Technology Workarounds and Patient Safety

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Aims

This study focuses on identifying technology workarounds that have the potential to compromise patient safety.

- Consider characteristics of a safety culture
- Recognize the importance of cognitive informatics principles
  - influence human factors engineering and technology usability
- Examine case reports
- Propose strategies for assessing the characteristics of technology workflow disruptions and for preventing technology workarounds.

Background

- Healthcare technologies are designed to improve the work of managing and delivering healthcare
- Many technologies are focused on ensuring patient safety
- New technologies and safety strategies may disrupt the typical workflow of clinicians
- To meet workload demands, clinicians may use a technology workaround that has the potential to compromise patient safety

Definitions

- Safety Culture
  - Just Culture: System or process issues are identified and addressed
  - Strategies for developing a safety culture
    - Human factors engineering
    - Systems engineering
    - Root cause analysis or failure modes and effect analysis
- Workarounds: deviations from accepted and expected practice protocols

"Shortly after beginning my career as a new nurse on a med/surg unit, I can still distinctly remember thinking that I can take everything I learned from nursing school and throw it out the window. Looking back after learning about workarounds, I feel almost my entire orientation was based around teaching me how to workaround everything."

Methods

- Qualitative data collection and analysis
  - RN student (BS and DNP discussion forums)
- Data Collection Prompts
  - Identify a technology workaround that you have personally used or have observed someone else using in a clinical setting
  - Reflect on how the workaround may compromise patient safety
  - Think about the human-technology interface, the technology design, and cognitive informatics and discuss the characteristics of the technology that led to the workaround
- Examine reported cases of technology workarounds (N=26)

Results

- Technology workarounds related to medication administration (N=18)
  - bypassing second clinician verifications for high-hazard medications (N=7)
  - patient ID scanning workarounds (N=6)
  - bypassing smart pump technologies (N=5)
- Inappropriate use of EHR functions for documentation (N= 4)
- Medication dispensing system accessibility (N=1)
- Technology malfunction (N=1)
- Audit and tracking of call-center response times (N=1)
- Special circumstances ER(N=1), neonates (smart pump), anesthesia (smart pump)

CASE ILLUSTRATION:

Second Clinician Verification

High-hazard medications require a second clinician to verify the order, dose, route of administration, and patient and then sign-off on the EHR.

- Workaround types
  - Sharing ID badges
  - Sharing passcodes
  - Completing verification somewhere other than patient room
- Reasons given for workaround
  - Difficulty finding another nurse
  - Short staffing
  - Confidence in competency to practice
- Solve the problem by going to biometric verification (fingerprint)

CASE ILLUSTRATION:

Patient ID Scanning

- Electronic medication administration systems (eMAR) require scanning of patient ID band as part of the medication administration process
  - Medication administration populates to the EHR
- EHR function allows printing of additional ID bands
  - Duplicate bands are scanned rather than ID band on the patient
- Reasons for workaround:
  - Too few scanners or malfunctioning scanners
  - Bar code printer generates unreadable labels
  - Bar codes unreadable on patient bands (small wrists)
  - Less disturbing to patient during sleep
  - System allows ID number to be typed in rather than scanned

CASE ILLUSTRATION:

Bypassing Smart Pump Safety Technology

- Smart pump technology promotes safe administration of IV infusions
  - Software ‘guardrails’ for therapeutic dosing (high/low limits and soft/hard warnings)
  - Guardrails will signal a provider that a proposed medication administration is dangerously high or therapeutically low.
- Reasons for bypassing technology
  - Too many steps involved in programming
  - Incorrect or inconsistent minimum infusion times in drug library
  - Drug libraries did not support use in neonates, anesthesia, certain antibiotics
  - Air-in-line sensors are too sensitive causing multiple alarms

Limits

- Case report sample size is small (N=26)
- Cases are limited to US
- Qualitative methodology does not capture the extent of the issue

Bottom Line

- Technology workarounds compromise patient safety
- Technology designers must consider usability and clinical workflow
  - Design for ease-of-use and intuitive use (seek input by end users)
  - Reprogram and or update drug libraries
- We must promote a culture where healthcare professionals commit to using the technology in the way that it was designed.
  - Identify system weaknesses and barriers
  - Measure/monitor compliance
  - Educate staff
- Organizational culture must embrace the ideas, opinions and strategies proposed by end users to improve the human technology interface.

References

- Mastrian, K. and McGonigle, D. 2017. Informatics for Health Professionals. Burlington, MA: Jones and Bartlett Learning.

- McGonigle, D. and Mastrian, K. 2018. Nursing Informatics and the Foundation of Knowledge, 4e. Burlington, MA: Jones and Bartlett Learning.