

Efficacy of Control Measures Used to Prevent Needlestick Injuries

Outline:

- **Hierarchy of Controls**
- **Efficacy of Individual Types of Controls**
 - ◆ **Examples**
 - ◆ **Published studies**
- **Conclusions**

Hierarchy of Controls:

Most effective

- Elimination of hazards
- Engineering Controls
- Administrative Controls
- Work Practice Controls
- Personal Protective Equipment

Least Effective

Elimination of Hazard

- Use of needle-less IV systems
- Removal of sharps and needles
- Elimination of unnecessary injections

Elimination of Hazard

- **“Efficacy and Cost-Effectiveness of a Needleless IV Access System.” Yassi et al. 1995**
 - ◆ Compared NSI for year before/after introduction
 - ◆ 78.7% effective in reducing IV line-related NSI
 - ◆ Overall reduction of 43.4% in total NSI from all procedures
 - ◆ Also used universal precautions and education

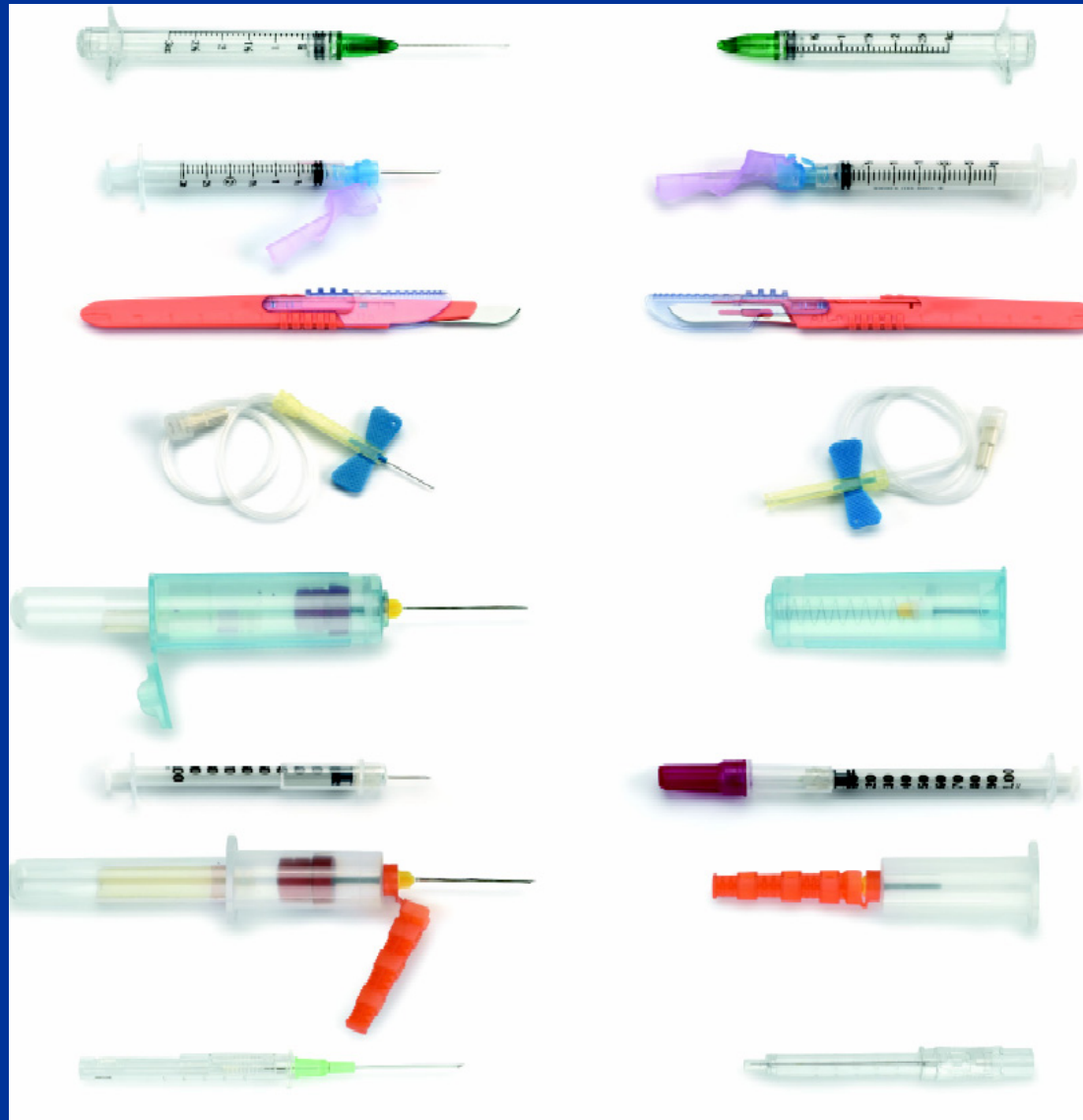
Elimination of Hazard

- **“Assessing the Effect of Long-Term Availability of Engineering Controls on NSI among HCW.” Reddy et al. 2001**
 - ◆ **Implementation of needleless IV systems and safety syringes**
 - ◆ **Incidence pre-implementation: 10.6%-6.4%**
 - ◆ **Incidence post-implementation: 6.3%-4.2%**
 - ◆ **Confounding variables: educational component, availability of traditional needle devices**

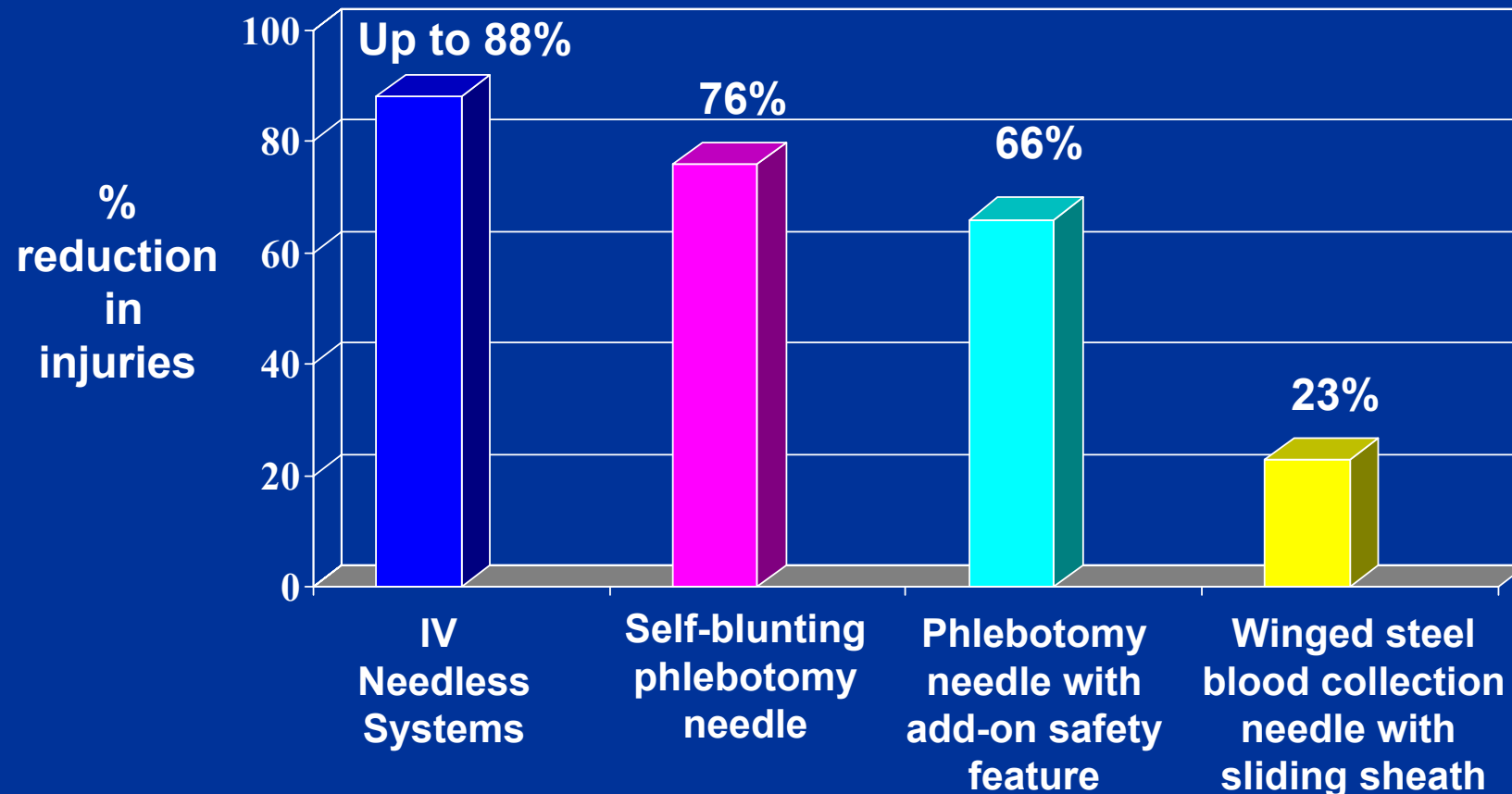
Engineering Controls

- Needles that retract, sheathe, or blunt immediately after use
 - ◆ Active
 - ◆ Passive
- Sharps container styles

Engineering Controls



Percent reduction in needlestick injuries for major safety device categories



EPINet

Centers for Disease Control and Prevention

Engineering Controls

- **“Do Protective Devices Prevent NSI among HCW?” Orenstein et al. 1995.**
 - ◆ **Compared NSI 6 months before/after introduction of shielded safety syringe and needleless IV system**
 - ◆ **Overall NSI rate reduced by 61%**
 - ◆ **NSI rate assoc. with IV line manipulation, proc. with syringes, and sharps disposal declined by 50%**
 - ★ **Reductions in these subcategories not statistically significant**

Engineering Controls

- **“Reducing Sharps Injuries among HCW: A Sharps Container Quality Improvement Project.” Hatcher. 2002**
 - ◆ Evaluation of NSI during disposal of used sharps before/after change in container style
 - ◆ Before: straight-drop style
 - ◆ After: ‘letter-drop’ style
 - ◆ Before change, staff 2.9 x more likely to have a disposal injury than after
 - ◆ Annual NSI rate reduced by 2/3

Engineering Controls

- **“Evaluation of a Safety Resheathable Winged Steel Needle for Prevention of Percutaneous Injuries....” Mendelson et al. 2003**
 - ◆ Compared percutaneous NSI rate assoc. with standard vs. safety resheathable winged needle
 - ◆ Pre: 19 mo.; Training: 3 mo.; Post: 11 mo.
 - ◆ Rate assoc. with winged steel needles decline 13.41 to 6.41 per 100,000 (52.2% reduction)

Engineering Controls

- **“A Review of Sharps Injuries and Preventive Strategies.” Trim et al. 2003**
 - ◆ **Review of 7 studies of needle protective devices**
 - ◆ **“results...demonstrate that needle protective devices reduced associated sharps injuries by 23-100%, with a mean of 71% compared with conventional products.”**

Administrative Controls

- Policies limiting exposure to hazard
- Allocation of resources demonstrating commitment to HCW safety
- Needlestick prevention committee
- Consistent training on use of safe devices
- Policies implementing Universal (standard) Precautions
 - ◆ a set of effective practices designed to protect HCW from infection from bloodborne pathogens, applied universally when caring for patients regardless of diagnosis.

Administrative Controls

- **“Effects of Hospital Staffing and Organizational Climate on NSI to Nurses.”
Clarke et al. 2002**
 - ◆ **Retrospective: 1 month; Prospective: two 1 month periods**
 - ◆ **Likelihood of NSI 3x higher among nurses with:**
 - ★ **less adequate resources**
 - ★ **less nurse leadership**
 - ★ **lower staffing**
 - ★ **higher levels of emotional exhaustion**

Administrative Controls

- **“Organizational Climate, Staffing, and Safety Equipment as Predictors of NSI and Near-Misses in Hospital Nurses.” Clarke et al. 2002**
 - ◆ **Poor organizational climate and high workloads assoc. with 50% or greater increase in likelihood of NSI and near-misses**
 - ◆ **Study suggested working conditions can be as important in determining risk as compared to safety equipment.**

Work Practice Controls

- No re-capping
- Placing sharps containers at eye-level and at arms reach
- Emptying sharps containers before they are full

Work Practice Controls

- **“Impact of Introduction of Sharps Containers and of Education Programs on Pattern of NSI in a Tertiary Care Center in India.” Richard et al. 2001**
 - ◆ **Compared NSI before intro of containers and education**
 - ◆ **1995: large containers placed in center of ward, plus education**
 - ◆ **1998: small containers placed close-by in all patient areas.**
 - ◆ **Proportion of NSI by improper disposal reduced from 69% to 38% after 1995, and to 18% after 1998**

Work Practice Controls

- **Studies investigating the implementation of 'No Recapping' have shown an approximately 2/3 reduction in Needlestick Injuries at the study sites**

Personal Protective Equipment

- Barriers and filters between the worker and the hazard
- Gloves
- Gowns

Personal Protective Equipment

- **“Evaluation of Interventions to Prevent NSI in Health Care Operations.” Rogers et al. 2000.**
 - ◆ **Reviewed studies evaluating use and variations of double gloves in preventing NSI**
 - ★ **One study showed an increase in glove perforations with double gloves**
 - ★ **Review of other studies, measuring # of perforations in inner glove, found “reductions of 60% to 70% in glove perforations”**

Conclusions

- **Data limited due to fact that number of NSI events can be low**
- **Can't easily compare research findings due to differences in study design**
- **New products continue to become available**

Conclusions

- While studies show that reductions of NSI are achievable, it is difficult to identify efficacy of individual control measures in studies with numerous interventions.
- Reducing NSI by greatest amount possible will likely entail a combination of :
 - ◆ Elimination of procedures using sharps
 - ◆ Education
 - ◆ Safer devices
 - ◆ Positive work conditions
 - ◆ Universal Precautions

Useful Websites

- <http://www.cdc.gov/sharpssafety/>
Workbook for Designing, Implementing, and Evaluating a Sharps Injury Prevention Program
- <http://www.healthsystem.virginia.edu/internet/epinet/>
The International Health Care Worker Safety Center at the University of Virginia
- <http://www.cdc.gov/niosh/topics/bbp/safer/>
Safer Medical Device Implementation in Health Care Facilities
- <http://www.cdc.gov/niosh/2000-108.html>
NIOSH Alert: Preventing Needlestick Injuries in Health Care Settings

THANK YOU