

## Editorial

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# Needlestick Prevention: New Paradigms for Research

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The Centers for Disease Control has recommended safe needle disposal practices to prevent percutaneous exposures to bloodborne pathogens for the last decade.<sup>1,2</sup> Infection control policies and procedures based on these guidelines have been implemented in most US healthcare facilities, but few have noted an appreciable decline in needlestick incidence. Hospital infection control practitioners have traditionally relied on behavioral interventions to achieve infection control goals. In the case of needle safety, these interventions include glove use, nonrecapping of needles, and prompt needle disposal in puncture-resistant containers. Although this strategy has a sound theoretical basis, in practice, many factors appear to reduce compliance with the recommended behaviors.

The extent to which knowledge deficits (inadequate training and risk education), motivational problems (failure to appreciate risk, unwillingness to change old habits), skills deficits, equipment problems, competing hazards, and administrative issues (e.g., inadequate staffing) interfere with infection control goals has not been entirely elucidated. However, a growing body of evidence indicates that behavioral interventions alone are not adequate to prevent needle injuries and that a more comprehensive approach is needed. Two novel frameworks for evaluating needle injuries are described in this issue. The success of both of these projects indicates that adopting research methods and risk reduction models from disciplines not traditionally applied to infection control may enhance understanding of the determinants of healthcare worker safety.

English applies adult learner theories to the needlestick problem.<sup>3</sup> In her model, knowledge of correct procedures, provision of safe equipment, and proper management predicted compliance with needle precautions. This approach could easily be expanded to include assessment of other factors considered important in learning new behaviors, such as beliefs and attitudes about the risks associated with the undesired behavior (needle injury), the probability that behavior change (nonrecapping) will lead to the desired outcome, and the ability to successfully accomplish behavior change (self-efficacy).<sup>4</sup>

Haiduven et al have introduced other important concepts that draw from both learning theory and the industrial hygiene model.<sup>5</sup> Their program demonstrated that knowledge of needle safety precautions (training), engineering controls (access to safe disposal containers), and motivation (feedback about injury mechanisms) can significantly reduce needle recapping injuries.

The new standards promulgated by the Occupational Safety and Health Administration for preventing occupational exposure to bloodborne pathogens emphasize provision of engineering and administrative controls as well as behavioral controls to prevent needle injuries.<sup>6</sup> Although this approach to risk management has been employed in other work sites for many years, adaptation of these control strategies to healthcare institutions is a relatively recent phenomenon. In retrospect, most infection control practitioners overestimated the efficacy of behavioral interventions and were slow to apply established principles of industrial hazard control to healthcare environments.

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The landmark article published by Jagger et al in 1988 presented a strong argument for improvements in needle device design and heralded the arrival of engineered approaches to healthcare worker safety.<sup>7</sup>

The plethora of new products coming on the market indicates that industry is responding to the demand created by the awareness of bloodborne pathogen risks among workers. Use of safer needle products and disposal systems may prove to be important components of needlestick prevention efforts.

However, these products must be carefully evaluated to determine if they live up to the manufacturers' claims, are economic, and will be accepted by front-line users. Some products with promising design features have proved to be ineffective in preventing injuries or imparting new hazards not present in the traditional device. The impact of the new device on patient safety must also be considered. Moreover, training all healthcare workers to use the device properly is sometimes a difficult task that if not accomplished satisfactorily, can paradoxically increase injury rates.

Preventing needlestick injuries remains the highest priority for protecting workers from occupational infection with bloodborne pathogens. Application of engineering controls represents a giant step forward

but does not replace the need for administrative improvements, behavioral interventions, training, and personal responsibility. Clearly, more research and multidisciplinary problem-solving efforts will be required to understand and prevent needle injuries. The creative approaches outlined by English and Haiduven et al represent important advances in this regard and should be applauded.<sup>3,5</sup>

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