Sharps injuries

Assessing the burden of disease from sharps injuries to health-care workers at national and local levels

Elisabetta Rapiti
Annette Prüss-Üstün
Yvan Hutin

A Microsoft Excel spreadsheet for calculating the estimates described in this document can be obtained from WHO/PHE.
E-mail contact: EBDassessment@who.int

World Health Organization
Protection of the Human Environment
Geneva 2005

Suggested citation

Table of contents

List of tables

Figure

Preface

The disease burden of a population, and how that burden is distributed across different subpopulations (e.g. infants, women), are important pieces of information for strategies to improve population health. For policy-makers, disease burden estimates provide an indication of the health gains that could be achieved by targeted action against specific risk factors. The measures also allow policy-makers to prioritize actions and direct them to the population groups at highest risk. To provide a reliable source of information for policy-makers, WHO recently analysed 26 risk factors worldwide in the *World Health Report* (WHO, 2002).

The Environmental Burden of Disease (EBD) series of guides continues this effort to generate reliable information, by presenting methods for assessing the burden of disease caused by environmental risk factors. The introductory volume in the EBD series outlines the general method (Prüss-Üstün et al., 2003), while subsequent guides address specific environmental risk factors. The guides on specific risk factors are organized similarly, first outlining the evidence linking the risk factor to health, and then describing a method for estimating the health impact of that risk factor on the population. All the guides take a practical, step-by-step approach and use numerical examples. The methods described in the guides can be adapted both to local and national levels, and can be tailored to suit data availability.

The present guide provides information on how to assess the burden of disease at national and local levels that is caused by sharps injuries to health-care workers. The guide complements an earlier one in the EBD series, on the global burden of sharps injuries in health-care workers (Prüss-Üstün, Rapiti & Hutin, 2003).

Affiliations and acknowledgements

Abbreviations

AF	Attributable fraction.
EBD	Environmental burden of disease.
HBV	Hepatitis B virus.
HCV	Hepatitis C virus.
HIV	Human immunodeficiency virus.
$I_{b(GP)}$	Baseline incidence of infection in the general population.
$I_{b(HCW)}$	Baseline incidence of infection in all health-care workers.
$I_{bs(GP)}$	Baseline incidence of infection in susceptible individuals in the general population.
$I_{bs(HCW)}$	Baseline incidence of infection in susceptible health-care workers ($= I_{bs(GP)}$).
$I_{n(HCW)}$	Incidence of infection from sharps injuries, for all health-care workers.
$I_{ts(HCW)}$	Total incidence of infection among susceptible health-care workers.
n	Average number of sharps injuries per health-care worker per year.
N_b	Baseline number of infections among health-care workers.
$N_{(HCW)}$	Number of health-care workers at risk.
N_n	Number of infections in health-care workers from sharps injuries.
PEP	Post-exposure prophylaxis.
p_i	Proportion of health-care workers (or the general population) immunized against HBV.
p_s	Proportion susceptible to infection.
$p_{s(GP)}$	Proportion of the general population susceptible to infection.
$p_{s(HCW)}$	Proportion of health-care workers susceptible to infection.
p_t	Rate of transmission of the infection following a sharps injury.
p_v	Prevalence of the infection in patients (or in the general population).

Summary

This guide outlines a method for estimating the burden of disease at national or local levels from sharps injuries to health-care workers. Sharps include syringe needles, scalpels, broken glass and other objects contaminated with blood from a source patient. Health outcomes from percutaneous injuries include infections with hepatitis B virus (HBV), hepatitis C virus (HCV) or human immunodeficiency virus (HIV). Exposure is assessed from the number of sharps injuries in health-care workers each year, and from the infection prevalence in source patients. The immunization rate against HBV, and the post-exposure prophylaxis (PEP) coverage are also needed to assess the disease burden. The assessment provides the incidence of HBV, HCV and HIV infections caused by sharps injuries to health-care workers, and the fractions of the infections attributable to sharps injuries. The number of infections that could be prevented by PEP can also be estimated. The data can be used to assess the distribution of disease burden by category of health-care worker, by ward or by activity, which would allow protection measures to be more-specifically targeted.

The guide includes a numerical example, and a Microsoft Excel worksheet is available at the WHO web site to assist with the calculations (EBDassessment@who.int). Estimates from the Global Burden of Disease study for sharps injuries to health-care workers are listed in Annex 1 for each of the 14 WHO subregions (Table A1).