Needlestick Prevention: An Ongoing Journey

Lisa Hoegg, BSN, CIC
Infection Control/Value Analysis Specialist
Memorial Medical Center
Johnstown, Pennsylvania

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- Results were taken from data at the named institution only and should not be interpreted as being representative in all cases.

By now we are well aware of the origins of the Needlestick Safety and Prevention Act of 2000. In the year the Act was passed, over 600,000 healthcare workers suffered needlestick injuries (NSI) and other percutaneous injuries—dangerous events that exposed them to over 20 different bloodborne pathogens. At the same time, recent advancements in medical technology were creating a new generation of technology to make the hospital a safer place.

The language of the Act was simple, but its impact far-reaching. At its core, it called for OSHA to clarify and revise its Bloodborne Pathogen (BBP) Standard of 1991. The revised standard of January 2001 gives additional definitions to address newly developed sharps safety devices. It specifies that a hospital's Exposure Control Plan (ECP) must be updated annually to include developments in technology that have been implemented to reduce or eliminate an employee's exposure, and to identify positions and tasks with exposure potential. Front-line users must be involved in choosing the appropriate medical devices. Finally, a Sharps Injury Log detailing the specifics of exposure incidents must be maintained.

We all must end up in the same place. However, it is the tales of the journey of where we started and how we got there that differ.

Memorial Medical Center is a member of the Conemaugh Health System. We are a 566-bed community and regional referral hospital in Western Pennsylvania, known for clinical excellence and patient satisfaction. We are recognized as a top 100 Hospital in the U.S. in both orthopedics and open-heart surgery. We offer highly specialized services which include: a regional trauma center, a regional intensive care nursery, high risk obstetrical care, centers for heart care, vascular disease, neuroscience and minimally invasive surgery.

Along with its role in patient care, Memorial Medical Center has been educating and training health care professionals for more than 100 years. In addition to a physician residency program, we offer accredited education programs for careers as registered nurses, histotechnologists, radiologic technologists, surgical technologists, emergency medical technologists and paramedics.

Within the hospital, I act as an Infection Control/Value Analysis Specialist. By background, I am a Registered Nurse with my Bachelors of Science in Nursing and I am certified in Infection Control. I have eight years Medical/Surgical/Trauma experience; six years as a full-time Infection Control (IC) Specialist and three years in my current role in both Infection Control and Value Analysis.

The Move to Compliance

Even before enactment of OSHA's Revised Bloodborne Pathogens Standard, our institution was examining its policies with respect to sharps injuries.

Internally, our Employee Health Department presented data to the Infection Control Committee on our sharps injuries that were related to disposal. In the fall of 1999, they detailed the types and designs of sharps containers in use that they felt may have been contributing to the injuries.

At the same time, we were following events external to the institution. My IC Director and I had been following the progress of CalOSHA and the other states that were drafting and implementing their own Needlestick Prevention Laws. We took this opportunity to analyze our own sharps injuries further and found that, similar to the NaSH data[1], 64% of our injuries in 1999 were associated with hollow bore needles.

We took inventory of existing sharps safety devices and found:

- A recessed needle for intermittent IV administration had been implemented in the early 90's and was consistently being used hospital-wide.
- The laboratory had been using a safety butterfly and a safety ABG collection device for a few years.
- Despite new advances in technology, we were using the same sharps containers as we did in 1987.
- A safety syringe—the BD Safety-Lok™ syringe—was available for use in the psychiatric unit; however, the safety syringes were not being used consistently.

We decided it was time to take an across-the-board look at the dangers and possible solutions, and to investigate the new generation of technology that had become available. Since the Infection Control Committee was a multi-disciplinary team, we used it as our decision-making body for the types of devices we would pursue. Since that time, we have formed the SafetyNet Committee, a subcommittee of the Infection Control Committee. This multi-disciplinary committee is charged with reviewing and updating our engineering controls and fulfilling the requirements of OSHA's BBP Standard.

Our first target was the procedures that carried the most risk of injury and subsequent conversion: those that involved hollow-bore needles. Starting in January, 2000, our Committee started to research the various safety devices available. From the start, we involved front-line users, who gave us valuable information based on actual usage and technique. In addition, we involved Materials Management. In the beginning, they helped us source products and verify availability; as the project evolved, they also provided input on pricing. Around the same time, my duties were expanding to include Value Analysis, in addition to my role as an IC Specialist. Little did I know how intimately I would be involved with implementation of the new products!

By November 2000, when President Clinton signed the Needlestick Safety and Prevention Act, our efforts started to pay off. First, we had already implemented a needleless intravenous (IV) delivery system. Second, we were planning training for a new safety device for phlebotomy. We were also planning the installation of updated sharps containers throughout the institution. Finally, our Employee Health Department was implementing the use of EPINet™ for exposure tracking. This was a good start for our quest.

Evaluating Options: Safety Syringes

We make extensive use of the EPINet™ software in evaluating staff exposure within our institution. The software, which is a Microsoft Access® template, allows us to input data immediately following a needlestick, without omitting any of the required information. EPINet™ generates the Sharps Injury Log, as required under the BBP Standards, and also allows us to see where needlesticks are occurring and what devices present the greatest risk.

As our previous research had established, the most dangerous product in the hospital, in terms of potential for needlestick injury, was the hollow-bore needle.[2] And, despite the move towards needleless IV systems, there were many situations where medications needed to be delivered through intramuscular (IM) and subcutaneous (SubQ) means. We took as our task the implementation of a safer hypodermic syringe.

With the help of Materials Management, we narrowed the field to three safety syringes:

- BD SafetyGlide™
- Kendall Monoject®
- VanishPoint® Syringe

We chose these products because of our past experiences with using safe, dependable products manufactured by these vendors. We also relied on ECRI's Health Devices Needlestick-Prevention Selection Guide.

The trials were conducted in the spring of 2001, with the active participation of front-line users. We allowed the end users to totally familiarize themselves with the operation of each product, and to discover how procedures may need to be altered in a number of different clinical situations. The trials involved a psychiatric unit and a cardiac med/surg unit. These units were chosen because it was felt that these units gave an adequate number of hypodermic injections. We also felt that the psychiatric area would help us assess the products' performance in situations where patients may be less than cooperative.

Clinicians were carefully briefed before the onset of the trials, and were given the same evaluation form to use with each product. We used the "Safety Feature Evaluation Form for Safety Syringes" from the American Hospital Association's *Sharps Injury Prevention Program: A Step-By-Step Guide.*[3] The evaluations and comments were collected. The responses to each question were compared for

each product; a percentage value was calculated for each response, which was rated on a scale of 1 to 5, with 1 being the highest level of agreement and 5 being the lowest. I then displayed the results on a spreadsheet. It was clear to see that the VanishPoint® syringe was the preferred device based on our hospital's evaluation.

The clinicians' responses and comments led to our conversion to the VanishPoint® syringe. They preferred the VanishPoint® syringe for the following reasons:

- The level of protection the VanishPoint® syringe provided.
- The VanishPoint® syringe is easy to use. If clinicians do not feel comfortable with a safety device, they won't use it. Clinicians will find a way of bypassing a device that requires them to significantly change technique.
- Safety devices can be described as "Active" or "Passive". Active devices require clinicians to take an extra step, something beyond what they usually do, in order to be protected. Passive devices have a safety mechanism that is automatic, or part of the procedure usually followed in using a syringe. The VanishPoint® syringe safety mechanism is activated by fully depressing the plunger while the needle is still in the patient, part of the normal procedure for administering a medication. That makes it a passive device: compliance is higher with passive devices than with active ones.
- The VanishPoint® syringe provides downstream protection, so it protects the clinicians, as well as housekeeping staff and others who might be exposed to the discarded syringe.
- The safety mechanism on the VanishPoint® syringe can be activated using a one-handed technique; the worker's hands remain behind the needle at all times.

One factor was especially important. The CDC has noted in a *Morbidity and Mortality Weekly Report*[4] that most needlesticks occur within seconds of withdrawing the needle from the patient. The VanishPoint® syringe protects the clinician during this critical time.

An incident that had occurred in one of our psychiatric inpatient units a few months earlier exemplified this critical time. A clinician was administering an IM injection, and the patient became agitated while the clinician was withdrawing the needle. Somehow the syringe became airborne and landed in the arm of another clinician standing nearby! One type of safety device that could have prevented this incident was a safety device with retractable technology, since the incident occurred in that split-second *between* the withdrawal of the needle and the time when a sheath-type safety mechanism would have been activated.

VanishPoint® Syringe Implementation

The results of the trials were taken to a Nursing Management Committee to confirm that the results reflected their choice. The decision was then taken to the SafetyNet Committee for final endorsement.

Once approved, we needed to make sure that sufficient product was available in all locations where the VanishPoint® syringe was to be used. Since the VanishPoint® syringe was to be the accepted syringe for all IM, SubQ and intradermal injections in volumes of 3 cc or less, that meant inventory of the appropriate size syringes in all nursing stations and places where conventional syringes had been stocked.

It is important to realize that Materials Management was a part of our SafetyNet Committee from the beginning. They understood that the different safety syringes under consideration had different invoice line pricing—but they agreed with the structure of the evaluation, in which front-line users were asked to choose the product that offered them the best protection, and did not hinder patient care. In my experience the most expensive product is not always the best and the least expensive is not always the worst—the bigger picture is that costs to the institution will be decreased if sharps injuries are decreased and the "emotional cost" to employees reduced.

Following that, we needed to make sure that clinicians understood the operation of the VanishPoint® syringe safety mechanism. The sales representative provided an educational program with training materials as part of the in-service commitment.

Borne out of a happy coincidence in timing, the departments of Education and Nursing were planning a nine-month weekly course on Clinical Basic Skills just when the VanishPoint® syringe was being implemented. Our component was titled "Protective Devices and Practices." As part of this required continuing education, another IC Specialist and I offered a training module on safe work practices. Our session reviewed all of the sharps safety devices available and gave front-line users a chance to brush up on technique. We created a catalog that included a picture of each device along with a short description. The catalog is

an invaluable tool for new clinicians and for in-services. I am currently working on having the catalog available on the hospital's intranet site.

In addition, we needed to make sure all clinicians understood that the VanishPoint® syringe was the syringe they were supposed to use unless there was a clear reason not to.

So, our task was to make the VanishPoint® syringe the accepted safety syringe, and to outline a clear exception policy that had to be consulted before any other syringe could be used. We did this in two steps: first, I worked with Materials Management and some of the front-line users to identify all of the basic syringes and syringe needles in use in the hospital; then, we asked individual departments if all of these devices could be replaced with the VanishPoint® syringe. In almost all cases, the answer was "yes."

In those situations where clinicians needed to use another device, we established a procedure which allowed them to obtain the proper syringe and needle through a separate inventory, usually an automated dispensing system stocked by Pharmacy. In this way, the hospital can meet clinicians' needs without compromising our basic policy decision to make the VanishPoint® syringe the accepted hypodermic syringe.

In keeping with this policy, Materials Management keeps a list of these exceptions, and checks the list when any department requests a syringe besides the VanishPoint® syringe. Off-list orders are "red flagged," and the product is not ordered unless approved by SafetyNet.

Clinical Practice

Front-line users found the operation of the VanishPoint® syringe very similar to the conventional syringes they were used to, and there were minimal changes in clinical practice or technique.

We reminded clinicians to use standard technique in administering an injection: the index finger and middle finger should be positioned under the flange, where they can support the syringe against the pressure of the thumb on the plunger–and continue that support through the activation of the safety mechanism.

In followup surveys, clinicians have told me that there was no difference in patient discomfort compared to administering an injection with a conventional syringe and needle. In fact, a few thought injections were less painful. There were concerns about withdrawing medication through the rubber stopper of a vial and using the same needle to administer the injection. Some clinicians had been in the practice of changing needles after drawing medication into the syringe. The manufacturer's representative provided data that showed that the needle was not dulled after penetration of a vial stopper.

Also, some clinicians used a filter needle to withdraw medication from an ampule, then removed the filter needle and attached a needle for injection. Our SafetyNet Committee reviewed medication administration with faculty from our School of Nursing. They provided documentation[5] that use of a filter needle when drawing medication from an ampule is optional. This information was presented at a Nursing Management Meeting. We are aware that some institutions filter; however, Nursing at our institution decided to eliminate the use of a filter needle when withdrawing medication from an ampule for hypodermic injections.

Many of our SubQ injections involved the 1 cc insulin syringe. Staff had reported an air bubble that appeared to be difficult to remove. The manufacturer provided data that showed that the accuracy of the 1 cc syringe had been verified over a wide dose range despite the presence of the bubble. In addition, we learned that each lot of syringes met ISO internal dose accuracy standards. It was also noted that the 1 cc syringe is marked in one-unit increments to allow accurate administration of low doses.

A year after implementation, I had the opportunity to go back and survey clinicians in the patient care areas. I wanted to know if they felt comfortable with using the VanishPoint® syringe, now that they had some experience with the device. Overwhelmingly, clinicians saw safety and a decrease in needlestick injuries as the primary benefit of using the VanishPoint® syringe. Although they are effectively using it in all types of injections, including insulin injections, some staff continue to cite the presence of an air bubble and dose accuracy for insulin administration as a concern. We will continue to address these concerns with education and continued input from the sales representative.

Results, and Future Plans

As of September, 2002, the VanishPoint® syringes have been the accepted hypodermic syringe in all departments of the hospital for one year. The most important result is that there has not been a single needlestick involving any VanishPoint® syringe.

In looking back at the evaluation process and selection of the VanishPoint® syringe, I can say that the primary benefits are:

- Activation of the safety feature while the needle is still in the patient eliminates the "danger point" for the clinician, which is within seconds after removing the needle from the patient.
- The fact that the safety mechanism is an integral part of the product is also very important. It is a "passive" safety design; proper use of the product requires you to use the safety feature.

The Bloodborne Pathogens Standard requires that safe work practices as well as engineering controls be implemented. OSHA[6] estimates that almost 83% of sharps injuries can potentially be prevented by the use of safer medical devices. I feel that the VanishPoint® syringe is a high quality product with advanced technology that is moving us one step closer to minimizing the exposure potential for our employees! Safe work practices must fill the gap if we hope to achieve the National Healthcare Safety Network's goal of zero needlestick injuries by the year 2005. For this reason, we must continually reassess what we are doing, what safety devices we are using, and what products are available.

Comparison in Number of Needlesticks
Memorial Medical Center, Johnstown, Pennsylvania

This chart shows the number of needlestick injuries experienced in the course of IM, SubQ and Intradermal injections (the injections for which the VanishPoint® syringe is appropriate) in our institution. Before September, 2001, these injections were performed with conventional (non-safety) syringes; after September, 2001, they were performed with the VanishPoint® syringe.

Other Syringe	VanishPoint® Syringe
6 Needlesticks	0 Needlesticks
6 NSI in 3 Quarters (January, 2001 to September, 2001)	0 NSI in 4 Quarters (October, 2001 to September, 2002)

Number of Injections Delivered Using VanishPoint® Syringe

For reference purposes, the number of injections delivered is shown below. Time period is one year, from October 1, 2001, to September 30, 2002.

	Intramuscular (IM)	Subcutaneous (SubQ)	Intradermal	TOTAL
Per Year	47,892	101,592	23,496	**172,980**
Per Quarter	11,973	25,398	5,874	**43,245**
Per Month	3,991	8,466	1,958	**14,415**

References

1 Safer Needle Devices: Protecting Health Care Workers. OSHA. October, 1997. Accessed on the web September 16, 2002: http://www.osha-slc.gov/sltc/needlestick/saferneedle devices/saferneedledevices.html pages 4, 5, and 6.

2 Ippolito, G., Puro, V., Petrosillo, N., Pugliese, G., Wispelwey, B., Tereskerz, P.M., Bentley, M., & Jagger, J. *Prevention.* "Management, and Chemoprophylaxis of Occupational Exposure to HIV." Charlottesville, VA: Advances in Exposure Prevention, International Health Care Work Safety Center. 1997. Quoted in OSHA, op cit., page 4.

3 American Hospital Association. *Sharps Injury Prevention Program. A Step-By-Step Guide.* American Hospital Association. 2001.

4 CDC MMWR. January 17, 1997. Vol. 46, No. 2 p. 1.

5 Ruth F. Craven (Editor) Constance J. Hirnle (Editor). *Fundamentals of Nursing: Human Health and Function 3rd Edition.* Lippincott Williams & Wilkins. November, 1999.

6 Ippolito, et al. Quoted in OSHA, op cit., page 9.