Sharps Injuries and Costs involved

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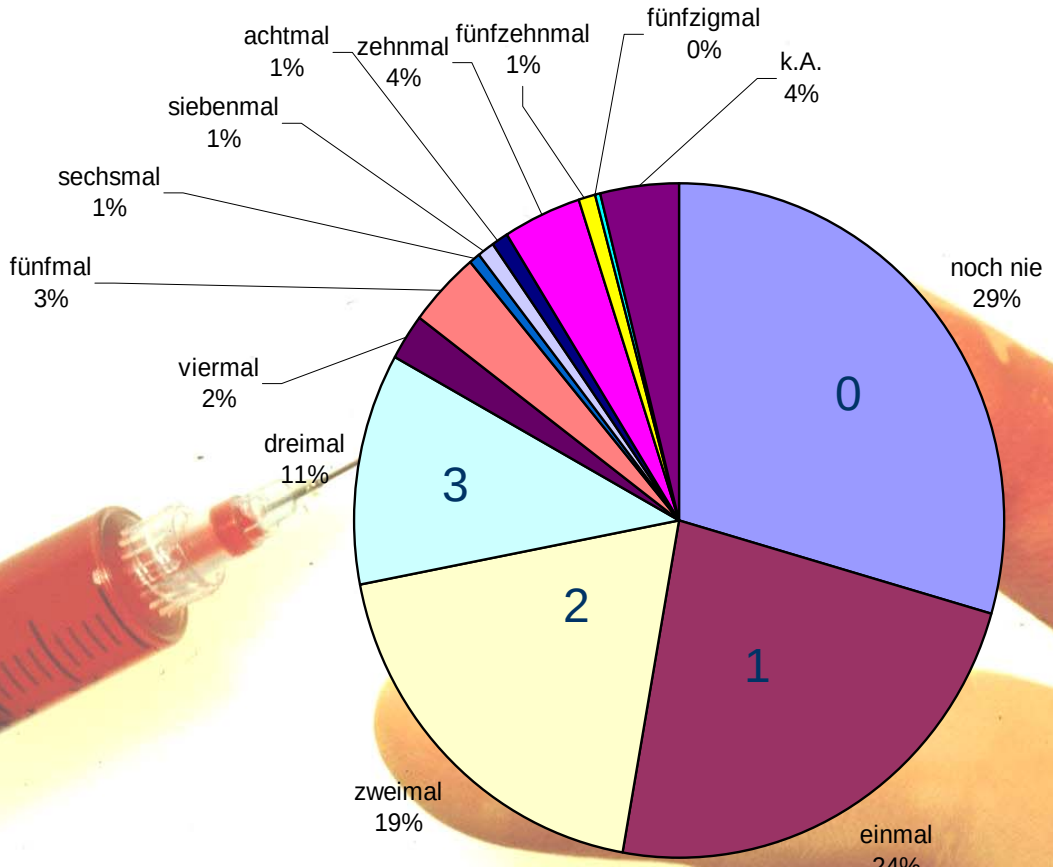
Needlestick Injuries

Frequency in professional life / German University Hospital

Wie oft haben sich die Beschäftigten in ihrem Berufsleben insgesamt verletzt? (n=259)

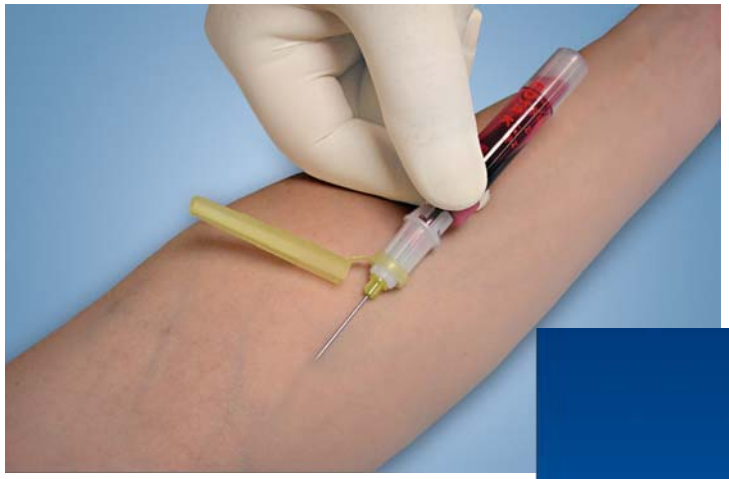


Bloodborne Pathogens

- Hepatitisvirus (HBV, HCV)
- Human immunodeficiency virus (HIV)
- Most other pathogens!

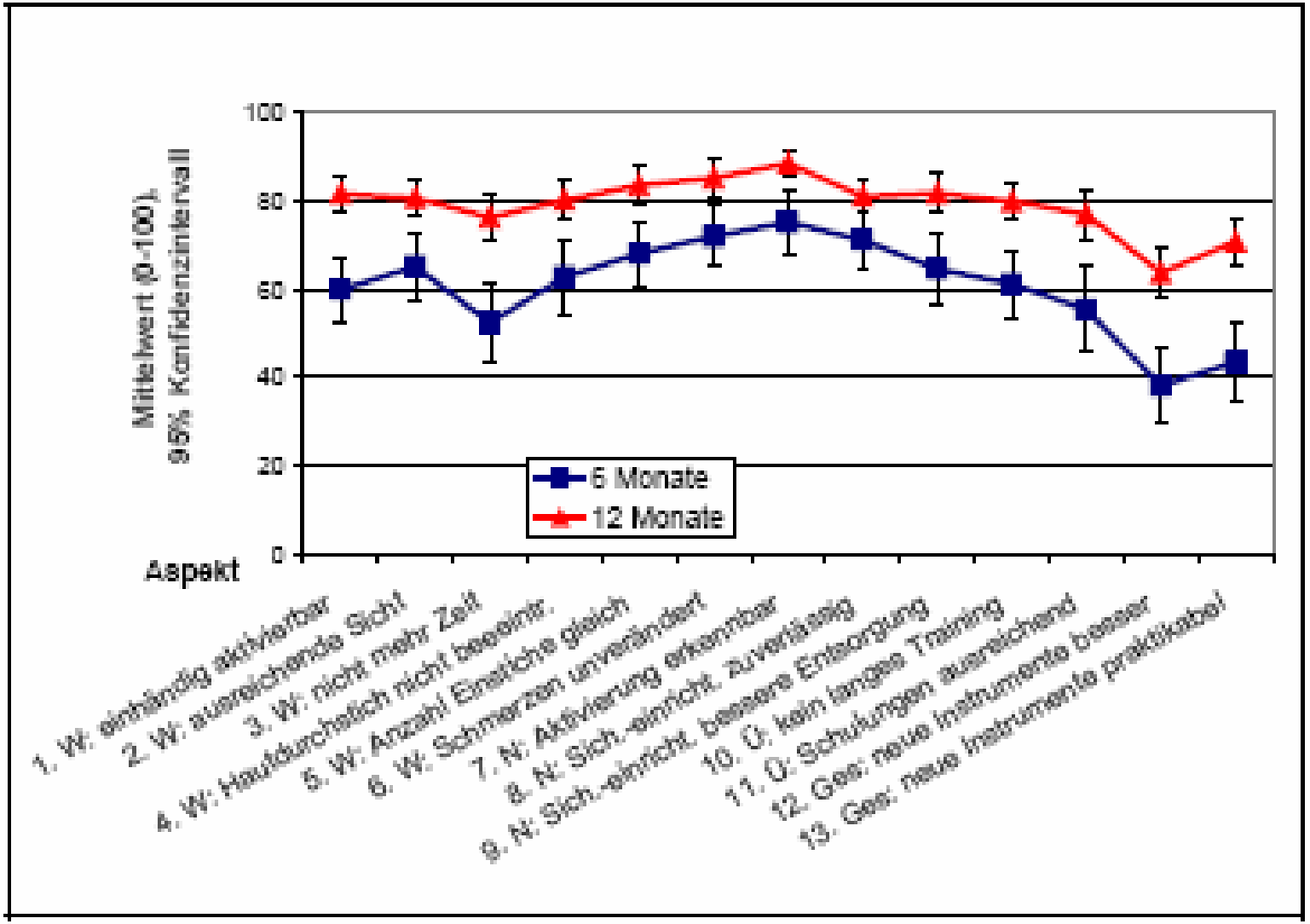
Safety Devices

Safety devices (SD) / safety-engeneered devices (SED) / needle safety devices (NSD) / needle protection devices (NPD)/engineered sharps injury protection (ESIPs)



Experience with Safety Devices in Germany

Manageability / 6 and 12 months (Heidelberg)



Source: Nübling/FFAS

Safety Devices 2

Safety Devices …

- are available,
- are well engineered,
- offer best protection,
- are prescribed in Germany for years and
- are not normaly used yet!

Is this due to higher costs? Is the use of SD cost-effective?

Prevalence of Relevant Pathogens

Virus	RKI -Data	Wuppertal (after NSI) n=1224	Freiburg (after NSV) n=8426
HBV	O,6 %	2,5 %	4,2 %
HIV	0,05 %	2,5 %	3,7 %
HCV	0,6%	9,8 %	6,8 %

Rates of Seroconversion

Riskiness / Rates of Seroconverson after NSI with infective Source Patient

	Risk after NSI	„Rule of three“
HBV	Up to 100 % depending on Viral Load in Blood	30%
HCV	2,7 – 10 % depending on Subtyp	3%
HIV	0,3 % untreatenes source patient	0,3%

Source: Werner BG, 1982; Lanphear BP, 1994; Bell DM. 1997;

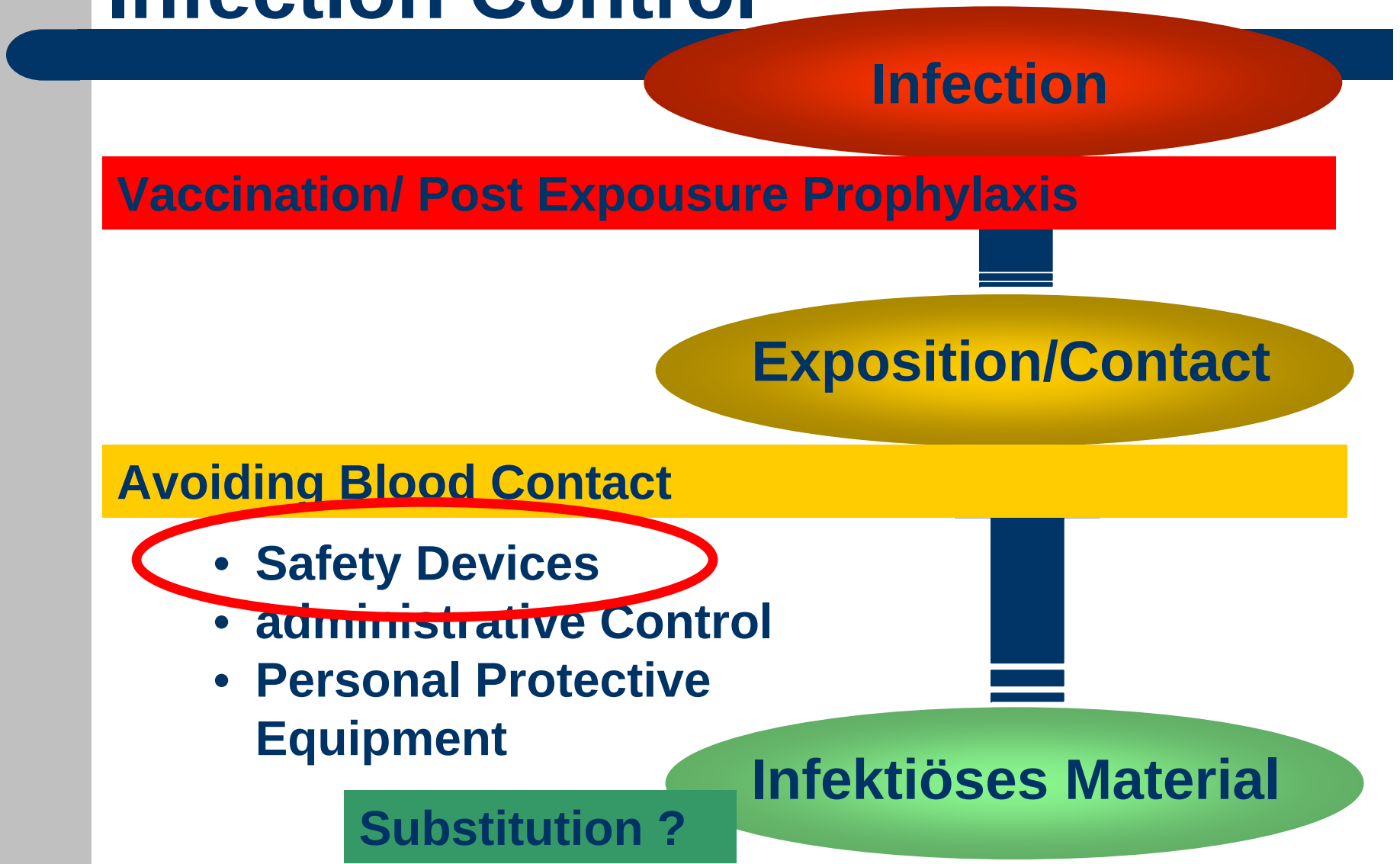
Strategies

for controlling Injury and occupational Disease

Hirarchy of controls (order of preference)

1. Substitution of major Hazards for less hazardous Materials or Processes
2. Application of engeneering controls to sepatate workers from hazards that remain
3. Use of administrative controls to minimize contact uncontrollable by engeneering
4. Use of personal protective equipment (last line of defence)

Infection Control



Reduction of Risk by using Safety devices

- **The use of Safety Devices decreases the rate of Needlestick injuries from**

1,5 NSI/10.000 i. v. treatments to

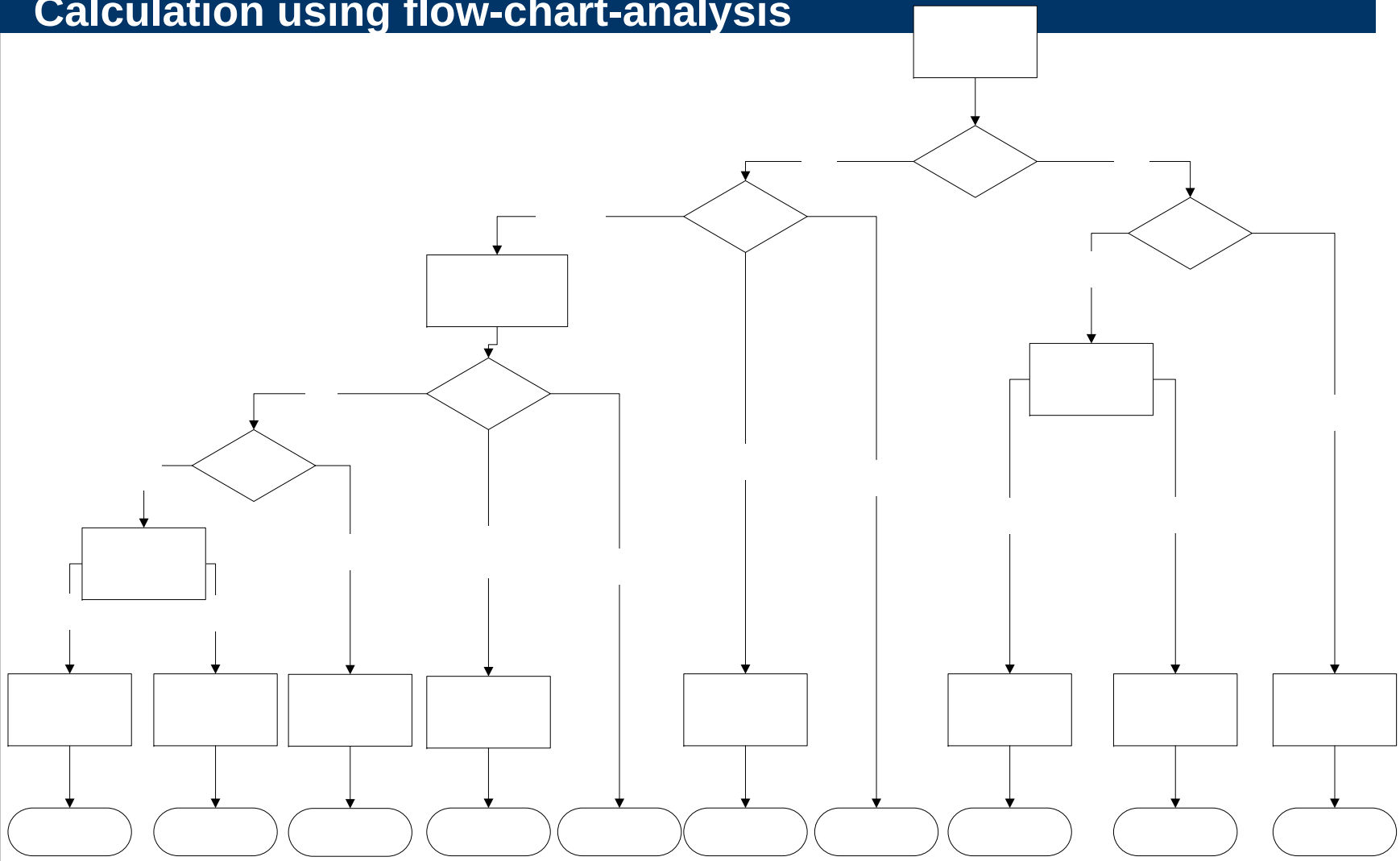
0,2 NSI/10.000 i. v. treatments [1]

- At Heidelberg University Hospital during a period of one year no NSI with Safety devices happened in wards using Safety Devices only [2]

Quellen:
1) Dale J, Pruett S, Maker M. (1998)
2) Nübling M, Müller-Barthelmeh R, Buchholz L, Häberle E. (2005)

Cost of (reported) NSI

Calculation using flow-chart-analysis



Factors of Influence
on the Costs of Needlestick Injuries

Individual Costs

- Costs of Treatment
- Infection rate in Population
- Infection Rate in Health Care Workers
- possibility to examine the source Patient
- What is included in „Costs“?

Costs in Common

- Reporting rate of NSI

  → Non reported NSI do not need expensive treatment yet

  (but perhaps in a few years)

Costs of a reported NSI in a German Hospital

in addiction to the Vaccination Rate against Hepatitis B

	Prävalenz Klinikum Wuppertal		Prävalenz Allgemeinbevölkerung	
Vaccination rate against HBV	Total Costs	Costs of the Hospital	Total Costs	Costs of the Hospital
100%	450,57 €	118,80 €	395,48 €	109,84 €
90%	487,48 €	147,78 €	431,71 €	138,90 €
80%	524,39 €	176,76 €	467,94 €	167,95 €
70%	561,30 €	205,74 €	504,17 €	197,01 €
60%	598,20 €	234,72 €	540,39 €	226,06 €
50%	635,11 €	263,69 €	576,62 €	255,12 €

Other Studies on Costs of NSI

Studie	Land, (Jahr)	Point of view	Costs	Costs [€]
NSI on non infectious Patient (Graf Deuel 2002)	Schweiz (2000-2002)	prospektiv	525,80 SFr	**355,87 €**
NSI at Patient suffering from HCV (Graf Deuel 2002)	Schweiz (2000-2002)	prospektiv	*1.008,40 SFr*	**682,50 €**
NSI at Patient suffering from HIV (Graf Deuel 2002)	Schweiz (2000-2002)	prospektiv	*5.119,50 SFr*	**3.464,64 €**
NSI in HIV high prevalence Area (Jagger 1998)	USA (1995-1997)	retrospektiv	672 US-Dollar	**785,05 €**
NSI in HIV low prevalence Area (Jagger 1998)	USA (1995-1997)	retrospektiv	539 US-Dollar	**629,67 €**
NSI In Germany including all administrative Costs (Wagner-Ferrer 2006)	Deutschland (2006)	prospektiv	**1601 €**	
NSI in German Hospital (Wittmann 2005)	Deutschland (2005)	prospektiv	**487,48 €**	

Economic Costs

Using same flow chart modelizing than for microeconomic costs for reported NSI we tried to find out the costs of non reported NSI.

- probable Seroconversions,
- resulting Infections,
- Illnesses and
- the lifetime costs of these illnesses

were considered.

Costs (and also savings) of early demise were not considered.

Economic Costs 2

Economic Costs of each unreported NSI

- non negotiated 79 € for each NSI
- negotiated (30 Jahre) **52 €** for each NSI

Calculation of additional Costs
for the Implementation of Safety Devices

- Discovery of yearly usage of Sharps in an 1000 Bed hospital
- Identification of Sharps that could be replaced by Safety Devices
- Survey at Manufacturers of Safety Devices in 2002 and in 2006; Costs for complete conversion to safety devices were calculated.

Cost-Benefit Equation

Our Hospital

- Maximum Level Treatment
- 2.477 Employers
- 1.006 Beds
- „Cases“ (2001): 38.175

Number of NSI reported

- 2000: 180
- 2001: 185
- 2002: 172
- 2003: 127 (Helios)

Additional Costs of the Substitution

- Ø Total Substitution 2002: 156.000 €
- Ø Total Substitution 2006: 116.000 €

  Replacement of: Veincatheters (peripher), Canulas for Blood Drawing, Butterflycanulas, Canulas for Injektion, and Lancets for peripheral blooddrawing

Cost-Benefit Calculation

Number of NSI	Number of NSI after Conversion	Economised Costs for Hospital	Economised Costs for Insurance Company	Economised Costs in total	Economised Costs for Insurance Company Additional Costs Hospital
500	75	62.000 €	207.000€	269.000€	207.000 € 54.000 €
400	60	50.000 €	166.000€	216.000€	166.000 € 66.000 €
300	45	38.000 €	124.000€	162.000€	124.000 € 78.000 €
200	30	25.000 €	83.000 €	108.000€	83.000 € 91.000 €
166	25	21.000 €	69.000 €	90.000 €	69.000 € 95.000 €
100	15	13.000 €	42.000 €	54.000 €	42.000 € 103.000 €

Costs of NSI in Germany

- 50.000 reported NSV = 24 Mio €
- 450.000 unreported NSV = 23 Mio €

- Additional Costs for Safety Devices (530.000 Hospital Beds in Germany) = 61 Mio €

- Balance: 14 Mio. €;

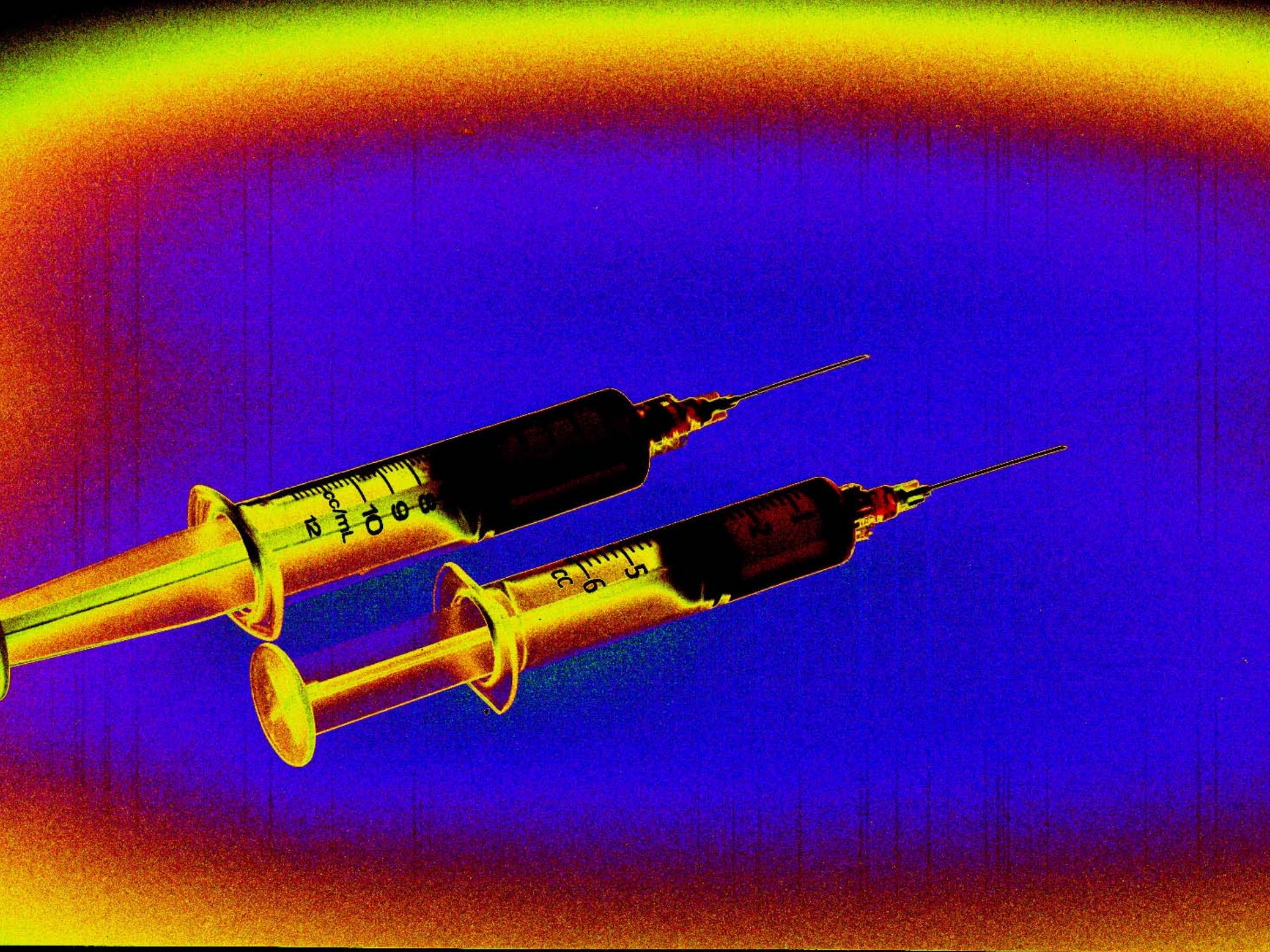
Since 17.5.06: TRBA 250 Punkt 4.2.4

Um Beschäftigte vor Verletzungen bei Tätigkeiten mit spitzen oder scharfen medizinischen Instrumenten zu schützen sind diese Instrumente unter Maßgabe der folgenden Ziffern 1 bis 7 – soweit technisch möglich – durch geeignete sichere Arbeitsgeräte zu ersetzen, bei denen keine oder eine geringere Gefahr von Stich und Schnittverletzungen besteht....

Needlestick Injuries

Are

- Common,
- Dangerous,
- Expensive and
- Preventable!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