



Tuesday, March 11, 2008

2007 Annual Report of Hospital Adverse Events

Introduction

Since 2006 the Patient Safety Commission has worked with Oregon hospitals to systematically collect information about adverse events (which some people call medical errors). In the process we have created a unique data set that includes details about what happened, what was learned when hospitals investigated events, and what remedies hospitals put in place to avoid the next problem. This report provides an overview of findings from 2006 through December 2007.

About the Patient Safety Commission

The Patient Safety Commission is an organization with a single mission—to help reduce the risk of patient harm in Oregon’s healthcare system. We strongly believe that we represent a necessary means of improving patient care in Oregon. Our focus is the delivery system; our role is to offer practical ways to learn from mistakes, to eliminate unnecessary variation, and to introduce and champion best practices.

The Commission is governed by a 17-member board of directors appointed by the Governor and confirmed by the Senate. The board represents a cross-section of diverse health care interests in the state. As such, the Patient Safety Commission offers an independent viewpoint on quality of care in Oregon.

While we remain a small organization, we continue to make real progress. Our reporting program for hospitals is solidly underway, and we’ve had success in expanding that program to nursing homes and ambulatory surgery centers. We’ve also demonstrated an ability to create consensus solutions to important patient safety problems, and we’ve proposed an ‘audacious’ patient safety goal for the state. As a result of our collective efforts we’ve begun to gain a national reputation for doing innovative patient safety work. For example the Patient Safety Commission is highlighted in the November/December 2007 issue of the Commonwealth Fund’s bimonthly newsletter, [States in Action: Innovations in Health Policy](#).

Patient Safety Made Real. A story:

Patient safety is about avoiding harm while providing complex care that can include hundreds of details. It is about teamwork and about communication. It is about thoughtful diagnosis and quick response. It is about embracing new *best practices* without losing sight of the accumulating wisdom of the discipline. But mostly it is about patients:

In 2007 a woman in an Oregon hospital gave birth to a premature baby. Weighing less than two and a half pounds the baby was in trouble right from the start. His skin was bluish, his arms moved only weakly, and his facial features remained unresponsive. As the baby was rushed to the hospital's critical care unit he was connected to a breathing machine. The doctors watched the color return to the baby's fingers, took their own deep breaths and began working to stabilize him for the long haul.

One task was to install a catheter (a small tube) so they could administer needed medications. Placing a PICC line (peripherally inserted central catheter) in such a tiny baby is difficult. The first step was to administer a 0.06mg dose of morphine sulfate. The drug was given, but the attending physician was unable to insert the line. Needing to treat another patient, the physician asked the neonatal nurse practitioner to re-attempt the line placement when she had time. Later that afternoon the nurse practitioner had a break in her busy schedule so she dressed in a sterile gown, told the RN that she was ready to do the procedure, and verbally said to give the 'same dose as before' (referring to the pre-procedural morphine sulfate). Being a good team member, valuing efficiency, and seeing the Nurse Practitioner ready to act, the RN inquired, 'Point six?' based on her recall of the previous order. The Nurse Practitioner said yes. Given her good memory and the assent of a trusted colleague, the RN drew up 0.6 mg of morphine sulfate without looking at the baby's chart. She then requested verification from another RN who also affirmed the order, this time based on what she had heard spoken. With everything appearing to be in order the primary RN administered the medication. Immediately the baby had a respiratory arrest, and his heart rate slowed precipitously. CPR was initiated, additional medications administered....

At first, this case seems cut and dried. The nurse had a memory lapse, didn't follow procedures and misplaced the decimal point. This mistake is so common as to have a name: "the darned decimal." But consider the entire scene—the baby's frail condition, the heightened sense of urgency within a critical care unit, the level of trust required to work in such stressful circumstances, the inability of the physician to insert the initial PICC line, the need to juggle so much information, the ever-changing members of the medical team—and the picture becomes less clear. That such a tiny baby was alive at all is a testament to our health care system. That a team of highly skilled and knowledgeable professionals might make an error amidst the hubbub of providing such care starts to make sense. Perhaps too, this story (which really happened) might offer some insight into the Commission's role of offering systems-based, non-punitive solutions to complex problems. *Now, to our annual report:*

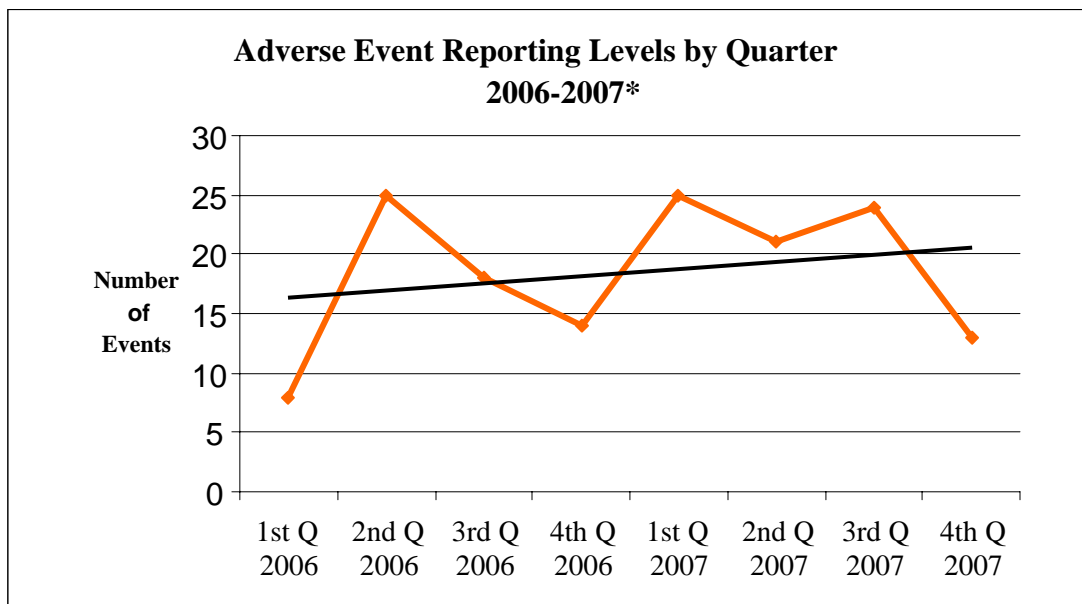
Hospital Participation in the Commission's Reporting Program

In 2007, 54 of Oregon's 57 acute care hospitals participated in the Commission's voluntary reporting program (in 2008 the 55th hospital agreed to join). These 54 hospitals provide 99% of the hospital care provided in Oregon:

Participation in Hospital Reporting Program - 2007			
Size of Hospital	Hospitals in Oregon	Number (and percent) of Participants	Percent of all hospital discharges represented by participants
Small 0-3000 Discharges	30	27 (90% of size class)	9.8%
Medium 3001-10,000 Discharges	16	16 (100% of class)	27.2%
Large 10,000+ Discharges	11	11 (100% of class)	62.3%
Totals	57	54 (94.7%)	99.3%

Frequency of Reporting

In 2007 the Commission received reports of 94 adverse events, eleven of which actually occurred in 2006. For the purposes of this summary, we've classified reports by year of occurrence—therefore we had 65 events in 2006 and 83 events in 2007, a 28% increase between the two years (because of this reclassification we actually understate our progress. It would be fair to say that the actual number of reports submitted increased 74% between 2006 and 2007 – from 54 reports to 94). Overall we've had 148 reports submitted by participating hospitals:



*Because we now classify events by date of occurrence, these numbers might be different than previous reports.

We are encouraged by the increase in reporting, and we expect this trend to continue. By way of context, the 2007 hospital numbers compare favorably to the adverse event reporting programs of other states. For example, Minnesota has a much discussed *mandatory* program. Between October 7th, 2006 and October 6th, 2007, that program received 125 adverse events. If those

numbers are adjusted by patient days (2.8 million patient days in Minnesota versus 1.46 million in Oregon) then Oregon’s 2007 totals are very similar to Minnesota’s. Even taking into account the different definitions of reportable events between the two states suggests that the programs are seeing similar results.

Another way to consider the frequency of reports is to look at the pattern of hospitals that have not yet submitted any reports. Over time we would expect all hospitals to have had at least one reportable event and to have shared information about that event with the Commission.

At least one event reported in first two years of program?			
Hospital Size	Hospitals signed up	Submitted at least 1 report	No reports submitted
Small (0-3000 discharges)	27	15 (56%)	12 (44%)
Medium (3001-10,000 discharges)	16	10 (63%)	6 (37%)
Large (over 10,000 discharges)	11	11 (100%)	0%
TOTALS	54	36 (67%)	18 (33%)

To date, two-thirds of Oregon hospitals have shared adverse event reports with the Commission. Should we have seen more? In truth it is not easy to establish what the “right” number should be. The overall pattern seems to make sense—hospitals that have not yet reported tend to be smaller facilities. They see fewer patients and, since serious adverse events are relatively rare, these smaller facilities are probably less likely to have experienced any. For another perspective, let’s revisit Minnesota’s reporting experience. Even acknowledging that they have a stricter definition of reportable events, upwards of 70% of hospitals have not yet submitted even a single report to that state’s mandatory reporting program. Still we are concerned about the possibility of under-reporting in Oregon. The Commission intends to explore this issue more thoroughly in the coming months.

Adverse Events by Hospital Size

In 2006—our first year of reporting—we received a higher-than-expected number of reports from smaller hospitals. In 2007 the pattern of reporting more closely follows patient volume—large hospitals provide 62% of hospital care (based on discharges) and now account for about 64% of the adverse event reports.

Number of Adverse Events			
Hospital Size	2006	2007	Expected*
Small	23 (35.4%)	11 (13.3%)	11%
Medium	13 (20.0%)	19 (22.9%)	27%
Large	29 (44.6%)	53 (63.9%)	62%
Totals	65	83	100%

* Assuming adverse events are proportional to number of discharges

What Types of Events are Being Reported?

All adverse event reports are assigned an “event type” by the participating hospital and double-checked by Commission staff. The pattern of events for 2006 and 2007:

Frequency of Adverse Events -- 2006 and 2007			
Event Types	2006	2007	Combined Percent
Retained object	13	15	18.9%
Wrong site procedure	7	8	10.1%
Medication	8	7*	10.1%
Fall	4	10	9.5%
Infection	6	7	8.8%
Perinatal event	3	7	6.8%
Equipment-related	4	3	4.7%
Patient protection event	1	4	3.4%
Low blood sugar	0	2	1.4%
Blood incompatibility	0	2	1.4%
Wrong procedure	2	1	2.0%
Newborn jaundice**	2	1	2.0%
Pressure ulcer	1	0	0.7%
Other***	14	16	20.3%
<i>Totals</i>	65	83	100%

*In three reported events, a medication error was also noted, for a total of 10 events that included medication errors.

** Technically referred to as Neonatal hyperbilirubinemia

*** The “other” category is large because it includes unique events for which more detailed categorization might violate facility confidentiality.

Over the last two years, five types of events have accounted for nearly 60% of the reports:

- Retained Objects (18.9%)
- Wrong Site Procedures (10.1%)
- Medication Errors (10.1%)
- Falls (9.5%)
- Infections (8.8%)

Retained objects – This category refers to objects unintentionally left in a patient after surgery. Most cases involve sponges, but sometimes instruments or guide wires are left behind. Given the relatively large number of cases (28 in two years), the Patient Safety Commission tackled this issue head-on in 2007 by convening an expert panel to recommend better approaches. The panel’s guidelines, based on the strength of the literature and comments from those working in hospitals, were divided into three categories: practices *essential* to the prevention of retained objects, *preferred* practices, and practices that deserve *further discussion* and consideration. While the recommendations are focused upon decreasing the possibility of an unintentionally retained object, many are appropriate to promoting safe surgery in general. These consensus

recommendations were adopted by the Commission and shared with all hospitals in the state. The full report is available on the Commission’s [website](#).

Wrong site procedures – The Commission has received 15 reports of wrong site procedures (seven in 2006; eight in 2007). Such events include wrong site incisions, and wrong site anesthesia. In 2007 all but one of reported events were considered to be low-harm events, meaning the surgical team caught the problem early.

Medication errors – 15 events have been reported (eight in 2006; seven in 2007). For 2007, three additional events included medication errors in secondary roles. If these are included, then a total of ten adverse medication events occurred in 2007. Of these ten, five involved a wrong dosage, four involved the wrong drug and one reported wrong route of delivery (e.g. using an IV for a drug meant to be given via a stomach tube). One medication error resulted in death; one in serious permanent harm, and four in temporary serious harm.

Falls – Of the ten falls that occurred in 2007, eight involved serious harm; three resulted in death. All but one involved patients over the age of 65. Four were over the age of 80. The average age was 74.2.

Infections – Of the seven infections that occurred in 2007, five involved MRSA, an antibiotic-resistant staph infection. Five of the seven resulted in death (four involved MRSA).

The Impact of Adverse Events – Harm Levels

The Commission’s hospital reporting program is based on a two-tiered definition. First, participating hospitals must agree to share data about specific types of *serious adverse events*. These are defined as “any unanticipated, usually preventable consequence of patient care that results in patient death or serious physical injury.” In addition, the Commission encourages hospitals to report less serious adverse events and close calls. The following table provides an overview for 2006 and 2007 organized by ‘harm score’ (the shaded area represents “serious adverse events”):

Severity of Harm – 2006 and 2007				
Harm Level	2006	2007	Total	Percent
Death	21	24	45	30.4%
Serious Permanent Harm	3	5	8	5.4%
Serious Temporary Harm	15	25	40	27.0%
Moderate Permanent Harm	3	4	7	4.7%
Moderate Temporary Harm	8	5	13	8.8%
Minimal Permanent Harm	1	0	1	.7%
Minimal Temporary Harm	7	9	16	10.8%
No Detectable Harm	7	11	18	12.2%
TOTAL	65	83	148	100%

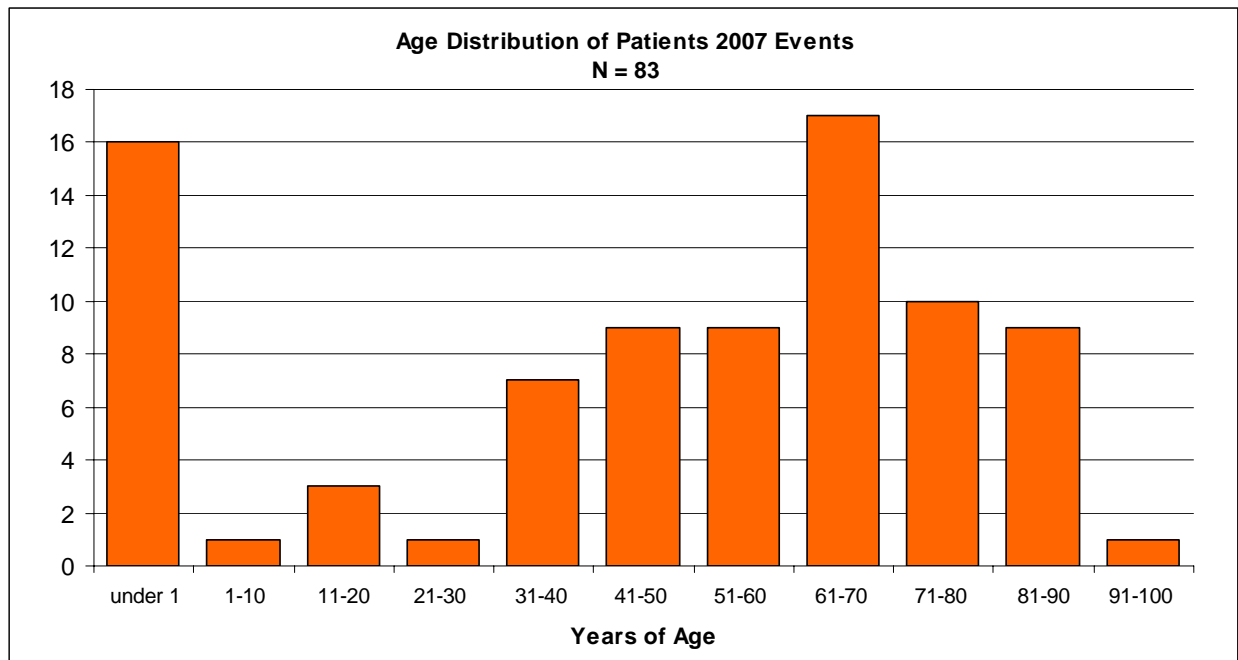
Since 2006 when the Commission’s program began, hospitals have reported 93 *serious adverse events* (the top three harm levels). Of these, 45 were linked with patient death (21 in 2006, 24 in

2007). In 2007 infections were associated with five of these deaths, four involved perinatal care, and three were linked to falls. The rest were scattered across a number of different categories.

Of the 24 deaths in 2007, 17 of the patients were male (70%). The average age (excluding those under age 1) was 55 for males and 51 for females. Most important, every single adult death from an adverse event was associated with a complex medical case (as judged by the number and type of co-morbidities). Errors are more likely in such instances—the patients are typically frailer, the number and difficulty of medical interventions greater.

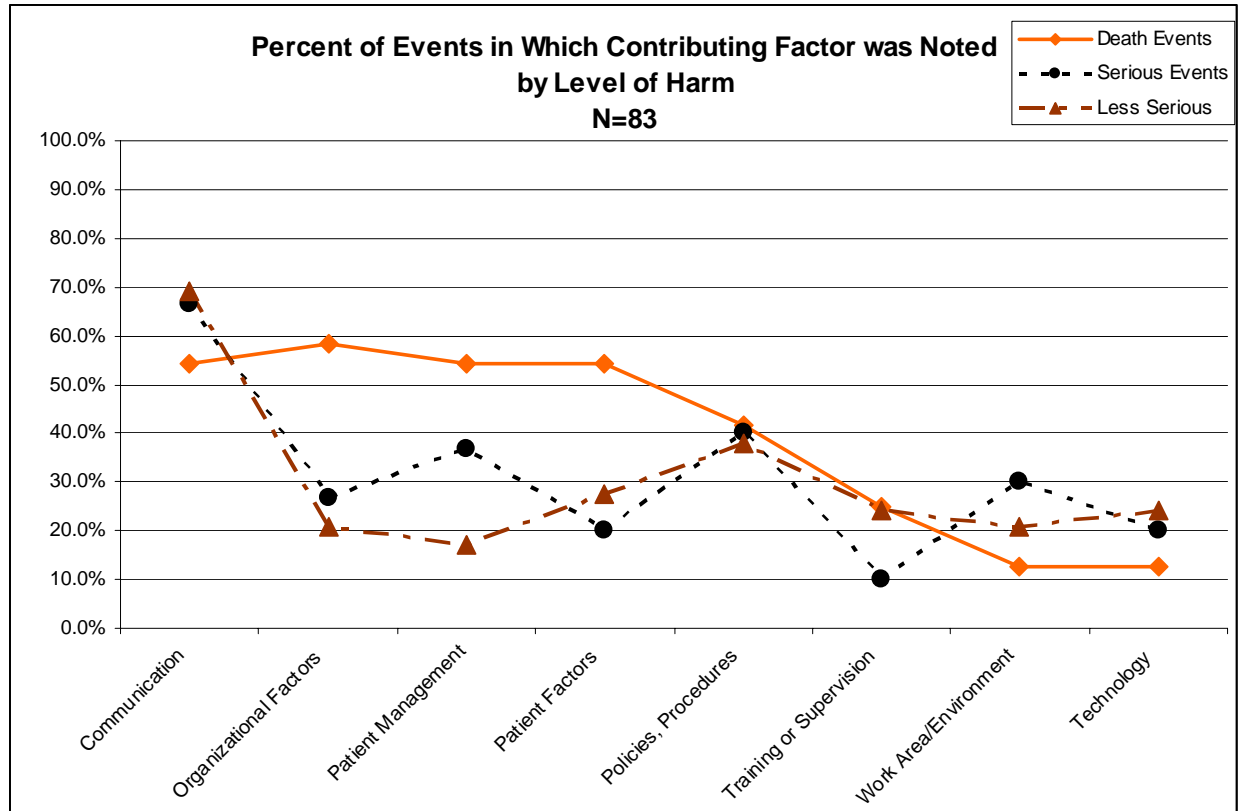
Who Suffers Adverse Events?

Given the small number of events it is difficult to present a stable demographic profile of who is likely to experience adverse events. However, looking only at 2007 data, 82% were white and 60% were female. Sixteen of the 83 cases that occurred in 2007 involved neonates or children under one year of age (19.2%).



What are the Causes of Medical Errors?

The following table offers an overview of what hospitals discovered when they investigated their own adverse events. Assigning the proper cause(s) takes a serious commitment on the part of a hospital. A good investigation needs an interdisciplinary team of experts, a sustained effort, good science, strong leadership, and a climate where people are fearless about getting to the bottom of the real problem.



For all types of problems, regardless of harm score, “communication” was the most often cited fundamental cause. For those events that resulted in death, three additional dimensions come strongly into play – organizational factors, patient management, and patient factors. Among neonates and patients under one year of age (16 cases; 12 were serious) treatment delays was the most often cited contributing factor.

A few words about communication issues:

Communications issues were cited in 55% to 70% of the adverse events reported, depending on harm level. Such issues can be hard to resolve—they touch on the most human of dimensions (likes and dislikes), they are often products of the prevailing organizational culture, and they depend on teams that continually change. As to the content of the message being communicated, the right information needs to be delivered to the right person(s) at just the right moment and that person needs to be able to receive it -- all of which can be difficult.

One way to analyze communication problems is to look at types of communication interchanges. In hospital settings, at least four types emerge:

- Clinician -- Patient
- Physician – Physician
- Physician – Staff
- Staff -- Staff

Problems between clinician and patient often had to do with language barriers, with patients assessing risks differently than staff, or with a basic psychological issue.

Physician-to-physician problems included ineffective handoffs between specialties (e.g., between primary care and hospitalists or between ER and on-call surgeons), and failure to create or share formal care plans.

Physician and staff problems included staff failing to speak up when they see a problem and delays in calling for backup.

Staff-to-staff issues included animosity between departments and failure to share critical information between units.

Some ideas generated by hospitals to improve communication:

While many action plans developed by hospitals focused on developing policies, others addressed more essential changes to patient care process and practices. Some of the ideas hospitals are putting into place include:

- Systematic handoff processes including SBAR (a structured framework for quickly sharing information, usually between nurses and doctors. SBAR stands for **S**ituation, **B**ackground, **A**ssessment, **R**ecommendation).
- Crew Resource Management training/Team training across department
- Clear processes for information flow; regular audits to ensure process is integrated and sustained.
- Team consultation to work groups struggling with communication or teamwork
- Flags and alerts in computerized records
- SPEAKUP campaign for patients
- Cognitive aids, such as visual cues, whiteboards
- Routine nurse-physician patient rounds
- Leadership attention through monthly reviews
- Use of standardized phrases and language

Managing Adverse Events

1. Senior Management and Board Review

One measure of an organization's commitment to patient safety is how it manages an adverse event. Who in the organization knows about the problem? Who is consulted? How high up the organization does the discussion reach? To get a sense of this commitment, we continually ask hospitals to indicate whether senior management and the Board of Directors are notified after a serious adverse event. We also ask if the team that investigates the event has a post-analysis briefing with senior management.

Based on self-reporting, hospitals are doing a good job and have shown improvement from 2006:

Level of Involvement	2006	2007
Senior Management Notified	100%	100%
Board of Directors Notified	73.9%	88.7%
Senior Management Post Review Briefing	76.1%	88.7%

Perhaps even more encouraging, hospitals report that 81% of events are now subject to all three notification and review steps (senior management and board notified; senior management post-analysis review). In 2006 only 63% of serious adverse events generated this level of review and discussion.

2. Written Notification

When the Patient Safety Commission began its reporting program for serious adverse events we created the expectation that hospitals would notify patients or their representative -- *in writing* -- when they were affected by such events. The core idea is to create another means of anchoring a patient to the hospital, even in the most difficult of situations. However, even though a notification letter is not an admission of liability, it is still considered legally risky by some. Also, the idea is still novel and no national norm exists (Pennsylvania is the only other state using this approach). So, while the idea of written notification is built into statute, the Commission has remained flexible about how best to implement it.

Adoption rates mirror these challenges. Based on updated information, in 2006 about 68% of qualifying events (the most serious ones) included a written notification. In 2007 the rate dropped to 45%. Even though our data suggest that hospitals might be doing a better job at *talking with patients* about adverse events (more instances of hospitals describing multiple conversations with patients) we will continue our efforts to make written notification the norm (see Summary for additional comments).

Patient Story – Next Chapter

We started this report with a story about a newborn in distress. Thanks to the medical team's quick intervention and their good follow-up care the baby recovered without apparent ill effects. That brief narrative was meant to give the reader a glimpse into the world of medical errors. It also highlights the role of the Patient Safety Commission. Without the Commission, this sort of information would not be compiled into a useful data tool. In addition, thanks to a Technical Advisory Group that we organized in 2007, we were able to explore this case in even greater detail. This expert panel meets regularly and includes physicians, a pharmacist, nurses, an ethicist, a systems engineer from the nuclear industry, and others. Please see our website for a clinical description of the case (which is de-identified and shared with the permission of the reporting hospital).

Perhaps the critical point to make is that the Commission's reporting program is simply a means to an end. We seek to be a patient safety improvement organization that helps to drive change by leveraging our unique ability to capture error data. A few examples of how we do that:

- We initiated an effort to bring consistency in the use of colored wristbands in Oregon hospitals. We identified the patient safety risks, documented the variation-in-use across hospitals, and developed policy options. The Oregon Association of Hospitals and Health Systems (OAHHS) then took on the project and worked with hospitals to implement this new approach.
- We are actively working with OAHHS to improve the ability of hospitals to investigate their own adverse events (training in root cause analysis).
- We convened a work group to offer strategies for reducing the risk of retained objects after surgery. The expert panel presented recommendations to the Commission's Board of Directors in August, 2007. This issue came to light as a result of the high number of cases reported to the Commission. We are now promoting the recommendations throughout the state.
- We've issued five alerts and bulletins to Oregon hospitals based on cases reported to the Commission. These real-time alerts offer a new way to quickly disseminate emerging patient safety information.
- We disseminate monthly updates to participating hospitals, offering quality improvement tips and summaries of hot topics.
- We are partnering with a consortium of hospitals enrolled in the National Surgical Quality Improvement Project (NSQIP) to identify and champion emerging best practices.
- We've helped focus attention on the need for better transitional care planning. We are working with the *5 Million Lives Network* (hospitals only) and the *Advancing Excellence campaign* (nursing homes only) to develop a statewide strategy for reducing the pressure ulcer rate in Oregon.

What Can Patients and Consumers Do?

Hospitals in Oregon are involved in a growing quality improvement effort to share adverse event data, learn faster, and make progress toward eliminating errors. But what can the patient do? It can be a little confusing. On the one hand, as consumers many of us feel the impulse to take charge, study the facts, make decisive choices, and be advocates for ourselves. Isn't the idea of being a good consumer as American as buying an apple pie? But on the other hand, we have a heartfelt need to trust our medical team. Many of us simply want a competent doctor to take care of us when we are sick. We know that we don't know enough; we sense that there are too many complicated decisions; we feel we are not at our best in such situations.

Of course, we don't really have to choose between the roles of consumer or patient, but we do need to balance them. Good health care starts with finding a doctor or medical team that you trust. We can all learn to ask better questions of that team. And at times it's useful to have an advocate with you. Please visit our [website](#) for some ideas. You'll find tips on questions to ask and how to be an active healthcare consumer. We've also listed ideas on how patients can help improve safety, ways to avoid hospital-acquired infections, and suggestions on *being a patient*. In addition, for 2008 the Patient Safety Commission has set itself the goal of finding additional ways to engage the public in patient safety efforts.

Summary

- While Oregon remains the only state in the country relying exclusively on a voluntary and confidential model, we believe we are demonstrating the feasibility of this approach. By and large, hospitals are participating in good faith; the Commission is showing an ability to use the reports to drive system change.
- One of the emerging truths about our voluntary model is that it takes time to create such a program. By necessity, the program is built on trust (proving to participants that data really are kept confidential), administrative savvy (making reporting easy), data integration/consistency (making sense of 54 hospitals having 54 ways of doing business), and the need to demonstrate real value to participants.
- Hospitals are beginning to integrate the Commission's reporting program into their everyday work life. We are encouraged by the increasing number of reports. However, we continue to worry about the possibility of 'underreporting.' There is a significant body of literature that suggests that we should see a larger volume of incidents. In 2008 we will work with hospitals to address these concerns. We'll put our initial focus on those hospitals that have not yet submitted any reports.
- Hospital Boards and senior management are becoming more actively involved in their organizational response to adverse events.
- The Commission remains committed to making written notification work. We've teamed up with a national researcher to field a survey of hospitals to better understand the barriers to implementation. This is a work in progress.

Closing Remarks

This report has focused on hospital care. However the Patient Safety Commission also works with nursing homes, ambulatory surgery centers and retail pharmacies. In the future we intend to include outpatient renal dialysis and free-standing birthing centers as well. In this way we encompass a big swath of the entire health care delivery system. This scope has given the Commission the platform to adopt its 'North Star' goal. In January of this year the Commission challenged Oregon to develop the safest health care system in the country by December 2010. The Commission has just begun this effort, and basic questions need answers—how will we measure our progress, how will we work together? Still, the audaciousness of the goal is riveting. It puts the reporting program into focus, it forces us to a higher level of accountability. And it partially redeems each harm event – if such events provide footholds for progress.

If you have questions or comments please contact us:

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