Evaluation of potential reduction in blood and body fluid exposures by use of alternative instruments

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Background
Injuries from needlestick, sharps injuries and splashes lead to exposure to blood and body fluids with the potential for transmission of blood-borne viruses.

Aims
To identify alternative instruments, which if used would improve worker safety.

Methods
Retrospective review of 161 injuries with identification of safer alternative products for instruments that caused injury. The proportion of injuries that could be prevented was calculated [with 95% confidence intervals (CI)].

Results
The average rate of injury was 7.8/1000 employees per annum (95% CI, 6.8–9.4/1000). In the 2 years the highest rates of injury occurred in pre-registration house officers (164/1000; 95% CI, 64–264/1000), phlebotomists (154/1000; 95% CI, 15–291/1000) and senior house officers (45/1000; 95% CI, 13–77/1000). An upper estimate of 65% (95% CI, 58–72%) of incidents would have been preventable with a change to alternative devices.

Conclusions
Change to the use of intrinsically safer instrumentation has the potential to prevent injury to healthcare workers.

Keywords
Injuries; needlestick; prevention; sharps.

Introduction
Needlestick and sharps injuries lead to exposure to blood and body fluids with the potential for the transmission of blood-borne viruses [1,2]. Such injuries also result in significant anxiety to injured staff [3]. The current management of injuries to staff associated with blood and body fluids is summarized in recent NHS guidance [4].

This retrospective study was designed to investigate reported injuries from needlestick, sharps injuries and blood and body fluid splashes and to determine whether the availability of a safer device could have eliminated or reduced the risk to staff.

New products and safety-engineered devices include:
1. retractable lancets used for blood sampling by heel stabs and finger sampling;
2. retractable needles used for injections and immunizations;
3. shields added to needles for injections and venepuncture which are activated by the operator at the end of the procedure;
4. protected disposable scalpels with a shield that can be activated before passing the instrument between staff and before disposal;
5. blunt suture needles; and
6. intravenous cannula with blunting or guarding of the needle of the introducer that is activated when removed from the plastic cannula.

Methods
Injuries reported to this OHS over a 2 year period were analysed retrospectively from audit data.
Safer alternative products were identified from suppliers’ literature. The proportion of injuries that could have been prevented was estimated, if alternative safer products had been used (correctly) from cross-tabulation of data on the instrument associated with injury and ‘human factors’ (own technique or error, patient movement, other staff error, overfilled sharps bins, other factors).

The investigator did not carry out a subjective assessment of how avoidable injuries were so as to prevent bias.

**Statistical analysis**

The rate of injury was calculated as an average per annum using NHS workforce census data for NHS Argyll & Clyde as denominators for staff groups with 95% confidence intervals (CI). The proportion of injuries, which could have been prevented by use of alternatives, is presented (with 95% CI).

**Results**

One hundred and sixty-one injuries occurred during a period of 2 years. The average rate of injury was 7.8/1000 employees per annum (95% CI = 6.8–9.4/1000). The highest rates of injury occurred in pre-registration house officers (164/1000; 95% CI = 64–264/1000) phlebotomists (154/1000; 95% CI = 15–291/1000), senior house officers (45/1000; 95% CI = 13–77/1000), theatre sterile supply staff (33/1000) and radiographers (30/1000) (Table 1). The 95% CI for the last two categories were not significant, as a result of the small number of incidents, in small groups of workers.

The most common injury was needlestick (63%) with other sharps contributing 27% of injuries. Mucous membrane/eye splashes accounted for 11 cases (7%).

The instrument associated with the injury was a hollow-bore venepuncture/injection needle in 76 cases (50%); butterfly/subcutaneous needle in 18 cases (12%); stylet for blood glucose monitoring in 10 cases (7%); intravenous needle/Venflon in seven cases (4%); and scalpel blade in 11 cases (7%). Other instruments included suture needles (10), dental equipment (4), guide wire (1) and stapling gun blade (1). Blood was the most common material associated with injury (77%). Other high-risk body fluids were present in eight incidents (5%).

Patient movement factors were involved in 11 cases (8%). Other staff errors occurred in 22 incidents (14%). Overfilled sharps bins were recorded in nine incidents. In 101 cases (64%) no external problem was noted on the audit form. For the purpose of this report it is assumed that the injury was associated with the injured person’s technique or error.

In 80 of the 101 cases a safer alternative instrument was identified, that if used correctly by the person, could have prevented the injury. Use of such instruments would additionally have prevented 17 other staff and eight overfilled sharps box injuries. An upper estimate of 105 incidents (65%; 95% CI = 58–72%) of incidents would have been preventable with a change to alternative devices.

**Discussion**

Change to the use of intrinsically safer instrumentation has the potential to prevent 65% of injuries presenting to the occupational health service. As a result of this a strategic change in practice for occupational health is necessary. More effort should be made to introduce safer instrumentation that will reduce injury rates in healthcare workers with the added benefit of a reduction in exposure to blood-borne viruses. The time spent on negotiating changes to instrumentation should be saved within occupational health from the reduced management of injuries.

Other authors have documented reductions in injury rates during evaluation of ‘safer’ equipment including quoted reductions of 23–48% through the use of safer winged steel needles and 66–76% with blunted or shielded needles [5,6]. Such results lend support to the data provided in this review of audit data.

**References**


