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

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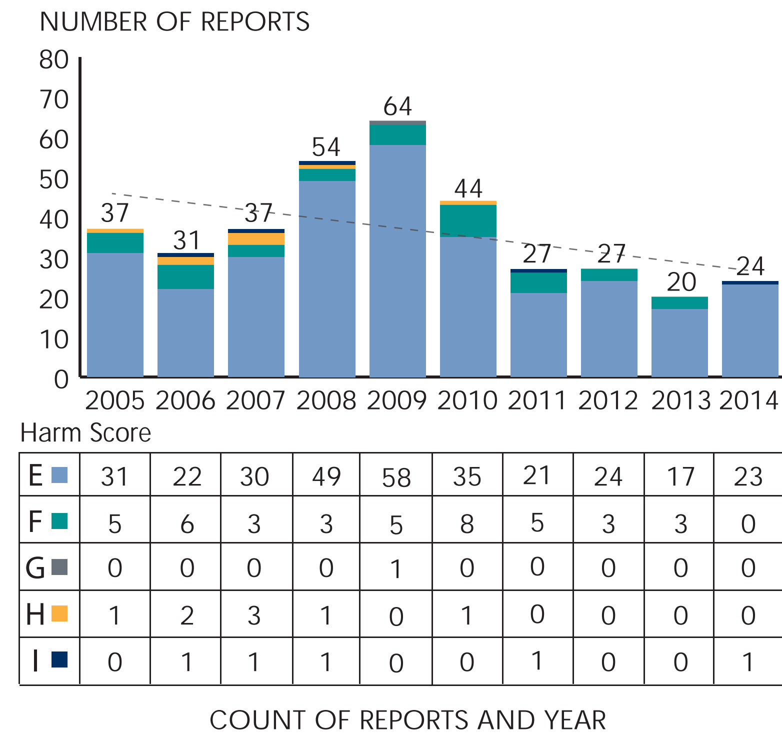
As a class of high-alert medications, opioids bear a heightened risk of causing significant patient harm when used in error.[1] Errors with opioids have led to serious adverse events, including allergic reactions, failure to control pain, oversedation, respiratory depression, seizures, and death.[2]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

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

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

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



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

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

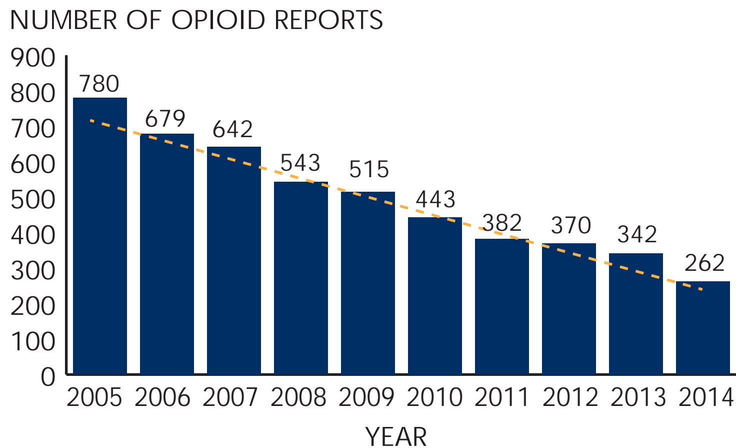
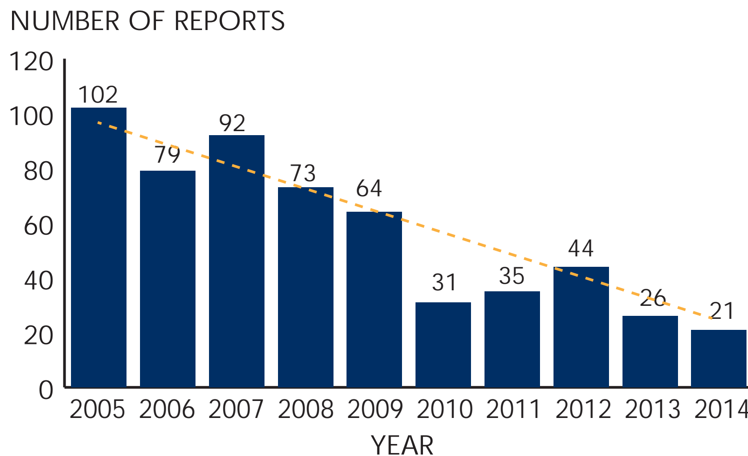


Figure 3. Reports of Wrong-Drug Events that Mentioned HYDROmorphone and Morphine in the Same Report to the Pennsylvania Patient Safety Authority, January 2005 through December 2014 (N = 567)



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

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

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

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

NOTES

1. Institute for Safe Medication Practices. ISMP's list of high-alert medications [online]. 2014 [cited 2015 Nov 24]. http://www.ismp.org/Tools/institutionalhighAlert.asp
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3. Focus on high-alert medications. PA PSRS Patient Saf Advis [online] 2004 Sep [cited 2015 Nov 23]. http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2004/Sep1_(3)/Pages/06.aspx
4. Hicks RW, Santell JP, Cousins DD, et al. *MedMARX 5th anniversary data report: a chartbook of 2003 findings and trends*

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1999-2003. Rockville (MD): United States Pharmacopeia Center for the Advancement of Patient Safety; 2004.

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6. Institute for Safe Medication Practices. Safety issues with patient-controlled analgesia: part I—how errors occur. *ISMP Med Saf Alert Acute Care* 2003 Jul 10;(8)14:1-3. Also available at http://www.ismp.org/Newsletters/acutecare/articles/20030710.asp
7. Common medication pairs that contribute to wrong drug errors. PA PSRS Patient Saf Advis [online] 2007 Sep [cited 2015 Nov 23]. http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2007/sep4_(3)/Pages/89.aspx
8. Adverse drug events with HYDROmorphone: how preventable are they? Pa Patient Saf Advis [online] 2010 Sep [cited 2015 Nov 23]. http://www.patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2010/Sep7(3)/Pages/69.aspx

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

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

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

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