PA PSRS
Pennsylvania Patient Safety Reporting System

Patient Safety Advisory

Produced by ECRI & ISMP under contract to the Pennsylvania Patient Safety Authority

ICU Reports More Likely to be Reported as Serious Events

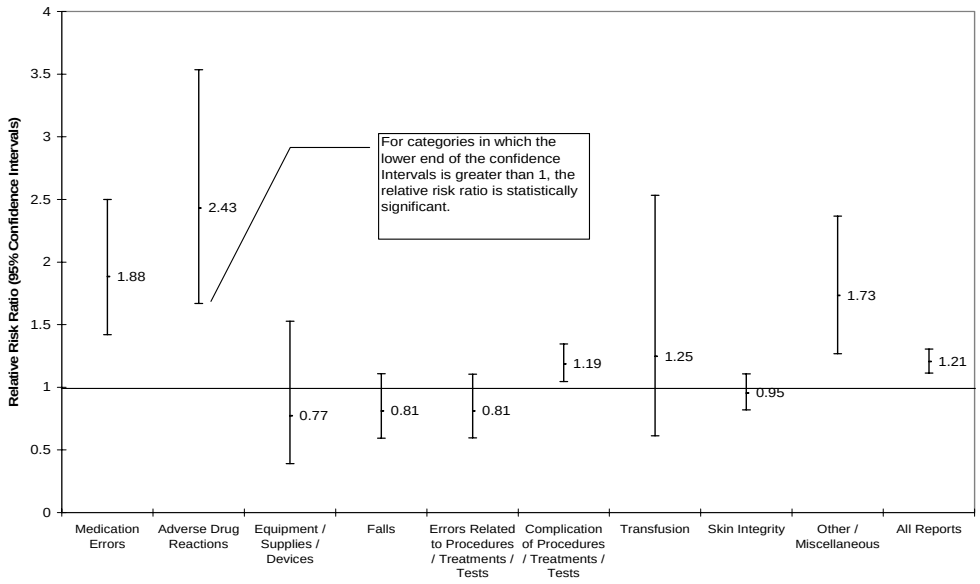
PA-PSRS Data Brief

Patients in intensive care units (ICUs) may be more likely than non-ICU patients to be injured by adverse events. The procedures performed on critically ill patients and the quantity and type of drugs used in their care may also increase their risk relative to non-ICU patients.[1]

An analysis of one year's data from seven Australian ICUs collected 536 reports, identifying 610 incidents, that reduced or could have reduced the "safety margin" for the patient (i.e., it included near misses and no-harm events).[2] A recent one-year observational study estimated the rate of adverse events in the ICU as 80.5 per 1,000 patient days.[3] Another study reported a rate of 89 events per 1,000 ICU days, including near misses as well as harmful events.[4] In terms of errors (as distinct from adverse events) a study of a single university-based medical-surgical ICU estimated an error rate of 1.7 per patient day.[5]

An analysis of reports submitted to PA-PSRS supports the hypothesis that ICU patients may have an increased risk of injury from adverse events. Among reports from hospitals, reports involving the ICU were about 20% more likely to be identified as Serious Events* than those that did not involve the ICU. As shown in Figure 1, reports of Adverse Drug Reactions† were 2.4 times as likely to be identified as Serious Events if they involved the ICU. Reports of Medication Errors and Complications of Procedures,

Figure 1. Reports from ICUs Identified as Serious Events, Relative to Non-ICU Reports
(Based on Reports Submitted by Hospitals from 6/7/04 through 6/6/05)



*Relative Risk Ratio was 1.205 (95% C.I.: 1.113,1.305). For readers who may not be familiar with the statutory definitions, PA-PSRS staff receives two types of reports: Serious Events (similar to "adverse events") and Incidents (similar to "near misses" and "no-harm events").

†The World Health Organization (WHO) defines Adverse Drug Reaction (ADR) as "Any response to a drug which is noxious and unintended, and which occurs at doses normally used in man for prophylaxis, diagnosis, or therapy of disease, or for the modification of physiological function." Source: WHO. Requirements for adverse reaction reporting. Geneva, Switzerland: WHO; 1975.

This article is reprinted from the *PA-PSRS Patient Safety Advisory*, Vol. 3, No. 2—Sept. 2005. The Advisory is a publication of the Pennsylvania Patient Safety Authority, produced by ECRI & ISMP under contract to the Authority as part of the Pennsylvania Patient Safety Reporting System (PA-PSRS).

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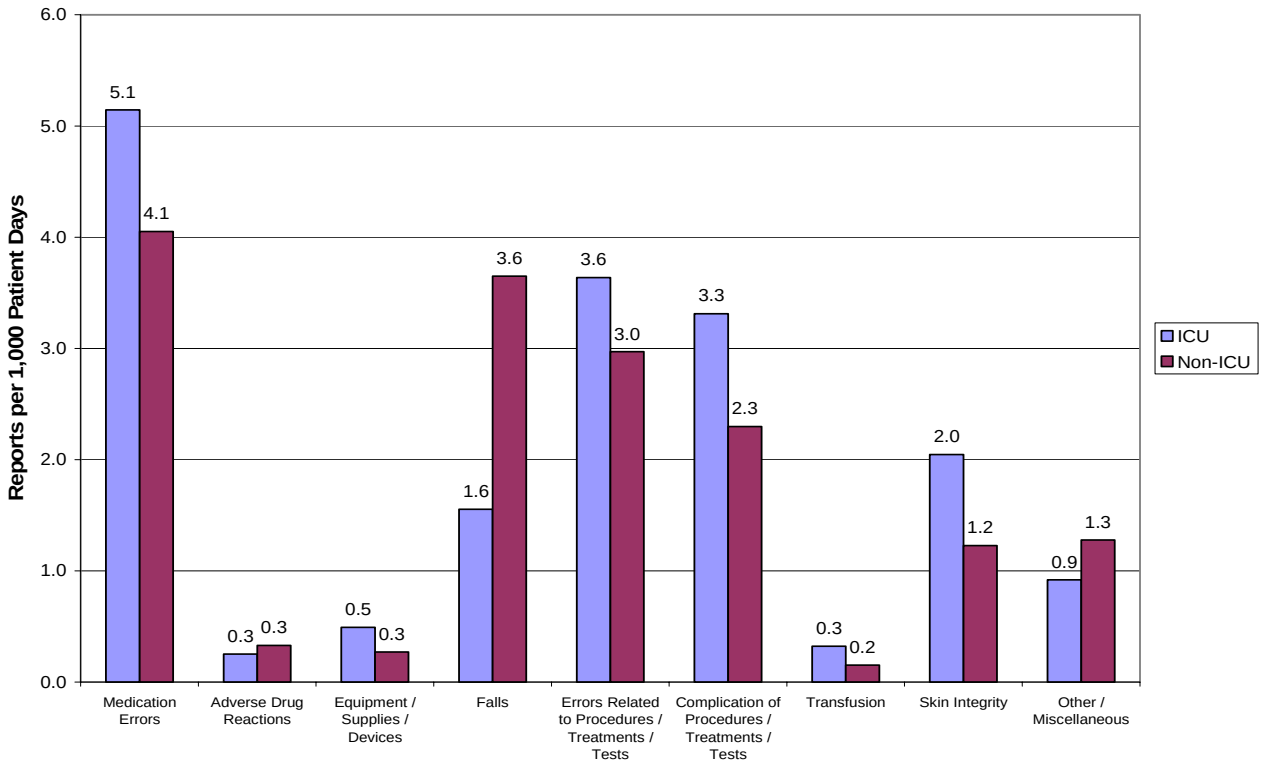
ICU Reports More Likely to be Reported as Serious Events (Continued)

Treatments, and Tests were 88% and 19% more likely to be Serious Events, respectively

During the first year of mandatory reporting, Pennsylvania hospitals submitted 11,959 reports identified as occurring in the ICU (or 17.7 reports per 1,000 ICU patient days[‡]). Of those reports, 5.4% were Serious Events, a significantly greater proportion than that from non-ICU areas.[§] Reports involving the ICU accounted for 8.5% of all reports submitted by hospitals. Figure 2 presents the number of reports from ICU and non-ICU areas by Event Type in terms of the number of patient days.

Table 1 presents the most frequently cited contributing factors in ICU-related reports providing detailed causative information. Factors shown on this table are those with at least a 1-in-10 likelihood of being cited as a contributing factor in the set of analyzed reports. All of the contributing factors shown related to staff, team, environment, and organizational factors were significantly more likely to be reported in ICU-related reports than from other reports from hospitals. Patient compliance and patient understanding were significantly less likely to be cited as a contributing factor in ICU-related reports.

Figure 2. Reports per 1,000 Patient Days by Event Type and ICU Involvement (Based on Reports Submitted by Hospitals from 6/7/04 through 6/6/05)



[‡]Based on data from: Pennsylvania Department of Health, Bureau of Health Statistics and Research. Hospital and ambulatory surgery center data, standard output reports 2003-2004, Report 2A, Inpatient hospital unit data by facility and county. Reporting period: July 1, 2003, through June 30, 2004. Accessed 15 Aug 2005. Available online at www.health.state.pa.us.

[§]Based on a Chi square test of significance ($p<0.05$).

ICU Reports More Likely to be Reported as Serious Events (Continued)

Table 1. Frequently Cited Contributing Factors in Reports Related to the ICU (Based on Reports Submitted by Hospitals from 6/7/04 through 6/6/05)

Selected Contributing Factors	ICU-Related Reports Citing this Factor (%)[a]	Relative Risk Ratio (with 95% CI)[b]	Significance Relative to Non-ICU-Related Reports[c]
Staff, Team, Environment, and Organizational Factors			
Failure to follow procedures	36.5	1.24 (1.17-1.31)	Higher
Communication	25.6	1.29 (1.20-1.38)	Higher
Staff proficiency	22.7	1.19 (1.10-1.29)	Higher
Distractions	12.0	1.13 (1.01-1.27)	Higher
Training	9.6	1.50 (1.32-1.71)	Higher
Patient–Related Factors			
Patient compliance	17.0	0.60 (0.55-0.66)	Lower
Patient understanding	9.7	0.85 (0.75-0.97)	Lower

(a) Proportion is based only on reports that provided detailed information on contributing factors.
(b) A ratio of the likelihood that a contributing factor will be cited in an ICU-related report relative to the likelihood that the same factor will be cited in a non-ICU-related report. For example, "Training" is 50% more likely to be cited as a contributing factor in an ICU-related report than a non-ICU-related report.
(c) Based on Chi square tests of significance ($p<0.05$).

Notes

1. Cullen DJ, Sweitzer BJ, Bates DW, et al. Preventable adverse drug events in hospitalized patients: a comparative study of intensive care units and general care units. Crit Care Med. 1997 Aug;25(8):1289-97.
2. Beckmann U, Baldwin I, Hart GK, Runciman WB. The Australian incident monitoring study in intensive care (AIMS-ICU). An analysis of the first year of reporting. Anaesth Intensive Care. 1996 Jun;24(3):311-3.
3. Rothschild JM, Landrigan CP, Cronin JW, et al. The critical care safety study: the incidence and nature of adverse events and serious medical errors in intensive care. Crit Care Med. 2005 Aug;33(8):1694-1700.
4. Osmon S, Harris CB, Dunagan WC. Crit Care Med. Reporting of medical errors: An intensive care unit experience. 2004 Mar; 32 (3):727-33.
5. Donchin Y, Gopher D, Olin M, et al. A look into the nature and causes of human errors in the intensive care unit. Crit Care Med. 1995;23;294-300.

An Independent Agency of the Commonwealth of Pennsylvania

The 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, as contractor for the PA-PSRS program, is issuing this newsletter to advise medical facilities of immediate changes that can be instituted to reduce serious events and incidents. For more information about the PA-PSRS program or the Patient Safety Authority, see the Authority's website at www.psa.state.pa.us.

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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 non-punitive approach and systems-based solutions.