Patient Safety Tip of the Week

February 28, 2017 The Copy and Paste ETTO

Our September 15, 2009 Patient Safety Tip of the Week "ETTO's: Efficiency-Thoroughness Trade-Offs" discussed efficiency-thoroughness trade-offs or ETTO's. That concept, best associated with Erik Hollnagel (Hollnagel 2009), is well known to everyone in the human factors and safety fields. Basically, the ETTO concept means there are certain procedures and practices that we do which make our work more efficient but at the risk we may compromise thoroughness or safety. Hollnagel, in his book, notes that such things usually go right but occasionally go wrong. A classic example of an ETTO is the "**copy and paste**" function that we all know well from our word processors and spread sheets. Copy and paste functionality is also widely used in electronic medical records. It allows us to easily input a large amount of text, images, etc. into one part of an EHR without having to type in all the details. This can be a huge timesaver.

But there are times when "copy and paste" can go wrong. For example, we might only copy part of a patient's medication list, inadvertently leaving off some important medications. (That's particularly a problem when the medication list is long and may span more than one computer screen or is otherwise truncated). Or we may copy information that is no longer accurate, such as copying an old medication list and not amending it to account for medications since discontinued or those added or those whose dose has been adjusted.

There are also instances where an inaccurate piece of information may get deleted (or more properly amended with appropriate attribution) from the medical record but someone copies and pastes that item from a prior part of the medical record, thus perpetuating the erroneous information. A good example is when the record says a patient is allergic to a certain antibiotic but that later gets amended when a physician realizes there was no true allergy. If the original note noting the "allergy" gets copied and pasted, the patient may be deprived of a most appropriate antibiotic in the future.

And in our many articles on wrong patient/patient identification errors we've noted that information sometimes gets copied from the chart of one patient inadvertently into the chart of a different patient.

In 2015 two significant studies highlighted the problems associated with "cut and paste". A National Institute of Standards and Technology (NIST) study (Lowry 2015) showed that the integrity of information in EHR's is frequently compromised by how data is used and reused, with "copy and paste" being a major contributor. The second was a comprehensive review of the practice by the ECRI Institute (ECRI 2015). A follow up report from NIST is now available (Lowry 2017).

The ECRI study (ECRI 2015) did a nice job of trying to determine the frequency of copy and paste in the EHR. They note that reported rates vary depending upon the definitions used, the venue, and the method used to detect copy and paste (eg. self-report, chart review, direct observation, etc.). You can get all the details in the ECRI study but a good example is the self-reported frequency found in a study by O'Donnell and colleagues (O'Donnell 2009). They found that 90% of physicians surveyed using an EHR for inpatient documentation used copy/paste to write daily progress notes, and 78% identified themselves as high-frequency users. 81% of copy/paste users frequently copied notes authored by other physicians and 72% copied notes from prior admissions.

The ECRI study also found that nearly all aspects of the medical note have been subject to copy/paste, including chief complaint, history of present illness, past medical history, review of systems, physical exam, medications, lab and radiology results, assessment, plan, etc.

The ECRI study noted there is a paucity of studies documenting the adverse consequences of copy/paste. Most of the examples of adverse outcomes are in individual case studies. They do note that the large study of electronic medical records at the VA (Singh 2013) noted substantial errors related to copy/paste but did not provide details (as discussed in our March 2013 What's New in the Patient Safety World column "Diagnostic Error in Primary Care").

The ECRI study also noted prior attempts to categorize the risk level of the various copy/paste events. One study (Thielke 2007) gave as an example of "high risk" copying notes from another physician or copying notes greater than 6 months old. A "moderate risk" example was copying from oneself 1 to 6 months prior and a "lesser risk" example was copying from oneself from <1 month prior. In the Thielke study 55% of copy/paste events were in the highest risk category, and 18% and 27% in the moderate and lesser risk categories, respectively. Other studies categorized by whether a full note was copied, whether minor changes were made, or substantial changes made.

The ECRI study also noted that many, if not most, physicians recognize that errors might be made through copy/pasted. The O'Donnell study had found that 25% agreed that copy/paste makes progress notes more likely to lead to a mistake in patient care but only 3% reported committing an error related to confusion caused by a note with copy/pasted text. Physicians also agreed that frequent copy/pasting can result in notes that are less accurate, lengthier, and less organized and felt copy/paste facilitated generation of progress notes that were more likely to contain outdated or inconsistent information. However, in keeping with the concept of ETTO's, O'Donnell's study also noted that copy/paste had important benefits like a "more trustworthy" medical note, improved documentation of the patient's hospital course, documentation for legal purposes, and documentation for billing.

Much as we have seen, the ECRI study noted four problems for the medical chart:

- Introduction of new inaccuracies, including wrong patient/patient identification errors
- Propagation of inaccurate information
- Internal inconsistency of notes and information
- Note "bloat"

The ECRI study also noted the following factors that contribute to problems related to copy/paste:

- Time constraints
- Documentation requirements (for billing, quality, etc.)
- Limitations in EHR design that may incentivize poor use of copy/paste
- Movement, for example in value-based payment models, to use the EHR to capture "structured" data that can be readily analyzed

The ECRI study has numerous recommendations. Responsibilities for the authors of medical record notes should:

- Be able to vouch for the information's accuracy, whether they have copied their own note or someone else's
- Acknowledgement of or attribution to the original source of the information (particularly when copying from someone else)
- Strive for brevity
- Recognize that copy/paste may acceptable for certain portions of the note, but perhaps forbidden for others.

Some items that should not be copied include medical student notes or the history of present illness. Also not to be copied from another provider's notes are history of present illness, review of systems, physical examination, assessment, and plan. But some sections such as past medical history, family history, and social history might be amenable to a "copy-forward" approach with modifications after the author confirmed the accuracy with the patient.

The ECRI study also has numerous recommendations for those who design EHR's.

With the ECRI study (ECRI 2015) and the first NIST study (Lowry 2015) as background, a follow up report from NIST was just published (Lowry 2017). The researchers in the current study collected data while observing clinicians (nurses and physicians) interacting with the EHR during their routine tasks and then follow-up interviews were conducted. Specifically, they looked at how practices met with four ECRI recommendations:

- Recommendation A: Provide a mechanism to make 'copy and paste' material easily identifiable.
- Recommendation B: Ensure that the provenance of 'copy and paste' material is readily available.
- Recommendation C: Ensure adequate staff training and education regarding the appropriate and safe use of 'copy and paste'.

- Recommendation D: Ensure that 'copy and paste' practices are regularly monitored, measured, and assessed.

The current NIST report focused on improving EHR systems with the intent of:

- Minimizing "bloat" or the accumulation of large amounts of irrelevant information
- Attribution (identifying who copied and from what source and what modifications were made. And date and time the copy/paste took place)
- Accuracy (ensuring that the copied material has been reviewed and edited as appropriate to verify the information is correct)

The NIST report recommends that a mechanism for copy/paste should be available in the EHR but that there should be a mechanism where the **material to be copied should be visually enhanced so that the copier does not inadvertently copy only part of the information, leaving key information uncopied**. There should be a mechanism facilitating **verification that "the copied information was read consciously and edited by the clinical provider** which would promote the attribution of the source of the information." Moreover, there should be a display of the "**chain of custody**" of the information, providing appropriate attribution.

They recommend **certain elements be prevented from being copied**: demographic information, dates, and any information should be blocked from entry into a blood bank information system. Demographic data should be autopopulated by the EHR and copying demographic information from one chart to another should never be allowed.

The report also has some recommendations about **vital sign** documentation, including **date and time stamping** of not only when the vital signs were taken and recorded but also when it was signed, revised and retrieved. (They also recommend including how the vital signs were taken.) **Allergies** can be copied and pasted but should have a clear "chain of custody" for attribution. They recommend that ensuring that **surgical notes** be copied in toto since context might be lost if only part of a note is copied.

The report notes that copying a **medication list** may actually be preferable to using drop down menus (because of the known vulnerabilities to inaccurate selection from drop down lists). **But** it specifies that **copy/paste should never be allowed for ordering new medications** (so that the provider is forced to consciously think about the order). And any copied medications should have a clear "chain of custody" for attribution.

They note that the **discharge summary** is one place where copy/paste can improve efficiency but stress the need for a "chain of custody" for attribution.

And then a point we have stressed over and over: there must be a mechanism to ensure a provider using copy/paste between two systems (eg. copying information from a radiology system into an EHR) the "EHR system must **keep the clinician oriented as to which patient's record they are accessing at any given point** in the process", again with a clear "chain of custody".

Regarding the recommendation to "Ensure adequate staff **training** and education regarding the appropriate and safe use of 'copy and paste'" the current NIST study confirmed the importance of training for copy and paste functionality, noting that training raised awareness of the error-prone nature of copy/paste. Moreover, they found during task performance that participants learned instructions **better by watching an instructional video** than reading printed material.

And don't forget that the electronic medical record is not the only healthcare IT system vulnerable to copy and paste errors. In our June 17, 2008 Patient Safety Tip of the Week "Technology Workarounds Defeat Safety Intent" we noted that in our very first barcoding implementation we saw an instance where the label on the medication could not scanned so the nurse simply cut and pasted the bar code information from the computer, totally bypassing the safety feature of a barcoding system!

And in our April 15, 2014 Patient Safety Tip of the Week "Specimen Identification Mixups" we also noted the caveat in laboratory information systems to never allow two patient records to be open at the same time so that copy/paste can never get a report into the wrong chart.

Copy and paste is a great computer tool. We couldn't do Patient Safety Tip of the Week without it, since we often copy information from previous columns. But if we are not careful, mistakes will occur. Whenever we copy information we have to consciously verify the accuracy of all the copied information. For example, links to other columns or to our references may have expired or changed so we have to verify the current links.

So "copy and paste" and healthcare IT in general are classical ETTO's. Technology has greatly changed the way we practice medicine and in most respects these changes have been very positive. Nevertheless, technology introduces its own set of unanticipated consequences and errors so we need to remain vigilant at all times and try to design our information systems to anticipate, mitigate, and minimize errors.

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"
- 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 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"
- March 2017 "Yes! Another Voice for Medication e-Discontinuation!"

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