

Patient Safety Tip of the Week

May 23, 2023

Smudges as Patient Safety Threats

When we were doing our very first electronic medical record implementation, we wanted to see how the just implemented barcoding system at that hospital was doing. Our very first observation of a nurse administering medications via the barcoding system was eye opening. The **label** on the medication was **smudged** so the nurse simply copied and pasted the medication label from the CPOE system, totally bypassing the safety built into the barcoding system.

ISMP recently published a warning about a danger related to a smudged IV bag label ([ISMP 2023](#)). A critically ill, septic elderly patient was receiving high doses of three vasopressors, including norepinephrine, to maintain adequate blood pressure, as well as a heparin infusion for new-onset atrial fibrillation with a rapid ventricular response. An alert from the smart infusion pump said the norepinephrine infusion was running low. A nurse ordered and received from the pharmacy both a norepinephrine infusion and also a heparin infusion since the latter was also running low. The nurse mistakenly hung the heparin infusion bag instead of the norepinephrine bag on the IV pole directly behind the currently running norepinephrine bag in anticipation of needing to change the bag. The nurse then attempted to scan the barcode label affixed to the bag of heparin, thinking it was norepinephrine. But the barcode would not scan because it had been smudged with alcohol-based hand sanitizer. As a workaround, the nurse scanned the bag of norepinephrine currently infusing. The nurse did not further examine the heparin label and administered it at the rate the norepinephrine infusion had been running. Shortly thereafter the patient had a cardiac arrest. The patient was resuscitated and the erroneous heparin administration was discovered. However, the patient continued to deteriorate and died 2 days later.

Investigation of the incident identified several contributing factors, including recognition that the heparin infusion with the smudged label and barcode should not have been used. Rather, it should have been returned to the pharmacy. Use of a **proxy scan** of the barcode on the previously administered norepinephrine infusion bag was a key error. Similar errors with proxy barcode scanning have been reported.

ISMP recommended several recommendations to prevent this type of error:

- Pharmacy should purchase premixed heparin and norepinephrine infusions, when possible, and require barcode scanning of the manufacturer's barcode before dispensing and administering the product
- Medication labels should be tested to see whether smudging of the label and barcode information is possible, especially since practitioners frequently use alcohol-based sanitizers when handling medications
- Never use a medication with a smudged label or barcode
- Educate practitioners during orientation and annually thereafter, not to administer a medication with a label that is smudged and unreadable, or if the barcode is smudged, which would render it unscannable
- Develop an escalation process for what to do if a medication barcode will not scan (e.g., contact the pharmacy for immediate help)
- If a barcode will not scan, never use a proxy scan, such as scanning the barcode on an empty infusion or alternative label that is not on the medication being administered

Barcoding is arguably our most powerful medication safety tool. But workarounds continue to negate the safety mechanisms that make barcoding so important. In many of our previous columns (see, for example, our September 28, 2021 Patient Safety Tip of the Week "[Barcoding Better? Not So Fast!](#)") we've noted the seminal study by Ross Koppel and colleagues ([Koppel 2008](#)) that identified 15 types of workarounds and 31 types of causes for the workarounds in barcoding medication administration systems. Workarounds, such as use of the proxy scan, are dangerous and can have devastating consequences such as the outcome in the case described above.

Smudges are dangerous. We've also noted that **faxes** can have a role in promoting 10-fold medication errors. A smudge on the fax can obscure a decimal point, resulting in a 10-fold overdose. Alternatively, a smudge on faxed orders could look like a decimal point, so the patient receives one-tenth the intended dose (see our June 19, 2012 Patient Safety Tip of the Week "[More Problems with Faxed Orders](#)"). While most healthcare facilities no longer accept faxed orders, a clinician might be referring to faxed medical records as he/she enters orders via CPOE or an ePrescribing system. See our May 2021 What's New in the Patient Safety World column "[Axe the Fax](#)" for more comments on why we need to get rid of the fax in healthcare.

See some of our other Patient Safety Tip of the Week columns dealing with barcoding:

- June 17, 2008 "[Technology Workarounds Defeat Safety Intent](#)"
- April 5, 2016 "[Workarounds Overriding Safety](#)"
- February 28, 2017 "[The Copy and Paste ETTO](#)"
- January 2018 "[Can We Improve Barcoding?](#)"
- September 2020 "[More on Workarounds](#)"

- September 28, 2021 “[Barcoding Better? Not So Fast!](#)”
- June 2022 “[Where Are You Barcoding?](#)”

See some of our other Patient Safety Tip of the Week columns dealing with unintended consequences of technology and other healthcare IT issues:

- June 19, 2007 “[Unintended Consequences of Technological Solutions](#)”
- May 20, 2008 “[CPOE Unintended Consequences – Are Wrong Patient Errors More Common?](#)”
- June 17, 2008 “[Technology Workarounds Defeat Safety Intent](#)”
- August 26, 2008 “[Pattern Recognition and CPOE](#)”
- September 9, 2008 “[Less is More...and Do You Really Need that Decimal?](#)”
- December 16, 2008 “[Joint Commission Sentinel Event Alert on Hazards of Healthcare IT](#)”
- February 2009 “[Healthcare IT The Good and The Bad](#)”
- March 3, 2009 “[Overriding Alerts...Like Surfin’ the Web](#)”
- October 2009 “[A Cautious View on CPOE](#)”
- November 24, 2009 “[Another Rough Month for Healthcare IT](#)”
- April 20, 2010 “[HIT’s Limited Impact on Quality To Date](#)”
- July 27, 2010 “[EMR’s Still Have a Long Way to Go](#)”
- March 22, 2011 “[An EMR Feature Detrimental to Teamwork and Patient Safety](#)”
- January 24, 2012 “[Patient Safety in Ambulatory Care](#)”
- June 26, 2012 “[Using Patient Photos to Reduce CPOE Errors](#)”
- June 2012 “[Leapfrog CPOE Simulation: Improvement But Still Shortfalls](#)”
- July 17, 2012 “[More on Wrong-Patient CPOE](#)”
- January 2013 “[More IT Unintended Consequences](#)”
- April 23, 2013 “[Plethora of Medication Safety Studies](#)”
- April 30, 2013 “[Photographic Identification to Prevent Errors](#)”
- October 8, 2013 “[EMR Problems in the ED](#)”
- March 11, 2014 “[We Miss the Graphic Flowchart!](#)”
- October 2014 “[Ebola Exposes Fundamental Flaw](#)”
- January 2015 “[Beneficial Effect of EMR on Patient Safety](#)”
- March 2015 “[CPOE Fails to Catch Prescribing Errors](#)”
- March 31, 2015 “[Clinical Decision Support for Pneumonia](#)”
- August 2015 “[Newborn Name Confusion](#)”
- December 2015 “[Opioid Alert Fatigue](#)”
- January 12, 2016 “[New Resources on Improving Safety of Healthcare IT](#)”
- January 19, 2016 “[Patient Identification in the Spotlight](#)”
- February 9, 2016 “[It was just a matter of time...](#)”
- April 5, 2016 “[Workarounds Overriding Safety](#)”
- May 2016 “[Name Confusion in the Pharmacy](#)”
- May 3, 2016 “[Clinical Decision Support Malfunction](#)”
- May 24, 2016 “[Texting Orders – Is It Really Safe?](#)”
- August 23, 2016 “[ISMP Canada: Automation Bias and Automation Complacency](#)”

- November 22, 2016 “[Leapfrog, Picklists, and Healthcare IT Vulnerabilities](#)”
- January 2017 “[Joint Commission Thinks Twice About Texting Orders](#)”
- February 28, 2017 “[The Copy and Paste ETTO](#)”
- March 2017 “[Yes! Another Voice for Medication e-Discontinuation!](#)”
- April 2017 “[How Much Time Do We Actually Spend on the EMR?](#)”
- June 27, 2017 “[Texting – We Told You So!](#)”
- August 1, 2017 “[Progress on Wrong Patient Orders](#)”
- January 2018 “[Can We Improve Barcoding?](#)”
- January 16, 2018 “[Just the Fax, Ma’am](#)”
- January 30, 2018 “[Texting Errors Revealed](#)”
- June 19, 2018 “[More EHR-Related Problems](#)”
- September 2018 “[More Clinical Decision Support Successes](#)”
- December 11, 2018 “[Another NMBA Accident](#)”
- January 1, 2019 “[More on Automated Dispensing Cabinet \(ADC\) Safety](#)”
- February 5, 2019 “[Flaws in Our Medication Safety Technologies](#)”
- March 26, 2019 “[Patient Misidentification](#)”
- May 2019 “[Too Much Time on the EMR](#)”
- May 21, 2019 “[Mixed Message on Number of Open EMR Records](#)”
- July 23, 2019 “[Order Sets Can Nudge the Right Way or the Wrong Way](#)”
- September 10, 2019 “[Joint Commission Naming Standard Leaves a Gap](#)”
- September 24, 2019 “[EHR-related Malpractice Claims](#)”
- December 17, 2019 “[Tale of Two Tylers](#)”
- June 2020 “[EMR and Medication Safety: Better But Not Yet There](#)”
- June 16, 2020 “[Tracking Technologies](#)”
- July 2020 “[Patient Requests for EHR Corrections](#)”
- July 21, 2020 “[Is This Patient Allergic to Penicillin?](#)”
- September 2020 “[More on Workarounds](#)”
- November 17, 2020 “[A Picture Is Worth a Thousand Words](#)”
- March 2021 “[ECRI Partnership Whitepaper on Alert Fatigue](#)”
- May 11, 2021 “[How Are Alerts in Ambulatory CPOE Doing?](#)”
- July 2021 “[EPIC Sepsis Prediction Tool Falls Short](#)”
- September 28, 2021 “[Barcoding Better? Not So Fast!](#)”
- October 2021 “[Tool to Prevent Discontinued Medications from Being Dispensed](#)”
- October 2021 “[More on Smartphones and Watches Effect on Cardiac Devices](#)”
- November 2021 “[Panic Buttons to Protect Healthcare Workers – But a Word of Caution](#)”
- December 2021 “[Can AI Triage Postoperative Patients More Appropriately?](#)”
- May 2022 “[Reduced Mortality Using Pneumonia Clinical Decision Support Tool](#)”
- June 2022 “[Where Are You Barcoding?](#)”
- August 2022 “[CDSS Success for Pediatric Head CT](#)”
- September 13, 2022 “[Smart Socks and Robots for Fall Prevention?](#)”
- November 22, 2022 “[The Apple Watch and Patient Safety](#)”

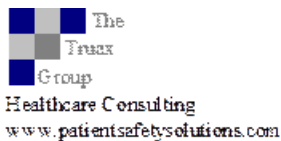
References:

ISMP (Institute for Safe Medication Practices). Smudged IV bag label and a proxy scan set up a patient for a cardiac arrest. ISMP Nurse AdviseERR Medication Safety Alert! 2023; 21(5): May 2023

<https://www.ismp.org/nursing/medication-safety-alert-may-2023>

Koppel R, Tosha Wetterneck T, Telles JL, Karsh B-T. Workarounds to Barcode Medication Administration Systems: Their Occurrences, Causes, and Threats to Patient Safety. JAMIA 2008; 15(4): 408-423

<https://academic.oup.com/jamia/article/15/4/408/731255>



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