

Proven Strategies to Prevent Bloodborne Pathogen Exposure in EXPO-S.T.O.P. Hospitals

By Linda Good, PhD, RN, COHN-S, and Terry Grimmond, FASM, BAgrSc, GrDpAdEd&Tr

ABSTRACT

The **Exposure Study of Occupational Practice (EXPO-S.T.O.P.)** is the Association of Occupational Health Professionals in Healthcare's (AOHP) national blood and body fluid exposure study. The 2015 study was the largest in its five-year history. Of the 214 facilities participating, 160 were suitable for inclusion in this study to qualitatively determine what strategies might be effective in reducing blood and body fluid exposures (BBF) via sharps injuries (SI). The 160 hospitals were separated into teaching and non-teaching hospitals and their SI rate per 100 FTE determined and ranked. The five hospitals with the lowest SI rate in each hospital category were interviewed and asked to describe in a narrative discussion the strategies they use to achieve SI rates that are significantly lower than the national average. Numerous strategies were described, and these were categorized into: education and training; communication; incident investigation; and staff engagement. A similar selection process was applied to large participating hospitals, and those with the lowest SI rates were asked for the strategies that they believed reduced exposures during surgical procedures. Successful strategies in surgical procedures followed closely the hierarchy of hazard controls, notably: elimination of sharps; use of engineered controls; administrative controls; work practices; and personal protective equipment. We urge all hospitals to evaluate these best practices and, where possible, implement them in an effort to reduce the persistent problem of BBF exposures.

INTRODUCTION

A blood or body fluid (BBF) exposure, either via a percutaneous sharps in-

jury (SI) or a mucocutaneous exposure (MCE), is stressful for many - the injured employee, his or her family and the occupational health clinician - as each deals with the looming question: *"What if this exposure results in a bloodborne pathogen (BBP) transmission?"* Too often, organizations and healthcare workers resign themselves to the notion that certain risks *"just go with the territory"*, and when this mindset becomes associated with BBF exposures, complacency can replace action-oriented attention to this serious threat. Organizations can become content with a rote pattern of tracking and reporting on the same exposure rates year after year, wishing rates would go down, but unsure of how to influence change, and no longer shocked by the numbers. But, if BBF exposures really are inevitable, we would see consistent rates at hospitals everywhere—*however, we do not*. Many hospitals have exposure rates *significantly below* the national average, demonstrating that BBF exposures are preventable when successful prevention strategies are embedded into everyday work. In each of the last five EXPO-S.T.O.P. studies, hospitals with the lowest incidence of exposures were asked qualitative questions to identify their best practices. This sharing of successful initiatives has resulted in the identification of many creative and effective best practice strategies in these "Exposure Aware" organizations. This qualitative study outlines these strategies so that other healthcare facilities may consider adopting them to reduce the persistent national problem of BBF exposures.

What is EXPO-S.T.O.P.?

The **Exposure Study of Occupational Practice (EXPO-S.T.O.P.)** is the Association of Occupational Health Profes-

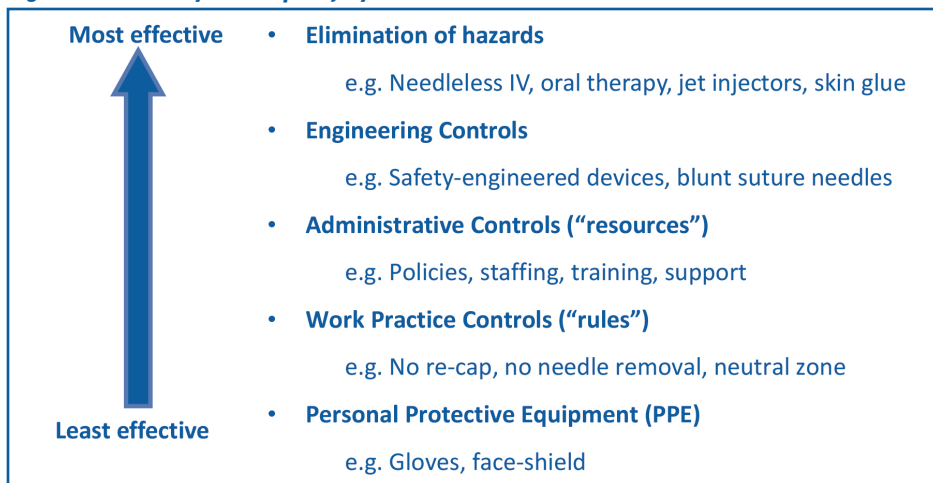
sionals in Healthcare's (AOHP) national blood and body fluid exposure study.¹⁻³ Over the years, occupational health professionals have used various databases⁴⁻⁶ — each with their advantages and disadvantages—as a point of reference for their own exposure rates. However, there had been no truly national exposure database. With SI incidence decreasing so slowly, to highlight the issue of exposures, the authors, along with the AOHP Board, capitalized on AOHP's nationwide presence to develop an exposure database representative of all regions of the United States.

The EXPO-S.T.O.P. annual survey is an electronic questionnaire distributed by AOHP newsletters and e-mails to members of AOHP, and the data download is via the AOHP website. The EXPO-S.T.O.P. questionnaire, initially composed of nine questions on exposure incidence and denominator data,¹ was expanded to 22 questions in 2015 to gather additional denominator and reporting data. Participants are given the option of providing their contact information if willing to speak with investigators about their programs – and the majority of participants provide this. EXPO-S.T.O.P. debuted in 2013 (2011 data),¹ and we are currently collecting data for the year six survey (2016 data). Each year, the information shared by participants has provided valuable insights on both SI and MCE incidence, patterns and rates. EXPO-S.T.O.P. results have been presented at AOHP, the Association for Professionals in Infection Control and Epidemiology (APIC) and other conferences and in the AOHP Journal.¹⁻³

Hierarchy of Exposure Controls

Before discussing best practices, it is prudent to reflect on the hierarchy of

Figure 1. Hierarchy of Sharps Injury Controls



hazard controls. Fig 1 depicts its application to sharps injury prevention by the American Nurses Association.⁷

Simply put, the hierarchy advises, in order of decreasing effectiveness, to: eliminate use of sharps if possible; apply engineering controls to lessen dependency on human behavior; ensure the facility has written policies and adequate safety resources including occupational health staff; ensure there are rules in place to protect workers; and finally, supply PPE to lessen the risk of exposure.

STUDY METHODOLOGY
Selecting the Hospitals for Interview

Two hundred and fourteen AOHP member facilities completed the questionnaire for their 2015 calendar year exposure data. After removal of 41 non-hospital facilities and 13 facilities whose data was insufficient to calculate an SI incidence rate per 100 full-time equivalent staff (FTE), 160 hospitals were included in the study. The 160 were sorted into teaching and non-teaching hospitals, and within each of these two categories, the five hospitals with the lowest SI rate per 100 FTE were selected for interview. The persons supplying data in the selected hospitals were contacted by one of the authors and asked to describe in narrative dialogue the strategies they use to reduce their exposures.

In addition, the same process was used to select the five lowest SI rate hos-

pitals with an average daily overnight patient census (ADC) of 300 or greater (where contact details were supplied), and these hospitals were interviewed to ascertain their strategies for reducing exposures during surgical procedures. The threshold of 300 ADC was chosen, as hospitals of this size have higher SI rates¹⁻³ and were considered more likely to have formal exposure-reduction strategies in place in the operating room (OR) and other departments where surgical procedures are conducted.

RESULTS AND DISCUSSION
Best Practice Themes

The study revealed that the combined average SI/100 FTE incidence rate of the top five teaching and non-teaching hospitals was a significant 49.2% lower than the national rate. Hereafter, we have termed these hospitals “Exposure Aware”.

As clinicians from “Exposure Aware” hospitals shared their safety programs, common themes began to emerge: **Education and Training, Communication, Investigation and Engagement.** And many of these strategies were in addition to those required under the 2001 OSHA Needlestick Prevention Act,^{8,9} or OSHA’s New Rule being implemented on January 1, 2017.¹⁰

Education and Training: “Exposure Aware” hospitals do not assume new clinical staff are familiar with the hospital’s policies, rules and, particularly, the

safety-engineered devices (SED) available. They require all new clinicians and other new staff handling sharps to:

- Undergo exposure-prevention education and training individually and in orientation in a personalized way, using scenarios directly related to the new employee’s role.
- Sign off on their completion and understanding of the facility’s:
 - o Exposure prevention policy.
 - o Work practices relevant to sharp handling and disposal.
 - o Exposure reporting procedure.
 - o Policy on the un-authorized purchase/use of non-SED.
- Demonstrate *competency* on all SED relevant to the staff member’s work area.
- Return for additional training on SED:
 - o If the staff member sustains a sharps injury.
 - o At regular intervals (e.g. every two years).
 - o Whenever a new SED is introduced into their work area.

“Exposure Aware” hospitals also:

- Build a bloodborne pathogen exposure event into simulation lab training scenarios, thus bringing realism to the education and training in a way that a lecture could never do.
- Ensure that BBP safety education is on-going and covers all staff and all shifts. Using vendor support and clinical educators can “expand” resources to assist with this task.
- Require staff who wish to use non-SED to apply for permission through the Safety Committee.
- Adopt SED (and exclude non-SED) for all procedures where SED are commercially available and approved by users.

Communication: “Exposure Aware” facilities:

- Make their exposure-reduction initiatives data-driven and align their reporting and metrics with their organization’s strategic goals, terminology and methodology “style”. This could be Six Sigma, Lean, Standard Work, Continuous Quality Improvement, High Reliability Organization or any other performance improvement framework embraced by the facility. This

allows exposure prevention initiatives and successes to stand next to all others, making it much more likely to be recognized and appreciated in the annual list of “success stories” than a “one-off”, stand-alone campaign.

- Ensure transparent documentation of exposures and get them “on-the record” by reporting through established committees that reach decision-makers.
- Encourage exposure reporting by staff (including “near misses”) by making it convenient and efficient, such as a phone in or online reporting system.
- Conduct creative “awareness campaigns” to remind front-line staff to keep exposure risk top-of-mind as they go about their duties.
- Build safety into standard work practices, such as written safety scripts that are recited to patients to prepare them for procedures that are high risk for employee exposure, such as blood draws.
- Use signs or flagging outside a patient room to alert co-workers that a sharps procedure is in progress so as to avoid an inadvertent startle and possible injury.

Investigation: Hospitals with low exposure rates report that they:

- Have a “No Blame, No Shame”, non-retaliatory exposure reporting policy¹⁰ that encourages and facilitates staff reporting each and every one of their exposures.
- “Drill down” on every incident, conducting a thorough, systematic root-cause analysis. Key to this analysis is avoiding assumptions on causation or “solution-jumping” but rather, allowing the investigation to completely reveal the facts.
- Involve direct-care staff when a puzzling trend or problematic process is identified. These staff often have insight and solutions from their front-line vantage point.
- Investigate SED-related exposures and ensure:
 - o Users are correctly activating the safety mechanism, always.
 - o The relevant committee annually reviews whether there are safer SED on the market. Just using any SED

is not meeting OSHA’s Needlestick Safety and Prevention Act requirements. If an SED is resulting in exposures and there is a safer device available, OSHA mandates by law that the safer device be evaluated.⁸ In one hospital, switching from a troublesome slide-butterfly SED to a button-butterfly SED reduced SI from 24 per year to five.¹¹

- Consistently and actively involve the unit manager (and senior leadership when indicated), as well as the injured employee, in every follow-up investigation.

Engagement: “Exposure Aware” facilities:

- Hold both the front-line caregiver and management responsible for their part in the “Safety Formula” — and when they do it well, senior leadership recognizes and praises them. This practice is validated by Gershon and associates as they demonstrated how “Safety Climate” flows across all areas: *“Employees who perceived strong senior leadership support for safety and who received high levels of safety-related feedback and training were half as likely to experience blood or body fluid exposure incidents.”*¹²
- Hold Safety Forums, opening the discussion with a thought-provoking question to staff, such as, *“If you arrived to work today and it was a safer environment, what would it look like?”*
- Partner front-line staff as “Safety Advocates” or “Safety Champs” with Occupational Health and with management leaders in injury-reduction initiatives. These peer advocates become well-respected and appreciated for their influence toward positive change — and others want to join them. Including perceptions of workplace safety in employee opinion evaluation sends the message that this is a value and priority of the organization.

The over-arching theme at all the exposure-safe facilities was a “Culture of Safety”— not just as a slogan, but a put-into-practice value. One occupational health nurse shared how she and her team have been able to parlay one safety success into another — getting positive

“Culture of Safety” momentum going. In their case, they made great strides in safe patient handling, so when it was time to propose a bloodborne pathogen-reduction initiative it was met with receptivity — because of their proven track record. As a result, they were able to obtain endorsement for switching out their slide-style insulin needles (that were causing sticks). They were also having needlesticks with certain pre-filled syringes— so now the pharmacy automatically dispenses a needle protection device with any pre-filled syringe without adequate safety-engineered technology.

Spotlight on the Operating Room

The Operating Room (OR) is highly prone to BBF exposures due to the nature of the work being done with sharp instruments in close quarters under tense conditions. The EXPO-S.T.O.P. study identified a number of large hospitals with exemplary low SI rates per 100 FTE — once again proving that, with a commitment to consistent prevention practices, even high risk areas can be made safer. Some proven strategies specific to the OR were shared by these “Exposure-safe OR” facilities.

Applying the Hierarchy of Exposure Controls in the OR:

The following strategies are in addition to, or specific examples of, those mandated by OSHA.

Eliminate the hazard: The top priority in all workplace safety is to remove the potential hazard. “Exposure Aware” hospitals do this by:

- Substituting surgical glue and/or other closure devices for standard sutures when appropriate.
- Using Needleless IV systems.
- Using robotic devices to make incisions and perform other aspects of the surgery with non-human “hands”.

Engineered Controls: “Exposure Aware” hospitals use:

- Blunt suture needles where appropriate.
- Safety scalpels.
- Sharps disposal containers that are readily accessible.

Administrative Controls: “Exposure Aware” hospitals ensure:

- Staff undertake initial and ongoing education competency validation of their safety understanding and performance.
- Ensure perioperative team members participate in quality improvement activities.

Work Practice Controls: “Exposure Aware” hospitals:

- Reduce the possibility of exposure by changing the way a task is performed, including the elimination of direct hand-to-hand passing of sharp instruments and adoption of a “neutral zone” into which the instrument is placed for the surgeon to pick up.
- Clear communication during the case, especially during the passing of a sharp instrument. Contaminated sharps are organized in a standardized way until safely disposed.

Personal Protective Equipment: “Exposure Aware” hospitals:

- Are consistent with double gloving.
- Select masks and gowns that are impermeable to liquids.
- Require eye protection during cases where splashing/splattering is a potential risk.
- Use N95 (or higher) respirators during laser procedures to prevent inhalation of smoke plume and throughout procedures during which tissue or body fluids could aerosolize, resulting in possible pathogen inhalation or mucocutaneous contact.

Physician Collaboration in the OR: The consensus among the clinicians at the top “Exposure Aware” ORs was that a surgeon and anesthesiologist partnership in safety initiatives was the number one imperative. Until this full buy-in took place, they too struggled with typically high OR exposure rates. With any new work practice, there is a period of adjustment and a learning curve during which the technique can be slowed or feel awkward. One anesthesiologist expressed it this way following the demonstration of a proposed safety-engineered IV start needle: “I understand what you are saying, about it being necessary and

all, but when the pressure is on and all eyes are on me and a life is on the line, I want to go to my ‘old faithful’ that I am totally comfortable with.” This concern is understandable and common and, as a result, achieving collaboration is challenging. Finding a “Physician Champion” who is open to change and willing to be a bridge to his or her physician colleagues is invaluable. Often, this “Physician Champion” is someone who has had a personal experience with a BBF exposure or someone who tends to embrace new, evidence-based best practices. Once the champion is identified, the process of collaboration can begin.

While some changes could simply be mandated (backed by legislative regulations), the ideal “Culture of Safety” atmosphere is one in which all staff embrace the changes and adopt them with a positive attitude that enhances rather than hinders practice. An example of this shift in perspective was shared by a clinician at one of the OR “Exposure Aware” hospitals, telling of a surgeon who was removing the safety cover on the safety-engineered instrument because it hindered his line of site. The clinician shared an alternative safety-engineered device with the surgeon, who was pleased with it and agreed to its adoption. This new preferred instrument was documented in their system so that, from that point forward, all of the surgeon’s trays were assembled with the new, safer instrument.

Surgical Safety Education: Many OR “Exposure Aware” hospitals use the excellent Sharps Safety Tool Kit available on the Association of Perioperative Registered Nurses (AORN) website.¹³ This tool kit presents many evidence-based strategies that can assist occupational health professionals as they partner with the perioperative team to decrease and eliminate sharps injuries during surgery. The tool kit contains links to articles, posters, presentations, webinars, checklists and references.

LIMITATIONS AND STRENGTHS OF THE STUDY

The study has several limitations: first, the effective strategies listed by the in-

terviewees were not necessarily proven in controlled cause and effect studies; second, it was not possible to ascertain whether any one strategy was more effective than another in reducing BBF exposures; and third, we did not ascertain whether any or all of the strategies were adoptable by other hospitals. Also, we did not seek data or opinions on staffing levels, as causes of exposures as these have been published elsewhere.¹⁴⁻¹⁶ Strengths of the study were: the national spread of participating EXPO-S.T.O.P. facilities – enabling a geographically representative sampling of low-incidence hospitals to be interviewed; and, the EXPO-S.T.O.P. study had a large number of participating hospitals, enabling selection of hospitals with a significantly lower SI incidence than the national average, and thus were likely to have effective strategies that brought about their lower rates.

CONCLUSION

Blood and body fluid exposures are preventable when successful, proven strategies are incorporated into the day-to-day work of the healthcare personnel under our care. Effective best practices have been identified by our occupational health colleagues in the top “Exposure Aware” EXPO-S.T.O.P. facilities. These strategies are primarily grouped around education and training, communication, investigation, and engagement and reflect the hierarchy of hazard controls. The strategies listed in this paper were not necessarily used by all interviewed hospitals; however, we ask that consideration be given to which ones might be evaluated as part of your facility’s journey toward a “Culture of Safety” and a zero incidence of exposures.

Linda Good, PhD, RB, COHN-S, is Manager, Occupational Health Services for Scripps Health, San Diego. She can be reached at Good.Linda@scrippshealth.org.

Terry Grimmond, FASM, BAgSc, GrDpAdEd&Tr, is Director, Grimmond & Associates Microbiology Consultants, New Zealand. He can be reached at terry@terrygrimmond.com

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