Effect of a Safety-Engineered Phlebotomy Device on Activation Compliance and Sharps Injury

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Abstract
Background: 400,000 percutaneous injuries (PI’s) occur in US hospital workers yearly, resulting in potential transmission of bloodborne pathogens and significant cost. Objective: Determine the effect of a safety-engineered blood collection set on safety-feature activation and PI’s. Methods: In July 2005, device A (BD Vacutainer® Push-Button Blood Collection Set, Becton, Dickinson and Company, Franklin Lakes, NJ) replaced device B (Punctur-Guard® Winged Blood Collection Set, Bio-Plexus, Vernon, CT). Safety feature activation was assessed by examination of sharps disposal boxes present at baseline, 30 d, 60 d, 90 d, 180 d, and 360 d following device introduction. A confidential survey administered to phlebotomists at baseline and 90 days after introduction of device A was performed to assess attitudes regarding safety-engineered devices and PIs. PI’s were monitored by the Employee Health Dept. Results: PI baseline: the activation rate for device A was 77.5% (371/499) and device B was 41.6% (398/960). 100% of device A phlebotomists completed the post-introduction survey. 95% indicated satisfaction with device A, and 87% believed safety-engineered devices reduced PIs ever while working as a phlebotomist and 52% reported no previous PIs. 400,000 PIs occur per 100,000 hours worked. Conclusions: Device A was well accepted and was associated with safety-feature activation was used to reduce the rate of PI’s among healthcare workers in Washington state, 1996-2000. Infect control Hosp Epidemiol. 2004, 25:556-562.

Methods and Materials
Device and Timing of Use: In July 2005, device A: BD Vacutainer® Push-Button Blood Collection Set (Becton, Dickinson and Company, Franklin Lakes, NJ, Figure 1) replaced device B: Punctur-Guard® Winged Blood Collection Set (Bio-Plexus, Vernon, CT). Safety Feature Activation Assessment: Sharps disposal boxes were collected from 5 locations and their contents were observed and cataloged at 5 timepoints—baseline following introduction of device A and 30, 60, 90, 180, and 360 days post-introduction of device A. It was hypothesized that the activation rate for device A would be higher than device B. The rate of all PIs (n=101) per 100,000 hours worked remained constant following adoption of device A (1.6 ± 0.8 vs 1.2 ± 0.4, p = 0.6). The rate of PI’s reported to involve butterfly needles did not change appreciably (mean 0.11 ± 0.03 vs 0.10 ± 0.03, p = 0.6). The rate of all PIs (n=101) per 100,000 hours worked following adoption of device A (1.6 ± 0.8 vs 1.2 ± 0.4, p = 0.6). The rate of PI’s reported to involve butterfly needles did not change appreciably (mean 0.11 ± 0.03 vs 0.10 ± 0.03, p = 0.6). The rate of all PIs per 100,000 hours worked remained constant following adoption of device A (1.6 ± 0.8 vs 1.2 ± 0.4, p = 0.6). The rate of PI’s reported to involve butterfly needles did not change appreciably (mean 0.11 ± 0.03 vs 0.10 ± 0.03, p = 0.6). The rate of all PIs per 100,000 hours worked following adoption of device A (1.6 ± 0.8 vs 1.2 ± 0.4, p = 0.6). The rate of PI’s reported to involve butterfly needles did not change appreciably (mean 0.11 ± 0.03 vs 0.10 ± 0.03, p = 0.6). The rate of all PIs per 100,000 hours worked following adoption of device A (1.6 ± 0.8 vs 1.2 ± 0.4, p = 0.6). The rate of PI’s reported to involve butterfly needles did not change appreciably (mean 0.11 ± 0.03 vs 0.10 ± 0.03, p = 0.6).

Results

Figure 1 Device A (BD Vacutainer® Push-Button Blood Collection Set)

Figure 2 Device Utilization. The percentage of various devices found in the sharps disposal boxes is illustrated. Following introduction of Device A (BD Vacutainer® Push-Button Blood Collection Set), it accounted for 20.6% to 28.5% of all devices utilized. Other devices consisted of: Device B: Punctur-Guard® Winged Blood Collection Set, Device C: BD Vacutainer® Etilfill Blood Collection Needle, Becton, Dickinson and Company, Franklin Lakes, NJ. Device D: VenTec® Magellan® Plus Arterial Blood Sampling Kit (Smiths Medical, Keene, NH). The total number of device counted were all feasible baseline (n=2,944), 30 days (n=2,955), 90 days (n=2,953), 180 days (n=2,950), 360 days (n=2,926).

Figure 3 Device Safety Feature Activation. The percentage of the devices removed from the sharps disposal boxes with the safety feature activated is illustrated. The baseline activation rate for device B (Punctur-Guard® Winged Blood Collection Set) was 74.3%. Following introduction of Device A (BD Vacutainer® Push-Button Blood Collection Set), the activation rate was 87.6% (p = 0.02). The rate of PI’s reported to involve butterfly needles did not change appreciably (mean 0.11 ± 0.03 vs 0.10 ± 0.03, p = 0.6). The rate of all PIs per 100,000 hours worked following adoption of device A (1.6 ± 0.8 vs 1.2 ± 0.4, p = 0.6). The rate of PI’s reported to involve butterfly needles did not change appreciably (mean 0.11 ± 0.03 vs 0.10 ± 0.03, p = 0.6).

Conclusions
1. The BD Vacutainer® Push-Button Blood Collection Set Device A was well accepted.
2. Safety feature activation of Device A was superior over a comparable device by phlebotomists and resulted in reduced worker anxiety.
3. Safety feature activation of Device A was well maintained for 12 months post introduction.
4. PI’s reported with phlebotomy needle devices following adoption of Device A were notably lower compared to baseline.
5. Limited statistical power precludes conclusions regarding the impact of device A on PI’s.

References

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