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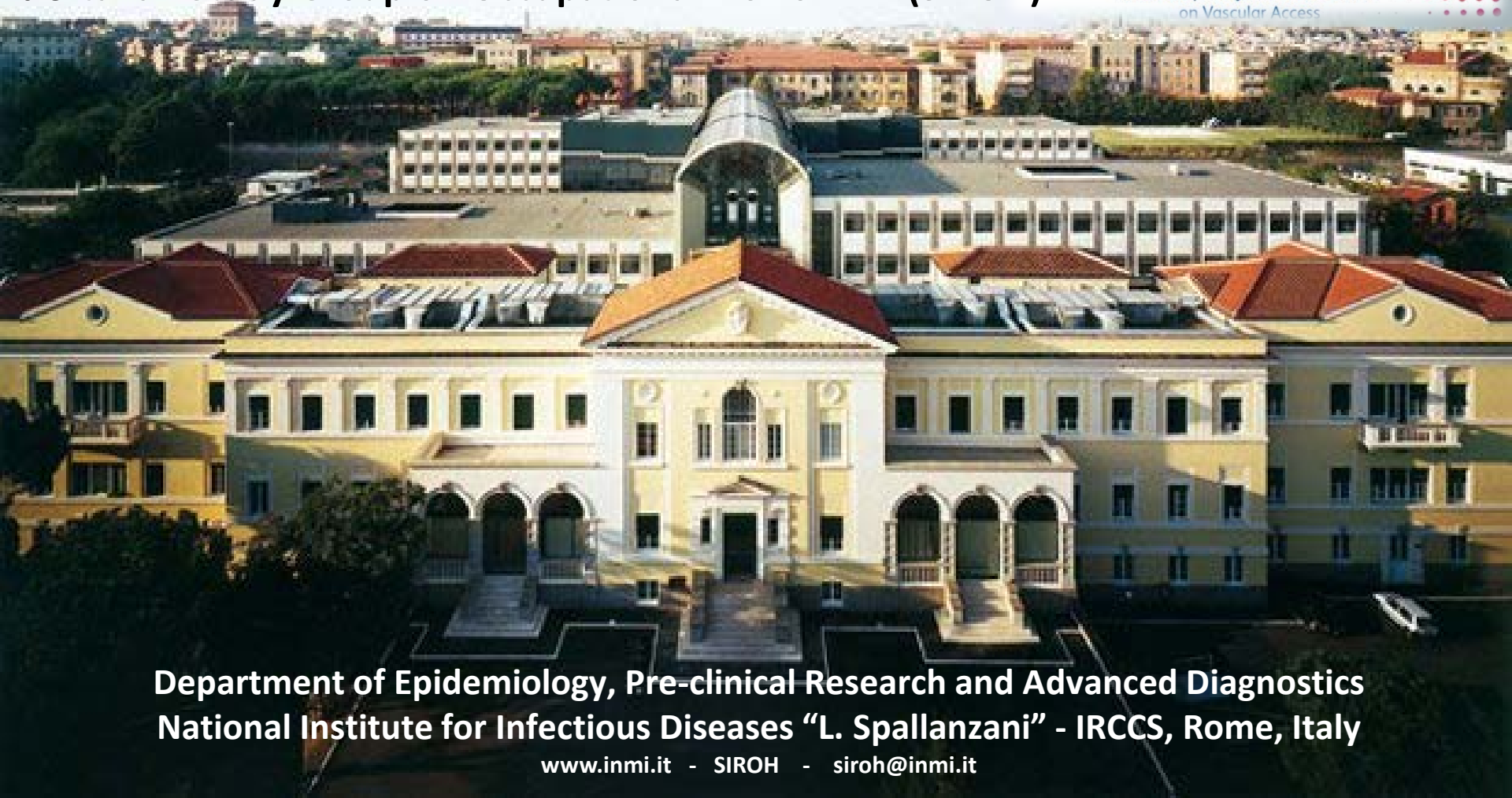
BD

The importance of safety

Gabriella De Carli, MD on behalf of
the Italian Study Group on Occupational Risk of HIV (SIROH)

MACOVA 2020
Multidisciplinary Advanced Course on Vascular Access



Department of Epidemiology, Pre-clinical Research and Advanced Diagnostics
National Institute for Infectious Diseases "L. Spallanzani" - IRCCS, Rome, Italy
www.inmi.it - SIROH - siroh@inmi.it

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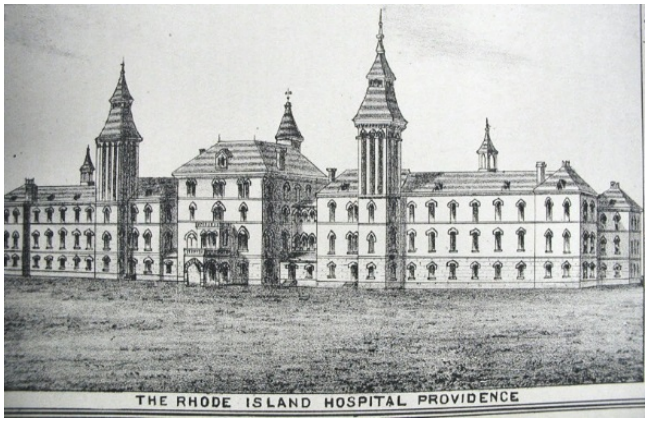
Multidisciplinary Advanced Course



"Many nurses avoid as far as possible the care of infectious disease cases, and for two reasons: they realize their insufficient training and fear the possible consequences.

Both these obstacles can be removed by a thorough training in fever nursing which embraces a knowledge of the nature of infectious diseases, their mo transmission and methods f prevention.

Fever nursing aims, fundamentally, at these two objects: the intelligent care of the patient in order that he may r and th

Health and safety of HCW is paramount and closely **linked** to the **health of patients**

Aseptic Fever Nursing
Author(s): D. L. Richardson
Source: *The American Journal of Nursing*, Vol. 15, No. 12 (
Published by: Lippincott Williams & Wilkins
Stable URL: http://www.jstor.org/stable/3405284
Accessed: 15-09-2017 15:08 UTC

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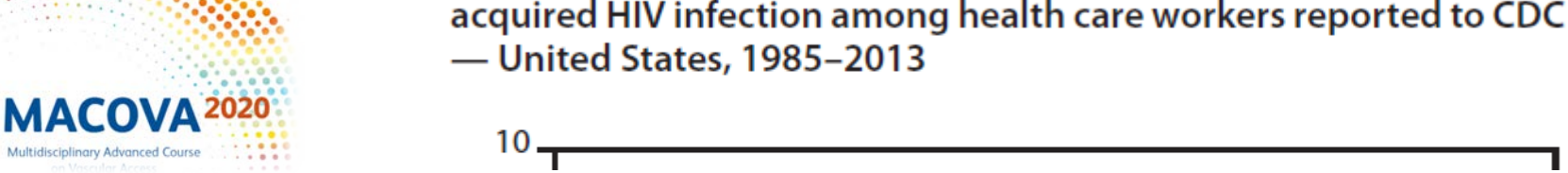
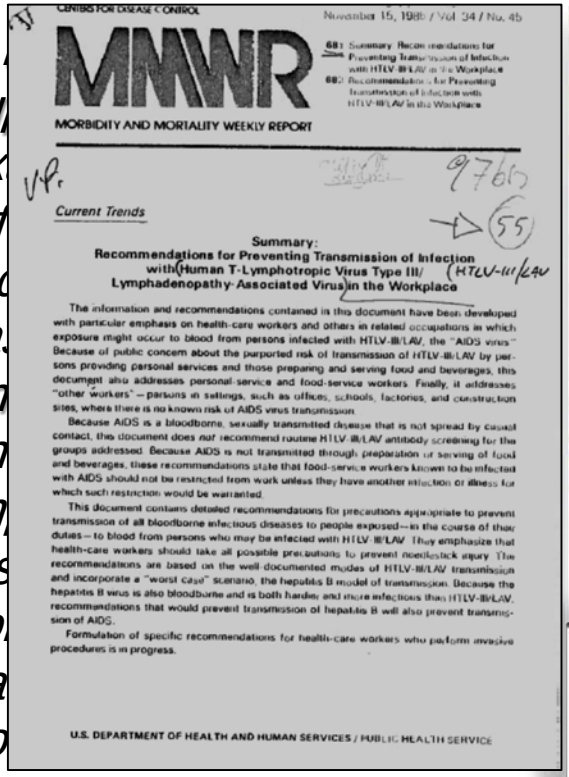
FIGURE. Number of confirmed cases (N = 58) of occupationally acquired HIV infection among health care workers reported to CDC — United States, 1985–2013



"... su... Ex... dif... a c... ca... un... on... im... dis... co... pa... ho... officer should realize th... fact and isolate all doubtful cases."



CENTERS FOR DISEASE CONTROL — November 15, 1985 / Vol. 34 / No. 45

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

68: Summary: Recommendations for Preventing Transmission of Infection with HTLV-III/LAV in the Workplace

68: Recommendations for Preventing Transmission of Infection with HTLV-III/LAV in the Workplace

Current Trends

Summary:
Recommendations for Preventing Transmission of Infection with Human T-Lymphotropic Virus Type III/ Lymphadenopathy-Associated Virus in the Workplace

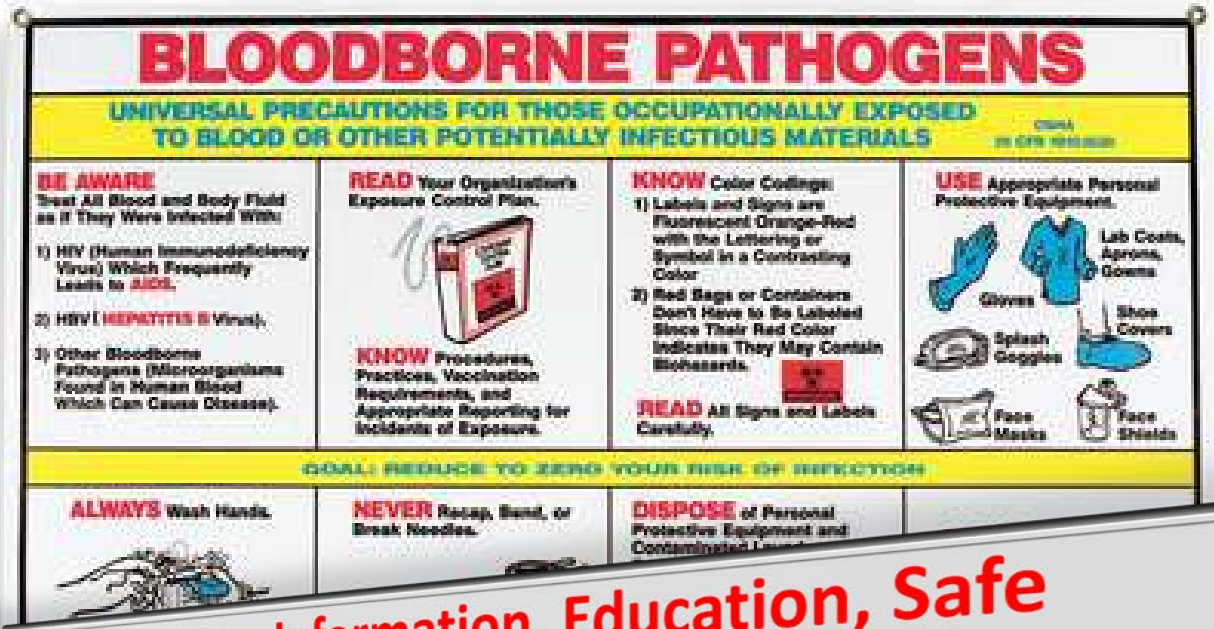
The information and recommendations contained in this document have been developed with particular emphasis on health-care workers and others in related occupations in which exposure might occur to blood from persons infected with HTLV-III/LAV, the "AIDS virus." Because of public concern about the purported risk of transmission of HTLV-III/LAV by persons providing personal services and those preparing and serving food and beverages, this document also addresses personal-service and food-service workers. Finally, it addresses "other workers"—persons in settings, such as offices, schools, factories, and construction sites, where there is no known risk of AIDS virus transmission.

Because AIDS is a bloodborne, sexually transmitted disease that is not spread by casual contact, the document does *not* recommend routine HTLV-III/LAV antibody screening for the groups addressed. Because AIDS is not transmitted through preparation or serving of food and beverages, these recommendations state that food-service workers known to be infected with AIDS should not be restricted from work unless they have another infection or illness for which such restriction would be warranted.

This document contains detailed recommendations for precautions appropriate to prevent transmission of all bloodborne infectious diseases to people exposed—in the course of their duties—to blood from persons who may be infected with HTLV-III/LAV. They emphasize that health-care workers should take all possible precautions to prevent needlestick injury. The recommendations are based on the well-documented modes of HTLV-III/LAV transmission and incorporate a "worst case" scenario, the hepatitis B model of transmission. Because the hepatitis B virus is also bloodborne and is both harder and more infectious than HTLV-III/LAV, recommendations that would prevent transmission of hepatitis B will also prevent transmission of AIDS.

Formulation of specific recommendations for health-care workers who perform invasive procedures is in progress.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES / PUBLIC HEALTH SERVICE



Awareness, Information, Education, Safe procedures for needle use & disposal, Ban of Recapping, Unnecessary use elimination, Provision of Training, Vaccination, PPE, & Safety Devices

MMWR / January

The Brick Wall of Safety

Needle and Sharps Injuries Prevention

Patients' safety

P inf. = P x E x F

Pinf. = Probability to acquire an occupational infection

P = Probability that sources are BBV-infected (prevalence)

E = Efficacy of transmission

F = Frequency of exposure

Raising Awareness

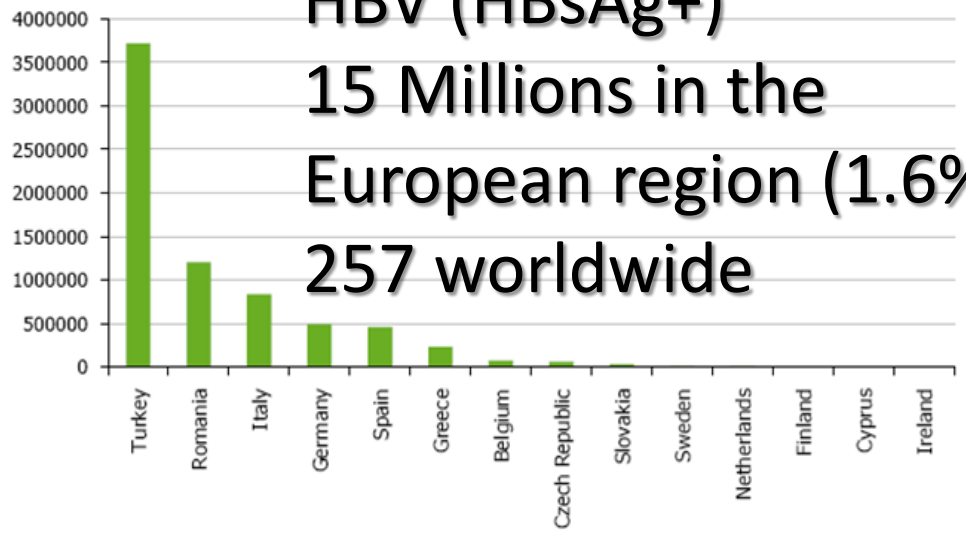
2017 N	2017 Rate	Cumulative total[b]	Country, territory or area[a]
			EU/EEA
270	3.1	9 543	Austria
890	7.9	30 618	Belgium
241	3.4	2 747	Bulgaria
106	2.5	1 538	Croatia
85	10.0	1 148	Cyprus
254	2.4	3 160	Czech Republic
242	4.2	7 591	Denmark
219	16.6	9 711	Estonia
158	2.9	3 911	Finland
5 211	7.8	83 306	France
–	–	60 688	Germany[c]
628	5.8	16 669	Greece
223	2.3	3 567	Hungary
24	7.2	385	Iceland
483	10.2	8 838	Ireland[d]
3 443	5.7	44 139	Italy
371	18.8	7 343	Latvia
0	0.0	67	Liechtenstein
263	9.1	3 012	Lithuania
59	10.2	1 641	Luxembourg[d]
45	10.4	432	Malta
716	4.2	26 129	Netherlands
213	4.1	6 291	Norway
1 325	3.5	22 798	Poland
1 068	10.3	57 913	Portugal
661	3.3	23 063	Romania
70	1.3	869	Slovakia
39	1.9	836	Slovenia
3 249	7.0	48 636	Spain
434	4.4	12 569	Sweden
4 363	6.7	155 267	United Kingdom
25 353	**5.8**	**654 425**	**Total EU/EEA**

HIV

New diagnoses and rates per 100 000 population 2008-2017

WHO (ECDC) 2018

Figure 6. Estimated number of HBsAg-positive individuals by country, based on general population prevalence estimates

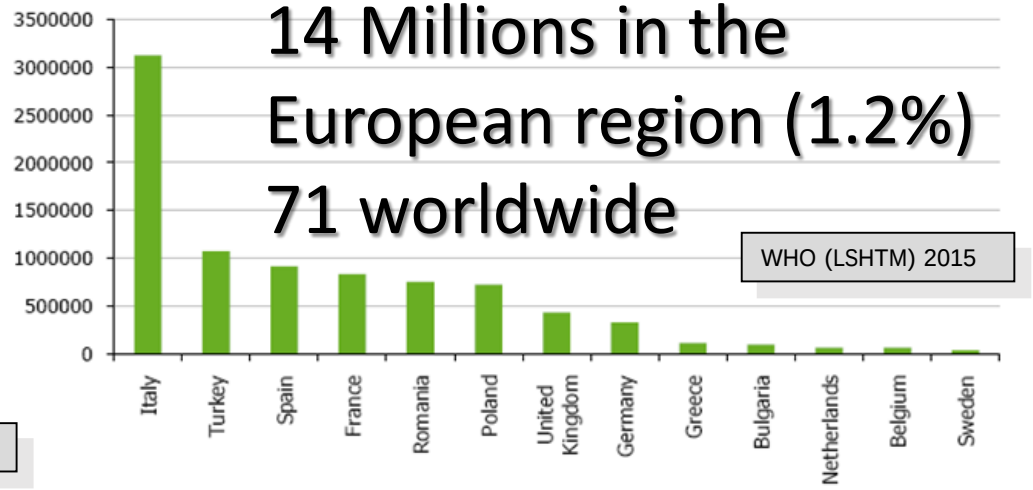


HBV (HBsAg+)

15 Millions in the European region (1.6%)

257 worldwide

Figure 7. Estimated number of anti-HCV-positive individuals by country, based on general population prevalence estimates



HCV (HCV RNA+)

14 Millions in the European region (1.2%)

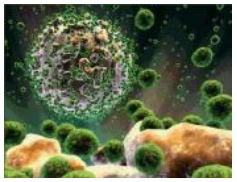
71 worldwide

WHO (LSHTM) 2015

Quantification of risks

HIV Seroconversion rate (SC), following exposure to blood SIROH, 1986-2017

	Type of exposure	SC/exp	% rate	95% CI
1986-1996 pre-HAART	*Percutaneous*	3/2066	**0.14**	0.03-0.42
	Mucous cont.	2/486	**0.41**	0.05-1.48
	Non-intact skin	0/547	**0**	-0.67
1997-2017 post-HAART	*Percutaneous*	1/1516	**0.07**	0.006-0.38
	Mucous cont.	0/727	**0**	-0.52
	Non-intact skin	0/285	**0**	-1.30

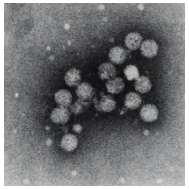


SIROH
STUDIO ITALIANO RISCHIO OCCUPAZIONALE DA HIV
Incidenti occupazionali per punture da ago o lesioni da altri oggetti taglienti*

Quantification of risks

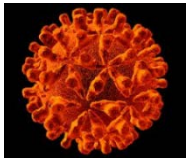
HCV seroconversion (SC) rates, following exposure to blood SIROH, 1994-2017

HCV



Type of exposure (blood only)	SC/exp	% rate	95% CI
Percutaneous exposure	41/13737	0.32	0.21-0.39
Hollow-bore, blood-filled needle	*36/3640*	*1.00*	*0.69-1.36*
Hollow-bore needle	*1/3943*	*0.03*	*.006 -0.14*
Solid needle/sharp	*4/5860*	*0.07*	*.001-0.10*
Mucous contamination	1/3887	0.03	.006-0.14
Conjunctival exp to blood	*1/3060*	*0.04*	*.006-0.18*
Other membranes to blood	*0/827*	*0*	*-0.44*
Non intact skin cont, with blood	0/1740	0	-0.20

HBV



Percutaneous exposure	1/347	0.30	.006-1.67

Susceptible subjects (118 vaccinated after exposure)

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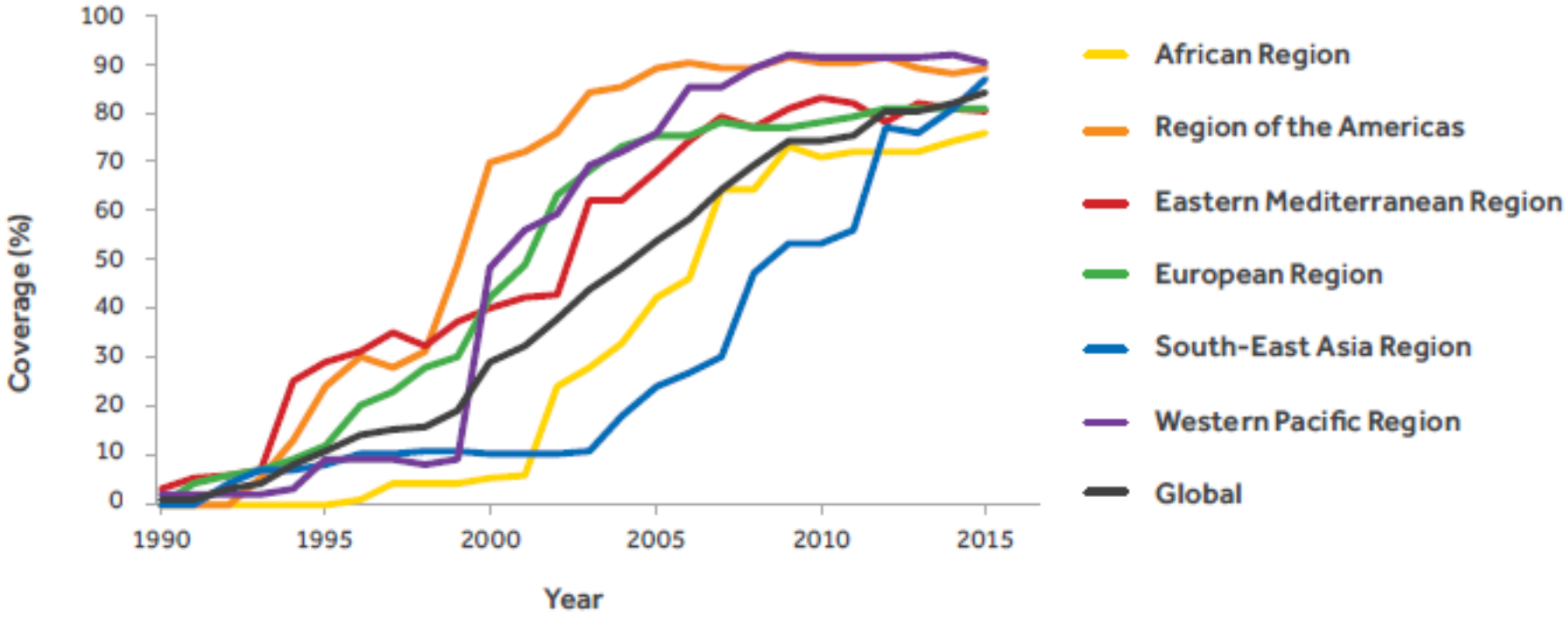
Incidenti occupazionali per punture da ago o lesioni da altri oggetti taglienti*

HBV Vaccination

Fig. 4. Three-dose hepatitis B vaccine coverage, by WHO region, 2000–2015: a major increase in coverage at the beginning of the 21st century



Source: Joint UNICEF–WHO reporting form

Cases of occupational infections or diseases acquired through a needle or sharps injury in the health care or laboratory setting

(by year of publication of the first report in the literature)

Bacterial	Viral	Protozoal	Fungal	Tumoral
• *Syphilis*, 1913 • *Diphteritis*, 1923 • *Leptospirosis*, 1937 • *Scrub typhus*, 1945 • *Gonhorrea*, 1947 • *Brucellosis*, 1966 • Rocky Mountain Spotted Fever, 1967 • *Mycoplasmosis*, 1971 • *Mycobacteriosis*, 1977 • *Rickettsia typhi*, 1978 • Staphylococcus aureus, 1983 • Streptococcus pyogenes, 1980 • -Necrotizing fasciitis, 1997 • Tuberculosis, 1931 (from a HIV-infected patient without acquiring HIV, 1998)	• Herpes simplex, 1962 • *Haemorragic fevers* (Ebola, Marburg, Machupo, Sabia, etc), 1974 • *Kyasanur virus*, 1975 • Herpes Zoster, 1976 • *Hepatitis B*, 1982 • *Human Immunodeficiency Virus (HIV)*, 1984 • Hepatitis D, 1986 • *Creutzfeldt-Jakob*, 1988 • *Herpesvirus simiae*, 1991 • *Hepatitis C*, 1992 • *Simian immunodeficiency virus*, 1994 • *Dengue*, 1998 • Hepatitis G, 1998 • *West Nile virus*, 2002 • Human T-lymphotropic Virus II, 2006 • Chikungunya, 2006 • *Hepatitis C Virus-NS3 recombinant vaccinia virus*, 2007 • *Hepatitis E*, 2007 • Cytomegalovirus, 2008 • *Vaccinia virus*, 2008 • Crimean Congo Haemorrhagic Fever, 2009	• *Toxoplasmosis*, 1951 • *Malaria*, 1972 • *Leishmaniasis*, 1997 • *Trypanosomiasis*, 2001	• Blastomycosis, 1903 • *Sporotrichosis*, 1977 • Cryptococcosis, 1985 (from a HIV-infected patient without acquiring HIV, 1994)	• *Human colonic adenocarcinoma*, 1986 • Sarcoma, 1996

*cases of pathogens or diseases enlisted in italics involved also or exclusively laboratory workers.

Raising Awareness

De Carli G, Abiteboul D, Puro V. Biochem Med (Zagreb) 2014; 24:45-56

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Novel coronavirus

Disease X

Using a large-scale meta-transcriptomic approach, we discover 214 vertebrate-associated viruses in reptiles, amphibians, lungfish, ray-finned fish, cartilaginous fish and jawless fish. The newly discovered viruses appear in every family or genus of RNA virus associated with vertebrate infection, including those containing human pathogens such as influenza virus, the *Arenaviridae* and *Filoviridae* families. *Nature* 2018;556:197–202.

Morens DM, Folkers GK & Fauci AS. The challenge of emerging and re-emerging infectious diseases. *Nature* 2004;430:242–249.

Newly emerging diseases
Re-emerging/resurging diseases
Deliberately emerging diseases
Prioritized diseases WHO 2018

Raising Awareness

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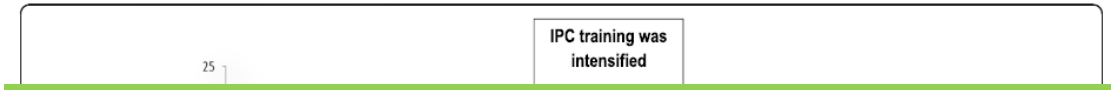
Epidemiology of Ebola virus disease transmission among health care workers in Sierra Leone, May to December 2014: a retrospective descriptive study

on an est
12 % were



Ebola Doctors Are Divided on IV Therapy in Africa

By DONALD G. McNEIL Jr. JAN. 1, 2015 NYT

Medical experts seeking to stem the Ebola epidemic are sharply divided over **whether most patients in West Africa should, or can, be given intravenous hydration**, a therapy that is standard in developed countries. […]

The group's overwhelmed doctors do what they can, officials said, but **it is hard to insert needles while wearing three pairs of gloves and foggy goggles.** IVs must be monitored, drawing virus-laden blood for tests is dangerous, and patients yank needles out — sometimes in delirium, sometimes just to go to the toilet when no nurse is around.

Doctors Without Borders normally puts IV lines in as many Ebola patients as it can manage, said Dr. Armand Sprecher, an Ebola expert with the organization. **That practice was temporarily stopped in September, when the disease was spreading so fast that doctors had only one minute per patient** during the one hour they could work in their sweltering protective suits.

Raising Awareness

Characterization of risks

Risk factors for acquiring an occupational infection following a percutaneous exposure

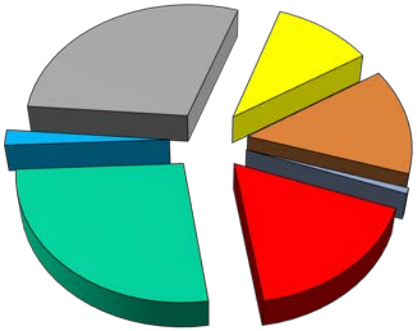
Risk factor	Added risk of acquiring HIV (adj. OR, CI 95%)[1]	Added risk of acquiring HCV (adj. OR, CI 95%)[2]
Deep injury	15,34 (6,01-41,05)	155,2 (7,1-3417,2)
Visible blood on the device	6,18 (2,15-20,74)	
Device posed in vein or artery	4,33 (1,71-11,89)	100,1 (7,3-1365,7)
Source patient with terminal illness	5,60 (1,99-16,06)	
Viremia > 6 $\log_{10}$ cp/mL		11,0 (1,1-114,1)
Zidovudine PEP	0,19 (0.06-0,52)	
Male healthcare worker		3,1 (1,0-10,0)

[1] Cardo DM , Culver DH, Ciesielski CA et al. N Engl J Med 1997;337:1485-90

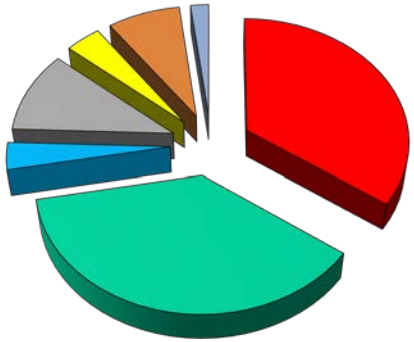
[2] Yazdanpanah Y , De Carli G, Migueres B et al. Cl Infect Dis 2005; 41:1423-30.

Map of risk: Device involved in NSI by area

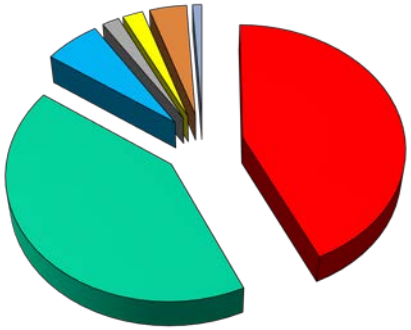
Surgical area



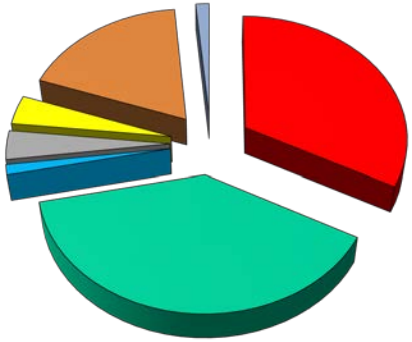
Critical area



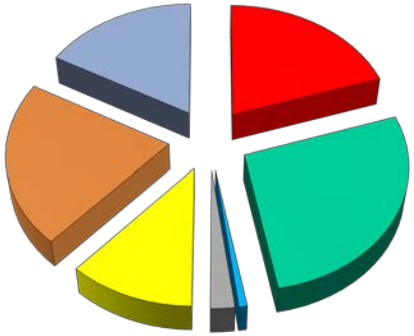
Medical area



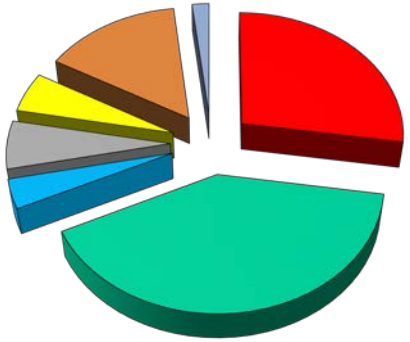
Services



Laboratory



Non hospital setting

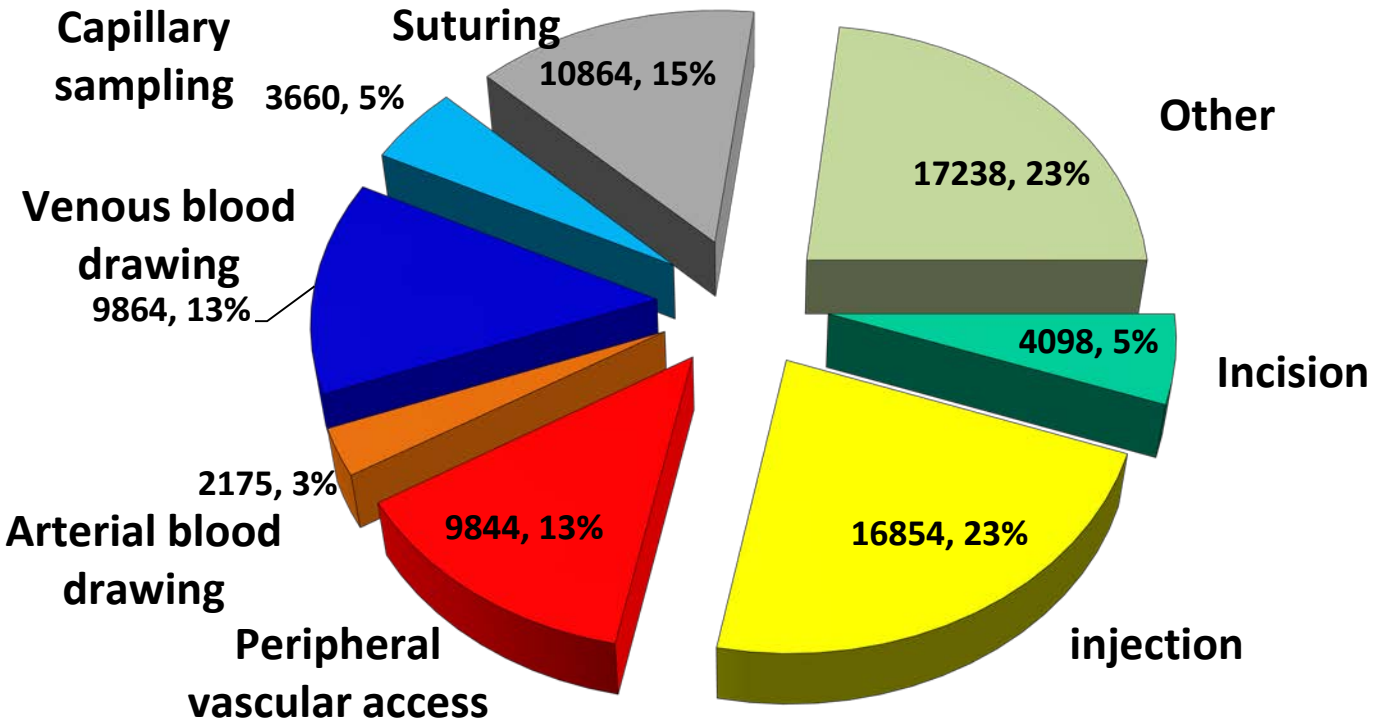


- Hollow-bore, blood-filled
- Lancet
- Scalpel
- Glass objects
- Hollow-bore, injection
- Suture
- Sharps

Map of risk

SIROH
STUDIO ITALIANO RISCHIO OCCUPAZIONALE DA HIV
Incidenti occupazionali per punture da ago o lesioni da altri oggetti taglienti*

Map of risk: Procedure being performed when the NSI occurred



ED: RR of sustaining a NSI with IV catheters vs other areas: 3.00 (CI 95% 1.95-3.75)

Map of risk

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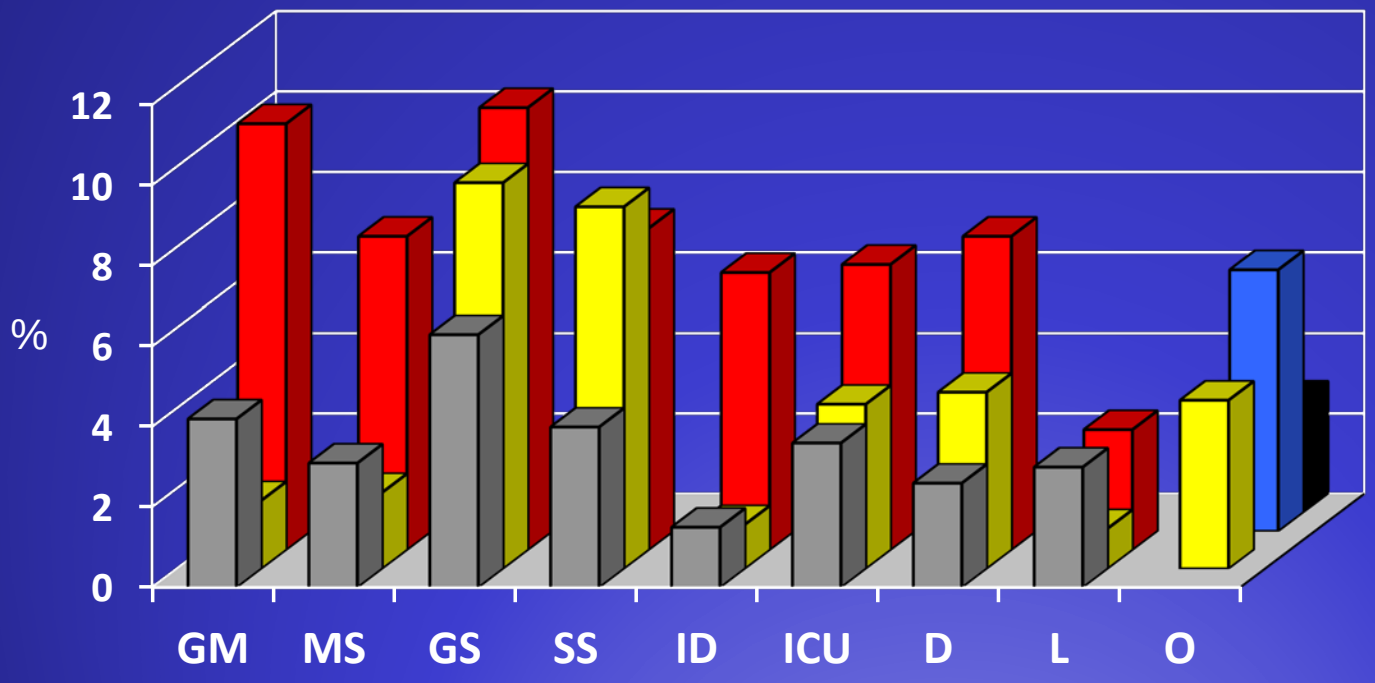
Incidenti occupazionali per punture da ago o lesioni da altri oggetti taglienti*

Percutaneous exposures per 100 full-time equivalents, by job category and area
SIROH, Italy



- Housekeeper
- MD
- Nurse
- Midwife
- Technician

GM general medicine

MS medical specialties

GS general surgery

SS surgical specialties

ID infectious diseases

ICU intensive care

D dialysis

L laboratory

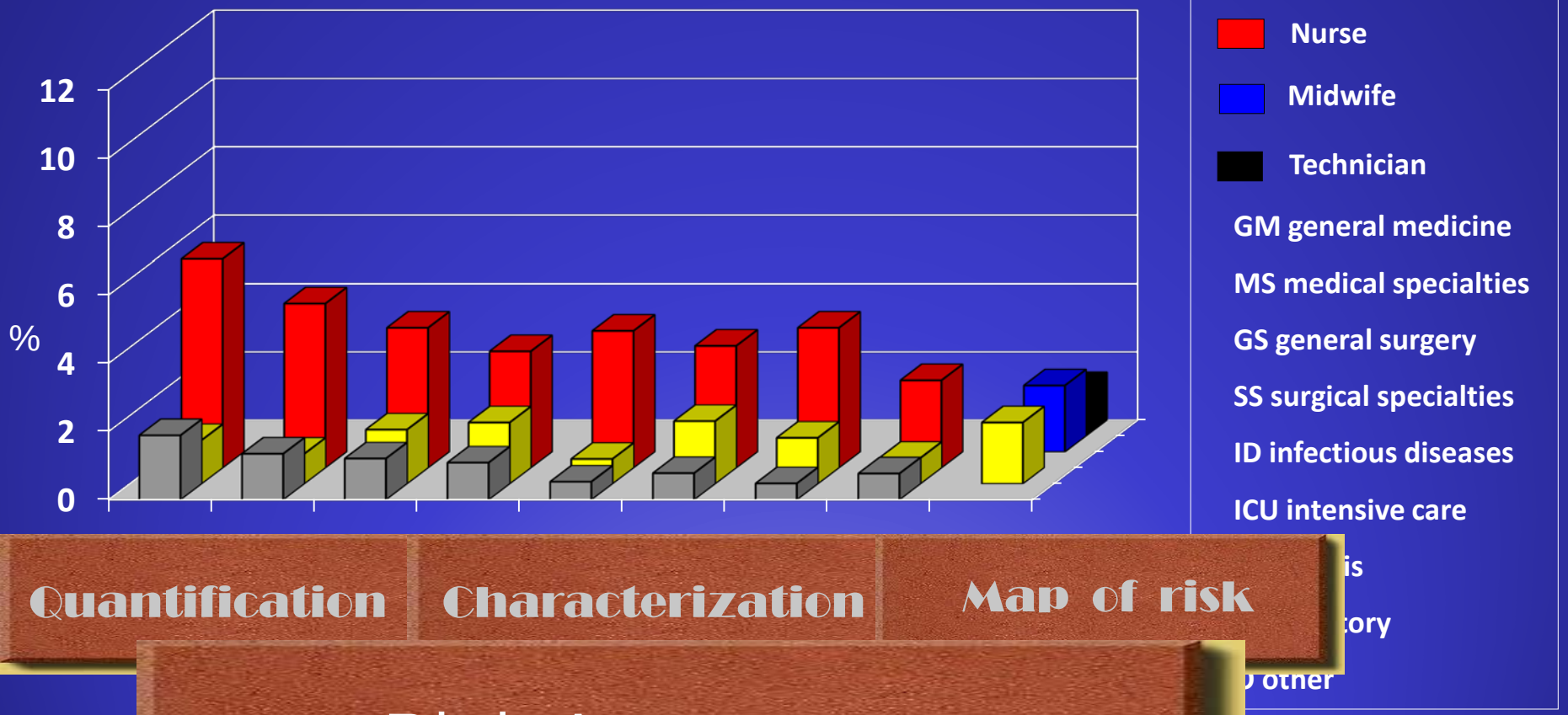
O other

Map of risk

Puro V, De Carli G, Petrosillo N, Ippolito G and the SIROH Group. Infect Control Hosp Epidemiol 2001; 22:206-10.

SIROH
STUDIO ITALIANO RISCHIO OCCUPAZIONALE DA HIV
Incidenti occupazionali per punture da ago o lesioni da altri oggetti taglienti*

High-risk Percutaneous exposures per 100 FTE, by job category and area SIROH, Italy



Quantification | Characterization | Map of risk

Risk Assessment

SIROH
STUDIO ITALIANO RISCHIO OCCUPAZIONALE DA HIV
Incidenti occupazionali per punture da ago o lesioni da altri oggetti taglienti*

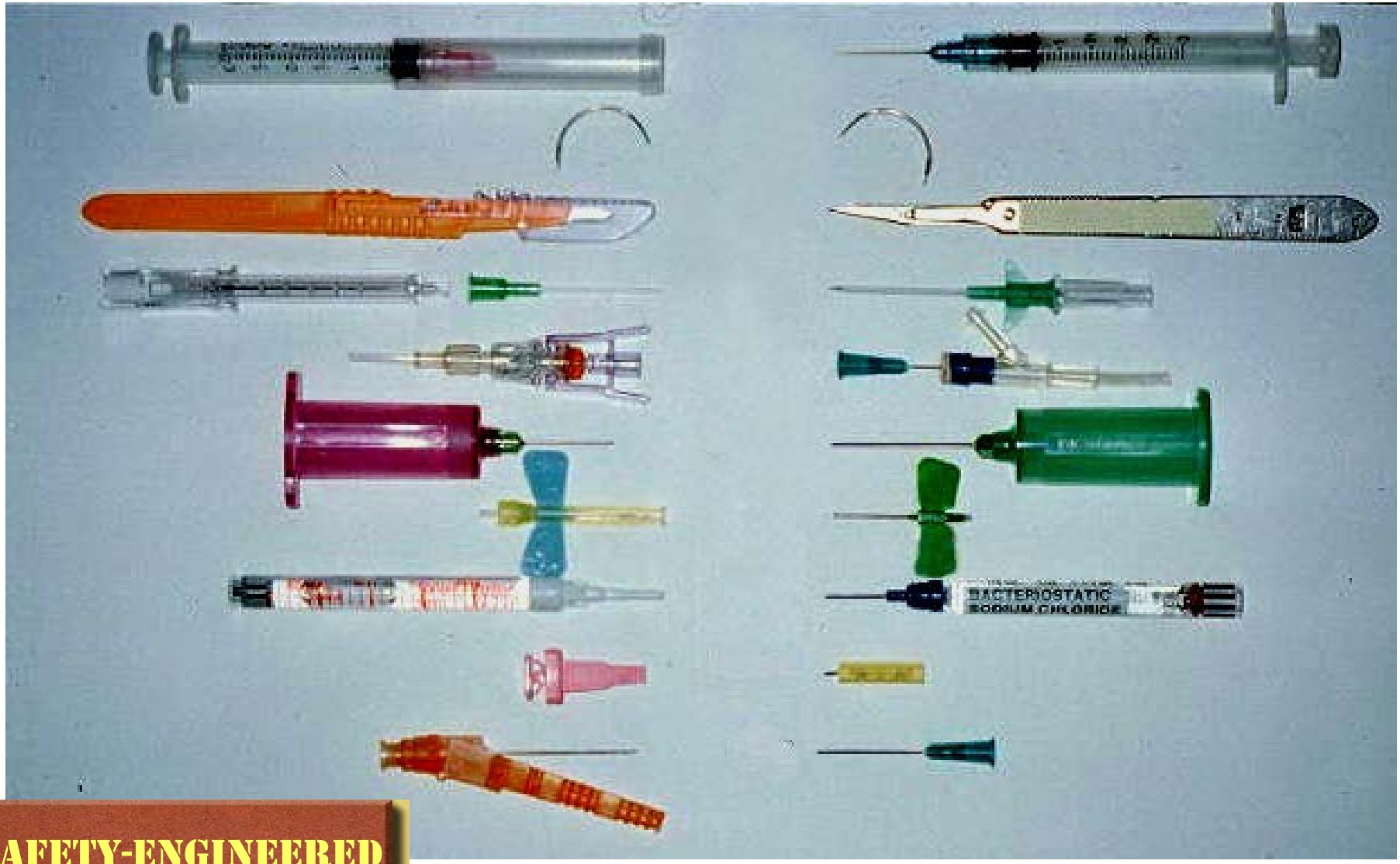
Risk of infection according to the amount of blood or other body fluid potentially inoculated through a needlestick or cut (consequences)					
	Critical	**Fistula needle Spinal needle**	**IV catheter stylet**	**Phlebotomy needle**	
	Serious	**Thoracentesis Paracentesis**	**Scalpel**	**Lancet**	**Surgical instruments**
	Medium	**Culture inoculation (laboratory)**	**IV injection**	**IM injection**	**SC injection**
	Low	**Brain electrodes Electromyography electrodes**	**Needle for drug reconstitution/ preparation**	**Insulin pen needle**	**Suture needle**
		Rarely	***Sometimes***	***Often***	***Frequently***
		Frequency of injury occurrence (likelihood)			

Adoption of safety devices integrating a protection mechanism essential. Hepatitis B vaccination and staff education and training mandatory.

Adoption of safety devices integrating a protection mechanism **recommended**. Hepatitis B vaccination and staff education and training **mandatory.**

Staff education and training to achieve the highest obtainable safety level**. Replacement with blunt needle, or needle elimination if alternatives are available.**

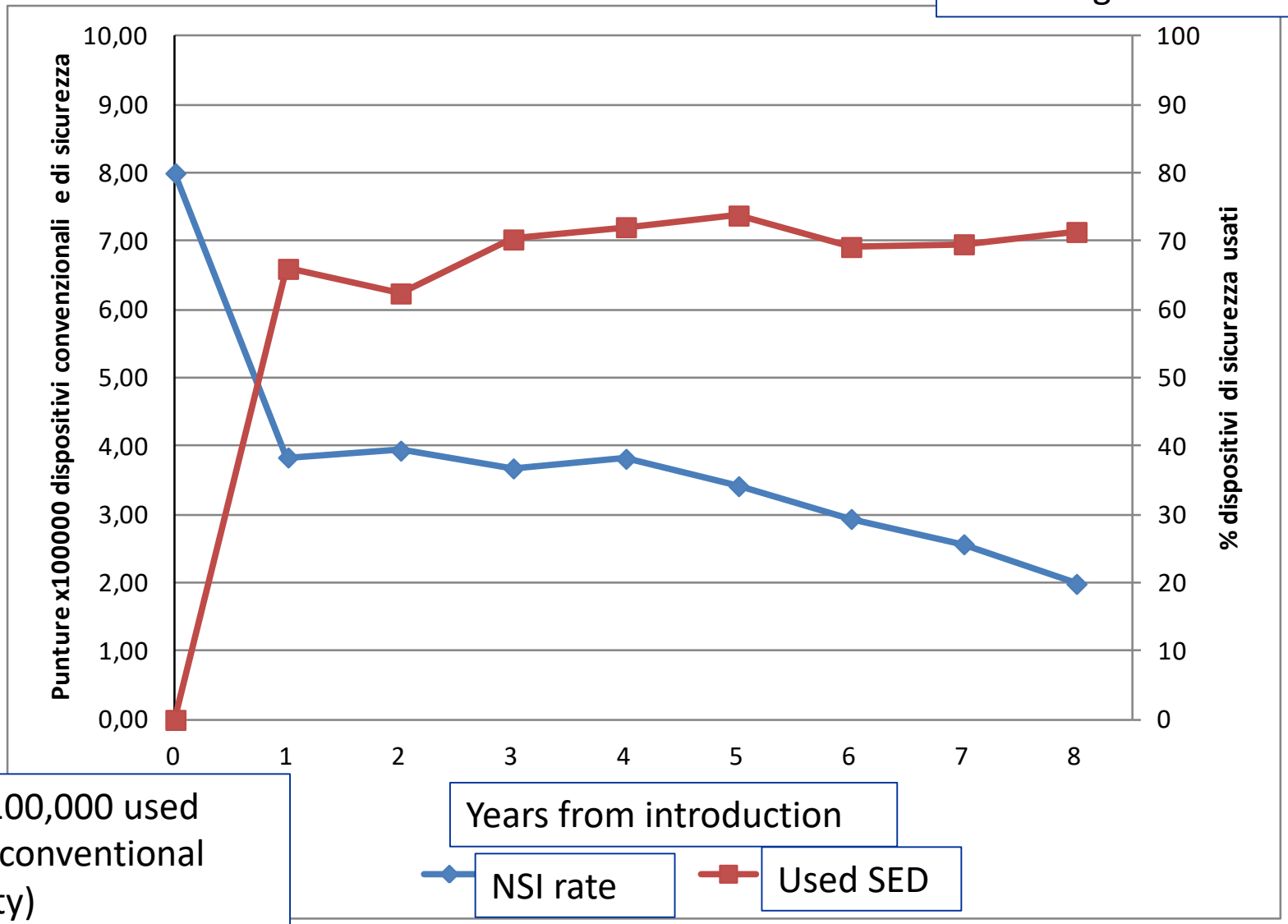
Risk Assessment



SAFETY-ENGINEERED DEVICES

SAFETY-ENGINEERED DEVICES

Percentage of SED used

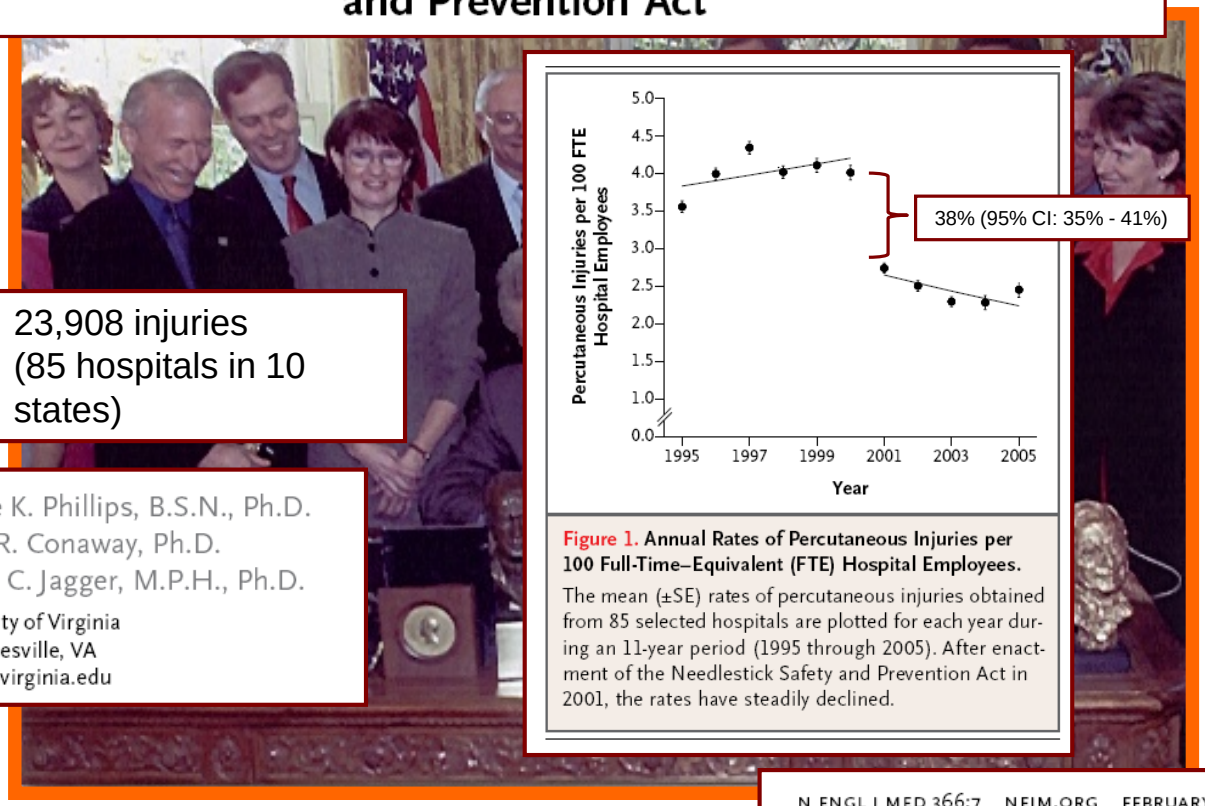


NSI per 100,000 used devices (conventional and safety)

SIROH
STUDIO ITALIANO RISCHIO OCCUPAZIONALE DA HIV
Incidenti occupazionali per punture da ago o lesioni da altri oggetti taglienti*

The Needlestick Safety and Prevention Act (6/11/2000)

Percutaneous Injuries before and after the Needlestick Safety and Prevention Act



23,908 injuries
(85 hospitals in 10 states)

Elayne K. Phillips, B.S.N., Ph.D.
Mark R. Conaway, Ph.D.
Janine C. Jagger, M.P.H., Ph.D.
University of Virginia
Charlottesville, VA
ekp2e@virginia.edu

Figure 1. Annual Rates of Percutaneous Injuries per 100 Full-Time–Equivalent (FTE) Hospital Employees.

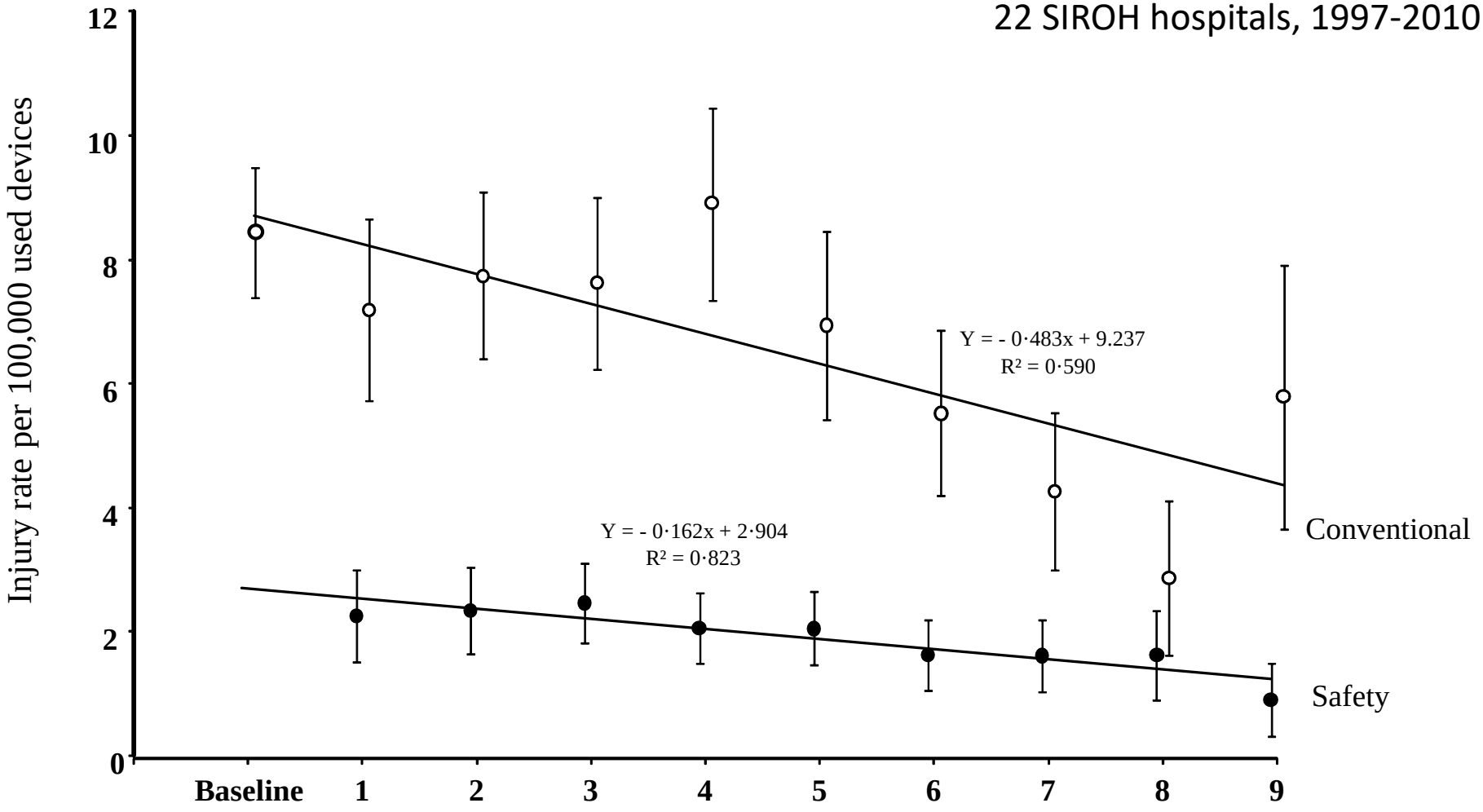
The mean (±SE) rates of percutaneous injuries obtained from 85 selected hospitals are plotted for each year during an 11-year period (1995 through 2005). After enactment of the Needlestick Safety and Prevention Act in 2001, the rates have steadily declined.

N ENGL J MED 366;7 NEJM.ORG FEBRUARY 16, 2012

SAFETY-ENGINEERED DEVICES

Needlestick rates, conventional vs safety-engineered devices

22 SIROH hospitals, 1997-2010.



Proportion of safety devices use	56·1%	52·2%	60·1%	64·5%	66·4%	62·2%	64·2%	63·6%	67·9%

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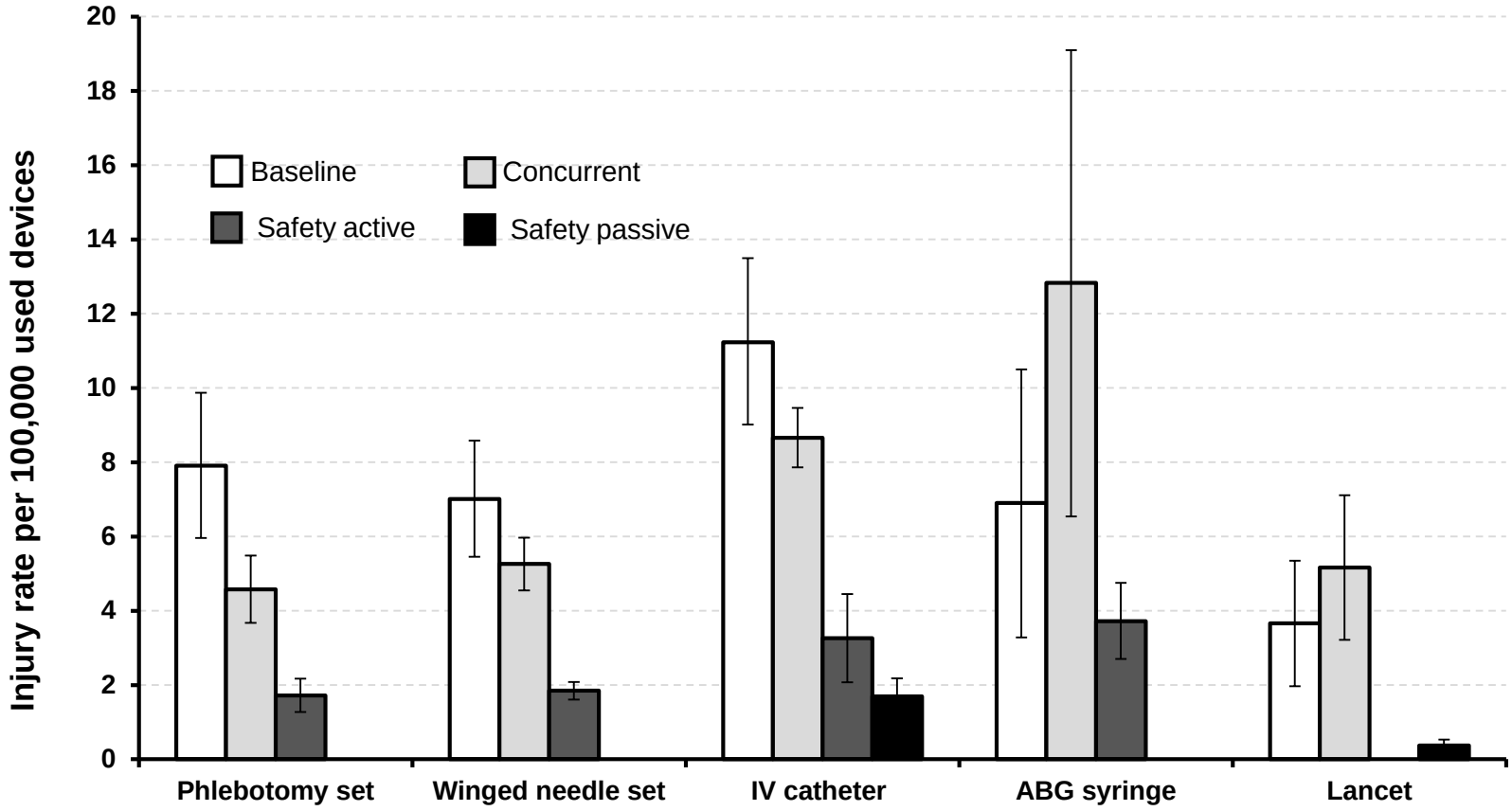
Efficacy of safety hollow-bore, blood-filled devices

22 SIROH hospitals, 1997-2010



	Phlebotomy set	Winged needle set	IV catheter	ABG syringe	Lancet
Baseline vs. Concurrent	0.001	0.028	0.005	0.085	0.257
Baseline vs. Safety active	<0.001	<0.001	<0.001	0.031	
Baseline vs. Safety passive			<0.001		<0.001
Concurrent vs. Safety active	<0.001	<0.001	<0.001	<0.0001	
Concurrent vs. Safety passive			<0.001		<0.001
Safety active vs. Safety passive			0.008		

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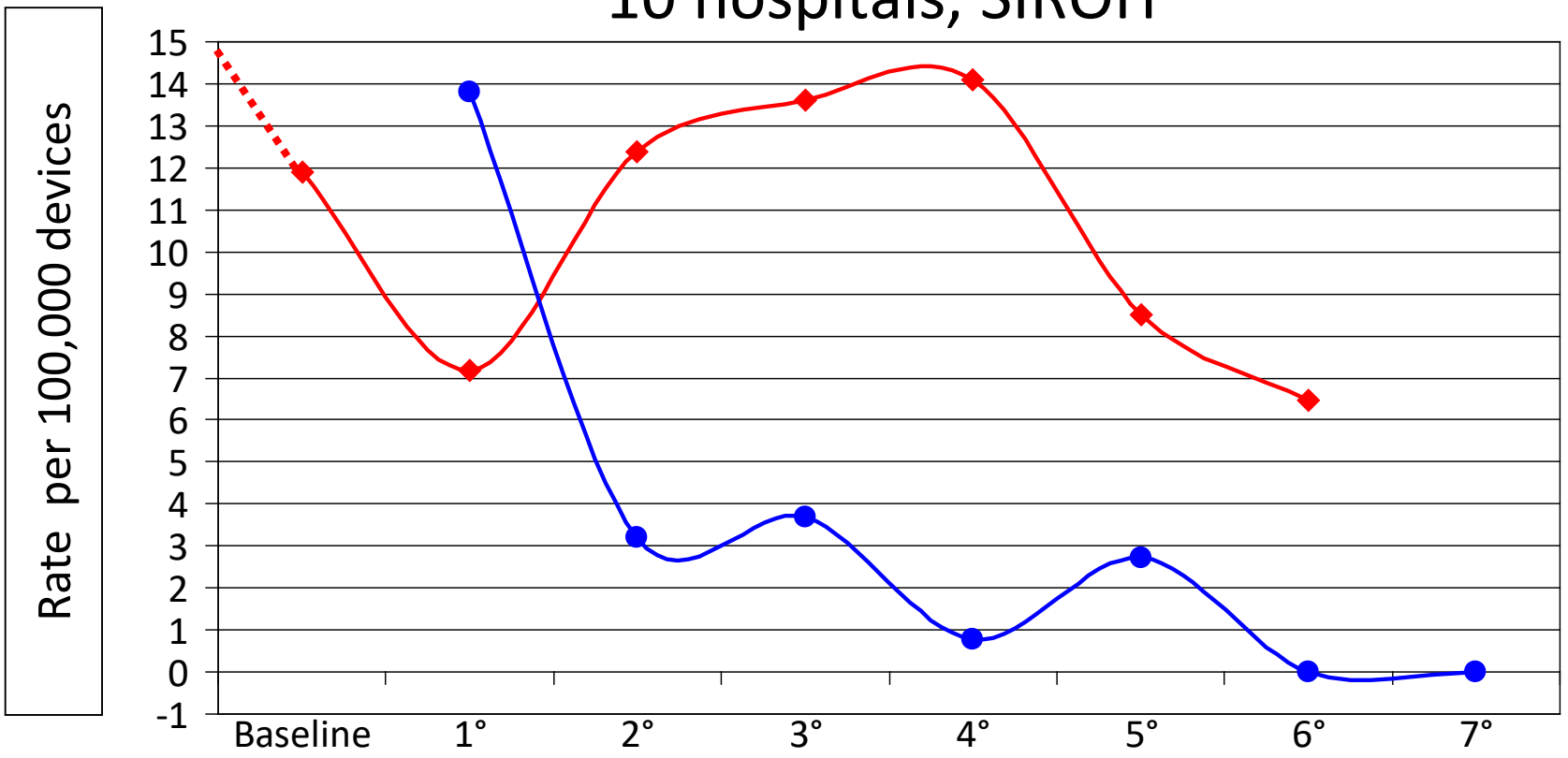
Needlestick rate per 100,000 IV catheters
10 hospitals, SIROH



Hospitals	10	10	8	8	7	6	3	2
Conventional Devices	480851	376100	346923	323404	305270	305649	61742	
Safety Engineered		79581	93370	108289	126447	110052	51912	22736

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MACOVA 2020
Multidisciplinary Advanced Course on Vascular Access

SAFETY-ENGINEERED DEVICES

2007 guideline for isolation precautions: preventing transmission of infectious

TABLE 4.
RECOMMENDATIONS FOR APPLICATION OF STANDARD PRECAUTIONS FOR THE CARE OF ALL PATIENTS IN ALL HEALTHCARE SETTINGS
(See Sections II.D.-II.J. and III.A.1)

COMPONENT	RECOMMENDATIONS
Needles and other sharps	Do not recap, bend, break, or hand-manipulate used needles; if recapping is required, use a one-handed scoop technique only; use safety features when available; place used sharps in puncture-resistant container

E. Patchen Dellinger, MD, Professor of Surgery, University of Washington School of Medicine
Jeffrey Engel, MD, Head, General Communicable Disease Control Branch, North Carolina State Epidemiologist
Steven M. Gordon, MD, Chairman, Department of Infections Diseases, Hospital Epidemiologist, Cleveland Clinic Foundation
Lizzie J. Harrell, PhD, D(ABMM), Research Professor of Molecular Genetics, Microbiology and Pathology, Associate Director, Clinical Microbiology, Duke University Medical Center
Carol O'Boyle, PhD, RN, Assistant Professor, School of Nursing, University of Minnesota
David Alexander Pegues, MD, Division of Infectious Diseases, David Geffen School of Medicine at UCLA

(Am J Infect Control 2007;35:S65-164.)
0196-6553/$32.00

doi:10.1016/j.ajic.2007.10.007

Nebraska Medical Center

HICPAC membership (past)
Robert A. Weinstein, MD (Chair), Cook County Hospital, Chicago, IL
Jane D. Siegel, MD (Co-Chair), University of Texas Southwestern Medical Center, Dallas, TX
Michele L. Pearson, MD (Executive Secretary), Centers for Disease Control and Prevention, Atlanta, GA
Raymond Y.W. Chinn, MD, Sharp Memorial Hospital, San Diego, CA
Alfred DeMaria, Jr, MD, Massachusetts Department of Public Health, Jamaica Plain, MA
James T. Lee, MD, PhD, University of Minnesota, Minneapolis, MN
William A. Rutala, PhD, MPH, University of North Carolina Health Care System, Chapel Hill, NC
William E. Scheckler, MD, University of Wisconsin, Madison, WI
Beth H. Stover, RN, Kosair Children's Hospital, Louisville, KY
Marjorie A. Underwood, RN, BSN CIC, Mt Diablo Medical Center, Concord, CA

Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the HICPAC. Am J Infect Control 2007;35:S65-164.

Needlestick Injury Rates According to Different Types of Safety-Engineered Devices: Results of a French Multicenter Study

TABLE 1. Needlestick Injury (NSI) Incidence Rates According to the Type of Safety-Engineered Device

Type of device	No. of devices purchased	No. of NSIs reported	No. of NSIs/1 × 10^5 devices purchased
Insulin pen needles	22,540	0	0.00
Lancets	8,624,518	2	0.02
Arterial blood syringes	624,946	7	1.12
Prefilled syringes	4,342,861	55	1.27
Vacuum tube blood-collection devices	2,248,630	48	2.13
Fistula needles	45,156	1	2.21
Injection needles and/or syringes	184,207	5	2.71
Intravenous catheters	1,801,107	68	3.78
Winged steel needles	4,176,912	257	6.15
Implantable port needles	62,003	10	16.13

overall frequency of NSIs was 2.05 injuries per 100,000

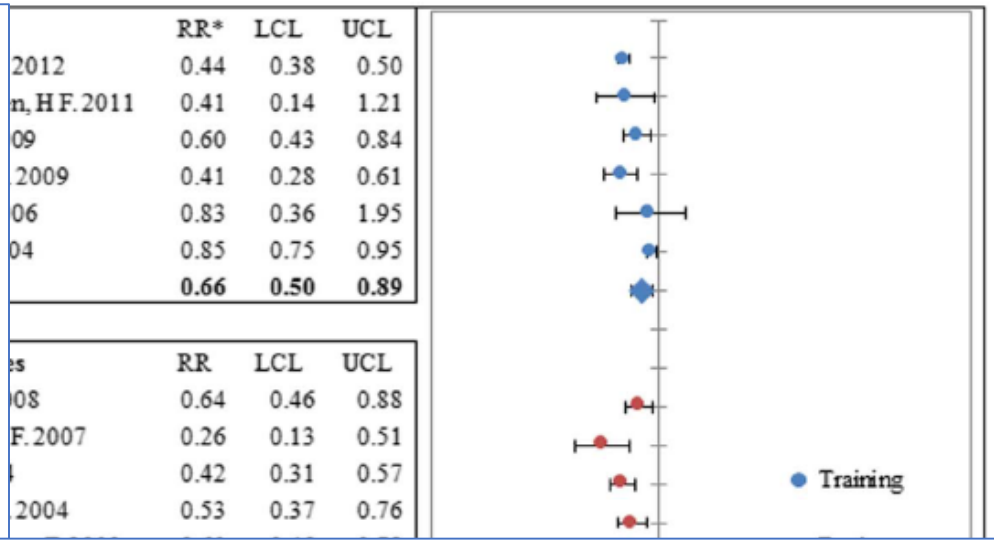
Prevention of Needle-Stick Injuries in Healthcare Facilities: A Meta-Analysis

Tarigan LH, Cifuentes M, Quinn M, Kriebel D. Infect Control Hosp Epidemiol. 2015 Jul;36(7):823-9.

Education/training (6 studies)
-34% (0.66, 0.50-0.89)

Safety-Engineered Devices (SED) (5 studies)
-49% (0.51, 0.40-0.64)

Education/training
-62% (0.38, 0.28-0



	RR*	LCL	UCL
2012	0.44	0.38	0.50
n, H F. 2011	0.41	0.14	1.21
09	0.60	0.43	0.84
2009	0.41	0.28	0.61
06	0.83	0.36	1.95
04	0.85	0.75	0.95
	0.66	**0.50**	**0.89**

s	RR	LCL	UCL
08	0.64	0.46	0.88
F. 2007	0.26	0.13	0.51
	0.42	0.31	0.57
2004	0.53	0.37	0.76

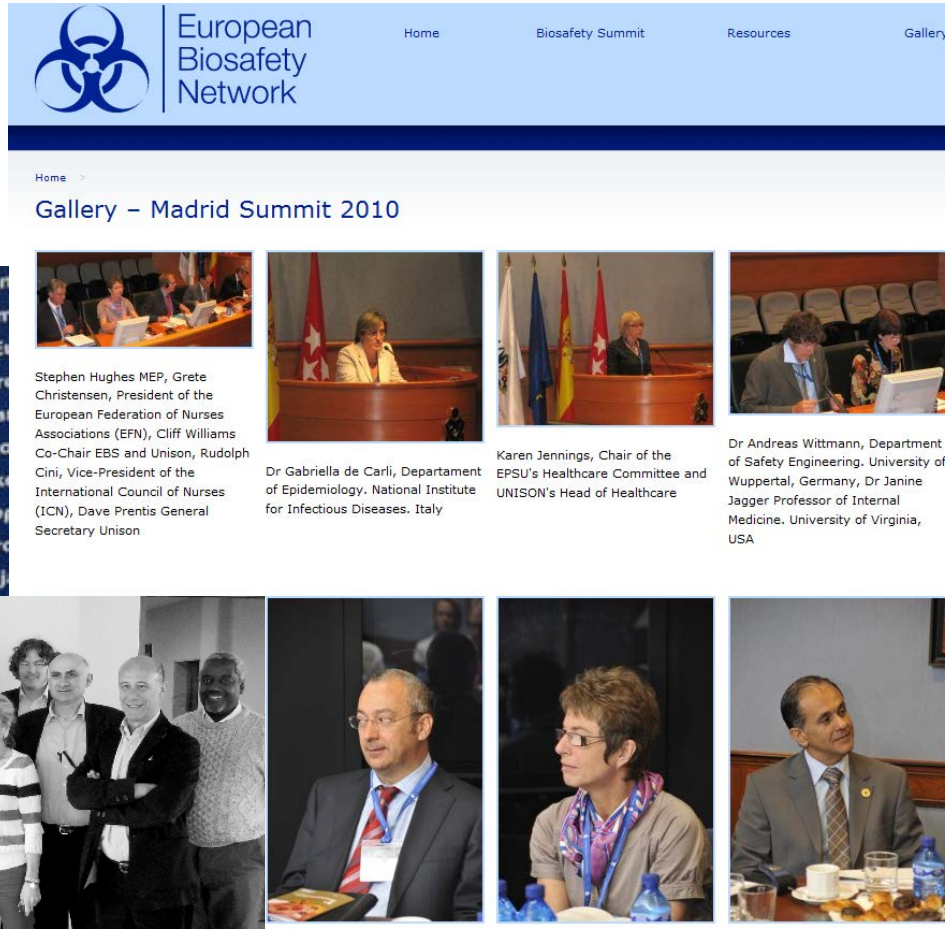
Education and Training

SAFETY-ENGINEERED DEVICES

Combining the 2 intervention approaches (training and SEDs) appears to be more effective than either intervention alone. This finding is in line with the conclusions of Ippolito et al,[31] who argued that successful NSI prevention needed to encompass many different interventions. Our finding that SEDs appear to be more effective than training was not surprising because SEDs reduce the exposure by modifying or isolating the hazard.[32,33] Training, in contrast, aims to reduce the risk by modifying the behavior of the subject (HCWs) without modifying the hazard from the devices.

It should be taken in mind that technological improvements can only be part of the solution. HCW must be aware, concerned and participate actively to reduce NSI to the best extent.

EU Directive on the prevention of sharps injuries:
a joint effort



Official Journal of the European Union 1.6.2010

- **Health and safety of HCW** is paramount and closely **linked to the health of patients**.

To achieve the safest possible working environment,[we must:]

- set up an **integrated approach to prevention** from sharp injuries,
- applying to **all** workers,
- who should be **well trained**, **adequately resourced** and secure.
- **Never assuming that there is no risk**,
- **employers and HCW** shall **work together**, to create a safe working environment, [for which]
- a combination of **planning, awareness-raising, information, training, prevention and monitoring** measures is essential,
- promoting a **no blame culture** in reporting.

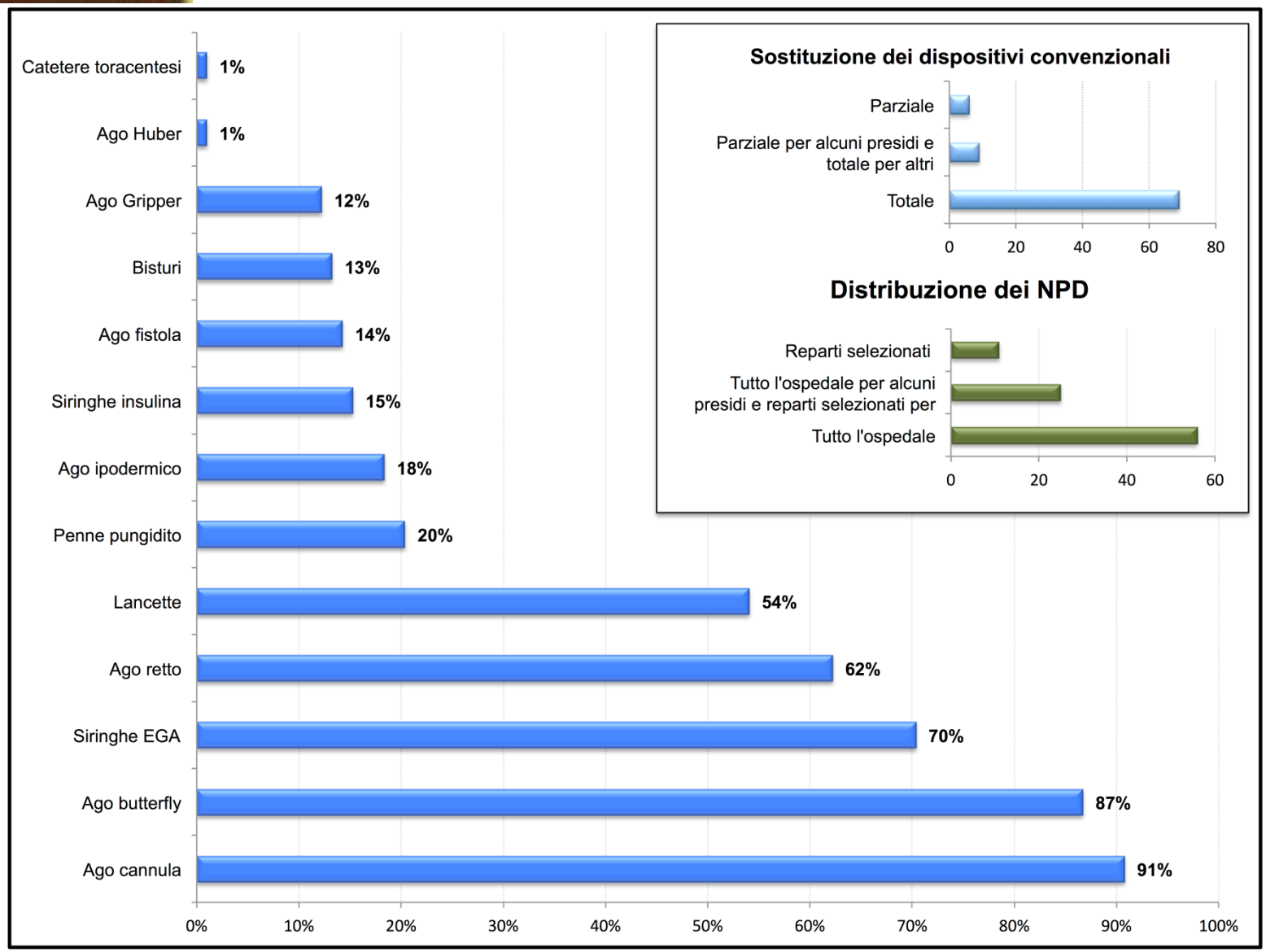
SAFETY-ENGINEERED DEVICES

Needlestick-prevention devices implementation in 100 SIROH hospitals (June 2013)

Which type of risk assessment?

Answer:

- Analysis of NSI in previous years: 16 hospitals
- Risky procedure in high-risk unit: 10 hospitals
- Units with high prevalence of bloodborne pathogens: 2 hospitals



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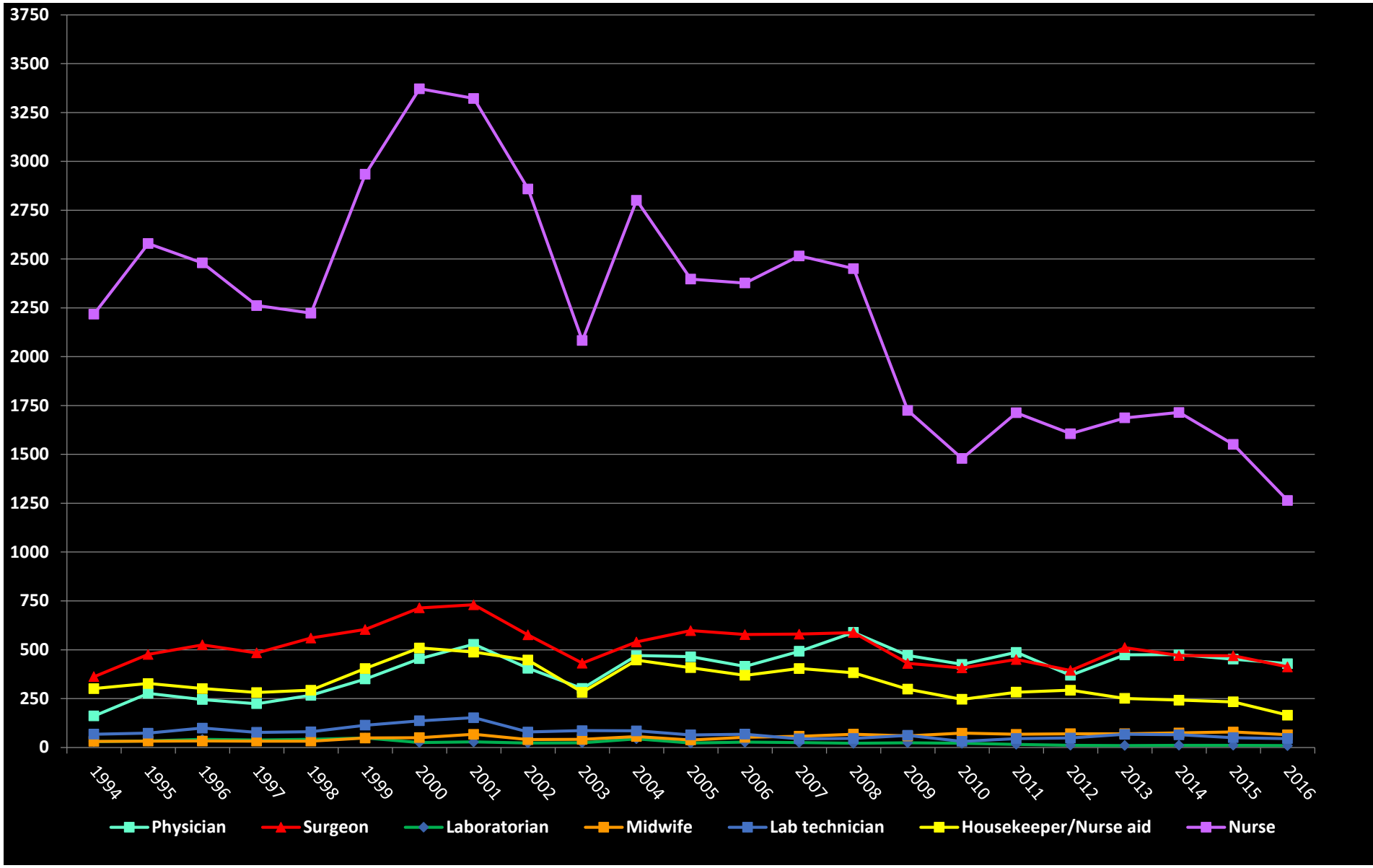
Time trend of NSI by job category - SIROH, 1994-2016 (n=83883 out of 87540)



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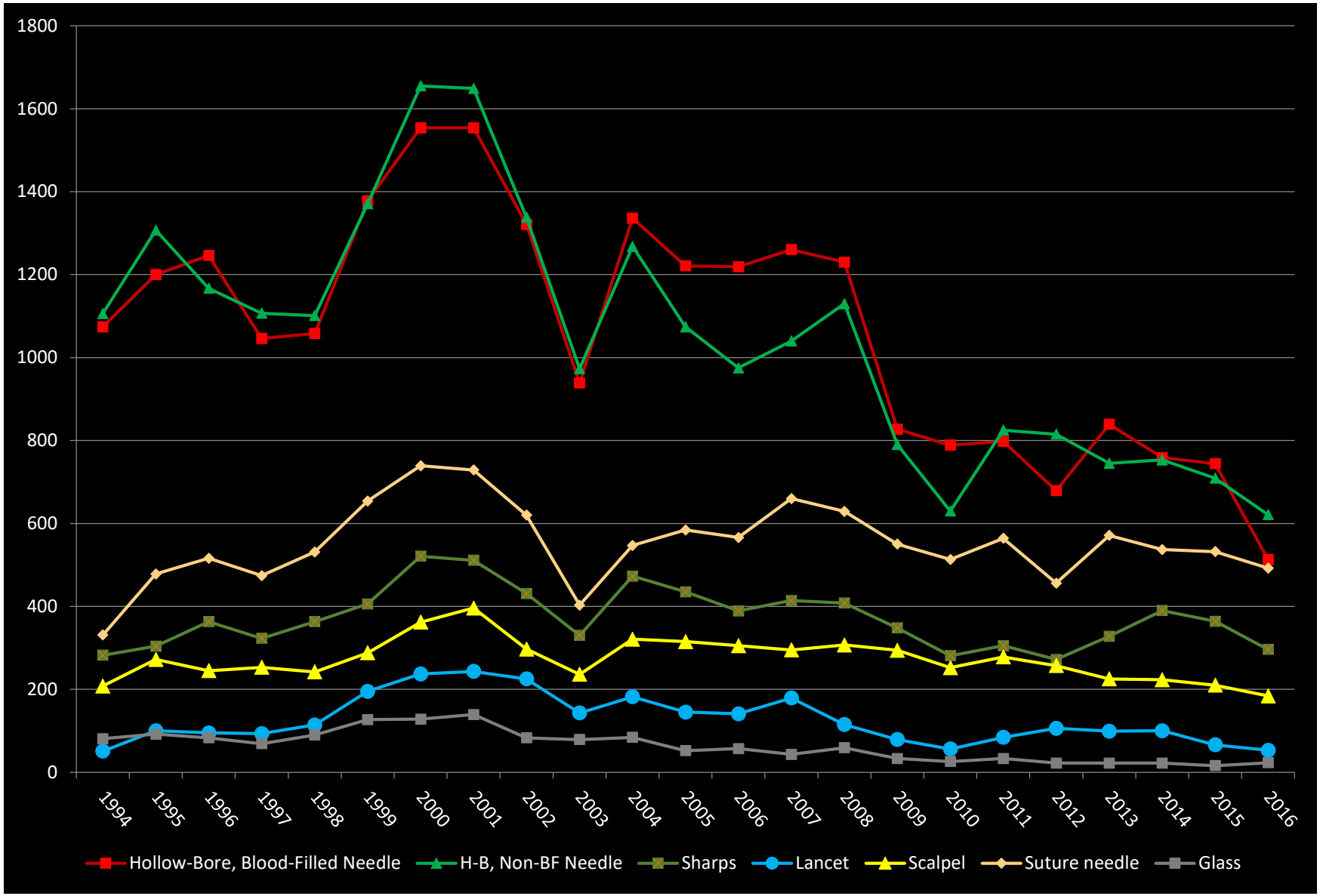
Time trend of NSI by type of involved device - SIROH, 1994-2016



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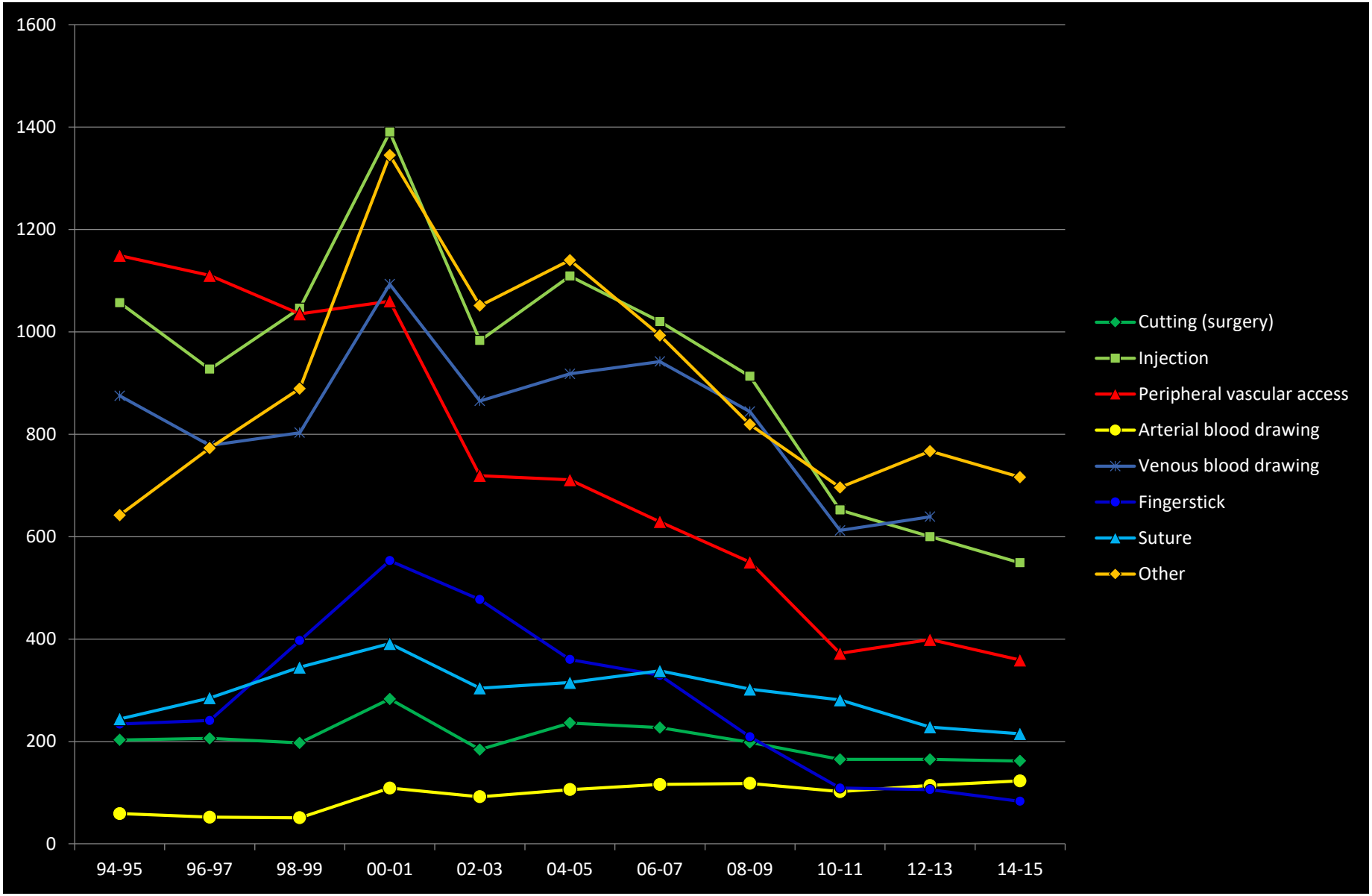
Incidenti occupazionali per punture da ago o lesioni da altri oggetti taglienti*

Registered nurses: temporal trend of NSI by procedure



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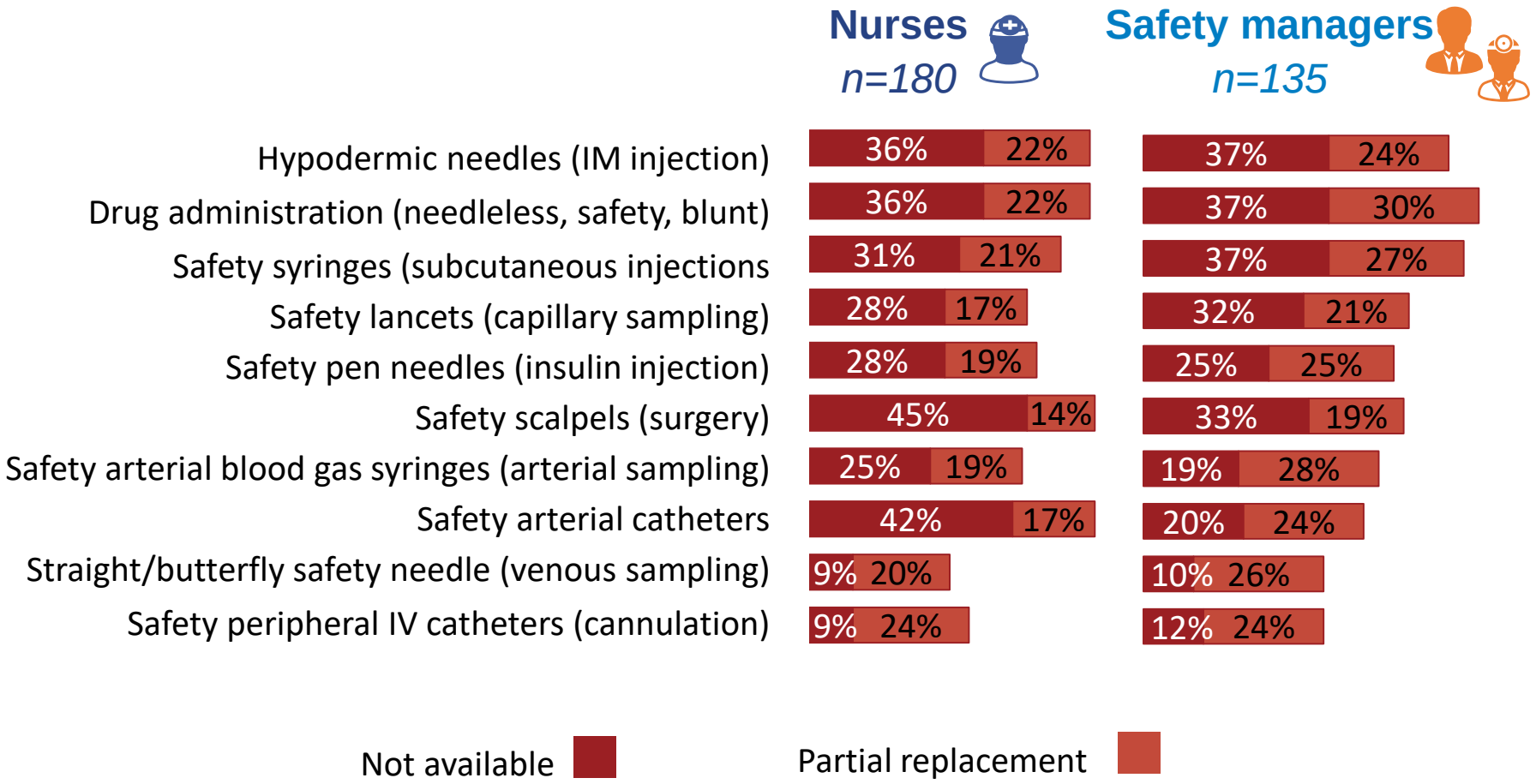
Incidenti occupazionali per punture da ago o lesioni da altri oggetti taglienti*

Implementation of devices integrating a safety mechanism
Italian National Safety Observatory – 2017 – 97 hospitals



Sharp Decrease of Reported Occupational Blood and Body Fluid Exposures in French Hospitals, 2003–2012: Results of the French National Network Survey, AES-RAISIN

N. Floret, MD, PhD;[1] O. Ali-Brandmeyer;[1] F. L'Hériteau, MD;[2] C. Bervas, MD;[3] S. Barquins-Guichard;[4] G. Pelissier, PhD;[5] D. Abiteboul, MD;[5] P. Parneix, MD;[3] E. Bouvet, MD, PhD;[2,5] C. Rabaud, MD, PhD;[1] and Working Group AES-RAISIN

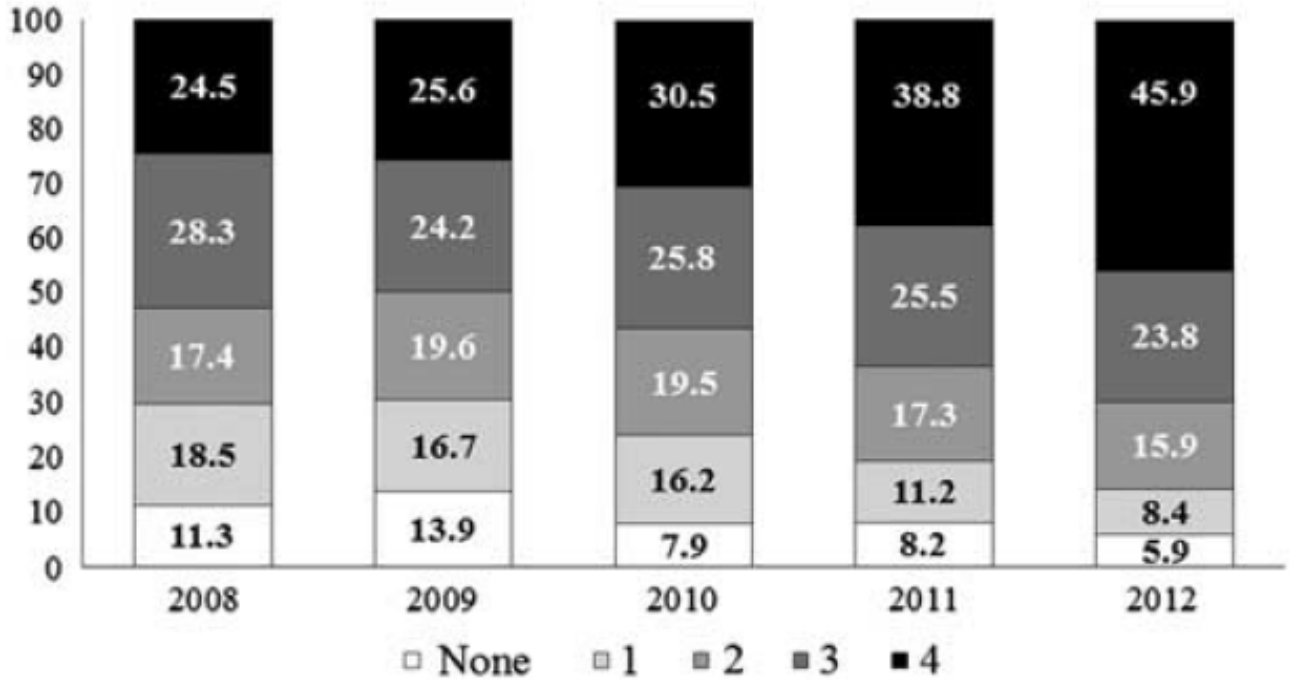


FIGURE 3. Trend in the proportion of healthcare facilities that have purchased more than 1 safety-engineered device among the 4 devices taken into account from 2008 to 2012 (intravascular catheters, blood gas syringes, needles for implanted ports, and unfractionated heparin syringes).

Safety device use in UK: Changes since 2013 sharps regulations

Table IV. Statistical comparison of 2013 and 2016 results

	2013	2016	RR	CL95	p
Activatable SED					
Total (%)	1210 (100)	1826 (100)			
Correctly activated (%)	814 (67)	1413 (77)	1.15	1.10 - 1.20	<0.001
Partially or non-activated (%)	387 (32)	392 (22)	0.67	0.60 - 0.76	<0.001
Tampered with (%)	9 (1)	21 (1)	1.55	0.71 - 3.36	NS
All HBN					
Total (%)	2545 (100)	2959 (100)			
Uncapped needles & syringe-needles (%)	643 (25)	166 (6)	0.22	0.19 - 0.26	<0.001
Capped needles and syringe-needles (%)	127 (5)	42 (1)	0.82	0.60 - 1.12	NS
SED incl draw-up needles (%)	1775 (70)	2751 (93)	1.33	1.30 - 1.37	<0.001
Sharps discarded "sharp" (%)	1039 (41)	579 (20)	0.48	0.44 - 0.52	<0.001

SED safety engineered devices; HBN hollow bore needles

Grimmond T. Occup Med (Lond). 2019 Aug 22;69(5):352-358.

Reduction of needlestick injuries by 48 % in 1 year : Effects of improvement of the safety concept according to the European Union Council directive 2010/32/EU at a large regional hospital

- In 2016 the NSI safety concept at a large regional hospital (Leverkusen, Germany) was improved according to 2010/32/EU, specifically by an update of blood screening profiles and standard operating procedures (SOP), better dissemination of information to employees and complete conversion to safety cannulas and scalpels.
- The number of NSIs in 2017 was significantly reduced by 48.4% as compared to 2016 and NSIs with scalpels were completely prevented.
- The proportion of employees with NSIs who were adequately immunized against hepatitis B was significantly increased to 84.1% in 2017.
- Identification of the index patient was significantly increased to 82.5% in 2017.
- The cost of avoiding NSIs increased by a total of 24.1% in 2017 as compared to 2015 before introduction of the safety concept.

Busche MN, Klein JM, Kröger B, Siewe J, Faber H, Müßler J, Reuter S, Bastian L, Vogt PM.
Unfallchirurg. 2019 Aug 19. doi: 10.1007/s00113-019-00710-8.

Reduction of necessary needles

- Reduce the number of blood drawings/blood tests

- Reduce peripheral IV catheter insertion

- inserting an IV catheter without a clear indication, or a daily reassessment of its indications, represents a risk of infection for the patient, and the possibility of a NSI for the HCW when replacing the device.

- Reduce quote or length of IV/i.m./s.c. therapies

- administering a drug IM or IV when an oral therapy is feasible, increases the risk of infection for the patient, and the chance of a NSI for the HCW.

Patients' safety

Replacement of necessary needles

Arch Gynecol Obstet (2009) 279:285–292
DOI 10.1007/s00404-008-0710-8

ORIGINAL ARTICLE

Integration of new safety technologies for needle aspiration of breast cysts

Randy R. Sibbitt · Dennis J. Palmer ·
Arthur D. Bankhurst · Wilmer L. Sibbitt Jr

Fig. 1 Safety needle on the reciprocating procedure device (RPD). A BD safety needle with an off-axis rotating safety sheath was chosen as the safety device to reduce needlestick injuries and is shown here mounted on the RPD safety device. The BD needle comes with two sheaths (*left RPD*), a conventional sheath that is removed to expose and then use the needle (*middle RPD*), and then a lateral rotating sheath that is pushed with the finger and encloses and inactivates the used needle (*right RPD*)

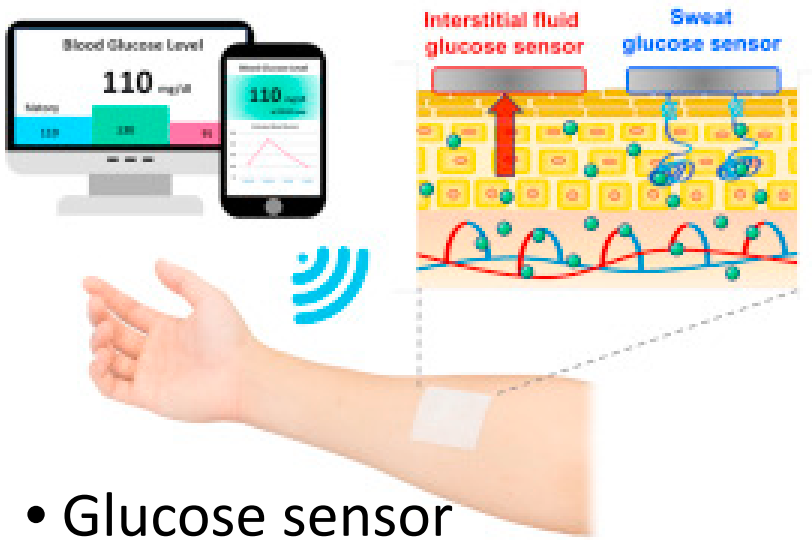
Fig. 2 Reciprocating procedure device (RPD). The RPD safety device for breast cyst aspiration injects when the thumb presses the dominant plunger and aspirates when the accessory plunger is pushed. The index and middle fingers do not change position on the finger flanges when transitioning from injection to aspiration. This results in an extremely well controlled and powerful safety device for breast cyst aspiration


QuikHeel™
6.5 mL/sec
325 PSI

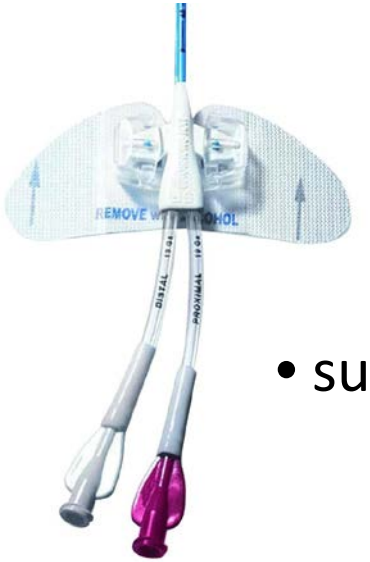
Elimination of unnecessary needles

• *Buttonhole* technique to access fistula in dialysis patients (blunt needles)

Non-invasive Epidermal Glucose Sensors



• Glucose sensor



• sutureless fixing

• 2-way or multiple access to avoid piggyback

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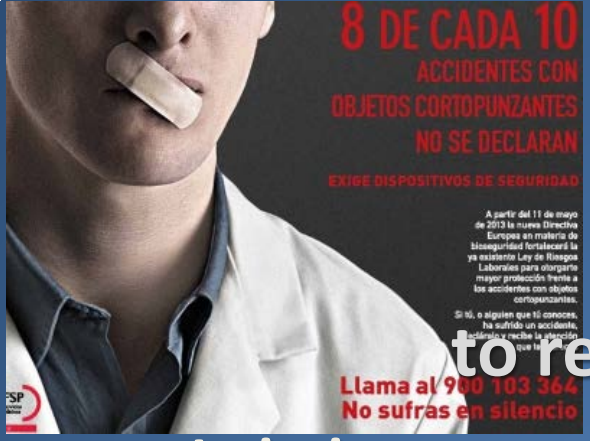
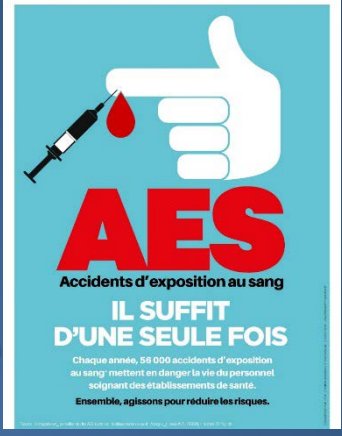


Four good reasons to report an occupational exposure



- **It is important for your own health:** it allows the prompt administration of a prophylaxis, if available, or of a therapy whenever indicated, and the prevention of secondary transmission (spouse, family)
- **It protects you:** the epidemiological investigation allows to identify the source and the possible risks, and to demonstrate a causal relationship to receive workers' compensation in case an infection should develop;
- **It allows to identify the causes and prevent other exposures:** we need the data to support preventive interventions!
- .....It is mandatory by law

Underreporting

Reporting & Recording

Response & follow up

Eurosurveillance

ORIGINAL ARTICLES

Euroroundup

EUROPEAN RECOMMENDATIONS FOR THE MANAGEMENT OF HEALTHCARE WORKERS OCCUPATIONALLY EXPOSED TO HEPATITIS B VIRUS AND HEPATITIS C VIRUS

V Puro [1], G De Carli [1], S Cicalini [1], F Soldani [1], U Balslev [2], J Begovac [3], L Boaventura [4], M Campins Martí [5], MJ Hernández Navarrete [6], R Kammerlander [7], C Larsen [8], F Lot [8], S Lunding [9], U Marcus [10], L Payne [11], AA Pereira [4], T Thomas [11], G Ippolito [1]

Exposure prevention is the primary strategy to reduce the risk of occupational bloodborne pathogen infections in healthcare workers (HCW). HCWs should be made aware of the medicolegal and clinical relevance of reporting an exposure, and have ready access to expert consultants to receive appropriate counselling, treatment and follow-up.

Vaccination against hepatitis B virus (HBV), and demonstration of immunisation before employment are strongly recommended. HCWs with postvaccinal anti-HBs levels, 1-2 months after vaccine completion,

Introduction

Bloodborne pathogens such as hepatitis B (HBV) and C virus (HCV) represent an important hazard for healthcare workers (HCWs) [1]. In the general population, HCV prevalence varies geographically from about 0.5% in northern countries to 2% in Mediterranean countries, with some 5 million chronic carriers estimated in Europe; while HBV prevalence ranges from 0.3% to 3%. The World Health Organization (WHO) estimates that each year in Europe 304 000 HCWs are exposed to at least one percutaneous injury with a sharp

How Much do Needlestick Injuries Cost? A Systematic Review of the Economic Evaluations of Needlestick and Sharps Injuries Among Healthcare Personnel

Response & follow up

Alice Mannocci, PhD, MS;[1] Gabriella De Carli, MD;[2] Virginia Di Bari, PhD, MD;[2] Rosella Saulle, MD;[1] Brigid Unim, MD;[1] Nicola Nicolotti, MD;[2] Lorenzo Carbonari, PhD;[3] Vincenzo Puro, MD;[2] Giuseppe La Torre, DSc[1]

TABLE 4. Description of the Distribution of the Means of the Costs for Managing a Single Percutaneous Injury (2015 International US Dollars)

			Means of the Costs for Managing a Single NSI				
Approach	Type of Cost	No. of Studies	Median	Mean	SD	Min	Max
Data driven (N = 8)	Direct	5	173	521	610	48	1,516
	Indirect	3	175	232	119	152	369
	Direct + indirect	6	656	831	630	199	1,691
Modeling (N = 6)	Direct	4	586	595	285	294	913
	Indirect	3	322	346	59	303	413
	Direct + indirect	5	747	897	284	649	1,324
All (N = 14)	Direct	9	425	554	467	48	1,516
	Indirect	6	322	286	117	152	413
	Direct + indirect	11	747	861	482	199	1,691

NOTE. NSI, needlestick and sharps injury.

Direct + indirect costs = Int$ **747** (range **199-1691**)

Direct costs (9 studies) = Int$ 425 (48-1516); indirect costs (6 studies), Int$322 (152-413).

Modeling studies had higher disaggregated and aggregated costs, but data-driven studies showed a greater variability

Infect Control Hosp Epidemiol 2016;37:635–646

Intangible costs of occupational injuries

- **Costs of intangible aspects** of HCW injuries, such as anxiety and distress, **could equal costs associated with the medical evaluation** of these injuries
- The **impact of being at risk of developing a bloodborne infection** has effects on:

  - personal and family life
  - sexual relationships
  - reproductive plans
  - breastfeeding
  - professional expectations

Response & follow up

PREMIO SHAM - FEDERSANITÀ ANCI
PREVENZIONE DEI RISCHI 2017

The Brick Wall of Safety

Needle and Sharps Injuries Prevention

Patients' safety

Monitoring

Audit & control

Raising Awareness

Education and Training

Recording & reporting