

# **Social Practice and Clinicians' Meaning of Urinary Catheter Insertions**

A Case Study of Context-Based Design

by

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## OVERVIEW

Urinary catheterizations are a common part of the clinical landscape in most hospitals across the country. Despite their routine nature, urinary catheterizations account for a sizable portion of all hospital-acquired infections, as well as additional costs to an already overburdened healthcare system<sup>1</sup>. Previous medical literature focused on the procedural aspects of urinary catheter insertion such as the maintenance of sterile technique or the avoidance of dependent catheter loops<sup>2</sup>. This case study addresses the previously overlooked area of the context in which the urinary catheter insertion unfolds. By focusing on context, with a particular focus on the social practice that encompasses urinary catheter insertion, opportunities for design improvements emerge that would not have emerged with a limited focus on the clinical practice. Further use of inductive observational studies, such as the one undertaken by Medline Industries Inc. (Medline), provide the potential for better patient care and patient outcomes through the revealing of insights left unrecognized in deductive methods.

Often, the literature isolates the clinical practice from its context, which places us in the position of creating idealized models that are not context-based. The need exists to understand clinical practices in a manner that does not separate the practice from the natural setting in which it unfolds.

This case study may serve as an early effort to create a broader application of inductive research approaches that leads to better design of practice improvement and product design. By utilizing inductive methods of qualitative research and expanding the focus to include the social practice

along with the clinical practice, such research efforts may enhance our capacity to create designs that work well in actual practice.

If we can improve our knowledge regarding context-based design, we can better match the designer's intent with the practitioner's goals to perform well in the natural setting. The highlighted case study provides such an opportunity to enhance our knowledge as it explores the practice of urinary catheter insertions, which may appear simple and straightforward until one explores the context in which the practice unfolds and the clinician's meaning of urinary catheter insertions.

## DESIGNING FOR URINARY CATHETER INSERTION

A leading area of interest is catheter-associated urinary tract infections (CAUTI). Urinary tract infections constitute 36% of all hospital-associated infections (numbering over 560,000 in 2002) and over 13,000 deaths<sup>3,4</sup>. Between 15% and 25% of all hospitalized patients receive a short-term indwelling urinary catheter<sup>5</sup>. While reported rates of UTI among patients with urinary catheters vary substantially, national data from the Centers for Disease Control and Prevention's National Healthcare Safety Network ranged from 3.1 to 7.5 infections per 1,000 catheter days<sup>6</sup>.

To address this new quality and safety environment, clinicians and providers work continuously to uncover practices that will improve quality and decrease patient safety risk. Clinicians and providers often look to government agencies

that provide guidance such as the recently released CDC guidelines for CAUTI<sup>7</sup>. In addition, they seek advice or expertise from quality organizations regarding best practices such as the National Quality Forum or CMS's Quality Improvement Organizations. And finally, they adhere to safe practices or advisory pronouncements by organizations such as The Joint Commission.

One group of market participants, healthcare manufacturers, are often overlooked in this effort to improve the quality and safety of health care services. Often, these organizations are thought of as suppliers more than safety or quality experts. Yet, it is undeniable that the manner by which products are designed can significantly impact the clinician's ability to provide high quality health care.

One such manufacturer, Medline Industries, Inc, set out to design a urinary catheter management system that would aid the clinician's efforts to reduce CAUTI. The catheter management system would reduce variations in catheter insertion practices; improve maintenance of sterile technique; decrease rates of inappropriate catheterizations; and increase awareness among clinicians and patients regarding the timely removal of urinary catheter. Medline, Inc., worked closely with a clinical advisory panel of physicians, nurses, and infection control professionals and reviewed the evidence in the medical literature of causes of catheter infections and the unnecessary use of catheterizations<sup>8</sup>. After gathering input from the subject matter experts, Medline interviewed hospital personnel to better understand their needs related to urinary catheterizations and then worked with designers to create a catheter management system that would be better designed to achieve the stated objectives.

However, Medline, Inc., wanted to better understand the context in which catheter insertions unfold in the natural setting of clinical practice.

Through an understanding of clinicians' actual behaviors and attitudes in the clinical setting, Medline could design a catheter management system that was based upon the reality of clinical practice versus idealized models of practice.

## THE RESEARCH STUDY

Given VHA's experience in conducting field research in hospital settings, Medline Industries, Inc., determined that VHA could help it understand the context of urinary catheter insertions in the natural setting of the clinical practice. As part of the VHA methodology, we expanded the scope to ensure that we could capture data related to the context from two perspectives, clinical and social practice.

Our primary goal was to understand the actual clinical practice of urinary catheter insertion and not anticipate idealized models exist in practice. We focused our intentions on:

- 1) understanding the objectives of catheter insertions from the clinician's perspective,
- 2) clarifying the actual practice that unfolds, and
- 3) identifying areas where the catheter management system aided clinicians or failed to aid clinicians based upon the clinician's perspective on the practice.

The case study utilized an inductive method of qualitative research that allowed themes and patterns to emerge in the natural setting. The study utilized narrative inquiry, direct observations, and visual ethnography without a predetermined framework. The study was bounded by time (3 separate visits of 3 days per visit), locations within the hospital setting (emergency department, medical/surgical floors, operating room), and access to patients that would allow direct observations by researchers.

The case study unfolded over three different site visits to Providence Sacred Heart Medical Center & Children's Hospital in Spokane, Washington. The first site visit allowed us the opportunity to gain understanding of the clinical and social practice of urinary catheter insertion at Providence Sacred Heart Medical Center & Children's Hospital. Originally, we conducted research for three days in the emergency department and on several medical/surgical floors (4-North, 5-South, 5-North). However, we eventually expanded our observational research to include patients receiving urinary catheters in the operating room. While the data obtained from the operating room enhanced the research, we did not include such data in our examination of the redesigned urinary catheter tray. We returned to Providence Sacred Heart Medical Center & Children's Hospital 12 weeks later, which was 4 weeks after Medline had introduced the newly designed catheter management system. On the return visit, we conducted the study on the same medical/surgical floors and the emergency department that had been involved in the initial visit. For the three days we were present, six urinary catheter insertions occurred in the emergency department and no observations of insertions occurred on the medical/surgical floors. Finally, we returned for a third visit based upon final product design modifications that had occurred since our last visit a few months earlier. The observations on the final visit consisted of eleven observations that occurred in the emergency department and one observation in cardiac care unit.

Hospital personnel in the various areas observed were made aware of the research team's presence and the general purpose of the study. Throughout the study, we continually articulated to the clinicians and personnel at Providence Sacred Heart Medical Center & Children's Hospital that our aim was to learn from them in an inductive manner.

Given the inductive structure to the study, VHA researchers captured observable data in detail in

the form of articulated words, artifacts used in the clinical setting, or visual ethnography that revealed aspects of the context of the clinical practice. We often verified our data capture with the clinicians through narrative inquiry. Based upon these research methods, we were able to identify themes that emerged out of the data. We divided those themes into those aspects that related to the clinical practice and those that related to the social practice in which the urinary catheter insertions occurred.

## **THEMES: CLINICAL PRACTICE**

Our research identified three overarching themes that clinician's utilized as they interacted with patients and among themselves. Through narrative inquiries, we continued to hear the clinician's discuss these themes as the primary focus for the clinician's and how the clinician's make meaning of the urinary catheter insertion practice. The combination of simultaneously achieving all three themes suggested a successful catheter insertion for a clinician where problems in any one of the three areas could lead the clinician to viewing the practice as problematic or difficult. Such categorization was not operator-dependent as non-compliant patients or product design problems could be the source for placing an attempted urinary catheter insertion into the problematic or difficult different category.

### **Sterile Technique**

All observed clinicians took steps to maintain sterile technique during urinary catheter insertion. The clinicians varied in the manner in which they created the location and size of the sterile field. Some clinicians preferred to utilize the space between the patient's legs and others preferred to create sterile field close to the foot of the bed and a few incorporated areas such as the patient's chest or the bedside tray. Yet, the maintenance of sterile technique continued to be a consistent priority and also used to evaluate

a successful insertion. In one situation, the clinician articulated that the procedure had “not gone well” in his view when a non-cooperative, mental health patient contaminated the sterile field and forced the clinician to restart the practice and seek additional support to temporarily restrain the patient.

### **Patient Comfort**

All observed clinicians voiced that one of the primary goals during the practice of urinary catheter insertion is to keep the patient comfortable or decrease the experience of pain. Clinicians expressed the following attitudes regarding patient comfort:

*“ Making sure I don't hurt the patient is upper-most in my mind.”*

*“ It's important to make sure the patient is comfortable at all times.”*

*“ After maintaining the sterile field, patient comfort is my next priority.”*

### **Time - Faster is Better**

The clinicians articulated that timeliness of completing the practice was important. The clinicians stated that the preference is to properly and quickly insert the catheter.

*“ Time is of the essence.”*

*“ Patients are nervous, anxious, and the longer it takes me to get it (the catheter) in, the more anxious they may become.”*

When one clinician retold to us that he heard the insertion on a non-cooperative patient had “not gone well,” he mentioned the time element as a signal of a less than optimal experience.

## **THEMES: SOCIAL PRACTICE**

In reviewing the observational data collected for the social practice of urinary catheter insertion, the data led us to conclude there are primarily 3 phases of the social practice between the clinician and patient during the insertion of the urinary catheter. The three

phases are continuous but distinct phases of the social relationship that occurs between the clinician and the patient as the urinary catheter insertion occurs.

### **Initiation**

In the first phase, which we called the “initiation” phase, the clinician establishes or maintains the relationship with the patient through words, touches, or gestures, designed to help the patient understand the urinary catheterization practice. The patient typically signaled understanding through nonverbal gestures such as head nodding and occasionally through verbal pronouncements, “*I've had one of these before, I'm ready.*” Typically, the clinician would wait for this patient signal before proceeding with the catheterization.

### **Navigation**

In the second phase, which we called the “navigation” phase, the clinician often transitioned to a different interaction with the patient. The clinician's interaction with the urinary catheter took on more prominence. For the clinician-patient interaction in the navigation phase, the clinician established control of the patient through the use of more directive language or physically position the patient into the desired posture. The patient acquiesced and would try to accommodate the demands of the clinician. After positioning the patient, the clinician would interact with the patient throughout the catheterization primarily through instructional statements regarding the procedure; affirming words to ensure patient of the practice; or directive guidance where patient failed to maintain position. The clinician would continue to remain in control of the relationship throughout the navigation phase until the phase often concluded with the clinician making statements that affirmed successful outcome of the practice such as, “*OK it's in, everything looks good. I'm getting urine flow now.*”

### **Completion**

The final phase, which we called the “completion” phase, the clinician-patient interaction transitioned



back to where the patient regains control. As part of the transition, the clinician might clean the perineum. Also, the clinician would reposition the patient close to the patient's original positioning. The clinician might use words to signal the transition *"Is there anything I can get you?"* The patient generally acknowledged the transition through nonverbal gestures or occasional verbal gestures, *"Good, I'm glad that's done!"*

## **DISCUSSION: IMPROVEMENT DESIGNS BASED ON OBSERVATIONAL DATA**

With identification of the themes uncovered during the initial phase of the research, VHA provided Medline with the results of the observational data. As part of the research provided to Medline, VHA categorized potential opportunities into three areas:

- 1) designs for clinical practice,
- 2) designs for social practice, and
- 3) designs for learning.

The three opportunities areas were not created in a mutually exclusive fashion but created to highlight the specific opportunities that may arise from these different elements of urinary catheter insertion.

To address the opportunities identified based on the initial research findings, Medline conducted a series of iterative product redesign meetings. These product design meetings evaluated the design options for aspects of the clinical practice, social practice, and learning. Upon completion of this process, Medline's product redesign focused on several elements with three primary areas of interest:

- 1) streamline tray to reduce steps for the clinician,
- 2) provide design that better supports clinician's education of catheter tray elements and insertion process, and
- 3) offer design that enhances the likelihood of patient education as part of the practice.

Prior to the final site visit by VHA researchers, Medline conducted catheter tray training, which was voluntary but encouraged by Providence Sacred Heart Medical Center & Children's Hospital management. Medline personnel provided the training during shift changes for the clinical personnel at Providence Sacred Heart Medical Center & Children's Hospital. The training sessions lasted anywhere from 15 to 20 minutes and consisted of live design demonstrations followed with question-and-answer session. Providence Sacred Heart Medical Center & Children's Hospital management estimated that 60-70% of frontline staff participated in the training.

Because of the specific focus that Medline had in the redesign of the catheter tray, the VHA observations in the second phase focused narrowly on the aforementioned three primary areas. Similar to the initial phase, VHA used an inductive method to uncover the relationship between the product redesign and the clinical practice, social practice, and learning.

### **Design for Clinical Practice**

Certain patterns previously observed persisted in the clinical practice. Observed clinicians continued to create sterile fields in a variety of locations. Also, clinicians continued to exhibit different personal preferences for use of gloves packaged separately from the tray versus those contained within the tray. In addition, clinicians did not routinely perform patient education as a result in the change of tray design.

However, the clinicians did prefer the benefits of the streamlined tray that created fewer steps for the clinician. As a single layer tray, the clinicians did not require steps related to maneuvering and positioning a two layer tray. Also, the clinicians preferred the change to swab sticks that decreased steps for the clinicians in the prepping and cleansing of the perineum.

In addition, the clinician's recognized the patient education card and kept the card for the patient

or placed it in location where the patient might review the card. This behavior is a departure from previously observed behavior where the education cards were discarded without much attention afforded to them. In the new tray, the patient education card was a separate enclosure that resembled an actual "Get Well" card. It was printed on heavy card stock with a picture of a vase of flowers on the front and printed instructions (in English and Spanish) for the patient on the inside. In all cases, the cards were recognized by the clinicians and set aside to give to the patient or a family member at a later time. Comments from clinicians included:

*" I like this."*

*" Oh that is nice."*

*" That's cool."*

### **Design for Social Practice**

For the final visit, the research team was able to again validate that the three phases (initiation, navigation, and completion) existed. While these elements of the social interaction remained unchanged, the role of the catheter tray changed, particularly in the initiation phase. During the previous observations, the clinicians did not use the catheter to help mediate much of the social interaction beyond the necessity of the second phase (navigation). In the latest observations, the researchers documented that several clinicians actually used the catheter tray as a teaching tool. In two cases, the clinicians showed the patient the unwrapped catheter tray using the outer packaging label, a new visual format of a high quality detailed photo of tray contents, to describe what was going to occur as part of urinary catheter insertion. Both cases involved patients that had not had a prior catheter insertion.

### **Design for Learning**

While clinicians may have recognized the new visual format of a high quality detailed photo showing the contents and positioning of the tray, our observations did not reveal a situation where

a clinician had the opportunity to train another clinician on the contents of the tray. As such, we did not observe a situation where the clinician utilized the peel away design contained on the outer package. Without an educational situation, it is unclear whether the peel away design would have better supported the clinician-clinician interaction. As discussed above, the observations did reveal a benefit of the new design to support clinician-patient interaction as clinicians used the new format to better explain the procedure.

## **CONCLUSION**

This case study suggests the need for more efforts to increase our knowledge of context-based design through observational studies. Through inductive, qualitative research methods involving observations in the natural setting, narrative inquiry, and visual ethnography, researchers, designers, and clinicians can uncover opportunities that might have previously gone unnoticed. Such new opportunities would address aspects of the current knowledge gap where we have not studied the context or social practices that are part of the clinical practice environment.

As an example, the case study found that product design can reduce or exacerbate disruptions in the clinician-patient interaction. The clinicians supported the change to a single layer tray as the reduction in steps as reduced disruptions in patient interaction. For the urinary catheter insertion practice, any design features that required the clinician to focus more on the catheter than the patient interaction created a disruption in the clinician-patient interaction. These same disruptions were associated with increased variations in practice that were not of value based upon the clinician's articulated goals for a successful urinary catheter insertion.

In addition, the case study revealed that the goal for the clinicians should not be viewed solely through

the focus on sterile technique as clinicians do not solely focus on sterile technique when performing such procedures. The clinicians are simultaneously focusing on maintaining sterile technique, providing patient comfort or eliminating pain, and reducing patient anxiety by decreasing the time it takes for the entire process. Thus, a goal for good design in this area should decrease the steps the clinician must take to properly insert urinary catheters. Such a design would maintain the clinician's goals for clinician-patient interaction and reduce variations that increase the possibility for contamination. Without such context-based design, we run the risk of creating practice improvement efforts and product design that ideally create better practices but don't address the overall context in which the practice occurs.

This case study does not begin to answer many of the questions that would abound regarding a broader application of context-based approach to product design or practice improvement in health care. Even within the research findings for this study, there are unanswered questions that remain due to the limited scope of the study that would have tested further design enhancements for urinary catheter insertion. Yet, the case study does start to suggest that clinicians, and manufacturers, such as Medline, could contribute to a growth in our knowledge through context-based design research. We need to support the further development of research that uses inductive methods to understanding the context of clinical practices.

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