The University of Michigan
University Hospitals and Health Centers
Adult Anesthesiology Department

Analysis of Anesthesia Narcotic Disposal Methods at The University of Michigan Hospital
Final Report

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Executive Summary

Due to risk in patient safety, the Department of Anesthesiology at the University of Michigan Hospital recently changed its policy for disposing of Schedule III narcotics in the operating room (OR) and post-anesthesia care unit (PACU). In the previous narcotic disposal method, called the return method, anesthesia providers were responsible for maintaining used and unused narcotic syringes throughout the day. At the end of a shift, providers returned unused vials and partially used syringes to the OR pharmacy for narcotic administration auditing. Carrying partially used syringes increases the risk of “syringe swap”; where a syringe is used on a subsequent patient. The new disposal process, known as the “wasting method”, requires anesthesia providers waste the remaining contents of a syringe into a gauze pad and place both the gauze pad and syringe in a hazardous waste receptacle. One witness is required to sign off on the waste and documentation of wasting is returned to pharmacy at the end of the day for auditing.

While elimination of syringe swap was the primary driver behind switching to a new disposal method, the Department of Anesthesiology also needs a method that can safeguard against providers diverting narcotics for recreational use. The wasting method decreases the ability of Anesthesiology to accurately monitor providers’ narcotic administration, which is a requirement by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). The Department of Anesthesiology asked a team of senior Industrial and Operations Engineering students at The University of Michigan to provide recommendations for the disposal of narcotics by analyzing different methods of narcotic management and disposal. The team used the following four goals to guide them in identifying narcotic disposal methods that will increase patient safety and Anesthesiology’s ability to monitor narcotic administration:

- Perform an observational study of the return disposal process and the new narcotic wasting process.
- Interview pharmacy administration at five other hospitals to research narcotic disposal methods.
- Survey Certified Registered Nurse Anesthetists (CRNAs) and anesthesiologists on different aspects of the narcotics management process, specifically focusing on narcotic disposal.
- Perform an observational study in the OR pharmacy on their method of disposal and documentation of narcotics in the return narcotics management process.

Methods and Findings

The team used observations of the disposal process, a survey of anesthesia providers, and research on the disposal methods of other institutions to analyze different methods of narcotic disposal for the Department of Anesthesiology.

Observations

The team observed the narcotic return method for 24 hours total by shadowing six CRNAs. The distribution and return of narcotic packs was observed in the OR pharmacy for three hours. The return process observations provided insight into the junctures in the narcotic management...
process and helped the team identify potential issues with narcotic management. During the pharmacy observation, the team watched the head pharmacist distribute packs of narcotics to providers for their shift and pharmacy technicians break down and audit narcotic packs that were returned the previous day.

Based on the observations the team found that issues with the narcotic management process include a lack of a standardized process in narcotic organization and documentation time.

The observation in the pharmacy revealed that rework is created for the pharmacists whenever a CRNA improperly documents the narcotic administration for a procedure. When this occurs, the head pharmacist has to contact the provider and rectify the errors in the documentation.

Surveying of the Providers

The team distributed a survey of 13 questions to approximately 190 narcotic providers that work in The University of Michigan Hospital. The survey was created using the information from the observational studies and asked questions on junctures in the narcotic management process. The survey was distributed using Qualtrics survey software and analyzed using Microsoft Excel and Qualtrics software. Of the 190 surveys distributed, 71 were returned.

The survey revealed that:

- Providers would rather deposit their narcotics in a one-way drop box than waste them.
- Providers find it cumbersome to maintain partially-used narcotics throughout the day.
- Providers don’t often witness-waste but when wasting does occur it is not difficult to find a witness.
- Most providers document their narcotic administration during or directly after a procedure.

Outside Institution Research

To research narcotic management and disposal methods of other institutions the team conducted phone interviews with five other hospitals, including four teaching hospitals similar to the University of Michigan Hospital. Before the interviews, the team created a list of topics to guide each interview. The list ensured that the team would retrieve information on the following four junctures in the narcotic management process:

- Narcotic Distribution
- Narcotic Documentation
- Narcotic Disposal
- Narcotic Administration Auditing

The interviews revealed that the other institutions use online systems to document narcotic administration. This allows the other institutions to monitor narcotic administration statistics and easily audit narcotic administration. While none of the institutions use a spectrometer to audit returned partially-used syringes, all of the contacts believe spectrometer audits are a useful deterrent to drug diversion. Each institution uses their own method for distribution and disposal, but four institutions found that using narcotic distribution machines relieve the labor intensive
job of re-making and distributing narcotic packs in the pharmacy and allows for more in depth narcotic monitoring abilities.

**Conclusions**

From the study on narcotic management and disposal methods, the team arrived at the following conclusions:

- An online method for narcotic documentation allows for more comprehensive forms of narcotic administration auditing, especially when the narcotic disposal method is wasting and no partially-used syringes are returned to the pharmacy.
- Narcotic distribution should be done on a case by case basis when possible. Distributing smaller amounts of narcotics means that the providers have to handle fewer narcotics at once.
- Narcotic distributing machines ease the workload of both the pharmacists and narcotic providers. The machines can enable case-by-case distribution and track metrics on narcotic administration for auditing.
- Any narcotic method that is implemented should not require anesthesia providers to manage partially-used syringes after a procedure. Managing partially-used syringes can lead to syringe swap incidents and adds to the workload of the providers.
- When coupled with proper narcotic administration documentation, disposal of narcotics through wasting has the potential to lighten the workload of the pharmacy.

**Recommendations**

The team developed recommendations for three main areas of the narcotic management process: documentation, wasting, and narcotic distribution.

*Implement an Online Documentation System*

Narcotic providers should no longer record the narcotic administration for each case on a paper Controlled Substance Form. Instead, an online interface should be created that works with the online charting system to reduce redundancies in filling out information and decrease the errors on the forms returned to pharmacy.

An online documentation system will also allow for more comprehensive methods of narcotic auditing. Online documentation will make reviewing a provider’s past administration records much easier than searching through years of paper documentation and allow pharmacy to track administration by procedure and narcotic type. Currently, the University of Michigan’s Centricity system cannot support witnessing, but in the future when the documentation system can support electronic witnessing, the Department of Anesthesiology should move towards this method.

Currently, the Hospital maintains seven years of paper returned controlled substance forms. An online documentation system will allow this space to be used for other purposes.
Use Wasting Method of Narcotic Disposal

The hospital should continue using the wasting method. The wasting method, when properly followed, removes the risk of syringe swap incidents by eliminating the provider’s need to manage partially-used syringes. The wasting method is not too drastic of a change because providers did not find it difficult to obtain a witness for wasting and only have to waste an average of three times per shift.

Analyze Feasibility of Narcotic Dispensing Machines

The team recommends that The Department of Anesthesiology analyze the feasibility of purchasing narcotic dispensing machines. Interviews with outside hospitals indicate that narcotic dispensing machines can be valuable tools in relieving pharmacy workload, tracking and auditing narcotic administration, and decreasing waste of narcotics by dispensing narcotics for each case.

Monitor Narcotic Administration Statistics

The Department of Anesthesiology should use the Centricity system to monitor the mean amount of narcotics administered, stratified by procedure-type and provider. This will allow for improved narcotic auditing and early narcotic diversion detection. If the Department decides to implement narcotic dispensing machines, monitoring these statistics manually will no longer be necessary because the machines will track these statistics automatically.
Introduction

The Department of Anesthesiology at the University of Michigan Hospital has changed the disposal method of narcotics used in the Operating Room (OR) and Postanesthesia Care Unit (PACU). In the method previously used at the hospital, the return method, Certified Registered Nurse Anesthetists (CRNAs) kept partially-used narcotic syringes on their person until the end of a shift. At the end of the shift the partially-used syringes were returned to the OR Pharmacy, where the contents of the syringe were squirted into a bin of cat litter. The new process, called narcotics wasting, requires the CRNA to empty any narcotics that remain in a syringe into a gauze pad and to dispose of both the syringe and gauze pad in a hazardous waste receptacle in the OR or PACU.

The return disposal process is set up in such a way that a “syringe swap” incident can occur. Syringe swap is when a needle that has been used on one patient is used again on a subsequent patient, and is a major safety concern. The risk of syringe swap created by the return disposal process is the primary driver behind implementing the new wasting method. Additionally, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requires hospitals to have a process in place to document and audit the administration of all Schedule III Controlled Substances. The auditing is aimed at preventing the abuse of narcotics by any of the narcotic handlers. The new process was implemented the week of October 29th 2012.

The Department of Anesthesiology had asked an Industrial and Operations Engineering senior design team to research industry best practices for narcotics management and waste disposal and provide recommendations on methods for the University Hospital. Specifically, Anesthesiology wanted to find the methods that will increase patient safety and decrease the ability of narcotic handlers to abuse narcotics. This report presents the team’s methodology, findings, and conclusions on narcotic management processes and provides recommendations on which methods best suit the University of Michigan Hospital System.

Background

The Department of Anesthesiology at the University of Michigan Hospital oversees the administration of narcotics by anesthesiologists and CRNAs in the OR and PACU. Currently, the pharmacy distributes packs of narcotics to CRNAs at the beginning of each shift. These packs contain a set amount of various narcotics contained in vials, but additional narcotics can be added upon request of the provider. Because of their classification as Schedule III Controlled Substances, the government requires the hospital to have a self-monitoring system in place to track the administration of these narcotics.

During each procedure, the CRNA draws the necessary amount of narcotic from a vial into a syringe. The amount of narcotic drawn is subject to the provider’s own experiences, but is mostly dependent on patient information such as procedure type, allergies, weight, and age. Since narcotics are drawn into a syringe based on provider experience, excess narcotic can remain in the syringe at the end of a procedure. In the return method, a green label marked “USED” was placed on the syringe by the CRNA to signal that this syringe could not be used again. Once the label was placed on the syringe, the CRNA kept that syringe on their person for
the remainder of their shift. There was risk of a syringe swap incident if the CRNA forgets to apply the label or if the label goes unnoticed in an emergency. CRNAs recorded the quantity of each narcotic drawn from the vials and used for the patient on the Controlled Substances Form (CSF).

At the end of a shift, CRNAs returned their remaining narcotics and used syringes to the OR pharmacy. For each pack, the pharmacy technicians confirmed that the amount of drug administered to patients and the amount of drugs remaining in the syringes and vials match the CRNAs’ CSF. In the return disposal process, syringe contents were randomly tested with a spectrometer to ensure the contents returned in partially-used syringes have not been replaced with a saline solution. Until mid-October, spectrometer tests were performed for three hours a month.

Because there was a risk of syringe swap with the return disposal process, the Department of Anesthesiology moved to a new narcotics disposal process called the “wasting process”. In the wasting process, the anesthesiologist or CRNA wastes any narcotics remaining in the syringes into a gauze pad. Subsequently, the gauze pad and the empty syringe are disposed of into a red hazardous waste receptacle after each procedure. The amount administered and wasted is documented on the CSF. One witness must be present during the physical wasting of excess narcotic and must sign off to attest that the wasted amount matches the amount recorded on the CRNA’s CSF. The pharmacy is still responsible for checking the amount of unused vials returned at the end of each shift. However, spectrometer audits are no longer used because the contents in partially-used syringed are wasted by the providers and not returned to the OR pharmacy.

While the Department of Anesthesiology has switched to a wasting process, they are unsure which method of narcotic management and disposal is most effective. Additionally the Department of Anesthesiology does not know how to best implement a narcotics wasting process.

**Key Issues**

This project is driven by the following issues with the return narcotics disposal process:

- The return narcotics and syringe disposal process allows for the situation where an anesthesiologist or CRNA might reuse a contaminated syringe on a patient.
- Improper disposal of narcotics may lead to the abuse of narcotics among narcotic handlers.
- The Department of Anesthesia would like to compare various methods of narcotics management.
- The Department of Anesthesia wants to use the industry’s best method for narcotic disposal, but does not know which method is best.

**Projects Goals and Objectives**

The goal of the project is to find which narcotic management and disposal methods best suit the University of Michigan Hospital, while increasing patient safety and decreasing the ability of narcotic handlers to divert narcotics for recreational use.
IOE Team 7 set the following goals in order to accomplish the main goals of the project:

- Perform an observational study of the return disposal process and the new narcotic wasting process.
- Interview pharmacy administration at five other hospitals to research narcotic disposal methods.
- Survey CRNAs and anesthesiologists on different aspects of the narcotics management process, specifically focusing on narcotic disposal.
- Perform an observational study in the OR pharmacy on their method of disposal and documentation of narcotics in the return narcotics management process.

The goals above will allow IOE Team 7 to:

- Make the University of Michigan Anesthesia Department compliant with government standards by eliminating the chance for syringe swap and providing necessary safeguards against narcotic diversion.
- Provide the advantages and disadvantages of five different methods of narcotics management.
- Identify the best methods for narcotics disposal that can be implemented at the University of Michigan Hospital.

**Project Scope**

This project analyzed the narcotics disposal method of the University Michigan Hospital’s OR and PACU. The disposal process begins when the OR pharmacy distributes narcotic packs to the CRNAs at the beginning of a shift and ends when the CRNAs return their individual narcotic packs along with their CSF at the end of the same shift.

Any narcotics disposal outside of the University of Michigan Hospital’s OR and PACU are not in the scope of this project.

**Methodology**

The team divided data collection and analysis into two categories: practices at the University of Michigan Hospital and practices at other institutions. This was done to understand and address the specific concerns of anesthesia providers at University of Michigan Hospital, while also comparing to the at outside institutions.

**The University of Michigan Hospital Practices**

The data collection methods that were used at The University of Michigan hospital were observations of the narcotic management process and a survey of anesthesia providers.

**Observations**

The team observed the pharmacy operations as a group on one occasion and shadowed CRNAs in the OR and PACU separately on two different occasions, for a total of 27 hours of...
observations.

In the pharmacy, the team observed the morning distribution of narcotic packs to CRNAs and the breakdown and audit of returned packs from the previous day. While observing, the team also discussed the role of the pharmacy in the narcotic management process with the head pharmacist.

Through the observations the team gained an understanding of the flow of the return process and identified key junctures in the narcotic management process, allowing the team to target areas for improvement.

Survey of Anesthesia Providers

To better understand University of Michigan Hospital narcotic management practices, the team developed a survey based on their observations of CRNAs in the OR and PACU. The survey can be found in Appendix A-1. The survey was distributed to approximately 190 providers and was completed over a two-week period. During the two-week period, 71 surveys were returned. The 37% response rate exceeded the team’s goal of 30% and was deemed a representative sample of providers by the clients.

The survey asks quantitative questions regarding the timing of charting and records updates during a procedure, as well as qualitative questions regarding aspects of how individual CRNAs and anesthesiologists handle their narcotics. The survey aimed to find out which practices are most common and preferred at key junctures in the narcotic management process. The survey was distributed using Qualtrics online survey software.

In addition to distributing the survey, the Qualtrics software was used in combination with Microsoft Excel to analyze the surveys returned. For the qualitative data, the team looked for trends in the responses of the providers and used the Qualtrics data analyzing tools to obtain a readout of descriptive statistics for the quantitative survey questions, create charts and graphs, and to cross tabulate data. The responses from the surveys provided insight into what the narcotic providers found important during narcotic management and helped the team recommend narcotic management methods that best suit the University of Michigan Hospital.

Other Institution Practices

In addition to surveying University of Michigan Hospital staff, the team contacted pharmacies and anesthesia departments at other hospitals. The team developed a list of talking points to guide the interviews of staff at other institutions. The complete list of talking points can be found in Appendix A-2. Specifically, the team wanted to understand:

- The disposal and auditing processes at other hospitals
- Compliance issues in the past with these methods
- Incidents of syringe swap
- Incidents of drug diversion

The team received contact information for pharmacy and anesthesia personnel at other academic medical centers and emailed them to set up conference calls. Fifteen people were contacted and
the team arranged phone calls with five institutions. A list of the hospital staff that was interviewed can be found in Appendix A-3.

Findings

This section details the information the team accumulated as a result of their data collection. The findings in this section refer to important issues with narcotic management regarding patient safety and narcotic auditing efficiency.

**OR Observation Findings**

The team observed the return process of narcotics management in the OR and PACU by shadowing six CRNAs. The team observed OR and PACU practices for 24 hours total during the last week in September and first week in October of 2012. Through shadowing, the team found three aspects of the narcotic management process that can either result in patient safety concerns or are crucial to implementing an effective future process.

- Currently no standard process exists to aid the CRNAs in managing their individual narcotic packs. Each CRNA manages their narcotics according to their personal preferences. Providers’ preferences differ on how they separate partially-used syringes from unused-syringes, amount of narcotic drawn up for a procedure, and anesthesiology cart setup.
- Despite hospital rules that no narcotics should be shared between providers, the team observed narcotics being handed off and shared on two separate occasions. The two instances occurred when a CRNA went on break and gave a syringe that was already used to the next CRNA to use for the duration of the break.
- Through conversations with CRNAs, the team discovered that they all prefer to follow their personal system of managing narcotics and are resistant to changing that system. In order for future narcotic management processes to be effectively implemented, the processes have to be flexible enough to allow CRNAs to combine their own personal methods with the processes.

A flow map of the return process, based on the observations, can be found in Appendix A-4. A process map for the wasting process can be found in Appendix A-5.

**Pharmacy Observation findings**

The team observed the OR pharmacy for three hours during the early morning narcotic pack distribution. The team observed packs being distributed to the CRNAs, as well as the auditing and remaking of returned packs into new packs ready for distribution. Auditing and remaking of narcotic packs is performed by pharmacy technicians. Pharmacy technicians check that the amount of narcotics returned match the amounts of narcotics administered and documented on the CSF. Pharmacy technicians separate unused narcotics from partially-used narcotics and place the unused narcotics in an Omnicell machine to be used in making new packs throughout the day. Observations of the pharmacy process and a brief conversation with the head pharmacist, revealed the following findings:
• Auditing of the CSFs and remaking of the packs is labor intensive. While observing the pharmacy, additional pharmacy staff was needed to help audit and remake packs in order to meet the demand of the pack distribution.
• During the auditing process, the pharmacy has to perform rework whenever a CRNA has made an error filling out their CSF. To resolve these mistakes, pharmacy staff compares the CSF with the online record system, Centricity, and must contact the anesthesia provider for any further clarification.
• Narcotic administration records are maintained on paper, with no database available to aid in narcotic auditing.

Survey Findings

The section below details findings the team collected through the surveying of anesthesia providers.

Narcotic Handling

Below are findings regarding the CRNAs’ and anesthesiologists’ perceived ability to distinguish between partially-used and clean syringes. Table 1 details the findings on the providers’ perceived difficulty level of maintaining partially-used syringes throughout the day. The providers were asked, “Prior to witness-wasting, how difficult was it to differentiate between your partially-used narcotic syringes and clean syringes throughout the day?” and, “Prior to witness-wasting, how difficult was it to manage your partially-used narcotics by keeping them until the end of your shift?” The results of these questions can be seen in Table 1.

Table 1. Narcotic Providers’ Perceived Difficulty in Syringe Management

| Sample size = 66 |
| Source: IOE 481 Team 7 Narcotics Survey |
| November 12-25 2012 |

<table>
<thead>
<tr>
<th>Provider Response</th>
<th>Percentage of Each Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What’s the difficulty level of differentiating partially-used and clean syringes?</strong></td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>1.41%</td>
</tr>
<tr>
<td>Somewhat Difficult</td>
<td>5.63%</td>
</tr>
<tr>
<td>Somewhat Easy</td>
<td>8.45%</td>
</tr>
<tr>
<td>Easy</td>
<td>84.51%</td>
</tr>
<tr>
<td><strong>How difficult is it to manage partially-used syringes on your person?</strong></td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>4.29%</td>
</tr>
<tr>
<td>Somewhat Difficult</td>
<td>17.14%</td>
</tr>
<tr>
<td>Somewhat Easy</td>
<td>18.57%</td>
</tr>
<tr>
<td>Easy</td>
<td>60%</td>
</tr>
</tbody>
</table>
Table 1 shows that, although only 6.77% of anesthesia providers find it difficult to differentiate between syringes throughout the day, a much larger percentage, 21.43%, find it cumbersome to keep partially-used syringes with them until the end of their shift.

Narcotic Documentation

The following section details narcotic providers’ preferences and expectations regarding narcotic documentation. Two main aspects of narcotic documentation were analyzed: time of documentation and providers’ expectations of online documentation systems.

To gain insight into when providers document the narcotic administration for a procedure, the team asked, “When do you typically fill out your controlled substance form to document narcotic administration?” Figure 1 below, shows that while 79% of the providers surveyed document their narcotic administration during or after the procedure, 21% fill out their forms at times that may be much later than the procedure and could cause inaccuracies in their narcotic documentation.

![Provider Controlled Substance Form Update Time](image)

Figure 1. Distribution of providers based on their time of narcotic administration documentation.

The team asked the providers, “If an electronic means of documenting narcotic waste was developed (via Centricity), which still required a witness, but replaced the administration/wasting paper record, would that improve the efficiency or accuracy of the narcotic wasting process?” This question allowed the team to gauge if the providers perceive any
benefits in an online controlled substance form opposed to a paper one. The results are provided in Table 2.

Table 2. Perceived Advantages and Disadvantages of Electronic Narcotic Documentation
Sample size = 63
Source: IOE 481 Team 7 Narcotics Survey
November 12-25 2012

<table>
<thead>
<tr>
<th>Provider Response</th>
<th>Percentage of Each Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficiency of the Wasting Process</strong></td>
<td></td>
</tr>
<tr>
<td>Improve</td>
<td>23.88%</td>
</tr>
<tr>
<td>Worsen</td>
<td>76.12%</td>
</tr>
<tr>
<td><strong>Accuracy of the Wasting Process</strong></td>
<td></td>
</tr>
<tr>
<td>Improve</td>
<td>48.48%</td>
</tr>
<tr>
<td>Worsen</td>
<td>51.52%</td>
</tr>
</tbody>
</table>

Table 2 above shows that while a majority of the providers believe an online documentation system would decrease the efficiency of the wasting process, the providers are split on whether the online system would improve or worsen the accuracy of the wasting process.

Wasting Process

The team wanted to see if the transition from return disposal to the provider wasting disposal process would burden providers, making them hesitant to comply with the process. Specifically, the team considered the number of times providers had to waste and how easy it was for them to find a witness for each waste. The results of this analysis are provided below.

Number of Provider Daily Wasting Events
Sample size = 64
Source: IOE 481 Team 7 Narcotics Survey
November 12-25 2012

Figure 2. Distribution of providers based on their average number of times they waste a day.
Figure 2 shows that 61% of the providers have to witness-waste between 1 and 3 times in a given day, while 3% of providers indicate that they never have to witness-waste during a given day.

**Provider Perceived Difficulty of Finding Witnesses**

Sample size = 64  
Source: IOE 481 Team 7 Narcotics Survey  
November 12-25 2012

![Graph showing the distribution of providers based on the difficulty of finding a witness for wasting.](image)

**Difficulty**

Figure 3. Distribution of providers based on the difficulty of finding a witness for wasting

Figure 3 shows the providers’ response to the question “How easy is it to find someone to witness your narcotic wasting?” The provider responses varied greatly, but the majority of providers, 62%, perceived finding a witness for wasting to be more easy than difficult.

**Narcotic Return**

The providers were asked to rate their preference between wasting and depositing used narcotics in a bin. An answer of 0 meant Not Preferable, and an answer of 10 meant Preferable. Table 3 shows that providers would rather deposit their partially-used syringes into a drop box than witness-waste them.

**Table 3. Providers’ Preference for Narcotics Disposal Method**

<table>
<thead>
<tr>
<th>Answer</th>
<th>Average Value</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Witness-waste partially-used narcotics</td>
<td>4.02</td>
<td>3.51</td>
</tr>
<tr>
<td>Deposit administration record and partially-used narcotics in drop box</td>
<td>6.77</td>
<td>3.65</td>
</tr>
</tbody>
</table>
A complete list of survey results is provided in Appendix A-6. The results include descriptive statistics of the quantitative questions and brief descriptions of the answers received for the open ended questions.

**Outside Hospital Findings**

By interviewing five outside institutions, the team found information on methods for narcotic distribution; narcotic documentation, narcotic disposal, and narcotic administration auditing that were being implemented at other hospitals. Some hospitals that were interviewed wished to remain anonymous and will be labeled Hospital 1-throughout the report. Below are our findings detailing the different methods of narcotic management being used at other hospitals.

**Hospital 1 Findings**

Hospital 1 is a large teaching hospital that uses a very similar system to the return disposal process that was in place at The University of Michigan. Hospital 1 distributes and returns narcotic packs to the OR pharmacy for each procedure and all narcotic administration is done using the hospital’s online charting system. There are two benefits to distributing and returning narcotics before and after each procedure. First, the providers are required only to manage a small amount of narcotics at one time. Second, by returning partially-used syringes between cases, there is no risk for syringe swap incidents to occur. The benefit of an online administration record keeping system is it provides easier access to narcotic administration records, which can be used to improve narcotic administration auditing. Table 4 outlines the narcotic management process at Hospital 1.

<table>
<thead>
<tr>
<th>Process Step</th>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcotic Distribution</td>
<td>Distributes packs for each procedure.</td>
<td>Smaller amount of narcotics to be handled at once.</td>
<td>Have to travel to the OR pharmacy between each case.</td>
</tr>
<tr>
<td>Narcotic Documentation</td>
<td>Only paper documentation that states each provider has received their narcotic pack. All narcotic administration is documented using online charting.</td>
<td>Able to have an online database of each provider’s narcotic administration.</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Hospital 1 Narcotics Process  
Source: IOE 481 Team 7 Narcotics Phone Interview  
November 13, 2012
Table 5. Hospital 1 Narcotics Process Cont’d
Source: IOE 481 Team 7 Narcotics Phone Interview
November 13st 2012

<table>
<thead>
<tr>
<th>Narcotic Disposal</th>
<th>Packs are returned to the OR pharmacy after each individual procedure. The pharmacy wastes returned syringe contents into the water stream.</th>
<th>No carrying partially-used syringes between procedures.</th>
<th>Have to travel to the OR pharmacy between each case.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcotic Administration Auditing</td>
<td>No use of spectrometer. Use the online charting to verify amounts of narcotics used match narcotics returned.</td>
<td>Ease of monitoring narcotic administration records.</td>
<td>No way to identify contents in partially-returned syringes.</td>
</tr>
</tbody>
</table>

Hospital 2 Findings

Hospital 2 is a large teaching institution with 62 ORs and a centrally located pharmacy. To dispense narcotics, Hospital 2 uses Pyxis 4000 machines located in every OR, as well as Pyxis “hubs” centrally located in other areas of the hospital focused on perioperative care. The machines can document the narcotics withdrawn from each machine and used during a procedure. Additionally, the machine links the narcotic usage to the provider who withdrew the narcotics. Because Pyxis 4000 machines are located in each OR, the providers only withdraw the amount of narcotics necessary for one procedure at a time.

At the conclusion of the procedure, the provider places any waste or unused narcotics in a bag with a printout from the Pyxis 4000 machine, which details the narcotic administration. The bag is then placed in a one-way drop box that only the pharmacy can access. Pharmacy technicians empty the drop boxes at the end of the day to audit the documentation, break down the returned narcotics, and restock the Pyxis 4000 machines. Table 5 below outlines the narcotics process of Hospital 2.

Table 6. Hospital 2 Narcotics Process
Source: IOE 481 Team 7 Narcotics Phone Interview
November 26st 2012

<table>
<thead>
<tr>
<th>Process Step</th>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcotic Distribution</td>
<td>Use Pyxis 4000 machines located in every OR. Withdraw narcotics for each procedure.</td>
<td>Providers only withdraw the amount of narcotic needed for each procedure.</td>
<td>No face time with a pharmacist. Cost of Pyxis machine.</td>
</tr>
</tbody>
</table>
### Narcotic Documentation

| Narcotic Documentation | All administration of narcotics is documented by the machines. Online documentation includes patient information, drug type and amount administered, and time of procedure. | Documentation is all connected through the Pyxis network. The Pyxis network can track each provider’s administration amounts and detect any weird behavior. |

### Narcotic Disposal

| Narcotic Disposal | The Pyxis 4000 machine makes a print out for each procedure, which is placed in a bag with any used materials. The bag is placed in a one way drop box located in the OR next to the Pyxis machine. Pharmacy technicians empty the drop boxes at the end of the day. | Each procedure’s documentation is attached to the narcotics used for that procedure. No buildup of providers at the pharmacy receiving and returning narcotic packs. Providers don’t manage used narcotics throughout the day. | Pharmacy technicians have to collect all of the bags left in the drop box. |

### Narcotic Administration Auditing

| Narcotic Administration Auditing | All of procedures information and narcotic usage is documented in Pyxis. Mean and median narcotic usage is specifically tracked to monitor any unusual behavior. | Able to stratify administration by many different variables including provider and procedure. A database is available to examine historic data for narcotic administration. |

### Hospital 3 Findings

Hospital 3 is a 957-bed teaching hospital with 52 ORs, 146 anesthesiologists, and 81 CRNAs. Hospital 3 previously relied on their pharmacy to distribute narcotics on a case-by-case basis. At the end of each day, two pharmacy technicians performed a daily narcotics count to ensure the amount of narcotics used by providers, the amount returned, and the amount wasted matched. Anesthesia providers recorded the amount of narcotics used on an online anesthesia documenting system, as well as on paper. Approximately 10% of paper records each day were compared to the corresponding electronic records. Additionally, five to ten returned syringes were refracted each day. Hospital 3’s spectrometer was unable to perform tests on Fentanyl syringes.

To decrease pharmacy’s heavy workload and better protect against drug diversion, Hospital 3 moved to a new process that relies heavily on the Omnicell. Providers obtain their drugs on a case by case basis from the Omnicell located in each OR. Providers no longer keep paper records, as syringes are no longer returned to the pharmacy at the end of the day. There is one witness for
each wasting and the wasting is recorded using the online records system. Pharmacy would like to keep track of witnessing data, but the IT department is currently unable to pull reports on witnesses from the records system. The team’s contact emphasized the importance of leveraging technology such as the Omnicell. The Omnicell is used to track the mean and standard deviation of drug amounts used by providers each month and can signal when a provider is using more than two standard deviations away from the mean of a particular narcotic. While the institution is not currently using the Omnicell for wasting, they are hoping to move towards wasting with the Omnicell in the future in order to take advantage of data such as trends in witnessing, which could signal partnering in drug diversion. Table 6 outlines the narcotics process of Hospital 3.

Table 8. Hospital 3 Narcotics Process  
Source: IOE 481 Team 7 Narcotics Phone Interview  
November 21st 2012

<table>
<thead>
<tr>
<th>Process Step</th>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcotic Distribution</td>
<td>Use Omnicell located in every OR. Withdraw narcotics for each procedure</td>
<td>Providers only withdraw the amount of narcotic needed for each procedure.</td>
<td>No face time with a pharmacist.</td>
</tr>
<tr>
<td>Narcotic Documentation</td>
<td>Narcotics are wasted in the OR with one witness present and are recorded using the online anesthesia documenting system.</td>
<td>Can keep track of witness wasting data once IT can support it</td>
<td>IT department cannot easily pull reports from anesthesia documenting system to track</td>
</tr>
<tr>
<td>Narcotic Disposal</td>
<td>Wasted in OR</td>
<td>Less work for pharmacy</td>
<td>Harder to monitor narcotics in operating room</td>
</tr>
<tr>
<td>Narcotic Administration</td>
<td>When a provider is suspected of drug diversion the pharmacy will refract a partially-used syringe. Use the online record in Omnicell to record narcotic administration.</td>
<td>Narcotic administration is in an online database that can be monitored.</td>
<td>Hospital has difficulty leveraging technology. Trouble obtaining data from Omnicell and online anesthesia documenting system</td>
</tr>
</tbody>
</table>

Hospital 4 Findings

Hospital 4 is large teaching hospital with 487 beds. Hospital 4 uses a wasting process to dispose of any remaining narcotics. At the end of each procedure, two witnesses watch the wasting of used narcotics into either a trash can or hazardous waste receptacle. Hospital 5 does not use
gauze pads to prevent narcotics from pooling, but the team’s contact thought gauze pad were an important safeguard against diversion. Hospital 4 relies on electronic records to document narcotic usage amount, as well as witnessing. The pharmacy tracks which providers and nurses witness together most often because two providers that witness each other’s wasting frequently could be an indication of diversion. Narcotics are distributed using Pyxis machines.

To comply with JCAHO standards, the pharmacy audits online records daily to ensure that all narcotic use matches the narcotic use documentation. If there is a discrepancy with a provider’s records, the provider is contacted for clarification. In most instances, the confusion is the result of a simple math error. Hospital 4 does not have the resources to invest in a spectrometer, but the contact thinks refracting syringes is a good deterrent against diversion. Table 7 below outlines the narcotics process of Hospital 4.

<table>
<thead>
<tr>
<th>Process Step</th>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcotic Distribution</td>
<td>Withdraw narcotics from Pyxis on a case-by-case basis</td>
<td>Providers are not withdrawing large amounts of narcotics and holding them for long periods of time.</td>
<td>No interaction with pharmacy personnel.</td>
</tr>
<tr>
<td>Narcotic Documentation</td>
<td>Amount of narcotic used and witnessing is recorded electronically</td>
<td>The pharmacy can track trends in witnessing and can easily look back at records if an issue arises.</td>
<td></td>
</tr>
<tr>
<td>Narcotic Disposal</td>
<td>Waste into trash or hazardous waste container with two witnesses</td>
<td>Providers are not carrying used syringes</td>
<td>Gauze pad is not used for wasting, which allows for pooling.</td>
</tr>
<tr>
<td>Narcotic Administration Auditing</td>
<td>The pharmacy verifies all electronic records</td>
<td></td>
<td>Time consuming for the pharmacy. Simple math errors are common and provider must be contacted to rectify</td>
</tr>
</tbody>
</table>

**Hospital 5 Findings**

Hospital 5 utilizes a system in which providers withdraw narcotics from a Pyxis CII Safe machine on a case-by-case basis. The machines are located throughout the hospital, with a heavier concentration near the ORs and PACU. After each case, the providers waste any remaining narcotics into a hazardous waste receptacle, with the assistance of two witnesses. The
providers will then return any salvageable narcotics to a Pyxis machine and withdraw the narcotics necessary for their next case.

Hospital 5 utilizes an electronic record keeping system for all documentation, including witness signatures, wasted narcotics, and case notes. At the end of each day, pharmacy technicians restock the Pyxis machines with any necessary narcotics. The pharmacy also audits anesthesia provider records. Auditing ensures that the narcotics administered are within an appropriate range and that the amount wasted matches what witnesses observed being wasted. The pharmacy does not have a quota of records they must check within a certain time period and auditing is done at the discretion of whoever is in charge of the pharmacy on a particular shift.

The team’s contact emphasized that while he believes the system currently in place is effective, the best possible system would involve pharmacy distributing narcotics directly to providers. The contact felt that direct interaction with pharmacy would discourage drug diversion and would allow for refraction tests on used syringes. Table 8 outlines the narcotics process of Hospital 5.

### Table 8. Hospital 5 Narcotics Process

<table>
<thead>
<tr>
<th>Process Step</th>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcotic Distribution</td>
<td>Use Pyxis located throughout the hospital. Withdraw Narcotics on a case by case basis.</td>
<td>Providers are not withdrawing large amounts of narcotics and holding them for long periods of time.</td>
<td>No interaction with pharmacy personnel.</td>
</tr>
<tr>
<td>Narcotic Documentation</td>
<td>Documentation is done electronically through the hospital’s record keeping system.</td>
<td>Data is retained in a usable form and can be analyzed easily.</td>
<td></td>
</tr>
<tr>
<td>Narcotic Disposal</td>
<td>Narcotics are disposed of on a case-by-case basis into hazardous waste receptacles located either in the OR or PACU. Two witnesses observe the process and provide electronic signatures.</td>
<td>Two witnesses help to ensure that the provider does not have an ally helping them divert. Case-by-case wasting increases accountability.</td>
<td>Wasting directly into the sharps container allows narcotics to pool at the bottom of the container, leaving room for possible diversion.</td>
</tr>
</tbody>
</table>
Table 8. Hospital 5 Narcotics Process Cont’d
Source: IOE 481 Team 7 Narcotics Phone Interview
November 13th 2012

| Narcotic Administration Auditing | Pharmacy audits anesthesia provider records irregularly with no established protocol in place. | Pharmacy occasionally checks provider records. | Pharmacy has no system in place to make the tests random or to ensure all providers are eventually checked. Pharmacy has no way to verify the contents of syringes to be wasted because they do not use refraction tests. |

**Conclusions**

The following sections detail the team’s conclusions regarding the interaction between narcotic management processes, patient safety, and narcotic auditing. Conclusions were derived from the observational study, survey of providers, and interviews with outside hospitals.

**Observation Conclusions**

From the observations of OR and pharmacy practices, the team concluded that paper documentation of narcotic administration can cause errors in documentation, rework for pharmacy workers, and make administration auditing more difficult. Additionally, a lack of a standardized narcotic management process can lead to errors in narcotic administration documentation and patient safety issues.

**Survey Conclusions**

After analyzing the 71 returned surveys, the team has conclusions on the following three topics: Wasting, Narcotic Documentation, Narcotic Handling.

**Wasting**

The survey indicated that the transition to a witness-wasting system was not difficult. Although providers do not have to waste often or find it difficult to find a witness, they still prefer to have pharmacy do the wasting.
Narcotic Documentation

A significant proportion of providers document their narcotic administration for a procedure at a time that is detached from the individual case, resulting in errors on the CSF form. Adding an online narcotic documentation system would increase the accuracy of the narcotic administration recording.

Narcotic Handling

Providers indicated that they dislike having to carry around partially-used syringes with them throughout the day. Any system that is put in place should not require providers to carry partially-used syringes on their person.

Outside Institution Conclusions

After speaking with pharmacy contacts at five other medical centers, the team narrowed down the most important elements of the narcotics disposal process that enable a hospital to waste; electronic or paper records; distributing narcotics through pharmacy or through a narcotic distribution machine; and frequency of narcotic pack distribution.

Electronic vs. Paper Record

All institutions used electronic record keeping for anesthesia records during an OR procedure. The hospitals with wasting methods also used electronic records to track wasting witnesses. The team’s contacts stressed the importance of electronic witness records in catching potential diverters. Having electronic records allows pharmacy to keep track of which providers witness for each other most often, which could signal two providers partnering in diverting. While some hospitals were able to keep track of this data using their electronic record keeping systems, other hospitals faced IT issues when trying to pull reports. Electronic witnessing along with narcotic distribution machines easily allows for witness monitoring.

Narcotic Distribution Machines vs. Pharmacy Distribution

Four out of the five institutions that were interviewed use some form of narcotic distribution machine to dispense narcotics to providers. The machines allow providers to withdraw the amount of narcotics needed for each individual case. Machine distribution allows pharmacy to concentrate on auditing returned narcotics. The narcotic distribution machines can monitor different statistics of narcotic administration, which enables the hospital to better prevent narcotic diversion. The team concludes that narcotic distribution machines increase the ability of a pharmacy to monitor narcotic distribution and allow the providers to better manage their narcotics.

Case-by-Case Methods

All of the hospitals interviewed distribute narcotics to the providers for each case. This smaller amount of narcotics distributed allows the providers to more easily handle narcotics than
requiring them to manage several cases worth of narcotics at one time. Any narcotic process implemented should distribute packs in as small of intervals as possible.

Wasting vs. Non-Wasting Disposal Methods

Three out of the five hospitals the team interviewed used a wasting method for disposing narcotics. In the other two hospitals, the non-wasting disposal methods created a heavier workload for pharmacy compared to wasting methods because narcotics were being returned to pharmacy between each case. Wasting eliminates the need for providers to maintain partially-used syringes throughout the day without creating a large workload for pharmacy.

Recommendations

After analyzing all of the collected data, the team has come up with the following recommendations for a safer, more efficient narcotics disposal process:

Implement an Online Documentation System

Narcotic providers should no longer record the narcotic administration for each case on a paper CSF. Instead, an online interface should be created that works with the online charting system to reduce redundancies in filling out information and decrease the number of errors on the forms returned to pharmacy.

An online documentation system will also allow for more comprehensive methods of narcotic auditing. Online documentation will make reviewing a provider’s past administration records easier and allow the pharmacy to track narcotic administration by procedure and narcotic type as well as track common provider waste-witness pairs.

Currently, the Hospital maintains seven years of paper returned controlled substance forms. An online documentation system will allow this space to be used for other purposes.

Use Wasting Method of Narcotic Disposal

The hospital should continue using the wasting method. The wasting method, when properly followed, removes the risk of syringe swap incidents by eliminating a provider’s need to manage partially-used syringes.

Analyze Feasibility of Narcotic Dispensing Machines

The team recommends that The Department of Anesthesiology analyze the feasibility of purchasing narcotic dispensing machines. Interviews with outside hospitals indicate that narcotic dispensing machines can be valuable tools in relieving pharmacy workload, tracking and auditing narcotic administration, and decreasing waste of narcotics by dispensing narcotics for each case.
Monitor Narcotic Administration Statistics

The Department of Anesthesiology should use the Centricity system to monitor the mean amount of narcotics administered, stratified by procedure-type and provider. This will allow for improved narcotic auditing and early narcotic diversion detection. If the Department decides to implement narcotic dispensing machines, monitoring these statistics manually will no longer be necessary because the machines will track these statistics automatically.

Expected Impact

The team expects that, as a result of confirming the validity of the implemented wasting process, several key improvements will be observed within the narcotics wasting process.

- **Elimination of syringe swap incidents**
  - As a result of the wasting policy emphasizing a lack of providers maintaining used syringes, the team expects the risk of syringe swap to be nullified.
- **Reduction in pharmacy workload**
  - Pharmacy no longer has to waste remaining narcotics while rebuilding packs.
- **Improved Narcotic Administration Auditing Through Electronic Record Keeping**
  - An electronic record keeping system allows for the collection of data, such as common witnesses and wasted amounts and may result in a better system to safeguard against diversion.
  - The team expects that changing to an all electronic record keeping system will reduce rework incurred by pharmacy due to errors in narcotic administration documentation on the paper controlled substance form.
- **Adoption of narcotics dispensing machines**
  - The team anticipates that the Department of Anesthesiology will discuss the possibility of purchasing narcotic dispensing machines. Although this would require a large initial investment, adoption of narcotic dispensing machines would result in a further reduction in pharmacy workload.
  - The narcotic dispensing machines also allow for the collection of data regarding the quantity of narcotics withdrawn by each provider and may result in a more robust system to safeguard against diversion.
- **Safer Narcotic Management Process**
  - The team expects that all of these expected impacts will combine to create a safer and more efficient narcotics wasting process.
## Appendix A-1 CRNA and Anesthesiologist Survey

1. What is your professional title?
   - CRNA
   - Resident/Intern

2. Prior to witness-wasting, how difficult was it to differentiate between your partially-used narcotic syringes and clean syringes throughout the day?
   - Difficult
   - Somewhat Difficult
   - Somewhat Easy
   - Easy

3. Prior to witness-wasting, how difficult was it to manage your partially-used narcotics by keeping them until the end of your shift?
   - Difficult
   - Somewhat Difficult
   - Somewhat Easy
   - Easy

4. When do you typically fill out your controlled substance form to document narcotic administration?
   - During the procedure
   - After the procedure
   - End of the day
   - When I get around to it

5. In your opinion, which wasting practice of partially-used narcotics presents the least risk to patient safety?
   - In the OR, at the end of a case
   - In the PACU, at the end of patient care
   - Not wasting at all- keeping and returning partially-used narcotics at the end of the shift

6. Please rate your preference for BOTH narcotic waste security process:
   1. Witness-wasting partially-used narcotic syringes at the end of each case
   2. Depositing partially-used narcotic syringes with an administration record in a central locked container at the end of each case

   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
---|---|---|---|---|---|---|---|---|---|---|---|
1. |   |   |   |   |   |   |   |   |   |   |   |
2. |   |   |   |   |   |   |   |   |   |   |   |

7. On average, how often have you had to witness-waste narcotics during a given DAY?
   - >5x
   - 5x
8. How easy has it been to find someone to witness your narcotic wasting?
- Easy
- Somewhat Easy
- Somewhat Difficult
- Difficult

9. If electronic means of documenting narcotic waste was developed (via Centricity), which still require a witness, but replaces the administration/wasting paper record, would that improve the efficiency or accuracy of the narcotic wasting process?

Efficiency
- Significantly Worsen
- Somewhat Worsen
- Somewhat Improve
- Significantly Improve

Accuracy
- Significantly Worsen
- Somewhat Worsen
- Somewhat Improve
- Significantly Improve

10. Please rate what is most important to you in managing your narcotics pack:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of narcotic pack</td>
<td></td>
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<tr>
<td>Contents of narcotic pack</td>
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<tr>
<td>Security of narcotic pack</td>
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</tbody>
</table>

11. Please list a few KEYS of how you personally handle and manage narcotics, specifically how you keep clean and dirty syringes separate & how you ensure accuracy while filling out the controlled substance form.

12. We are continually trying to improve… Please tell us what is the best system that you know of to manage narcotics in perioperative care?

13. Any other feedback:
Appendix A-2 Talking points for Other Academic Medical Centers

Can you walk us through a typical day, from the beginning of the day pack distribution up through the conclusion of a typical case? and the conclusion of the day in pharmacy.

A) If the anesthesia providers waste? If on a case by case basis what determines?
- How do they waste?
  - water stream?
  - sharps container?
    - witnessing? (Confirm they use a 2 witness system)
- Do you find that you have the same people witnessing a large majority of wasting? Is this a security concern?
- Where does wasting most commonly occur? Why?
- Depending on where the wasting most commonly occurs, have you found that the process of witnessing affects the workload of the witnesses in an adverse way?
- What is the compliance rate? Have you had difficulty enforcing the wasting policy?
- Do the anesthesia providers prefer the case by case wasting method? Have they voiced any particular problems or concerns with regards to a case by case wasting method?
- How do the anesthesia providers record their use of narcotics?
  - paper charting?
  - electronic charting?
  - both?
- Which records does pharmacy use to remake kits?
- Have you ever had syringe swap occur and has switching to a case by case wasting process helped to reduce the frequency?

B) If the anesthesia providers keep leftover narcotics until the end of the shift:
- Have you ever considered moving to a case by case wasting system? If so, why wasn’t the system implemented?
- What other methods has your institution used in the past?
- What is the process of returning the leftover narcotics at the end of a shift?
- Who wastes the leftover narcotics at the conclusion of shifts?
- How are the leftover narcotics wasted?
  - Water stream?
  - Kitty litter?
- Does syringe swap occur?
- How do the anesthesia providers record their use of narcotics?
  - paper charting?
  - electronic charting?
  - both?
- Which records does pharmacy use to remake kits?
- What is the compliance rate like? Does your institution have a lot of unanticipated case by case wasting? Is this a concern for you?

2. For both methods:
- What are your JCAHO regulated self checks?
  - spectrometer
  - records audits
  - OR audits
- Are you happy with these self check systems?
- Have you always used these methods or did you recently switch?
- Why do you use these specific self check methods as opposed to other options?
- If someone is accused of diverting or a concern is raised, what is your protocol for dealing with the situation?
Appendix A-3 Contact Information At Other Institutions

Christopher G. Murray, PharmD, MS
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Julie Golembiewski, PharmD, MS
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Division Director, Critical Care and Surgery Pharmacies
jlewin3@jhmi.edu
(443) 287-0560
Appendix A-4 Original Process Flow Map
Appendix A-6 CRNA and Anesthesiologist Survey Results

1. What is your professional title?
   - CRNA 70%
   - Resident/Intern 30%

2. Prior to witness-wasting, how difficult was it to differentiate between your partially-used narcotic syringes and clean syringes throughout the day?
   - Difficult 1%
   - Somewhat Difficult 6%
   - Somewhat Easy 8%
   - Easy 85%

3. Prior to witness-wasting, how difficult was it to manage your partially-used narcotics by keeping them until the end of your shift?
   - Difficult 4%
   - Somewhat Difficult 17%
   - Somewhat Easy 19%
   - Easy 60%

4. When do you typically fill out your controlled substance form to document narcotic administration?
   - During the procedure 31%
   - After the procedure 48%
   - End of the day 10%
   - When I get around to it 11%

5. In your opinion, which wasting practice of partially-used narcotics presents the least risk to patient safety?
   - In the OR, at the end of a case 14%
   - In the PACU, at the end of patient care 45%
   - Not wasting at all- keeping and returning partially-used narcotics at the end of the shift 41%

6. Please rate your preference for BOTH narcotic waste security process:
   1. Witness-wasting partially-used narcotic syringes at the end of each case
   2. Depositing partially-used narcotic syringes with an administration record in a central locked container at the end of each case

   0 1 2 3 4 5 6 7 8 9 10

   1. ________________________________
      Average Value = 4.02
      Standard Deviation = 3.51

   2. ________________________________
      Average Value = 6.77
      Standard Deviation = 3.65
7. On average, how often have you had to witness-waste narcotics during a given DAY?
   - >5x       12%
   - 5x       6%
   - 4x       17%
   - 3x       16%
   - 2x       28%
   - 1x       19%
   - Never       3%

8. How easy has it been to find someone to witness your narcotic wasting?
   - Easy       21%
   - Somewhat Easy     37%
   - Somewhat Difficult     34%
   - Difficult      7%

9. If electronic means of documenting narcotic waste was developed (via Centricity), which still require a witness, but replaces the administration/wasting paper record, would that improve the efficiency or accuracy of the narcotic wasting process?
   Efficiency
   - Significantly Worsen     48%
   - Somewhat Worsen     28%
   - Somewhat Improve     18%
   - Significantly Improve     6%
   Accuracy
   - Significantly Worsen     18%
   - Somewhat Worsen     33%
   - Somewhat Improve     41%
   - Significantly Improve     8%

10. Please rate what is most important to you in managing your narcotics pack:

    0          1          2          3          4          5          6          7          8          9          10

    Size of narcotic pack

    Average Value = 5.88
    Standard Deviation = 2.69

    Contents of narcotic pack

    Average Value = 7.98
    Standard Deviation = 2.28
Security of narcotic pack

Average Value = 7.37
Standard Deviation = 2.62

Other

Average Value = 5.52
Standard Deviation = 4.3

11. Please list a few KEYS of how you personally handle and manage narcotics, specifically how you keep clean and dirty syringes separate & how you ensure accuracy while filling out the controlled substance form.

Common responses included applying the “used” sticker to any syringes that have been used, as well as keeping used and clean syringes in separate pockets. Several responses also indicated that used syringes were placed in plastic bags obtained from pharmacy and placed back in the narcotics kit. Accuracy while filling out the controlled substance form was most commonly accomplished by using Centricity notes as a guide.

12. We are continually trying to improve… Please tell us what is the best system that you know of to manage narcotics in perioperative care?

The most common responses suggest the use of a narcotic dispensing machine, with the Omnicell and Pyxis models specifically mentioned. Some responses indicate a preference towards these machines being placed in operating rooms, while others prefer pre-op. Most providers indicate that constant vigilance is needed on the part of the provider and that most systems will leave room for error without this mentality.

13. Any other feedback:

Several responses indicate a belief that the narcotic wasting and return process was changed due to an isolated provider’s mistakes or incident. A concern that PACU and OR registered nurses do not want to witness wasting events was also raised.