.<sup>7,10,15,18</sup> A preliminary swallowing screening performed at the admission assessment can be an effective tool to determine whether additional swallowing evaluations are warranted.<sup>10</sup>

Hinchey et al. conducted a prospective study of 15 acute care hospitals in which 6 of the hospitals had formal dysphagia screening protocols. The hospitals' adherence rate to the screening protocols rate was 78% compared with 57% for the other 11 acute care facilities that lacked formal dysphagia screening. The dysphagia screening was defined as a checklist that assessed patients for previous and current risk factors for aspiration, based on clinical findings. If the patient passed the initial screening, a water challenge followed, and the patient was observed. If the patient failed the initial screening, an NPO order was initiated, followed by further evaluation by an SLP. Dysphagia screens were performed before any oral intake by the patient. The results for pneumonia rates at the hospitals with a formal dysphagia screen were 2.4% versus 5.4% for the hospitals that did not have formal dysphagia screening. Patients who experienced a stroke and had received a formal screening that were used to treat the patient were found to have significantly decreased odds (three-fold) of developing pneumonia after consideration for stroke severity.<sup>19</sup>

A preliminary bedside swallowing screening tool may be in checklist or algorithm formats, which may be easily conducted with the patient admission assessment.<sup>10,18</sup> The Massey bedside swallowing screen is an example of such a tool (a reprinted copy is available online from the Authority at <http://www.patientsafetyauthority.org>). This particular tool has content that has been shown to have predictive validity and interrater reliability. Sensitivity and specificity were determined by retrospective chart analysis to determine postscreening evidence of dysphagia.<sup>8</sup> All preliminary bedside tools screen a patient's swallowing abilities through a series of questions, the presence of a variety of symptoms, and the use of clinical indexes to identify patients with dysphagia, at risk of aspiration, or who have no prior history of dysphagia but meet the criteria for a full bedside swallowing assessment.<sup>4,8,13,17-19</sup>

While AHRQ identified a suggested patient care practice to include the evaluation of each patient for aspiration risk upon admission and regularly thereafter, the use of preliminary bedside screening tools can provide facilities the minimum requirements and key elements needed to identify patients with dysphagia and those at greater risk for developing aspiration. While AHRQ has not recommended any single screening tool, the agency suggests a formal dysphagia screening protocol may decrease the risk of pneumonia by three-fold.<sup>19</sup> The Joint Commission dysphagia screening requires that patients who have experienced a stroke be assessed for dysphagia before any food, fluids, or medications are administered orally. A preliminary bedside swallowing screening will promptly identify those patients at high risk for dysphagia, developing aspiration, or those experiencing silent aspiration, so a timely full bedside swallowing assessment can be provided.<sup>1</sup>

Several forms of full bedside swallowing assessments may be used to evaluate patients at high risk for aspiration or for those who have swallowing difficulties. Full bedside swallowing assessments typically involve a questionnaire that includes care history information; review of auditory, visual, and motor status; screening of cognitive/communications skills; a non-invasive oral-pharyngeal exam that includes the oral cavity; evaluation of oral motor skills and laryngeal function for phonation; observation of respiratory function; and functional swallowing trials.<sup>16,18</sup> Various acceptable methods are included in a full bedside swallowing assessment, including a simple standard bedside swallowing assessment and formal evaluation by an SLP.<sup>17</sup> The Joint Commission excludes the National Institutes of Health Stroke Scale rating and the documentation of a gag reflex or positive gag as the full evaluation for screening dysphagia. The dysphagia screening may include the minimum of a formal bedside swallowing assessment.<sup>18,20</sup> Patients who are waiting for the completion of the full bedside swallowing assessments are typically kept NPO until the testing is conducted so an individualized patient treatment plan may be developed. Full bedside assessments may also include the patient's health history, nutritional status, medications, physical examination, and diagnostic evaluation.<sup>6</sup> A diagnostic evaluation may be conducted through the VSE.

### Radiologic Swallowing Assessment

ACCP practice guidelines identify VSE screening as beneficial for those patients with medical conditions or diagnosed as being at high risk for developing aspiration or those with silent aspiration. Penetration occurs when food or liquid material enters the laryngeal area to the level of the true vocal cords. Aspiration occurs when the food or liquid material moves below the true vocal chords and enters the trachea.<sup>3</sup> Silent aspiration is often not recognized and therefore is not treated.

A FEES is used by the SLP for the functional evaluation of the oropharyngeal stage of swallowing. The FEES does not replace the fiberoptic examination performed by an otolaryngologist, which assesses the integrity of the laryngeal and pharyngeal structures. The FEES is a comprehensive assessment of swallowing and includes the following components:

- Observation of the anatomy involved in the oropharyngeal stage of swallowing
- Observation of the movement and sensation of critical structures within the hypopharynx
- Observation of secretions
- Direct assessment of swallowing function for food and liquid
- Response to therapeutic maneuvers and interventions to improve swallowing

The FEES frequently guides prescribers regarding the adequacy of the swallow, the advisability of oral feeding, and the use of appropriate interventions to

### Medications That Increase Aspiration Risk

- Benzodiazepines
- Neuroleptics
- Anticonvulsants
- Corticosteroids
- Lipid-lowering drugs
- Anticholinergics
- Antihistamines
- Antipsychotics
- Narcotics
- Anticonvulsants
- Antiparkinson agents
- Antineoplastics
- Antidepressants
- Anxiolytics
- Muscle relaxants
- Diuretics
- Antibiotics
- Iron preparations
- Quinidine
- Nonsteroidal anti-inflammatory drugs
- Potassium
- Anticholinergics
- Calcium channel blockers
- Theophylline
- Corticosteroids

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facilitate safe and efficient swallowing. The observations of structure or function of the larynx and pharynx through a fiberoptic examination may suggest the possibility of an undiagnosed medical condition.<sup>18,21</sup>

### Medications Affecting Swallowing

The review of the patient's current medication list may reveal some drugs that can exacerbate dysphagia and aspiration. Some of these side effects include central nervous system depression, increased salivation, drooling, myopathy, poor tongue movement, xerostomia, inability to initiate the swallowing process, coughing, burping, and esophageal sphincter dysfunction. These side effects may predispose a patient to

exhibit aspiration symptoms (see "Medications That Increase Aspiration Risk"). The medication review should also include any over-the-counter, supplemental, and herbal formulations the patient may be taking.<sup>2,4,5,6,10</sup>

### Individualized Treatment Plan

Development of an individualized patient treatment plan occurs following the bedside and radiologic assessments so the patient can receive safe and adequate nutrition. This treatment plan is developed by an interdisciplinary team and may include the physician, SLP, individual nurse and nurse manager for the patient care area, clinical nurse specialist, dietitian, respiratory therapist, physical therapist, pharmacist, patient, and family who determine patient-specific interventions.<sup>2,5</sup> These interventions may include exercises, indirect therapy (strengthening exercises for swallowing muscles), and direct therapy (exercises to perform effects of swallowing difficulties).<sup>2,10</sup> These interventions may also consist of rehabilitative measures that incorporate swallow therapy, compensatory strategies for patients to implement while swallowing, and dietary modifications that are directly related to the patient's swallowing capabilities.<sup>2,4</sup>

### Conclusion

There continues to be a need to optimize a preliminary bedside aspiration screening that accurately predicts patients who need further testing to diagnosis dysphagia, aspiration, and/or silent aspiration.<sup>16,17</sup> The need for organizations to have more standardized aspiration screening and assessments continues to be a priority when identifying patients with swallowing difficulties and those at risk for aspiration and silent aspiration upon admission.<sup>5,15,19</sup>

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## Self-Assessment Questions

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

1. Risk reduction strategies to prevent aspiration include all of the following EXCEPT:
  - a. Perform strengthening exercises for swallowing muscles.
  - b. Implement dietary modifications related to swallowing capabilities.
  - c. Perform videofluoroscopic swallowing evaluation upon admission.
  - d. Review medication list that includes all over-the-counter and supplemental drugs.
2. Clinical manifestations of silent aspiration include all of the following EXCEPT:
  - a. Altered mental status and decreased awareness
  - b. Gastrointestinal problems
  - c. Rib fractures
  - d. Generalized weakness or deconditioning
3. Which of the following should not be implemented when aspiration is suspected based on the admission screening?
  - a. The physician limits the patient to a full-liquid diet.
  - b. The speech-language pathologist conducts a formal evaluation.
  - c. The dietitian performs a comprehensive nutritional assessment.
  - d. The pharmacist assesses the patient for medications that affect swallowing.
4. The goals of the multidisciplinary team that manages patients with dysphagia include all of the following EXCEPT:
  - a. Optimize the patient's quality of life.
  - b. Eliminate any movement deficit caused by stroke.
  - c. Determine compensatory strategies to ensure safe swallowing.
  - d. Reduce aspiration risk.
5. A previously healthy 78-year-old female is admitted to the hospital with unexplained shortness of breath. Upon examination, she is found to be lethargic and wheezing with a pulse oximetry of 86%. Examination of her chest radiograph reveals right lower lobe infiltrates. There is no previous history of any respiratory problems, chronic obstructive pulmonary disease, or asthma. The patient is a nonsmoker. Her caregiver reports that she is drowsy and confused while awake.
 

Select the intervention that is appropriate for this patient upon admission.

  - a. Obtain a formal evaluation by a speech-language pathologist.
  - b. Restrict dietary intake until there is an increase in sensorium.
  - c. Develop an individualized swallowing treatment plan.
  - d. Perform videofluoroscopic swallowing evaluation.

## Using Administrative Data from Pennsylvania Hospitals to Monitor Patient Safety

Since the Pennsylvania Patient Safety Authority was established, the most challenging question asked of its staff has been whether healthcare in Pennsylvania is becoming safer. This question is not unique to Pennsylvania, nor is it unique to the United States. Experts in patient safety are forced to admit that while progress has been made since the 1999 publication of the Institute of Medicine's *To Err Is Human*, improving patient safety is a journey that is just beginning.

The ultimate measures of safety are the number of lives saved or the number of injuries prevented, but these measures are notoriously difficult to estimate reliably in a cost-effective way. The sources of data typically reviewed for evidence of improvement are all imperfect. Adverse event reports are subject to underreporting and variation in interpretation of reporting requirements. Survey data on structural or process measures, as presented in the Authority's 2008 annual report, is subject to response bias, the selective memory of the respondent, and many other biases inherent in all survey research. Even retrospective expert review of medical charts, often used as the gold standard in research on adverse events, is subject to the validity of the decision rules used by the reviewers and the quality of the documentation in the patient records.

While all these sources of data are imperfect, each can provide a unique perspective on the safety and resilience of the healthcare system. While each source on its own is too flawed to rely on in isolation, when taken together they can paint a richer portrait of the problems faced in patient safety and whether there is progress in resolving them.

Another source of information readily available to all hospitals is uniform administrative data used in billing. Under contract to the Agency for Healthcare Research and Quality (AHRQ), researchers from Stanford University and the University of California developed the Patient Safety Indicators (PSIs) as a tool to identify potentially preventable adverse events related to hospitalization. These indicators are based on records that hospitals complete on all inpatient discharges. While administrative systems were not designed to identify adverse events, by screening patients' diagnoses and what services they received, the PSIs identify by inference patients who may have suffered selected adverse events.

As with other sources of patient safety information, administrative data is subject to technical limitations. These include variations in coding practices at different institutions and by different individuals, errors in coding, and the quality of the underlying medical records on which the administrative data is based. Refer to the section "Technical Notes and Limitations" for further detail.

The PSIs that can be used at a state or regional level (referred to as the "area level" indicators) are as follows:

- Accidental Puncture or Laceration
- Foreign Body Left during Procedure
- Iatrogenic Pneumothorax (i.e., collapsed lung)
- Postoperative Hemorrhage or Hematoma (i.e., bleeding)
- Postoperative Wound Dehiscence (i.e., rupturing of the suture line following surgery)
- Selected Infections due to Medical Care (primarily related to intravenous lines and catheters)
- Transfusion Reaction (due to blood incompatibility)

These PSIs provide one window into the safety of Pennsylvania hospitals, and over time one hopes to see these rates decline, suggesting that safety is improving. Because of differences between the PSI definitions and how reportable events are defined under Pennsylvania's MCARE (Medical Care Availability and Reduction of Error) Act of 2002, direct comparisons with the reports submitted to the Authority are not appropriate. What the PSIs provide is an independent source of information about patient safety. Use of multiple data sources can help ensure greater confidence in potential trends; changes observed in any single source of data are more likely to be genuine and meaningful when corroborated by changes observed in other independent sources.

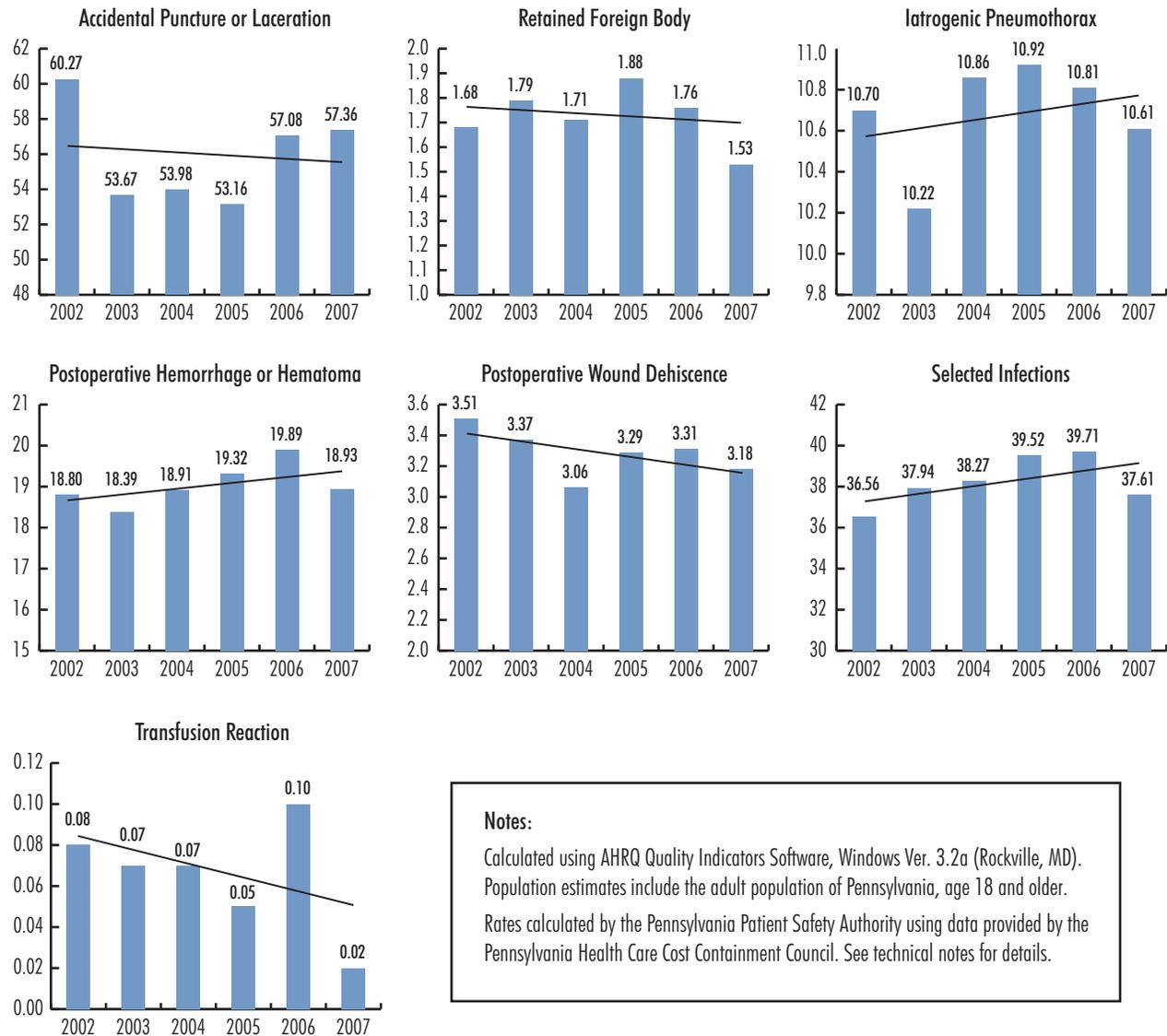
Overall, the evidence for improvement in these PSIs over the past several years is mixed and uncertain. Some PSIs, such as Transfusion Reaction and Postoperative Wound Dehiscence, seem to have declined, suggesting a move in the right direction. Yet others, such as Selected Infections due to Medical Care and Postoperative Hemorrhage or Hematoma, seem to be trending upward. However, all linear trend lines that were fit to these indicators failed tests for statistical significance, leaving no convincing evidence that the apparent trends in the data are due to anything other than chance.\* The Figure presents the rates of these complications from 2002 through 2007.

Even if the apparent declines in some of these complication rates were statistically significant, the improvement would be only moderate (though encouraging). Table 1 shows the PSIs with the percent change between 2002 and 2007 and with the number of cases avoided or added based on the percent

\* For each indicator, a linear trend line was fit to the data, and a Student *t*-test was performed on the slope of each trend line, testing the hypothesis that the slope was different from 0 at the  $\alpha = 0.05$  level.

(continued on page 124)

**Figure. Patient Safety Indicators for Pennsylvania Hospitals, Rates per 100,000 Population (2002 to 2007)**



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**Table 1. Change in Patient Safety Indicator Rates**

PATIENT SAFETY INDICATOR	% CHANGE IN OBSERVED RATE (2002 TO 2007)	LINEAR TREND SLOPE*	NUMBER OF CASES AVOIDED/ADDED (2007)†
Accidental Puncture or Laceration	-4.8	-0.15	72 avoided
Foreign Body Left during Procedure	-9.3	-0.02	10 avoided
Iatrogenic Pneumothorax	-0.8	0.04	20 added
Postoperative Hemorrhage or Hematoma	+0.7	0.16	78 added
Postoperative Wound Dehiscence	-9.3	-0.05	22 avoided
Selected Infections due to Medical Care	+2.9	0.34	163 added
Transfusion Reaction	-75.6	-0.01	3 avoided

\* A Student *t*-test was performed on the observed slope for each indicator, all of which were found to be not statistically significant at the  $\alpha = 0.05$  level.

† Refers to the difference between the number of cases predicted for 2007 based on the linear trend lines shown in the Figure and the number that would have been predicted for 2007 if 2002 predicted rates had stayed constant (i.e., if linear trend lines were flat).

**Table 2. Patient Safety Indicators, Comparison of Pennsylvania Observed Rates and National Estimated Rates**

PATIENT SAFETY INDICATOR	PENNSYLVANIA OBSERVED RATE PER 100,000 (2007)*	NATIONAL ESTIMATED RATE PER 100,000 (2006)†
1. Accidental Puncture or Laceration	57.36	48.08
2. Foreign Body Left during Procedure	1.53	1.53
3. Iatrogenic Pneumothorax	10.61	8.09
4. Postoperative Hemorrhage or Hematoma	18.93	16.11‡
5. Postoperative Wound Dehiscence	3.18	2.48
6. Selected Infections due to Medical Care	37.61	29.82
7. Transfusion Reaction	0.02	0.06

\* The Pennsylvania observed rate is the actual number of cases meeting the Patient Safety Indicator inclusion criteria divided by the Pennsylvania population as published in the U.S. Census; it is not risk-adjusted for differences between the Pennsylvania and U.S. populations.

† National rates from: Agency for Healthcare Research and Quality (AHRQ). (1-3; 5-7) HCUPnet, Healthcare Cost and Utilization Project, QI summary tables [online]. [cited 2009 Aug 5]. Available from Internet: <http://hcupnet.ahrq.gov>; (4) PSI comparative data for area indicators, ver. 3.1 [online]. 2007 Mar 12 [cited 2009 Mar 30]. Available from Internet: [http://www.qualityindicators.ahrq.gov/downloads/psi/psi\\_area\\_comparative\\_v31.pdf](http://www.qualityindicators.ahrq.gov/downloads/psi/psi_area_comparative_v31.pdf).

‡ Based on 2004 data; 2006 data unavailable for this indicator.

(continued from page 122)

change over this period. Those with the greatest percent change are not necessarily those in which the most improvement would have occurred. For example, a decline in the rate of Transfusion Reactions per 100,000 population from 0.08 in 2002 to 0.02 in 2007 represents a 76% decline and 3 injuries avoided. In comparison, cases of Accidental Puncture or Laceration, which occur more frequently, declined about 5% from 2002 to 2007, but this equates to 72 cases avoided.

Data from Pennsylvania is on a par with the most recent national data available (see Table 2). While the observed rates in Pennsylvania for most PSIs are slightly higher than national estimates, hospital discharge coding practices vary between hospitals and between states. Therefore, tracking changes in the same set of institutions over time is more meaningful than making comparisons between hospitals or geographic regions.

**Technical Notes and Limitations**

The observed rates of complications presented here are subject to the limitations inherent in all hospital discharge data. The primary concern is with the accuracy of discharge-based diagnosis coding. Errors made in individual institutions’ discharge abstraction may bias the rates calculated using those data sources. As with any source of patient safety data, it is not possible to identify all relevant adverse events without some false positives and false negatives.

It is not possible to distinguish, in this data, cases that represent preventable adverse events from those representing adverse events that are not preventable. Likewise, it is not possible to distinguish cases that represent medical errors from cases in which no error occurred. For these reasons, it is not expected that the number of potential adverse events identified in the PSIs would equal the number of reports submitted to

the Authority during the same time period. The statutory definition of events reportable to the Authority requires healthcare providers to assess whether adverse events were unanticipated, whether they require additional healthcare services, and whether they compromise patient safety.

These rates do not take into account the “Present on Admission” (or POA) indicator, which identifies in each patient’s discharge abstract the diagnosis codes that were present when the patient was admitted to the hospital. While hospitals were required to report this indicator starting in October 2008, it is not yet included in publicly available discharge data. Of the area-level indicators, the POA indicator is used only as an exclusion criterion for Selected Infections due to Medical Care, and it would not affect calculations of the other indicators.

The Authority calculated the rates of the seven area-level PSIs using data provided by the Pennsylvania Health Care Cost Containment Council (PHC4). The rates were calculated for the years 2002 through 2007, the most recent full year for which data was publicly available. Rates were calculated using AHRQ’s Quality Indicators software, Windows version 3.2a (Rockville, Maryland). For more information about the AHRQ Quality Indicators, visit <http://www.qualityindicators.ahrq.gov>.

PHC4 is an independent state agency responsible for addressing the problem of escalating health costs, ensuring the quality of healthcare, and increasing access to healthcare for all citizens regardless of ability to pay. PHC4 has provided data to the Authority in an effort to further PHC4’s mission of educating the public and containing healthcare costs in Pennsylvania. PHC4, including its agents and staff, has made no representation, guarantee, or warranty, express or implied, that the financial, patient, payer, and physician-specific data provided to the Authority is error-free, or that the use of the data will avoid

## Using the PSIs in Your Hospital

The Agency for Healthcare Research and Quality's Quality Indicators software tool, which includes the Patient Safety Indicators (PSIs), is distributed free of charge. The software can be used to help hospitals identify potential adverse events that might need further study. The software programs can be applied to any hospital inpatient administrative data. This data is readily available and relatively inexpensive to use.

In addition to the seven area-level PSIs discussed in this article, additional measures valid for use at the level of individual institutions are available, including:

- Complications of Anesthesia (PSI 1)
- Death in Low-Mortality DRGs (PSI 2)
- Decubitus Ulcer (PSI 3)
- Failure to Rescue (PSI 4)
- Foreign Body Left during Procedure (PSI 5)
- Iatrogenic Pneumothorax (PSI 6)
- Selected Infections due to Medical Care (PSI 7)
- Postoperative Hip Fracture (PSI 8)
- Postoperative Hemorrhage or Hematoma (PSI 9)
- Postoperative Physiologic and Metabolic Derangements (PSI 10)
- Postoperative Respiratory Failure (PSI 11)
- Postoperative Pulmonary Embolism or Deep Vein Thrombosis (PSI 12)
- Postoperative Sepsis (PSI 13)
- Postoperative Wound Dehiscence in Abdominopelvic Surgical Patients (PSI 14)
- Accidental Puncture or Laceration (PSI 15)
- Transfusion Reaction (PSI 16)
- Birth Trauma—Injury to Neonate (PSI 17)
- Obstetric Trauma—Vaginal Delivery with Instrument (PSI 18)
- Obstetric Trauma—Vaginal Delivery without Instrument (PSI 19)
- Obstetric Trauma—Cesarean Delivery (PSI 20)

The software is available in SAS® and Microsoft Windows® formats. User guides and technical documentation are available. Visit <http://www.qualityindicators.ahrq.gov/software.htm>.

differences of opinion or interpretation. This analysis was not prepared by PHC4. This analysis was done by the Authority. PHC4, including its agents and

staff, bears no responsibility or liability for the results of the analysis, which are solely the opinion of the Authority.

## Implementing a Safe Patient Handling and Movement Program in a Rehabilitation Setting

### ABSTRACT

*Musculoskeletal injuries are a prevalent and costly occupational health problem, particularly in the healthcare field. The performance of repetitive manual lifting tasks over a substantial period of time increases the risk. In recent years, many facilities have implemented no-lift policies or minimal-lift policies to reduce the risk of injury to patients and nurses associated with manual lifting, transferring, repositioning, or movement of patients. Several states have passed legislation requiring hospitals to establish and implement programs on safe patient handling. The American Nurses Association has launched the Handle with Care campaign, a profession-wide effort to prevent back and other musculoskeletal injuries. A strong body of research has demonstrated that the use of mechanical lifting equipment, as part of a program promoting safe patient handling and movement, can significantly reduce musculoskeletal injuries among healthcare workers while improving the safe delivery of patient care. Key to improving both patient and staff safety when implementing a no-lift or minimal-lift policy is to introduce the policy as part of an overall safe patient handling and movement program that includes administrative support, proper equipment evaluation and availability, staff and patient education, and defined conformance expectations. (Pa Patient Saf Advis 2009 Dec;6[4]:126-31.)*

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### Identifying the Need

Patient handling tasks, such as manual lifting and transfers, are high-risk, high-volume occurrences within healthcare facilities that pose significant risk to both personnel and patients. Performing these tasks increases nurses' risk for work-related musculoskeletal disorders, which may result in high costs, both financial and emotional. Nursing is among the occupations with the highest risk for musculoskeletal injuries and disorders. It is estimated that 12% of nurses leave the profession annually due to back injuries, and as many as 52% complain of chronic back pain.<sup>1</sup> Many of these injuries and disorders are directly associated with the manual handling and movement of patients and the frequency with which nurses must perform these tasks. Manual handling also increases the potential for patient injuries (e.g., musculoskeletal) from falls or other mishaps. Skin integrity issues related to shear and friction increase when patients require moderate or complete assistance with repositioning

and transfers. The Veterans Integrated Service Network 8 Patient Safety Center of Inquiry in Tampa, Florida, funded by the U.S. Department of Veterans Affairs (VA), recommends that a weight limit of 35 lb be used when assessing patient handling tasks.<sup>2</sup> This weight limit is derived from the National Institute for Occupational Safety and Health's (NIOSH) revised lifting equation algorithms to help healthcare workers know when an assistive device is required. If a patient is dependent and requires the worker to lift more than 35 lb, assistive equipment such as a full mechanical lift is recommended. If a patient is able to partially assist and will not force staff to lift more than 35 lb, they may be able to use a sit-to-stand assistive device, or they may be able to assist manually if equipment is not necessary.<sup>2</sup>

A safe patient handling and movement (SPHM) program uses assistive equipment and devices to help decrease the risk of staff injury and improve the safe delivery of patient care.<sup>3</sup> Assistive equipment and devices, such as lifts, lateral transfer devices, and friction-reducing devices, significantly reduce the risk of musculoskeletal injury to healthcare staff, consequently reducing work-related healthcare costs. Low nurse recruitment and retention rates remain a serious problem, and nursing shortages are only exacerbated by occupational injuries and residual disabilities. A SPHM program communicates organizational concern for staff safety, promotes retention, provides an added incentive for recruitment, and may reduce costs related to overtime and agency use for replacing injured workers.

A SPHM program affords a safer progression through the patient's care and greater preservation of the patient's dignity. SPHM equipment and practices enhance a patient's ability to assist in movement and allow the patient to progress as confidence, strength, and endurance improve. These improvements, in

### Editor's Note

*The topic of patient transfers and the benefit of equipment-assisted transfers is closely tied to preventing patient falls and their associated injuries (as well as injuries to healthcare workers). Falls account for a large number of the reports submitted to the Pennsylvania Patient Safety Authority as one of its nine event type classifications. From June 2004 through September 2009, the Authority received 180,458 reports of patient falls, of which 6,908 were reported as Serious Events (harm to the patient). Nearly 5,850 of the total fall reports were associated with problems with patient transfers. The Pennsylvania Patient Safety Authority is pleased to communicate information about the successful implementation of a program to decrease injuries with transfers.*

turn, promote and encourage patient autonomy, conserve energy, and maximize therapy tolerance and rehabilitation potential. Collectively, these factors may improve patient satisfaction, positively influence patient outcomes, and shorten overall length of stay.

### Development and Implementation

The John Heinz Institute of Rehabilitation Medicine is one of the foremost providers of rehabilitation in the United States. Under the supervision of board-certified physiatrists, a team of highly qualified professionals provides a broad range of specialized services and therapies for inpatients, treating both orthopedic and neurological conditions, with specialized programs in the areas of brain injury, injured worker recovery, and pediatrics. The organization's 71-bed inpatient rehabilitation facility, which has an 11-day average length of stay, has served the northeast United States for more than 25 years as part of the Allied Services organization. John Heinz provides comprehensive rehabilitation care, including services in audiology; clinical and forensic neuropsychology; physical, occupational, speech, and recreational therapies; rehabilitation nursing; respiratory therapy; social services; psychology; and rehabilitation technology. Patients admitted to the John Heinz Institute may require various levels of assistance with tasks and mobility, with some needing minimal assistance and others being completely dependent.

In March 2007, John Heinz's Susan Schwartz, CRRN, director of nursing, and Erin Pilch, CRRN, clinical nurse manager, attended the Seventh Annual Safe Patient Handling and Movement Conference in Lake Buena Vista, Florida, and immediately recognized the benefits of a SPHM program as a proactive safety improvement within the hospital for both patients and staff (see "Benefits of a Safe Patient Handling and Movement Program"). At the conference, they had the opportunity to observe available safe handling equipment and to speak with leaders in the field of SPHM. Upon their return, they presented their findings and ideas for a SPHM program within the hospital to administration, receiving full support. An interdisciplinary committee consisting of certified rehabilitation registered nurses, physical and occupational therapists, the patient safety officer, the infection control nurse, and the risk manager was convened to review information, statistics, and products. Despite the issuance of a white paper by the American Physical Therapy Association, Association of Rehabilitation Nurses, and Veterans Health Administration supporting the use of safe handling equipment,<sup>4</sup> the physical and occupational therapy staff had reservations regarding the implementation of a minimal-lift program and the incorporation of lifts and transfer devices within the scope of the patient's therapy. The therapists expressed concern that deviation from their current practice could potentiate patients' dependence on equipment and worsen patient outcomes. They did, however, concede the benefit of using the equipment on the nursing

units to reduce the risk of injury to nursing personnel and to conserve patient energy in order to maximize therapy participation. The nursing department staff openly supported the move toward developing a SPHM program within the hospital.

The intended patient population for the SPHM program was identified as patients who are assessed as requiring more than moderate assistance from two staff members, or who are dependent for transfer and movement tasks. These patients were felt to be consistent with those patients who would require the nurse to lift more than the NIOSH-recommended 35 lb.<sup>2</sup> The initial committee became the source of a subcommittee, consisting primarily of nursing personnel, which met on a regular basis to outline a mission statement (see "John Heinz Institute of Rehabilitation Medicine Safe Patient Handling and Movement Mission Statement"), actively seek out and evaluate equipment, develop policies and competencies, and identify potential risks and benefits. The infection control nurse was consulted during the evaluation and selection of equipment in order to identify and implement the appropriate infection control measures for the selected equipment. To further mitigate the risk of cross-contamination, the subcommittee identified the need to purchase enough slings for the lift equipment that each sling could be dedicated to a specific patient for the length of the patient's stay or until the patient's endurance and transfer status improved. A search of the ECRI Institute Web site was conducted by both the patient safety officer and clinical engineering staff. This search identified no alerts related to malfunctions of or injuries from the evaluated or purchased equipment. A search of Joint Commission *Sentinel Event Alerts* likewise identified no sentinel events related to the use of patient lifting

### Benefits of a Safe Patient Handling and Movement Program

- The potential for patient injury (e.g., shoulder injuries, skin tears) as a consequence of manual handling mishaps (e.g., patient falls) is reduced when assistive equipment and devices are used.
- Patients are provided with a safer means to progress through their care, promoting patient autonomy, conserving energy, and maximizing therapy tolerance.
- A reduction occurs in the rates of back injury, which is the second leading occupational injury in the United States (back pain is the most common reason for filing Workers' Compensation claims).
- Organizational concern about staff safety is communicated to nursing staff, promoting retention and providing an added incentive for recruitment. (Recruiting and retaining nurses is an ongoing problem.)

**John Heinz Institute of Rehabilitation  
Medicine Safe Patient Handling and  
Movement Mission Statement**

To eliminate unsafe manual patient lifting practices by creating an environment that promotes employee and patient safety utilizing patient handling devices to lift/transfer and reposition patients, thereby reducing the risk of injury to both patients and healthcare workers, and reducing the facility's financial burden associated with work-related injuries. This is accomplished through education, training, and the use of state-of-the-art ergonomics and patient handling technologies.

and transfer devices. (A more recent search of the ECRI Institute Web site revealed that ECRI Institute published a paper evaluating ceiling-mounted patient lifts in April 2009 and presented a Web conference titled "Implementing a Patient Lift Program That Won't Hurt Your Staff or Kill Your Budget" in May 2009. This further reinforced for us that SPHM is at the forefront of today's healthcare issues.)

In May 2007, the hospital sponsored a safe handling equipment fair, with demonstrations from several equipment vendors. Frontline nursing staff, clinical departments, and representatives from other divisions within the Allied Services organization were invited to attend. It was imperative to get feedback from frontline staff, since the equipment was intended for use primarily within their daily practice. Several members of the interdisciplinary SPHM committee also visited the local VA Medical Center to evaluate the equipment in use at that facility. Following the fair, some equipment was identified as being appropriate for the John Heinz patient population, and arrangements were made with the vendors for equipment trials.

The hospital's 71 beds are divided into 3 nursing units. No formal ergonomic assessment was completed to identify high-risk units because the acuity level fluctuates from day to day and any of the units could be considered high risk at any given time. Before any equipment trials, the vendor trained frontline staff in the safe and appropriate use of each item. Equipment trials commenced in May 2007, with frontline nursing staff providing written feedback and evaluations on each piece of equipment by means of an equipment evaluation form developed by the SPHM committee for this purpose. The SPHM subcommittee continued to meet to develop policies and review the evaluations of the equipment. Equipment trials and rentals continued from July 2007 to March 2008, with input from the clinical engineering department. After evaluating a minimum of three different versions of each piece of equipment, the hospital purchased its first full mechanical lift with attendant supplies. For the hospital's more mobile rehabilitation population, the subcommittee determined that one full mechanical lift and one sit-to-stand lift for

each 21- to 23-patient nursing unit would meet the hospital's needs. In total, three full mechanical lifts and three sit-to-stand lifts were purchased. To ensure the availability of an adequate number of slings and belts for individual patient dedication, the hospital also purchased 12 slings in various sizes for the full mechanical lifts, and 15 belts in various sizes for the sit-to-stand lifts. The subcommittee decided that having one lateral transfer sheet in each patient room would make these items easily available and facilitate staff compliance with their use. Additionally, lateral transfer sheets were placed in each of the therapy gyms, and a supine lift sling was purchased and stored with the backboard near the cardiac crash cart to facilitate safety in emergency situations. A safe patient handling equipment log was developed to enable nursing management to track the use and location of all slings and to prevent their loss (see Figure). The purchases were prepared and presented to hospital administration.

By July 2008, all initially requested equipment had been purchased and received. In all equipment purchases, the needs of bariatric patients were considered. Two of the full mechanical lifts purchased accommodate up to 500 lb, and the third has a capacity of 700 lb. All the sit-to-stand lifts accommodate patients up to 500 lb. The lateral transfer sheets purchased were bariatric size, with a weight capacity of 700 lb. Historically, the hospital has seen few patient admissions beyond this weight range, and it was confirmed with the vendors that additional bariatric equipment could be rented on an as-needed basis. Equipment storage was an issue for our hospital, as it is for many healthcare providers. Equipment that is not readily available to staff reduces the likelihood of compliance in using it. The facility determined that storing lifts on each nursing unit would facilitate their use. To ensure that the additional equipment in the patient care area would not become an impediment to patient flow in the event of an emergency, an addition was made to the nursing assignment sheet to specifically assign a nursing staff member on each unit and each shift to clear the hallways of equipment if such a situation were to arise. The clinical engineering department remained involved throughout the equipment selection process and remains available to address damaged or malfunctioning equipment.

Policies and staff competencies were developed for the overall SPHM program, as well as for each individual piece of equipment that had been purchased, and staff training was initiated and evaluated. A nursing department policy to direct the overall minimal-lift process was developed after review of current literature and similar policies in use at other healthcare facilities with successful SPHM programs. The policy was presented to and approved by administration via the patient safety committee and medical executive committee. The policy defines patient-handling-related terms, provides a process for the assessment of patients who may require patient handling equipment, and outlines the

Figure. Log Sheet Example.

<b>DATE INITIATED:</b>	
<i>Patient Identification</i>	<p><b>EQUIPMENT USED</b></p> <p><b>FULL MECHANICAL LIFT</b></p> <p>SHIFT USED: DAYS EVENINGS NIGHTS</p> <p>SLING SIZE: _____ SLING #: _____</p> <p>IN ROOM: YES NO</p> <p>CLEANED AFTER USE: YES NO</p> <p>DISCONTINUED DATE: _____</p> <p>RETURNED TO: _____</p>
	<p><b>SIT-TO-STAND LIFT</b></p> <p>SHIFT USED: DAYS EVENINGS NIGHTS</p> <p>BELT SIZE: _____ BELT #: _____</p> <p>IN ROOM: YES NO</p> <p>CLEANED AFTER USE: YES NO</p> <p>DISCONTINUED DATE: _____</p> <p>RETURNED TO: _____</p>

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responsibilities of staff and nursing supervisors and managers in relation to the program. Policies were also developed for the use and care of each individual piece of equipment based on the manufacturer's instructions, including cleaning between uses with a disinfectant approved by the U.S. Environmental Protection Agency. Individual competencies for each piece of equipment were developed by members of the SPHM committee and used throughout the training process. The competencies were designed to follow the manufacturer's instructions for use and required a return demonstration by each individual staff member before the equipment could be put into use. As part of each competency, staff signed a statement indicating that they understand that the safe patient handling and minimal-lift policy is important for the safety of the patients, their own safety, and the safety of their coworkers and that they agree to adhere to the policy. Our hospital promotes a nonpunitive culture. However, this does not mean that staff who repeatedly or intentionally violate policy and procedure will not be held accountable. Staff members found to be noncompliant with the minimal-lift policy are reeducated about the SPHM program and expectations for compliance. The circumstances surrounding the event are also reviewed to identify any potential system factors that may have contributed to the failure to follow policy.

Since the SPHM program was formally launched (September 2008), feedback from both patients and staff has been overwhelmingly positive.

**Potential Barriers to Program Implementation**

The most significant potential barriers to the implementation of any SPHM program are financial constraints. The cost for the initial implementation of the program in our facility was approximately \$45,000. However, the hospital expects to recoup this cost within three years of full implementation of the program because of a reduction in Workers' Compensation expenses. To further mitigate the financial impact, the equipment was identified for purchase in a prioritized manner, which allowed the initial outlay to be spread out over a period of time. It is also important to consider that the quantity of equipment purchased must be sufficient to ensure that it is available when needed. Insufficient equipment quantities resulting in wait times discourages staff compliance with equipment use policies.

Reluctance to accept change in longstanding processes is another barrier that may be anticipated, as was our experience with the physical and occupational therapy departments. While these staff members are still reluctant to fully adopt the SPHM program in the physical and occupational therapy milieu, in the time since the program was fully implemented in the nursing department, they have exhibited a growing acceptance of the equipment and

have even requested to use the lifts to safely recover patients in a fall or assisted-fall situation. Some staff may feel that it is more efficient in terms of time to simply perform manual transfers, as they have always done. Education regarding the risks of manual handling and the benefits of a SPHM program to workers empowers staff and helps them become invested in the program. Involvement of frontline staff in evaluations and equipment selection is crucial to successful compliance with the program. At John Heinz, frontline nursing staff were provided demonstrations and education about the use of all equipment selected for trial and purchase. The selected equipment vendors trained designated nursing staff to be trainers for other staff, providing them with responsibility and further investment in the program. Expected benefits were emphasized, including those associated with the reduction of physical workload in patient movement tasks, those from the reduction of work-related injuries, and benefits for patients. As the program progressed, we found that our staff were not only becoming excited about the program, but also becoming proactive. Based on the unique character and diverse requirements of rehabilitation patients, staff involved in the equipment trials began to identify and assess specialized needs among our patient population. This feedback was communicated to the vendors, who, based on suggestions and demonstrations from our staff, were able to develop and manufacture additional adaptations to the belts and slings, providing further safety and security for patients with specific deficits.

### Communication

Effective communication about transfer status and equipment needs of individual patients is imperative between members of the rehabilitation team and between workers from one shift to the next. The subcommittee developed new processes and revised existing ones to address this need (see “Communicating Safe Patient Handling and Movement Needs”). Patients’ transfer status had traditionally been assessed at the time of admission, with input from the nursing and occupational therapy departments. To better define each patient’s assessed transfer status, a revision was made to the Interdisciplinary Admission Assessment to allow documentation of the transfer status along with cues to identify patients who should be considered for patient handling equipment. Upon identification of the patient’s equipment needs, laminated photographs of patient-specific equipment items are placed in the nursing Kardex for communication between shifts. A revision was also made to the nursing shift summary form to allow documentation of the equipment required by the patient, which may potentially vary from shift to shift based on the patient’s fatigue level. An addition was made to the daily status sheet, which is completed by nursing staff and faxed to other clinical departments, to alert them to the patient’s transfer status and the equipment currently in use for safe handling. Good communication

### Communicating Safe Patient Handling and Movement Needs

- Nursing shift summary documentation revised to include documentation of patient transfer status on nursing unit and equipment in use for patient
- Space for documentation of equipment in use added to daily status sheet, which is provided to all clinical departments to communicate which equipment is in use for patient handling on the nursing unit
- Laminated photographs of equipment in use placed in nursing Kardex

results in consistency and continuity of care, prevents injury, and promotes positive patient progress.

### Outcomes

The SPHM subcommittee continues to explore options for obtaining meaningful measurement data for our SPHM program. Unfortunately, historical data related to employee injury before the development of the SPHM program was not gathered in a way that facilitates the identification of patient-handling-related injuries. To evaluate the initial effectiveness of the program, the number and cost of nursing injuries suspected to be related to patient handling tasks before the implementation of the program were compared to the values measured following the initiation of the program. The initial figures are encouraging. From July 1, 2006, to June 30, 2007, 16 nursing injuries attributable to patient handling tasks occurred, at a total organizational cost of \$35,747.\* From July 1, 2007, to June 30, 2008, a time when equipment was in use (either as part of a trial or after having been purchased), we saw a decrease to four nursing injuries attributable to patient handling tasks. One additional injury occurred during this period but was not reported until several months later. Including this injury, the cost for this period decreased to \$13,708.

Moving forward, we are working to standardize the data gathered on employee injuries. Additional information has been included on the employee accident reporting forms to identify events related to patient handling tasks and allow evaluation of any injury occurrence to monitor whether the staff member was complying with the minimal-lift policy and using the appropriate equipment at the time of the event. The risk management department now generates monthly reports of employee injury broken out by department and type, including cost, days missed, and days on light duty, that we feel will allow us to gather more

\* These costs reflect Workers’ Compensation claims. Costs related to patient injuries were not included in the analysis, but it should be noted that this could further increase the cost-effectiveness of the SPHM program, additionally justifying the financial outlay for the initial equipment.

### Additional Resources

- American Nurses Association. Nationwide state legislative agenda, 2008-2009 reports [online]. 2009 [cited 2009 Aug 19]. Available from Internet: <http://www.nursingworld.org/MainMenuCategories/ANAPoliticalPower/State/StateLegislativeAgenda.aspx>.
- American Nurses Association. Safe patient handling [online]. 2009 Jul 17 [cited 2009 Aug 19]. Available from Internet: <http://www.nursingworld.org/MainMenuCategories/ANAPoliticalPower/State/StateLegislativeAgenda/SPHM.aspx>.
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- Nelson A, Harwood KJ, Tracey CA, et al. Myths and facts about safe patient handling in rehabilitation. *Rehabil Nurs* 2008 Jan-Feb; 33(1):10-7.
- Waters TR. When is it safe to manually lift a patient? *Am J Nurs* 2007 Aug;107(8):53-8.

meaningful data. We also continue to monitor all patient event reports for any events related to patient handling tasks, and we have not noted any increase. It is anticipated that these numbers will continue to decline moving forward with full implementation of the program.

### Conclusion

At the John Heinz Institute, the development of our SPHM program is part of our comprehensive team-oriented approach and commitment to quality-driven patient care, as evidenced by the implementation of proactive safety initiatives that reduce risk to patients and staff, maximize resources, and reduce costs while improving quality of care. In the short time that the program has been implemented at our facility, we have already seen a decrease in employee injury rates and

related costs, and we have received positive feedback from both patients and staff. Staff openness and administrative support are key to a successful SPHM program, but it is just as important to maintain staff interest and program momentum. Our SPHM committee continues to meet periodically. Posters were designed and placed in prominent locations to alert staff, patients, and visitors to the hospital's SPHM program and minimal-lift zones. An information brochure was designed for distribution to patients. Patients and families are encouraged to ask questions and learn about the program and the benefits it provides. Lapel pins have been ordered to identify the "go to" person on each unit and each shift. As a result, these staff will be further invested in the program, and other staff members will have a resource person to go to with questions or problems. The SPHM committee is also presently exploring the prospects for an incentive program to encourage continued staff compliance with the minimal-lift policy and procedure.

Motivated by the American Nurses Association's Handle with Care campaign implemented in 2003, 9 states have already enacted safe handling legislation, and 10 more states have introduced legislation so far in 2009 related to the restriction or elimination of manual patient lifting.<sup>5</sup> If Pennsylvania introduces legislation, we feel we will have favorably positioned our facility for any regulations that may be forthcoming. Regardless, we will have provided both our patients and our nursing staff with a safer and more ergonomically friendly process.

### Notes

1. American Nurses Association. ANA supports safe patient handling measures in Congress to improve safety of nurses and patients [press release online]. 2009 Jun 4 [cited 2009 Aug 19]. Available from Internet: <http://www.nursingworld.org/MainMenuCategories/OccupationalandEnvironmental/occupationalhealth/handlewithcare/Safe-Patient-Handling-Measures-PR.aspx>.
2. Waters TR. When is it safe to manually lift a patient? *Am J Nurs* 2007 Aug;107(8):53-8.
3. American Nurses Association. Handle with care [brochure online]. 2004 [cited 2009 Sep 28]. Available from Internet: <http://nursingworld.org/MainMenuCategories/OccupationalandEnvironmental/occupationalhealth/handlewithcare/hwc.aspx>.
4. American Physical Therapy Association, Association of Rehabilitation Nurses, Veterans Health Administration. Strategies to improve patient and health care provider safety in patient handling and movement tasks [white paper]. 2004 Dec 1.
5. American Nurses Association. Safe patient handling [online]. 2009 Sep 1 [cited 2009 Sep 28]. Available from Internet: <http://www.anasafepatienthandling.org/main-menu/ana-actions/state-legislation.aspx>.

## Increasing Influenza and Pneumonia Vaccination Rates in Long-Term Care

### ABSTRACT

*Influenza and pneumonia remain significant causes of mortality from vaccine-preventable diseases, with 90% of these deaths occurring in adults age 65 or older, including those residing in long-term care (LTC) facilities. Improving the delivery of currently available vaccines decreases the exacerbation of underlying disease and should be a priority to prevent hospitalizations and deaths in this population. The Advisory Committee for Immunization Practices provides annual age-defined recommendations for adult immunization for influenza and pneumococcal pneumonia, yet a recent National Center for Health Statistics report shows that, on average, only 42% to 66% of LTC residents received these vaccinations. Healthcare workers self-report a low 45% acceptance of influenza immunizations, and unvaccinated healthcare workers risk spreading influenza to the vulnerable institutionalized elderly. Barriers to success can be overcome by the application of systems interventions, such as standing orders, approved since 2003 by the Pennsylvania Department of Health and the Centers for Medicare & Medicaid Services, as well as provider reminders and a standardized process and outcome measure protocol. This article explores risk reduction methods to enable LTC facilities to assess current program strengths and weaknesses, to increase vaccine availability and acceptance, to overcome decisional conflict, and to select new strategies to improve the effectiveness of vaccination programs. (Pa Patient Saf Advis 2009 Dec;6[4]:132-7.)*

### Introduction

Vaccination remains the best approach to protect the elderly with chronic health conditions who are considered at high risk for exposure to influenza,<sup>1</sup> invasive pneumococcal disease,<sup>2</sup> and complications. However, current vaccination rates of elderly individuals lag behind the Centers for Disease Control and Prevention (CDC) Healthy People 2010 goals of 90% for institutionalized adults with high-risk conditions that may contribute to unnecessary outbreaks of institutional influenza and pneumococcal pneumonia.<sup>3</sup>

### Background

Influenza virus and pneumococcal pneumonia continue to be leading causes of vaccine-preventable diseases in the United States, with influenza epidemics causing an average of 36,000 deaths and 200,000 hospitalizations per year. Ninety percent of these deaths attributed to influenza occur in adults older than 65 years.<sup>4</sup> The National Center for Health Statistics (NCHS) 2004 data summary reports that only 59% to 66% of institutionalized adults in the United States

are immunized each year against influenza and 42% to 49% are immunized for pneumococcal disease.<sup>5</sup> Morbidity is compounded by underlying health problems,<sup>6</sup> and pneumonia and influenza together remain one of the six principal causes of death in people age 65 or older, according to a 2005 NCHS report.<sup>7</sup> The CDC Advisory Committee for Immunization Practices (ACIP) report on prevention of pneumococcal disease<sup>2</sup> states that the highest case fatality rates for pneumococcal bacteremia occur among the elderly, and Muder reports that the mortality associated with bacteremic pneumonia in nursing home residents may be as high as 50%.<sup>8</sup>

National Nursing Home Quality Measures and Metrics' state performance ratings reveal that the immunization rates of Pennsylvania long-stay residents—the number of residents who were assessed and given influenza vaccination in the 2007 season—were 3.1% lower than the nationwide average of 85.9%. Pneumococcal polysaccharide vaccine (PPV) administration rates also fell 3.2% below the national average of 83.6%. In a national comparison, Pennsylvania nursing homes ranked 38th for residents given influenza vaccination and 26th for residents administered PPV.<sup>9</sup>

Treating influenza and pneumonia, rather than striving to prevent the infections through vaccination, can have variable outcomes and contribute to morbidity, mortality, and the growing concern of antimicrobial resistance due to inappropriate antibiotic use.<sup>10</sup>

In October 2005, the Centers for Medicare & Medicaid Services (CMS) introduced two major updates to make immunization an organizational priority. CMS requires long-term care (LTC) facilities to ensure that residents are immunized annually against influenza and are offered at least one dose of PPV when there is no history of immunization. Facilities are required to educate residents or their legal representatives about the benefits and risks of vaccination, and facilities must provide residents with influenza vaccine and PPV unless medically contraindicated or refused.<sup>11</sup> The LTC state operations manual guidance for surveyors<sup>12</sup> outlines requirements for annual influenza and lifetime pneumococcal immunizations. Section W, added to the minimum data set (MDS 2.0), specifically inquires about the influenza vaccine and PPV status of each resident.<sup>13</sup>

### Risk Reduction Strategic Planning

Despite the 2005 CMS requirement to offer these vaccines to all LTC residents, annual immunization programs often fall short of providing comprehensive policies and procedures to ensure that recommended vaccines are delivered to all eligible residents and employees.<sup>10</sup>

### Program Assessment

Initial steps toward creating a system to get everyone vaccinated include assessing the facility's baseline vaccination rates and establishing a leadership facility workgroup with the involvement of the facility medical director. Team member roles can be defined as assignment of resources, development of policy statements, and auditing of resident medical records for the most recent vaccination information. Defined roles also serve to structure implementation processes and influence peers by sharing positive experiences.

A random survey of nursing directors from 291 Pennsylvania nursing homes conducted between April and June 1999 listed the following factors associated with higher vaccination levels:<sup>14</sup>

- Strong belief in the importance and effectiveness of the vaccine
- Development of institutional policies related to assessment, consent, and orders
- Identification of a staff vaccine advocate
- Concentration on effective practices rather than on basic information about the vaccine
- Use of a resident management system, prompting staff to assess vaccination status and order vaccinations
- Knowledge of financial reimbursements

### Practice-Proven Strategies Increase Vaccine Availability and Acceptance

Many residents remain unvaccinated because of missed opportunities. Every healthcare encounter is an opportunity to offer vaccines to eligible residents and new admissions.<sup>15</sup> Historically, ACIP recommended that influenza vaccine should be offered beyond the traditional fall immunization season (October into January and beyond). Adherence to traditional timing is no longer recommended, and the vaccine should be given as soon as available until the end of the influenza season (April/May), depending on activity.

That this recommendation clearly differs from practice is made evident by a 2000 national survey of 1,606 physician practices regarding influenza vaccine in which Davis et al. report that 43% of respondents stopped vaccinating in December and only 27% vaccinated into February.<sup>16</sup> Medicare began coverage for pneumococcal vaccine in 1981 and for influenza immunizations in 1993 with no coinsurance or copayment.<sup>11</sup> A direct personal recommendation from healthcare providers has been shown to increase immunization rates among residents who are opposed to vaccination. Although education alone does not significantly affect vaccination rates, medical and support staff who are up-to-date in their knowledge are more likely to immunize themselves and to credibly encourage residents to consent to vaccination.<sup>15</sup>

O'Connor et al. describe decisional conflict associated with vaccination in a 2004-2005 survey of direct care providers and in a systematic review of 55 randomized

controlled trials on patient decision-making interventions published between 1983 and 2006. These studies concluded that uncertainty regarding healthcare decisions can be resolved by identification of individual support and clinical counseling needs, by presentation of clear and compelling evidence about vaccination risks and benefits by a strong clinical champion, and through the use of decision aids such as persuasive testimonials, posters, brochures, videos, and vaccination events for families and residents.<sup>17,18</sup>

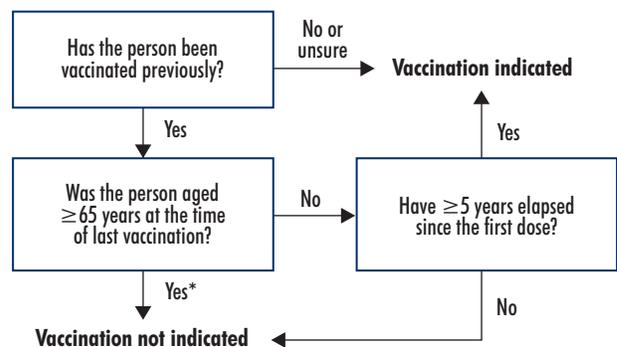
CDC produces vaccine information statements (VISs)—or information sheets—that explain both the benefits and the risks of vaccine administration. Federal law requires that the facility provide VISs to residents or their legal representatives before influenza vaccinations are given. VISs are available online for PPV and influenza vaccine at <http://www.cdc.gov/vaccines/pubs/vis/default.htm>. Furthermore, CDC provides a decision-making algorithm with recommendations for PPV, revaccination, and uncertain vaccine status for individuals age 65 or older. (See Figure.)

An important process in the transition of care between hospitals and LTC facilities is documentation of a resident's vaccination history in the medical record and on the transfer form. Improvement in this process will clearly enhance identification of the resident's vaccination needs and prevent revaccination.

### Vaccine Safety and Effectiveness

An observational study of more than 140,000 older adults occurring over the 1998 to 1999 and 1999 to 2000 influenza seasons highlights the effects of influenza vaccine in reducing the exacerbation of comorbidities, demonstrating an almost twofold reduction in hospitalization and death rates due to underlying comorbidity.<sup>19</sup> Although comorbidities are associated with age-related decline in response to vaccines, these residents have the most to gain from

**Figure. Algorithm for Pneumococcal Polysaccharide Vaccination of People ≥65 years**



\*Note: For any person who has received a dose of pneumococcal vaccine at age ≥ 65 years, revaccination is not indicated.

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Reprinted from Centers for Disease Control and Prevention. Prevention of pneumococcal disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 1997 Apr 4;49 (RR-8):1-24.

immunization because many of the complications of influenza are the result of exacerbation of underlying condition.<sup>6</sup>

CDC reports that the risk of adverse events from repeated pneumococcal vaccinations, other than self-limited local injection site reactions, is minimal. A second PPV dose, administered two to five years after the first dose, does not represent a contraindication to revaccination, and the vaccine should be administered to residents who are uncertain of their immunization history.<sup>2</sup>

See “Novel Influenza A (H1N1) 2009 Vaccine Use in the Elderly” for information about the novel influenza (H1N1) virus.

### Overcome Barriers to Success—Systems Interventions

An improved vaccination program is achievable with implementation of a structured process. A systematic review of evidence-based recommendations to increase the influenza and pneumococcal vaccination rates in the over-65 age group was published in 2003 by the Rand Corporation for the U.S. Department of Health and Human Services. Reviewers examined categories of interventions that included organizational changes in clinical procedures; the designation of a nurse to administer vaccines; the use of reminders, feedback, education, and financial incentives; regulatory and legislative mandates; and media campaigns. The review concluded that multifaceted organizational changes (e.g., standing orders,

provider reminders) most consistently produce the greatest increase in vaccination program effectiveness. Vaccination reminders can take the form of electronic or paper-based warnings, flags, or stamps on charts of residents who need vaccines. Resident reminders that are personalized by their physicians have a high rate of success. The organization’s on-hold telephone message can include information about vaccination during the influenza season. Mass mailings, posters, leaflets, computer-based programs, and postcards are useful when combined with other high-level interventions such as standing orders.<sup>20</sup> The Agency for Healthcare Research and Quality<sup>21</sup> and CDC<sup>22</sup> offer immunization toolkits detailing development and implementation of a LTC immunization program, sample guidelines, education brochures, campaign materials, and customizable standing order forms. The American Medical Directors Association published the *Immunizations in the Long Term Care Setting Tool Kit* in 2006, offering guidance, information, and tools to enable medical directors and other practitioners to take the lead in initiating and implementing activities to address and prevent influenza and pneumococcal disease in LTC facilities. The document is available at <http://www.amda.com>.

### Standing Orders

On October 2, 2002, CMS published an interim final rule removing the physician signature requirement for influenza and pneumococcal vaccinations from its Conditions of Participation. Some LTC facilities are unaware of this and continue to send

## Novel Influenza A (H1N1) 2009 Vaccine Use in the Elderly

The H1N1 “swine flu” novel influenza virus, initially identified in April 2009 in two children in California, progressed to uncontained worldwide transmission by June 2009 and is expected to continue to spread into the 2009-2010 fall and winter influenza season. The pandemic was declared to be an emergency by the U.S. Department of Health and Human Services in April 2009; the emergency declaration was extended in July 2009.<sup>1</sup> The Advisory Committee on Immunization Practices determined that the new H1N1 vaccine will initially be targeted to five specific priority groups and subsequently to a subset group.<sup>2</sup> The remaining available vaccine will then be offered to members of the over-64 age group. The rationale for this determination is that in contrast to seasonal influenza, the new H1N1 virus accounted for only 5% of hospitalizations and 8% of reported deaths in the over-65 age group, including residents in long-term care facilities where healthcare personnel worked while ill with H1N1, according to July 2009 unpublished data from the U.S. Centers for Disease Control and Prevention (CDC). CDC explains that results of serologic tests suggest that adults age 60 years or older may possibly possess some level of preexisting immunity to the novel

H1N1 strains as a result of previous vaccination or infection with an influenza A (H1N1) virus that is more closely related to the novel influenza A (H1N1) virus than the current seasonal H1N1 strains.<sup>2</sup> The August 2009 *Morbidity and Mortality Weekly Report* describes a low 33% to 43% response to H1N1 vaccine in the over-60 age group.<sup>2</sup> A July 2009 amendment to the Public Readiness and Emergency Preparedness Act, or PREP, provides targeted liability protection for the administration of the vaccine.<sup>1</sup> For more information on H1N1 novel influenza virus, visit the Pennsylvania Department of Health information Web site at <http://www.h1n1inpa.com>.

### Notes

1. United States Department of Health and Human Services. Public Readiness and Emergency Preparedness Act. Fed Regist [online] 2009 Jun 29 [cited 2009 Oct 15]. Available from Internet: <http://edocket.access.gpo.gov/2009/E9-14948.htm>.
2. Centers for Disease Control and Prevention. Use of influenza A (H1N1) 2009 monovalent vaccine: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 2009 Aug 28;58(RR-10):1-8.

out verbal orders for every resident.<sup>11,20</sup> Goldstein et al. noted that obstacles to adoption of standing order policies include providers who are unconvinced of vaccine benefits, physician discomfort with delegation of responsibility to nursing, lack of administrative support, need for examples of policies and forms, proof of regulatory requirements, resident refusal, and program expense.<sup>23</sup> A Health Care Financing Administration systematic literature review spanning 1998 to 2003 assessed the evidence of interventions designed to improve vaccination rates and showed that in nearly every study, organizational changes that included standing orders improve vaccination rates.<sup>20</sup>

ACIP recommends that standing order programs be used in LTC facilities to ensure the administration of recommended vaccinations for adults as a national public health priority. Nurses and pharmacists are authorized to administer vaccinations without the need for a physician's examination or direct order under the supervision of a medical director according to an institution- or physician-approved protocol. Based on the strength of available evidence, successful standing orders programs begin with the formation of a committee to develop a program plan and write protocols for the following procedures:<sup>24</sup>

- Assessment of residents eligible for vaccination based on their age, vaccination status, and risk factors
- Education of residents or their guardians regarding the risks and benefits of vaccine administration
- Documentation of patient refusals and medical contraindications
- Recording the administration of vaccine(s) and any postvaccination adverse events
- Documentation of education and vaccine administration
- Training and competency of healthcare professionals who administer vaccines to screen patients for vaccination contraindications, to monitor adverse reactions, and to report adverse events to the federal Vaccine Adverse Events Reporting System (VAERS) at <http://www.vaers.hhs.gov> (CDC uses information from VAERS reports to ensure the safest vaccine use strategies and to further reduce the rare risks associated with vaccines.)
- Use of a standard personal and institutional immunization record to verify the immunization status of patients and to reduce the risk for inappropriate revaccination
- Implementation of a quality assurance process to maintain appropriate standards of care

In a 1996 survey of 405 primary care physicians specializing in geriatrics, family practice, internal medicine, and general practice, 66% of physicians favored a standing order policy to immunize their eligible patients.<sup>25</sup> Preprinted admissions orders could improve the effectiveness of the program, encouraging staff members to assess the vaccination status of

patients and to provide information about the risks for and benefits of administering vaccinations routinely upon admission to facilities.<sup>23</sup>

### Consent

Written consent is not required before administration of vaccines, according to the Pennsylvania Medical Care and Reduction of Error (MCARE) Act of 2002, as amended.<sup>26</sup> Kissam et al. note that obtaining signed consent sets a precedent for an unnecessary impediment to implementation of a standing orders program. The authors also note that requiring consent before administering low-risk, high-benefit vaccines is inconsistent with the current practice of not requiring signed consent before prescribing other common low-risk treatments such as routine oral medications. Requiring written consent inappropriately gives the impression of risk beyond normal standards, takes substantial and precious staff time, and paradoxically discourages residents from receiving the vaccine. Informed consent is provided by the required provision of the VIS.<sup>27</sup>

### Outcome Measures/Documentation

Outcome measurement by means of standardized data collection is an essential process to evaluate success and maintain a sustainable immunization program. CDC recommends that each resident's chart include a permanent individual vaccination record providing a history of vaccination events from admission through discharge, immunization status on admission, the date vaccinated or reason for refusal, and adverse reactions. Standardized data collection logs provide reliable metrics to determine process and outcome measures such as the number of residents with up-to-date vaccinations, the number of new arrivals vaccinated, the baseline immunization state of current residents, the number of residents not vaccinated, and the reasons why. A facility vaccination registry would allow improved ease of reporting on vaccination rates and declination reasons. Program effectiveness is also measured by surveillance data for influenza-like illness and lower respiratory tract infections for residents and staff, the number of training sessions for staff, as well as assigned versus actual completion of program tasks. An annual written evaluation of the vaccination program compared to previous years is suggested to provide feedback to providers and personnel to motivate higher performance and set new goals.<sup>22</sup>

### Successful Outcomes

In August 2009, the Authority conducted interviews of a sample of LTC facilities reporting vaccination rates over 90%. Twelve facilities participated in a telephone questionnaire discussing strategies that led to their successful vaccination program. Examples are as follows:

Gwynedd Square Center for Nursing reported vaccination rates of 99% for influenza and 100% for PPV, attributing its success to the use of standing orders and a facility vaccination information log and nursing support of detailed resident assessment and vaccination throughout the influenza season. Residents,

families, and staff receive education and handouts at admission, at resident council meetings, and at orientation. Vaccination status is reviewed at the resident care conference. Critical to success was the active involvement of the owner, the administrator, and a committed staff, 63% of whom have more than five years longevity.

Tel Hai Retirement Community reported a 95% influenza vaccination rate and a 98% PPV rate using standing orders, with onetime orders for annual influenza vaccines and PPV and a onetime consent on admission, as well as education with VIS. A standardized process for follow-through with reminders, documentation, orders, logs, audits, and risk assessments contributes to a successful program.

Davis Manor, with a 98% influenza vaccination rate and a 100% PPV rate, obtains a onetime order on admission and attributes its success to the use of an individual resident vaccination record and constant monthly chart and vaccination log audits. Interviewed

facilities also incorporate strategies such as an annual in-service by the medical director, physician interviews with declining residents, education at an annual safety fair, and use of a declination form for employees. (See “Improving Healthcare Worker Vaccination Acceptance.”)

## Conclusion

Immunization is the primary method of preventing invasive pneumococcal diseases as well as influenza and its more severe complications. Despite documented vaccine safety and numerous regulatory efforts, the rate of vaccination among high-risk institutionalized elderly has not substantially improved. Vaccination program success can be enhanced and sustained by applying facility-specific comprehensive strategies such as standardized documentation, standing orders, provider reminders, and vaccine champions and by replacing complicated written consent procedures with informed consent via the VIS.<sup>15</sup> LTC facilities can extend the

## Improving Healthcare Worker Vaccination Acceptance

Transmission of influenza to patients by healthcare workers is well documented,<sup>1</sup> and healthcare settings are favorable environments for outbreaks of febrile respiratory illness. Achieving healthcare worker vaccination levels of 60% or higher is a Healthy People 2010 goal.<sup>2</sup> In a 2007 national health interview survey, 45% of healthcare workers self-reported that they protect their patients by getting immunized against influenza; the remaining unvaccinated 55% greatly increase the risk of spreading influenza virus in healthcare facilities.<sup>3</sup>

The Joint Commission advocates the prioritization of staff immunization programs over resident programs because the virus can be shed at least one day before symptoms start. Vaccination provides a reduction in influenza-like illness (ILI), fewer days of illness and absenteeism, and a decrease in impaired work performance and emphasizes a professional obligation to minimize the risk of virus transmission to patients, to vulnerable coworkers, and to family members. The 1999 Joint Commission collaborative tool “Providing a Safer Environment for Health Care Personnel and Patients through Influenza Vaccination”<sup>4</sup> describes high vaccine acceptance resulting from visible marketing strategies and active promotion of annual educational campaigns (e.g., e-mails, newsletters, screen savers, gift card incentives).

Data from staff surveys that determine reasons for vaccine acceptance can be used to design future campaigns. Staff feel supported during the decision-making process when provided with facts that clarify personal issues such as fear of needles, avoidance of medication, and peer pressure. Access to vaccination is improved by the use of mobile carts on all shifts or when it is linked to a group activity. Signed declinations with statements of declination risks and of leadership expectations

indicate the organization’s commitment to the program and motivates acceptance of the vaccine. A sample declination form is available at <http://www.immunize.org/catg.d/p4068.pdf>. Leadership commitment is ensured by the involvement of a program leader, role models such as administrators who are photographed getting vaccinated or vaccine “deputies.” Feedback to the staff and the governing body is measured by the impact of vaccination rates related to surveillance of ILI in patients and staff.

## Notes

1. Fiore AE, Shay DK, Broder K, et al. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP), 2008. *MMWR Recommend Rep* 2008 Aug 8;57 (RR-7):1-60.
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## Disclosure: Understanding the Barriers to Communicating Unanticipated Outcomes



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The communication of an unanticipated outcome can be difficult and painful. Such occurrences can create emotional and psychological stress for everyone involved, and it is important to understand the underlying causes of these feelings in order to effectively disclose an adverse event or unanticipated outcome to a patient or his or her family.

The disclosure of unanticipated outcomes or events requires appropriate planning by healthcare professionals and organizations. In order to maintain the trust of the patient, it is critical that the healthcare practitioner communicate openly and honestly when an unanticipated outcome occurs. A specialized team with training and experience in disclosure can serve as an invaluable asset in this important communication process.<sup>1</sup>

In my role as Patient Safety Liaison for the Northwest Region of Pennsylvania, I have had the opportunity to discuss the disclosure process at several of the facilities in my region. This experience has demonstrated that the most effective disclosure programs involve a specialized team approach.

One of the successful programs I have observed is the Family Assistance and Communication Team (FACT) of the West Penn Allegheny Health System. FACT comprises several individuals who have experience with patient disclosures and family meetings regarding serious events and unexpected outcomes, including patient safety department staff, physicians, nurses, social workers, and patient representatives. The team is trained to offer guidance in planning and conducting a disclosure or family meeting. The level of involvement of the team can vary, from acting in an advisory capacity for the practitioner who requested the team's services to coordinating and participating in the entire disclosure process.

Regardless of its level of involvement in the disclosure process, the team has developed guidelines for disclosing unanticipated outcomes to patients that address the following information.<sup>2</sup>

### Why Disclose Unanticipated Medical Outcomes

It is important to disclose unanticipated medical outcomes for several reasons. First, it is the right thing to do. Patients are entitled to know the details of their

care, good or bad. Communication of unanticipated events helps to maintain the patient/physician relationship by creating a culture of openness and trust. Second, Vincent et al. discussed that many patients sue because they feel that their physician or hospital has not communicated openly with them and view a lawsuit as the only way to obtain answers to their questions; disclosure, if done well, can be a valuable communication tool.<sup>3</sup> Finally, Pennsylvania law requires that a healthcare provider disclose to the patient that an unanticipated outcome has occurred.<sup>4</sup>

### When Disclosure Is Appropriate

Disclosure is appropriate when outcomes differ from the results expected, even if the outcome is a known risk of the procedure.<sup>5</sup> Furthermore, the Pennsylvania Medical Care and Reduction of Error Act (MCARE Act 13 of 2002) requires "medical facilities in the state to provide written notification to a patient affected by a serious event."<sup>4</sup>

### Key Elements of Disclosure Discussion<sup>5</sup>

The facts of any event that may have occurred and any immediate treatment rendered should be discussed. This discussion is to be done as soon as possible, so the family does not speculate about what may have occurred and so that clear conveyance of regret is provided by the facility. Avoid any speculation or opinions regarding the care rendered by another healthcare provider. It is important to establish reasonable expectations for the family. Clarify any limitations of the conversation, such as the need for additional testing. Also, establish a reasonable time frame to obtain and communicate information, and strive to stay within those time frames. Finally, discuss steps already taken to prevent recurrence of similar events.

### Important Steps in West Penn Allegheny Health System's Disclosure Process<sup>2</sup>

1. Any unexpected outcomes should be reported to the Patient Safety Officer.
2. The discussion should involve an initial disclosure of the event, as well as follow-up disclosure. For the initial disclosure, a private setting should be selected and sufficient time for emotions, venting, and questions should be allowed. Typically, it is the attending physician or healthcare provider most directly involved in the event who makes the disclosure; however, that may vary.
3. The initial disclosure should occur as close to the time of the event as possible. The patient or the family of the patient should be provided with the facts known at the time of the discussion. The patient should be advised of any additional information that will be gathered, and your discussion should be limited to your area of expertise. Unless

you have been able to immediately obtain all relevant facts, the patient or his or her family should be advised that you will follow up once you have obtained additional relevant information.

4. Gather all the available facts surrounding the event.
5. As a follow-up disclosure, consider a family meeting that would involve additional health-care providers. Include a detailed review of the medical records, and offer to follow up with any additional facts that are not available initially.
6. If you have limited time, the patient or his or her family should be informed of that constraint at the beginning of the discussion, and another time for a follow-up conversation should be provided in the very near future.
7. If involved in a family meeting, some simple considerations may be helpful toward achieving a successful meeting, such as offering parking validation or beverages.

It is often the way the situation is handled and not the incident itself that leads to litigation.<sup>3</sup> The key is to step back and consider how you would want to be treated and to do whatever you can to assist the family through the process. Even if litigation is not avoided,

establishing open and honest lines of communication can prevent a breakdown in the patient/physician relationship and minimize hostility and the sense of betrayal that families often feel. Direct, honest, non-defensive communication can go a long way toward achieving an amicable resolution.

#### Notes

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## Do Community Wristbands Present a Patient Safety Risk?

Recently, the Pennsylvania Patient Safety Authority received the following query from a Patient Safety Officer (PSO) in Pennsylvania.

*Our organization is moving to standardize the armband colors per the suggestions from the Pennsylvania Patient Safety Authority. We've read about also taking the step of "not allowing patients to wear recognition armbands while in the organization" (e.g., pink breast cancer awareness bands, yellow Lance Armstrong bands). Does the Authority have evidence to suggest that events have been prevented by taking this step? Phrased another way, has the Authority received "near misses" indicating that the potential for error exists? The color bands we intend to purchase will be much wider than the recognition bands and will have the stamped verbiage of the reason for the band clearly listed (e.g., fall prevention, allergy). Please provide some evidence to assist us with our risk assessment as we move forward with our decision.*

From June 2004 to August 2009, there were no near misses (i.e., Incidents) or Serious Events reported to the Authority involving community wristbands (i.e., colored wristbands, not affiliated with healthcare color designations, pertaining to charity sponsorship or fashion). However, removing community wristbands from patients may avert potential confusion with hospital color-coded wristbands, particularly during an emergency. The Authority has received reports involving patients being admitted with colored wristbands applied by other healthcare facilities that may conflict with the admitting facility's policy. The Authority also has received reports from hospitals that standardized on the Color of Safety Task Force model, in which clinicians applied outdated or leftover wristbands that were not collected and disposed of during implementation of the new policy. Other reports submitted to the Authority describe events in which clinicians nearly failed to identify a hospital wristband color's designation, which could have had serious consequences. The reports indicated that confusion occurred when a clinician incorrectly placed a wristband on a patient or could not identify the meaning of a color-coded wristband.

In 2005, the Authority surveyed the PSOs of all Pennsylvania hospitals and ambulatory surgical

facilities. The 139 survey respondents represented one-third of the combined number of healthcare facilities. The survey solicited whether the PSOs' facilities required patients to remove community wristbands they may have been wearing outside the healthcare facility. One-third of the respondents said yes, 14% said sometimes, and more than half (53%) either said no or that they did not know.<sup>1</sup>

The Authority recognizes the potential for confusion between community wristbands and hospital color-coded wristbands if the community wristbands are inadvertently interpreted as hospital wristbands, resulting in inadequate or incorrect care being delivered to patients, particularly in emergent situations. Other sources of confusion may include situations when patients are transferred among facilities or when patients are cared for by clinicians who work in multiple facilities. Facilities may consider prohibiting community wristbands in the healthcare setting. If patients do not consent to the removal of these community wristbands, covering them may be a viable alternative.

The Color of Safety Task Force's *Patient Safety: Color Banding Standardization and Implementation Manual* standardizes the use of hospital color-coded wristbands and addresses consistency in wristband meanings. This manual also addresses hospital colored-coded wristband application and the potential problems that may arise.<sup>2</sup> The manual, other patient safety tools, and articles published in the *Pennsylvania Patient Safety Advisory* constitute a color-coded wristband toolkit available on the Authority's Web site at <http://patientsafetyauthority.org/EducationalTools/PatientSafetyTools/wristbands/Pages/home.aspx>.

### Notes

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# Quarterly Update on the Preventing Wrong-Site Surgery Project: Improving, but Still Room for Perfection

The latest update from the Pennsylvania Patient Safety Authority's reporting system database continues to show an encouraging decrease in the number of reports of wrong-site surgery (see Figure 1, which includes adjustments for late reports from previous quarters). The number of reports for the third quarter of 2009 was the second lowest quarterly total ever (the previous quarter's total was the lowest), and was the lowest-ever total for a third quarter, during which the resident training cycle traditionally starts. The total number of reports for the past six months (16) is lower than the previous average for three-month periods (16.9).

The trend toward fewer reports of wrong-site surgery reinforces the Authority's belief that the advice developed from the Preventing Wrong-Site Surgery Project is useful. As further evidence, the regional collaborative to prevent wrong-site surgery that was sponsored by the Health Care Improvement Foundation again reported no wrong-site surgeries since the first quarter, meaning that the participating facilities have had no such events in more than seven months. The collaborative's time without wrong-site surgery now exceeds 97% of its previous event-free intervals.

## Anesthetic Blocks

The 10 reports received in the third quarter all described problems previously addressed by the Authority. In particular, four events, like three of the six reported last quarter, were wrong-site anesthetic blocks (all reports have been edited for contextual deidentification):

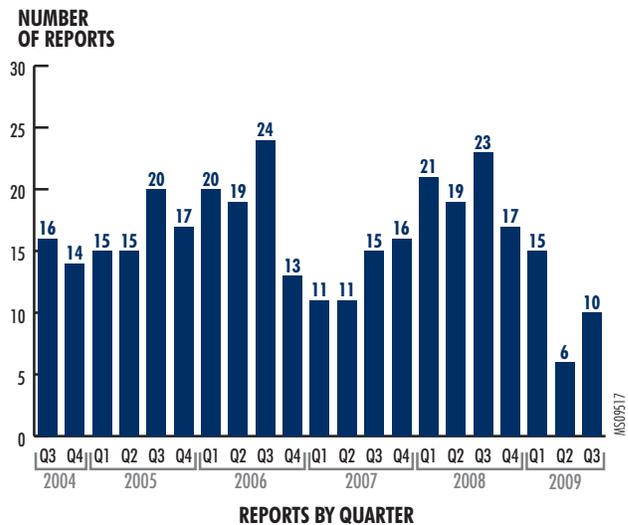
*A patient was scheduled for a surgical procedure of left hand under axillary block. The anesthesiologist blocked the right arm. The correct arm, left, was marked appropriately. The error was discovered by the anesthesiologist after initiating the block.*

*A patient was brought to the OR [operating room] after being identified by the attending surgeon. The informed consent was reviewed. Prior to the time-out identifying the eye to be operated on, a peribulbar block was inadvertently performed on the right eye by the surgeon; the left eye was marked. The error was realized by the surgeon. The left eye then was blocked, sterilely prepared, and draped in the usual manner. The time-out was performed.*

*A patient was scheduled for left cervical injection. The time-out was done prior to procedure, and all parties, including the patient, verified the procedure was to be done on the left side. The physician injected the right side. He did not mark the site. The patient asked after the procedure why the right was injected rather than the left.*

*A patient was admitted for surgery [on the right knee]. The patient was seen by the anesthesiologist,*

**Figure 1. Pennsylvania Patient Safety Authority Wrong-Site Surgery Reports by Quarter**

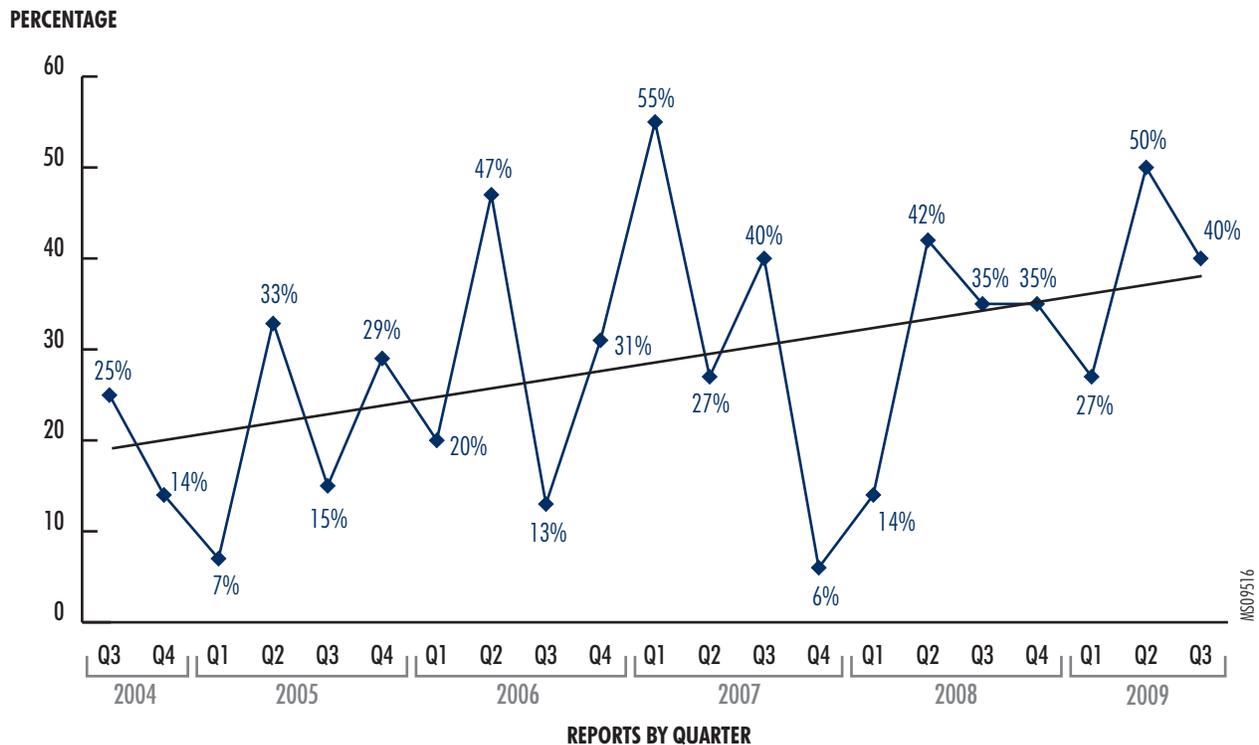


*who asked the patient which knee was to be operated on. The patient stated "left." The anesthesiologist performed the nerve block on the left side. The patient was taken to the OR for the right-knee surgery and it was determined the nerve block was done on the wrong side.*

Whereas wrong-site blocks constituted 20% of the wrong-site events in the first six months of data reporting to the Authority, they accounted for 44% of wrong-site events in the most recent six months of reporting (see Figure 2), suggesting that the implementation of best practices to prevent wrong-site blocks lags behind other efforts to prevent wrong-site surgery (the p value for the linear regression is 0.06, just above the cutoff for statistical significance). Doing a formal time-out before an anesthetic block could potentially eliminate about 27% (92 of 337) wrong-site errors in the surgical suite. However, based on the data from the Preventing Wrong-Site Surgery Project, a time-out before an anesthetic block does not eliminate the need to do a time-out just before the start of the surgical procedure, with the site marking visible in the prepped and draped surgical field, as illustrated by two other reports from this quarter.

*The patient consented [to] and verbally affirmed procedure on L side lumbar area. The patient was brought to the OR. The time-out was conducted with all members of surgical team present. All members agreed. The patient was moved onto table and positioned in the prone position. The patient tolerated the procedure well and was transferred to the PACU [postanesthesia care unit]. The physician met the patient and staff in PACU and explained he had done the procedure on the wrong side.*

**Figure 2. Percentage of Wrong-Site Surgery Reports That Describe Wrong-Site Anesthesia Blocks**



The side (left) was marked by the surgeon. When the perineal area is the operative site, the hand is marked by the surgeon after checking consent, reading note, and confirming with patient. The hand is left undraped during procedure for confirmation of side. In this procedure, the doctor did not place the mark on the hand; he marked it on the forearm. The patient was taken to the OR and positioned on table. The surgeon made the incision without a formal time-out. The surgeon asked which side. Without rechecking consent or site marking, the nurse stated the right side. The doctor [explored right side]. There was no evidence of pathology noted. Rechecked note. Completed procedure on left.

The 2010 revision of the Joint Commission’s Universal Protocol does not help the confusion, in the Authority’s opinion, about when to do the time-out. The 2009 version states that the time-out should be done before the start of anesthesia; the 2010 version reverts to stating that the time-out should be done before the incision.<sup>1</sup> Based on multiple studies from the Preventing Wrong-Site Surgery Project,\* the Authority strongly advises that a formal time-out be done

with the anesthesia provider just before any anesthetic block and that another time-out be done with the surgeon just before the incision, unless the surgeon performs the anesthetic block and incision in continuity after the surgical field has been prepped and draped.

### Spinal Surgery

Wrong-level spinal surgery continues to represent roughly 10% of the wrong-site surgery events reported to the Authority. This quarter, the Authority received two reports. Also, two parties requested that the Authority give suggestions on how to avoid this problem, which cannot be solved just by following the Universal Protocol, because the site (level) verification occurs intraoperatively. The North American Spine Society (NASS) suggests an intraoperative imaging study, after surgical exposure of the operative site, using markers that do not move, to confirm the vertebral level to be operated on, with a radiologist’s interpretation as well as the surgeon’s.<sup>2</sup>

The Authority advises the following, which summarizes its findings and the NASS checklist:

1. Note the level on the schedule and on the consent form.
2. Have relevant existing imaging studies available in the OR.
3. As always, the surgeon should include in the preoperative time-out an explicit empowerment for team members to speak up if concerned.

\* The Pennsylvania Patient Safety Authority has a Web page devoted to educational tools for preventing wrong-site surgery (available at <http://www.patientsafetyauthority.org/EducationalTools/PatientSafetyTools/PWSS/Pages/home.aspx>). Its resources include all the Authority’s publications on the subject, including self-assessment tools, sample forms and checklists, educational posters and videos, illustrative figures and tables, and patient education brochures, as well as links to information from other Web sites.

4. Conduct an intraoperative imaging time-out:
  - a. Localize the desired site with an immobile radiopaque marker, such as a needle in the bone or a Kocher clamp on the spinous process.
  - b. Obtain and read an imaging study that confirms the site exactly.
  - c. Have the imaging study also officially read by a radiologist before proceeding.

The Authority developed an addendum to the “Wrong-Site/-Side Surgery Error Analysis Form” that addresses wrong-level spine surgery and that is now on the Authority’s Web site. Facilities should consult these additional questions when wrong-level spinal surgery has been done.

**The Wrong-Site Surgery Consultation Program**

The Authority has begun an on-site consultation program for Pennsylvania facilities that wish to analyze their vulnerability for wrong-site surgery, particularly

following a wrong-site event (or a close call). Requests can be made by contacting the Authority office or the regional Patient Safety Liaison. The Authority clinical specialists will assist facilities in assessing their policies and procedures, measuring staff compliance, and conducting a thorough analysis of any events.

The Authority remains committed to eliminating wrong-site surgery.

**Notes**

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## Corneal Abrasion Injuries

In response to an inquiry by a Pennsylvania health-care facility Patient Safety Officer, staff from the Pennsylvania Patient Safety Authority identified 231 reports that indicated corneal abrasions had occurred between June 2004 and August 2009. Corneal abrasion is the most common ocular injury occurring in the perioperative period.<sup>1</sup> Most of the Authority reports (81%) were recognized in the perioperative setting. However, 19% of the reports occurred in diverse care areas such as the medical intensive care unit, the emergency department, on telemetry floors, in radiation oncology, and in labor and delivery wards, leading to the conclusion that all staff should be able to quickly identify, report, and treat corneal abrasions.

See Tables 1 and 2 for the number of reports received by the Authority.

Closed claims analysis in 2006 from two major anesthesia-related malpractice databases showed that ocular injuries, in general, account for 3% to 8% of anesthesia-related malpractice claims.<sup>2</sup> In 2007, Agency for Healthcare Research and Quality national statistics showed superficial corneal injuries occurred in approximately 1.5% of all hospital discharges; however, not all of these cases represent iatrogenic injuries because some may have been present on admission.<sup>3</sup>

The lack of information about corneal abrasions prevents the Authority from making new insights about this problem. Reports that are more detailed might be helpful in determining how and why these injuries occur.

### Notes

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**Table 1. Reports Submitted by Year**

YEARS	TOTAL	PROJECTED
2004	16*	
2005	47	
2006	34	
2007	44	
2008	52	
2009	38	62†
<b>Total</b>	<b>231</b>	<b>255</b>

\* Partial year data (6 months)

† Projection for 2009 based upon 32 weeks of data extrapolated over 52 weeks

**Table 2. Corneal Abrasions by Event Type (Actual Reports June 2004 to August 2009)**

EVENT TYPE	GRAND TOTAL
Medication error	6
Fall	1
Error related to procedure/ treatment/test	23
Complication of procedure/ treatment/test	142
Skin integrity	9
Other/miscellaneous	50
<b>Grand Total</b>	<b>231</b>

In order to provide open critique and feedback, the *Pennsylvania Patient Safety Advisory* welcomes letters to the editor, either in response to previous published articles or as questions or comments or alternative opinions consistent with the objectives of the *Advisory*. Correspondence should be addressed to PO Box 706, Plymouth Meeting, PA 19462-0706, USA, or [support\\_papsrs@state.pa.us](mailto:support_papsrs@state.pa.us).

All correspondence must include the author's names and contact information. All letters will be acknowledged. The decision to publish a letter is at the discretion of the editor, who also reserves the right to edit the correspondence. Authors will have to state any potential conflict of interest prior to publication of any correspondence as well as conform to the confidentiality, formatting, and style requirements of the *Advisory*.



## Online Resources Associated with Patient Safety Advisories

**Patient Safety Officers have expressed their interest in distributing educational resources within their healthcare facilities. The Pennsylvania Patient Safety Authority provides a growing collection of resources related to *Pennsylvania Patient Safety Advisory* articles to help increase situational awareness and patient safety within healthcare facilities. Examples include sample policies, educational videos and posters, brochures, interactive learning graphics, and reference materials.**

This collection of resources is available online at <http://www.patientsafetyauthority.org>. Topics addressed include the following:

- ▶ Preventing wrong-site surgery
- ▶ Verbal orders
- ▶ Contrast-induced nephropathy
- ▶ Expressed breast milk
- ▶ Hospital bed safety
- ▶ Skin tears
- ▶ Color-coded wristbands
- ▶ Common hazards in the behavioral health patient room

*More improvement comes from improving a system than improving the performance of individuals within an existing system.*



Whether you would like to learn more about the topics described above, or you need tools to help you meet other challenges, these educational resources can help.

If you would like additional information, please contact us at (866) 316-1070, or e-mail [support\\_papsrs@state.pa.us](mailto:support_papsrs@state.pa.us).

# PENNSYLVANIA PATIENT SAFETY ADVISORY

## 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 Web site 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 40 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.