

Abstract: Needlestick Injury Rates According to Different Types of Safety-Engineered Devices: Results of a French Multicenter Study

Highlights of this valuable study have been excerpted from the publication. Direct quotes are in quotations.

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Critical Elements

- Published April 2010 in *Infection Control and Hospital Epidemiology*, the peer-reviewed journal of the Society of Healthcare Epidemiology of America (SHEA).
- Study conducted by GERES (Groupe d'Etude sur le Risque d'Exposition des Soignants), a well-established, government-funded research group in France.
- A landmark study for multiple reasons:
 - Assessed the NSIs with various types of SEDs rather than comparing traditional, non-safety device to SEDs as most other studies have done.
 - Included 22 million SEDs, the largest study of SEDs to date.
- Introduction of safety-engineered devices (SEDs) has not eliminated the problem of needlestick injuries (NSIs).
- Results confirmed that passive SEDs, those with fully automatic features, produce lower NSI rates than other designs and create significantly better protection for healthcare workers.

Purpose of this study

"To evaluate the incidence of NSIs among different models of SEDs in healthcare settings."

Study Methods

- 61 French hospitals voluntarily participated; 54 public & 7 private hospitals.
- Data was collected over 2 years (2005 and 2006); 40 hospitals participated both years.
- Devices studied included those with a needle and an integrated safety feature intended to shield the needle after use.
- Prospective data on NSIs from all healthcare workers was voluntarily collected using a standardized form including:
 - The task being performed when the NSI happened
 - Type and brand of device being used
 - Cause of the NSI
 - Activation of the safety mechanism.
- At the end of each year, retrospective data was collected from each hospital on the types, brands, and number of SEDs purchased for the year. This number was used as the denominator for calculation of NSI rates.
- Training on each device was separate from this study and left to the judgment of each hospital.

- SEDs were divided by type:
 - Passive – those requiring no action by the healthcare worker
 - Active – those requiring some action by the healthcare worker; further divided into:
 - Protective sliding shield
 - Protective toppling shield
 - Semiautomatic safety mechanism (e.g., requires pushing a button or plunger)

Study Results

- 504 (9.8%) NSIs in the 2-year period; 453 were SED-related.
- 22 million SEDs purchased during the study period.
- Each hospital had from 1 to 14 different safety devices; 40 different SEDs identified; 22 SEDs associated with NSIs.
- Types of devices included:
 - Insulin pen needles
 - Lancets
 - Arterial blood syringes
 - Prefilled syringes
 - Vacuum tube blood collection devices
 - Fistula needles
 - Injection needles and/or syringes
 - I.V. catheters – 1,801,107 devices purchased
 - Winged steel needles
 - Implantable port needles
- Winged steel needles had the most NSIs with 257 or 6.15 per 100,000 devices purchased.
- I.V. catheters were the 2nd largest group with 68 NSIs or 3.78 per 100,000 devices purchased.
- Passive devices were associated with the lowest rates of NSI and included:
 - 7 brands of self-retracting lancets
 - 2 brands of I.V. catheters
 - 1 brand of insulin pen needles
- For all vascular catheterization, the number of NSIs were:
 - Manually sliding shield – 4.34 NSIs per 100,000 devices purchased
 - Semiautomatic safety feature – 2.54 NSIs per 100,000 devices purchased
 - Passive feature – 1.31 NSIs per 100,000 devices purchased
- When did these NSIs occur?
 - 168 (37.1%) during product use and not considered to be preventable by the SED
 - 133 (29.4%) during activation of the SED
 - 106 (23.4%) failure of user to activate the SED after the procedure
 - 46 (10.2%) after activation of the SED:
 - 18 (39.1%) due to incomplete activation.
 - 28 (60.9%) due to failure of the safety feature.

Limitations of the Study

- Too few of some devices or designs to make a valid comparison, however I.V. catheters would not be included in this group since there were 1.8 million devices purchased.
- Self-reporting of NSI can lead to under-reporting, although other studies using observational methods have reported similar results.

Study Conclusion

"Despite these limitations, we provide clear evidence that passive SEDs are more effective than active SEDs for NSI prevention. Passive devices require no input from the user, and this is particularly important when healthcare personnel are working long hours or night shifts, as well as in emergency situations, all of which are associated with a higher rate of NSIs. Furthermore, passive devices eliminate the need for elaborate training."