“Smart Labels”: Improving Syringe Labeling Compliance and Patient Safety in the Operating Room

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Introduction

The preparation and labeling of medications for anesthesia is a time-consuming, multi-step and error-prone process.1-3 The Joint Commission (JC) and ASHA have proposed that pre-labeling medications as a means of mitigating this problem; however, 15% of hospitals receive a citation for improper labeling of medications in critical situations and solutions.4

This study evaluated a novel, barcode based solution (“SmartLabels”) that may provide a systems-level solution to ensure 100% compliance with JC and ASHA labeling requirements and may improve patient safety and clinical communication. Methods

Baseline compliance with ASA and JC requirements were evaluated over a one month period at two large academic medical centers. Syringes were assessed for the following elements (according to hospital policy): drug name, concentration, date of preparation, time of preparation, and clinician initials or if it was a pre-filled syringe. Subsequently, at one institution SmartLabels was installed in 5 ORs. The new system produces JC and ASHA compliant syringe labels on demand at the point of care while providing closed-loop audio and visual feedback to the clinician simply by scanning the FDA mandated drug vial barcode.

Results

The baseline study evaluated 1656 syringes. Of the 1090 syringes, 43.8% (n=681) were pre-filled by the pharmacy or a 3rd party vendor and 56.2% (n=615) of syringes were prepared by the clinician. 33.6% (n=372) of the syringes were prepared by the clinician and met JC requirements, 2.5% (n=25) of syringes had no label, 16.7% (n=208) had only the drug name, 3.6% (n=46) had only the drug name and concentration but no expiration when the drug expired in less than 24 hours.

The study then evaluated 340 syringes in 5 ORs with SmartLabels installed. 41% of syringes were prepared by the pharmacist, 18.5% (n=62) were prepared 39% by the clinician and 100% (n=205) of these were fully compliant with JC/ASA requirements.

Discussion

The use of the syringes prepared by the clinicians in the baseline audit met JC requirements. Implementation of this new system improved compliance to 100% and immediately with minimal training.

Clinicians were very accepting of the new system into their workflow, citing the ease of use and utility of the safety features such as the barcode visual feedback provided by the system. The safety features of the system may decrease drug administration errors and has improved compliance with JC standards.

Additionally, this system enforces the minimum JC requirements providing date and time of preparation and expiration for all medications (figure 3). Furthermore, compliance with ASHA’s guidelines for labeling of pharmaceuticals, and carry a 2D barcode of all essential information that can be integrated with an AIMS.

Methods

Baseline compliance was evaluated at two tertiary health care centers in the United States. All observations were made by one trained individual at each site. Effort was made to train the anesthesiologists from knowing that labeling compliance was being monitored and random rooms were selected on random days in effort to achieve as accurate of baseline compliance as possible.

Compliance with the automated labeling solution, “Smart Labels” was evaluated at only one of the previous sites, with observations being made by the same user. The “Smart Labels” device was implemented in ORs on busy vascular and thoracic services. All users were provided with in-service training and the devices were supported 24/7 by an on call OR engineering team.

Results

A total of 1197 syringes were analyzed between the two sites for baseline compliance in 170 OR cases as presented in Table 2. These syringes were compared against 2009 Joint Commission Standard MM.4.5.01 for compliance and the compliance is presented in Figure 2.

Syringes that were prepared by a third party vendor were classified as “Prefilled”. Those syringes meeting JC requirements were labeled at JC Compliant. All Compliance syringes are shown with angled stripes in Figure 2. Syringes there were missing a label were designated “No Elements” and those with only a name designated “Name Only”. Since PreFilled expires in less than 24hrs of preparation it requires that the expiration time be noted on the label. Syringes missing this are designating “Proposed without Expiration.”

An additional 48 cases, were analyzed that utilized the “SmartLabels” system, looking at 541 syringes. Compliance with these cases were found to be 100% compliant with JC standards with minimal workflow disruption.

Discussion

Safe, high quality, error free care is the goal of anesthesiologists as they care for their patients. Our study demonstrates that broad variability of current labeling compliance practice exists among hospitals. As an increasing number of required compliance elements are added, full compliance with the national standards will become increasingly more difficult.

Innovative, user-friendly systems such as the one studied here may help solve the compliance challenge without impeding workflow or adding time to the process. Increased compliance with labeling requirements may help eliminate drug errors in the operating room and further improve patient safety. However, many could argue that simply labeling of drug name and concentration is simply enough; however, by providing this additional information it ensure that you are not using that medication that accidentally isn’t. The next step isn’t getting cleaned up from the previous day. Additionally, from a best practices point of view, this information should be present to simply provide the best care possible.

Providing the best patient care at a minimal disruption to work flow was the main focus of this project. With increasing complex labeling requirements, this will likely take an increasing larger amount of anesthesiologist’s time. When looking at the JC’s National Patient Safety Goals for 2010 (NPSPG.03.04.01), the requirements again increase. With current labeling practices, only 1 label in the baseline compliance would meet these national standards. However, with an automated labeling solution, such as the one developed for this study, not only does it meet the 2010 requirements, but provides other critical information for providing the best patient care.

References:


Table 1: Joint Commission Standard/NPSPG.03.04.01 (2010 JC Standard)

1. In protective and other procedural settings both on and off the sterile field, label medication only if there is only medication being used.
2. In protective and other procedural settings both on and off the sterile field, medication labeling occurs when any medication or solution is transferred from the original packaging to the sterile field.
3. In protective and other procedural settings both on and off the sterile field, medication labeling occurs when a pre-packaged medication is moved in parentheses.

Table 2: Breakdown of drugs assessed in the initial compliance for each site and the total. The number of pre-filled syringes are noted in parentheses.

Table 3: Joint Commission Standard/NPSPG.03.04.01 (2010 JC Standard)

Figure 2: Breakdown of the content of the Smart Labels

Figure 3: Baseline syringe labeling compliance breakdown

Figure 4: Examples of syringe labeling compliance categories

Figure 5: Smart Labels being used in an OR

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