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High burden of healthcare-associated infections in Germany, 2011 to 2012

Dr. rer. nat. Bene Zacher,
Dr. med. Sebastian Haller, MPH, MSc.

Disability Adjusted Life Years DALY

1 

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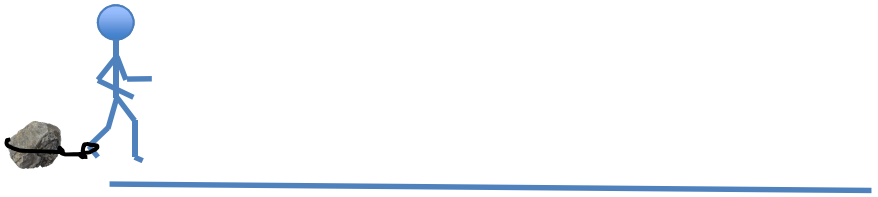
Disability Adjusted Life Years DALY

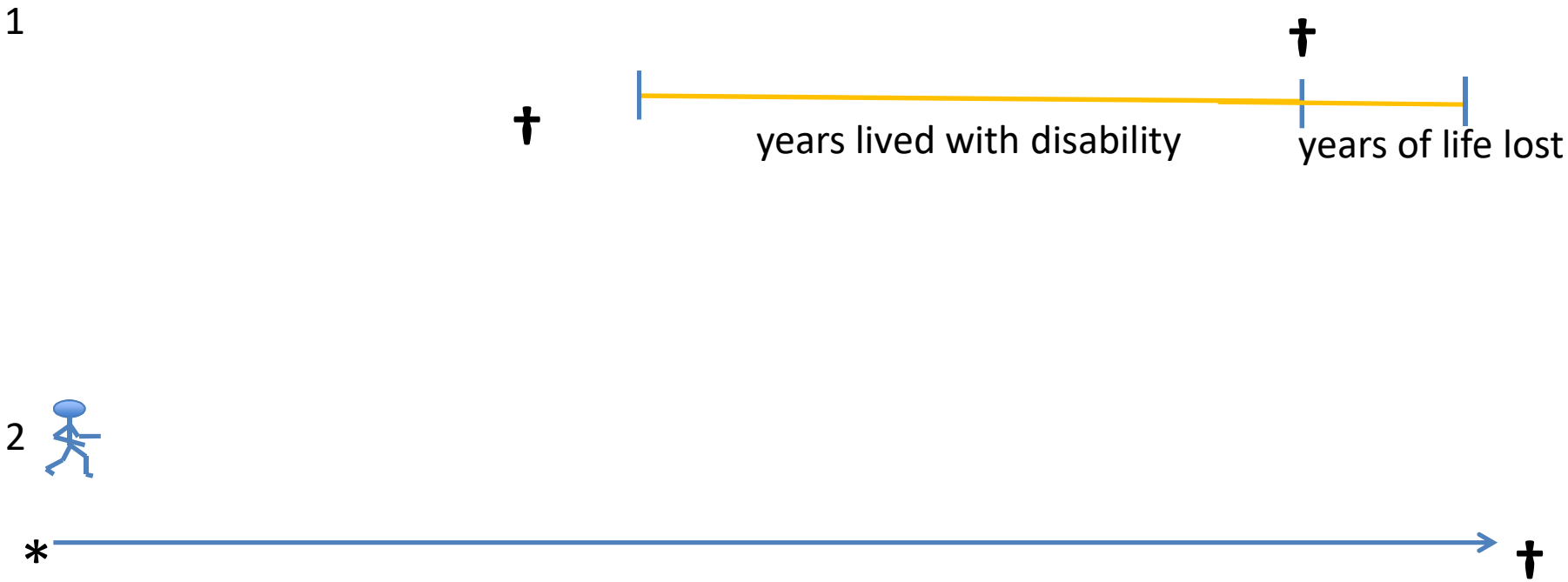
1

Disability Adjusted Life Years DALY

1



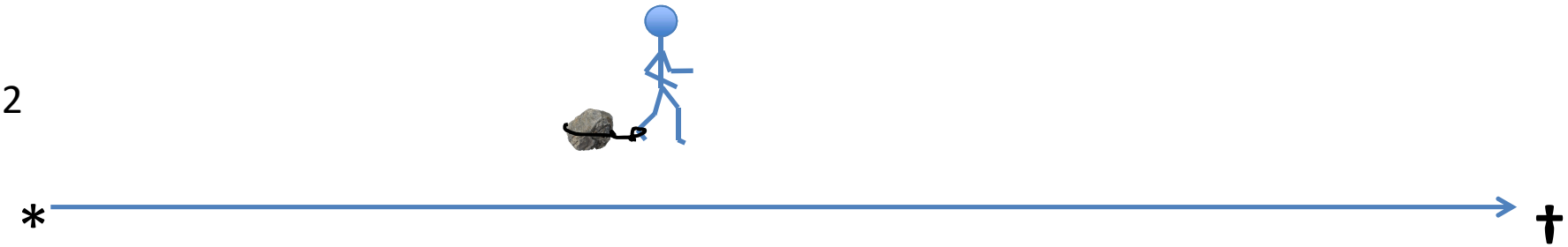
Disability Adjusted Life Years DALY
Burden of healthcare-associated infections



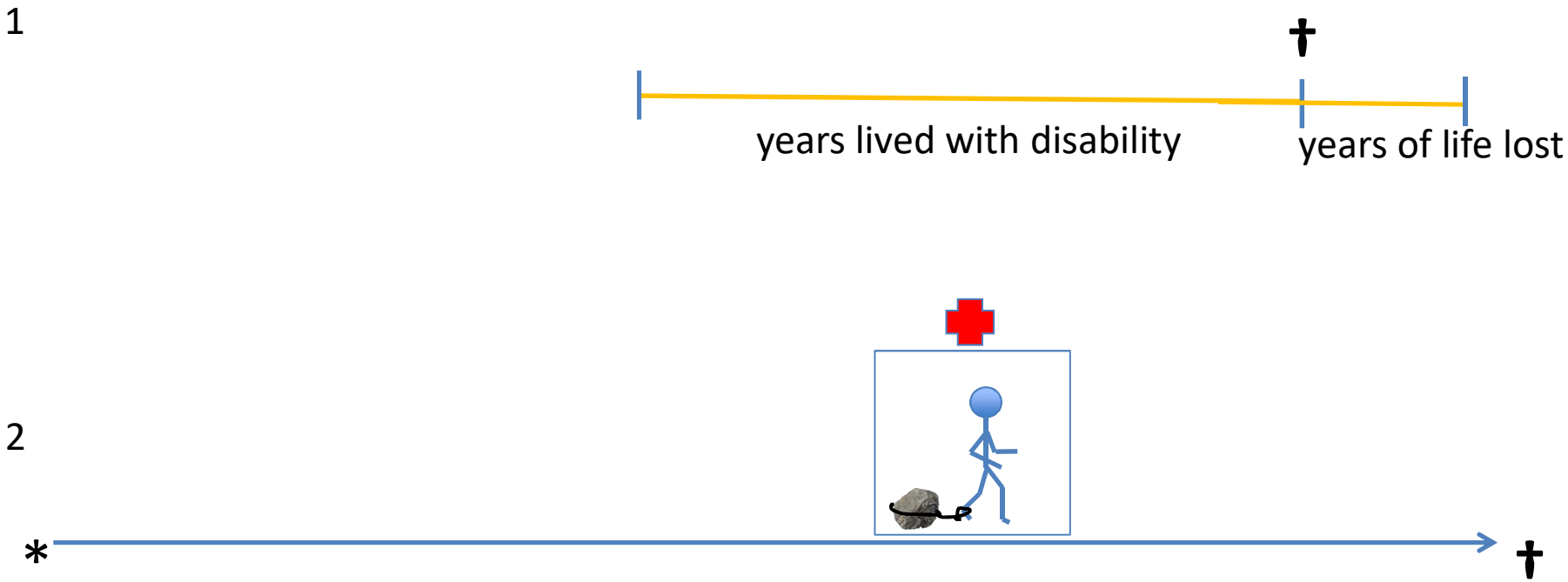
Disability Adjusted Life Years DALY
Burden of healthcare-associated infections

1

2



Disability Adjusted Life Years DALY
Burden of healthcare-associated infections



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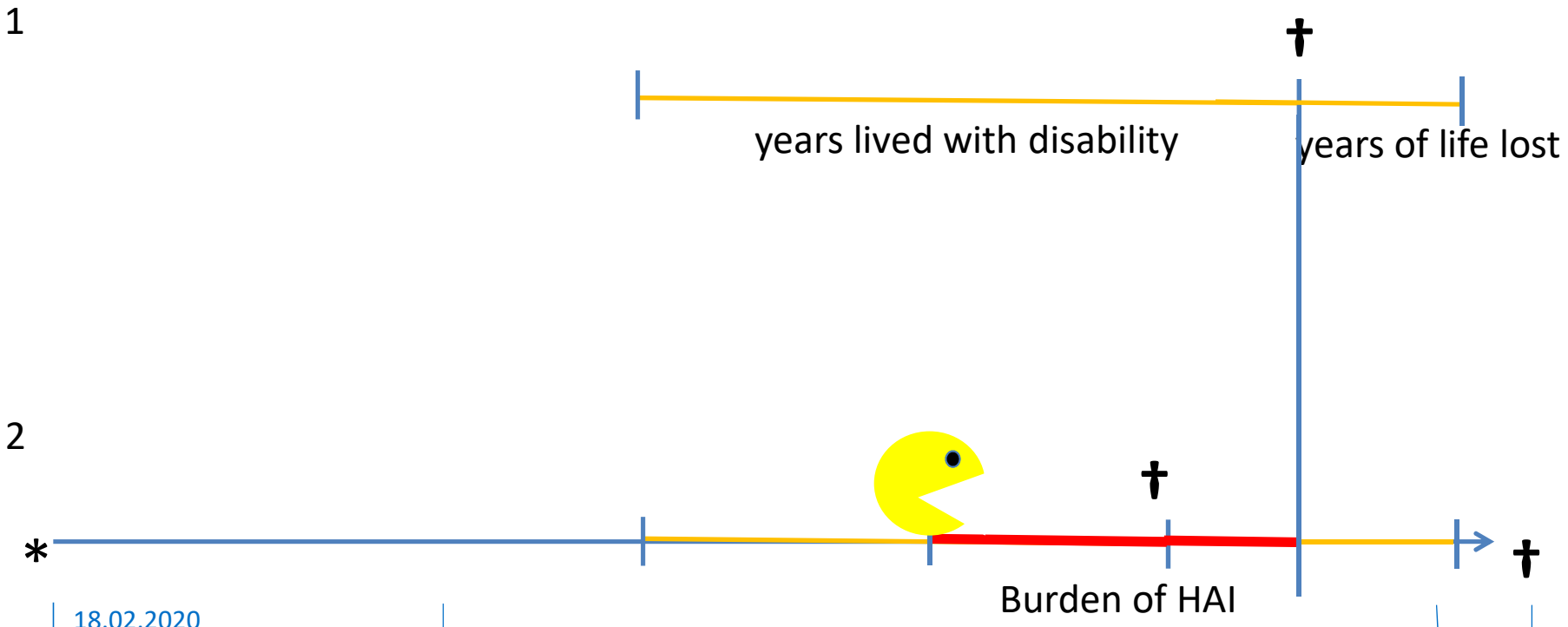
Disability Adjusted Life Years DALY



Outcome Tree Neonatal Sepsis in preterm born babies

neonatal sepsis

recovery

13 %

length of stay

+ 30 days

2-14 %

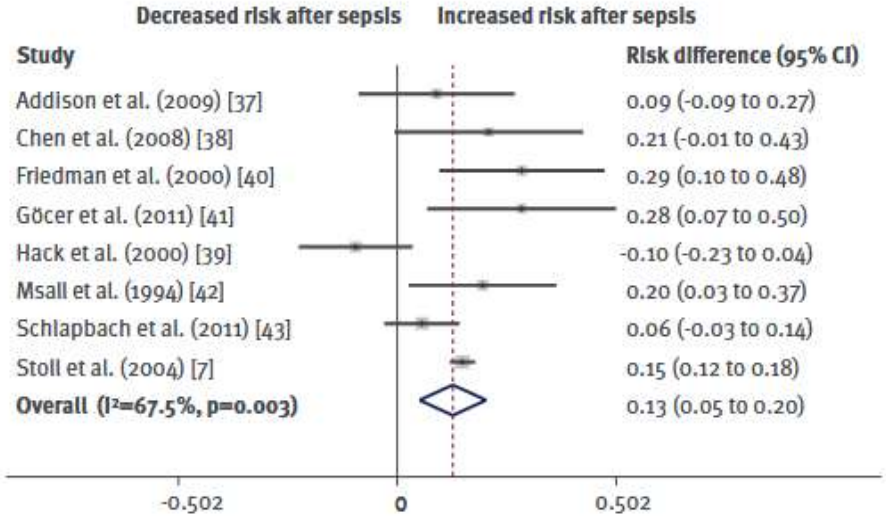
Tod

4 %

Hörschädigung

vision impairment

Forest Plot neuro impairment



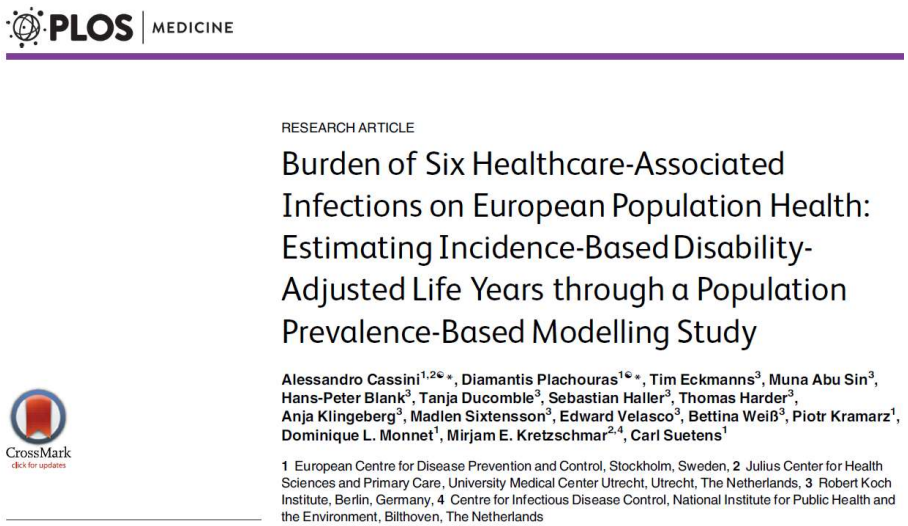
Haller S, Deindl P, Cassini A, Suetens C, Zingg W, Abu Sin M, Velasco E, Weiss B, Ducomble T, Sixtensson M, Eckmanns T, Harder T. Euro Surveill. 2016;21(8):pii=30

Burden of Healthcare Associated Infections

- Urinary tract infection
- Neonatal sepsis (in preterm born babies)
- Primary sepsis (non-neoantal)
- *Clostridium difficile* infection
- Healthcare associated pneumonia
- Surgical site infection

=> 13 systematic reviews

a) attributable mortality
b) attributable morbidity
c) Length of disease


PLOS | MEDICINE

RESEARCH ARTICLE

Burden of Six Healthcare-Associated Infections on European Population Health: Estimating Incidence-Based Disability-Adjusted Life Years through a Population Prevalence-Based Modelling Study

Alessandro Cassini[1,2☯*], Diamantis Plachouras[1☯*], Tim Eckmanns[3], Muna Abu Sin[3], Hans-Peter Blank[3], Tanja Ducomble[3], Sebastian Haller[3], Thomas Harder[3], Anja Klingeberg[3], Madlen Sixtensson[3], Edward Velasco[3], Bettina Weiß[3], Piotr Kramarz[1], Dominique L. Monnet[1], Mirjam E. Kretzschmar[2,4], Carl Suetens[1]

1 European Centre for Disease Prevention and Control, Stockholm, Sweden, 2 Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht, The Netherlands, 3 Robert Koch Institute, Berlin, Germany, 4 Centre for Infectious Disease Control, National Institute for Public Health and the Environment, Bilthoven, The Netherlands

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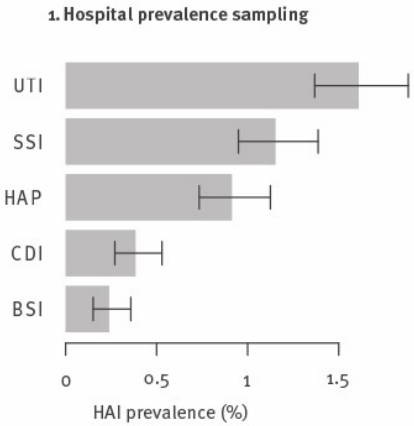
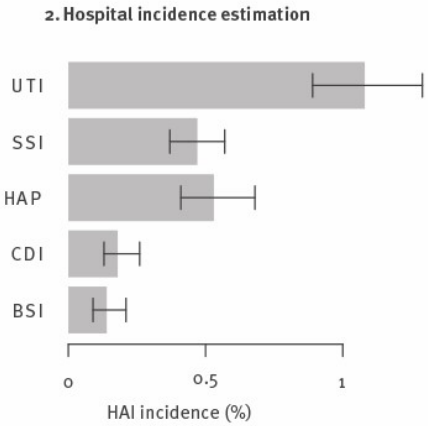
Burden of healthcare-associated infections in EU/EEA and Germany

PPS sample

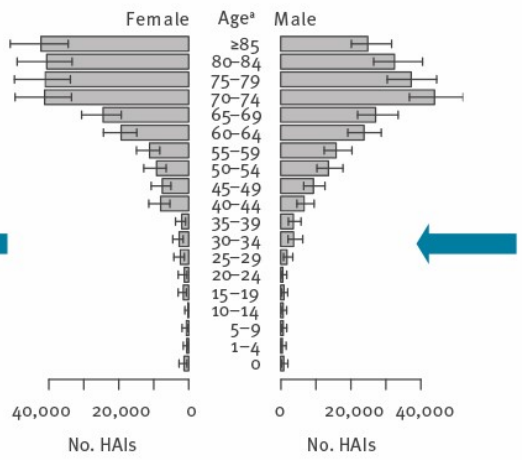
Type of HAI	No. HAIs
HAP	88
SSI	111
BSI	23
UTI	155
CDI	37

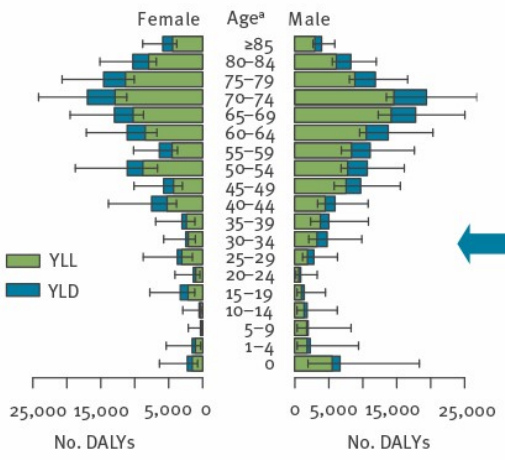




3. From hospital incidence to population incidence

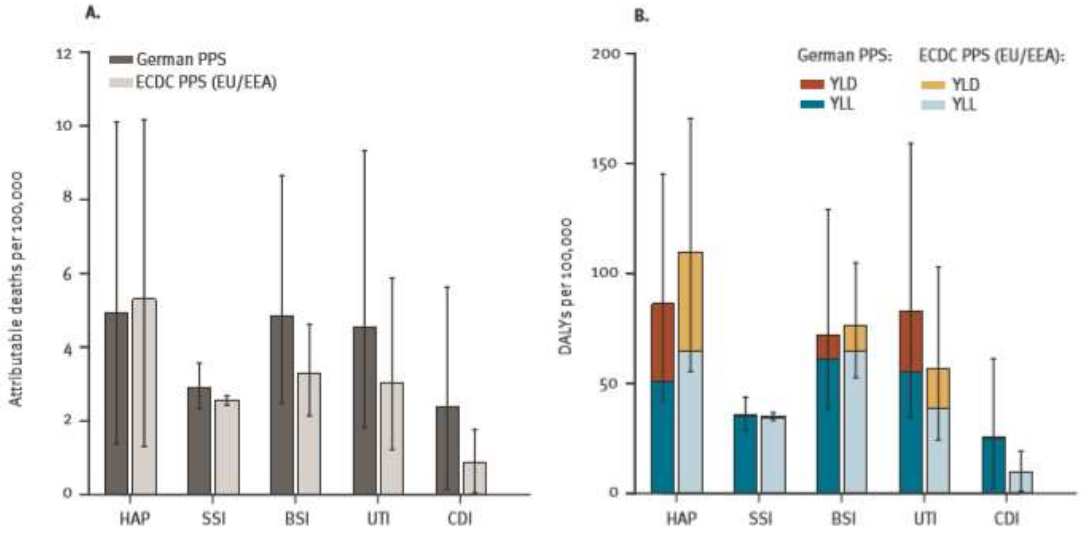
Type of HAI	No. HAIs
HAP	81,809–135,194
SSI	73,896–116,948
BSI	17,050–40,732
UTI	177,305–260,474
CDI	25,084–50,002





Burden of HAIs in Germany higher than in EU/EEA

- 400,000 – 600,000 cases/year
- 10,000 – 20,000 attributable deaths/year



Annual burden measure	Sample	HAP Point estimate[a] (95% UI)	UTI Point estimate[a] (95% UI)	BSI Point estimate[a] (95% UI)	SSI Point estimate[a] (95% UI)	CDI Point estimate[a] (95% UI)	All Point estimate[a] (95% UI)
HAIs per 100,000	German PPS	132.0 (103.5–170.2)	265.1 (216.8–313.9)	33.4 (20.5–52.3)	115.4 (93.3–141.4)	44.6 (31.1–61.8)	592.1 (521.7–665.8)
	German convenience	162.3 (137.5–190.7)	228.7 (200–260.7)	52.7 (42–66.9)	146.9 (126.5–167.8)	44.5 (35.6–55.4)	636.1 (586.7–689.2)
	ECDC PPS (EU/EEA)	143.7 (136.9–150.8)	174.7 (166.3–182.4)	22.2 (20–25.1)	111.3 (105.4–116.6)	16.0 (14.2–18.3)	467.9 (456.2–480.2)
Attributable deaths per 100,000	German PPS	4.9 (1.4–10.1)	4.5 (1.8–9.3)	4.8 (2.5–8.7)	2.9 (2.3–3.6)	2.4 (0.1–5.6)	20.1 (13.4–28.2)
	German convenience	6.1 (1.4–11.7)	3.9 (1.6–8)	7.9 (4.7–11.8)	3.7 (3.2–4.2)	2.5 (0.1–5.3)	24.4 (17.2–32.6)
	ECDC PPS (EU/EEA)	5.3 (1.3–10.2)	3.0 (1.2–5.9)	3.3 (2.1–4.6)	2.6 (2.4–2.7)	0.9 (0–1.8)	15.3 (10.2–21.2)
DALYs per 100,000	German PPS	86.1 (42.1–145.1)	82.6 (34.5–159.2)	72.2 (38.3–129)	35.7 (28.9–43.7)	25.9 (2.5–61.2)	308.2 (221.2–416.3)
	German convenience	103.4 (51.5–166.5)	69.5 (29.9–127.7)	113.5 (72.2–166)	45.0 (38.8–51.3)	26.5 (2.5–55.6)	359.3 (266.6–461.5)
	ECDC PPS (EU/EEA)	109.8 (55.3–170.5)	57.1 (24.3–102.9)	76.2 (52.6–104.8)	35.1 (33.3–36.8)	10.0 (0.9–19.2)	290.0 (214.9–376.9)

Burden of HAIs in Germany

- Germany has low HAI prevalence but 2nd highest number of hospital discharges per 1,000 population compared to 33 other OECD countries

HAI prevalence

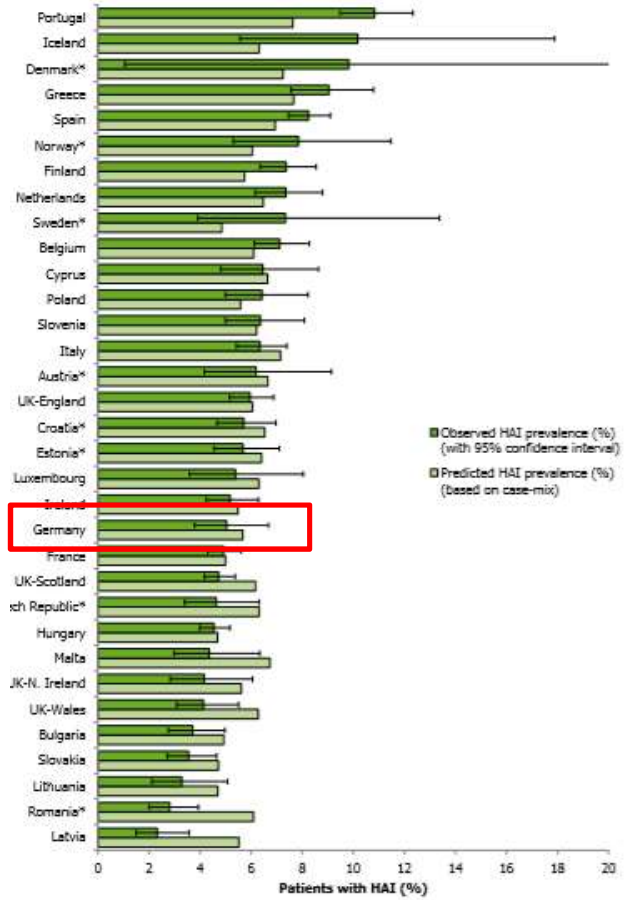
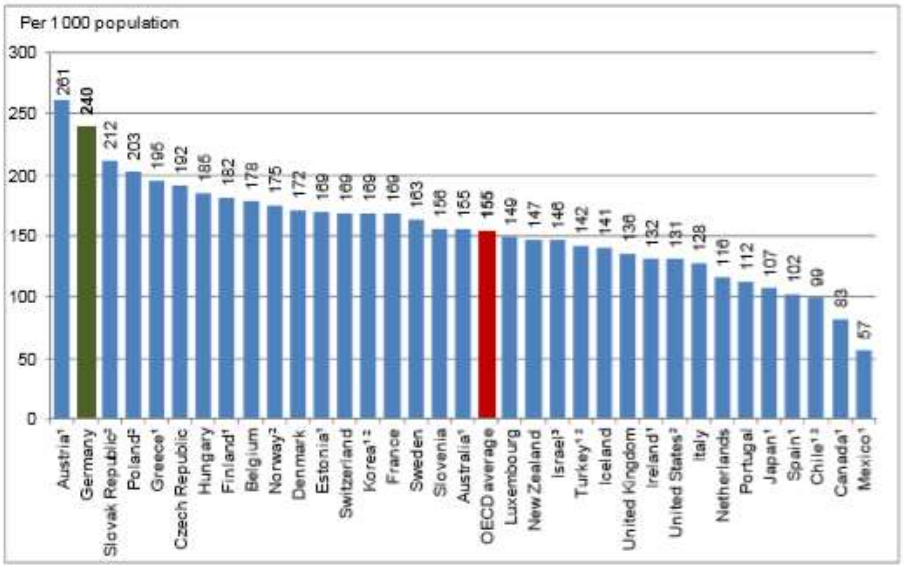


Figure 3. Hospital discharges per 1000 population, 2010 (or latest year available)



Kumar A, Schoenstein M. Managing Hospital Volumes: Germany and Experiences from OECD Countries. Paris: Organization for Economic Cooperation and Development (OECD); 2013.

Conclusion

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- Incidence based modeling of burden of disease suitable for short diseases with longterm sequelae
- Country comparison helped to identify target for prevention

- Aim:
  - Using incidence based burden models for forecasting

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BHAI: Estimate the Burden of Healthcare-Associated Infections

Provides an approach which is based on the methodology of the Burden of Communicable Diseases in Europe (BCoDE) and can be used for large and small samples such as individual countries. The Burden of Healthcare-Associated Infections (BHAI) is estimated in disability-adjusted life years, number of infections as well as number of deaths per year. Results can be visualized with various plotting functions and exported into tables.

Version:	0.99.2
Depends:	R (≥ 3.6.0)
Imports:	prevtoinc, MCMCpack, plotrix, graphics, grDevices, stats, methods
Published:	2019-10-06
Author:	Benedikt Zacher [aut, cre]
Maintainer:	Benedikt Zacher <ZacherB at rki.de>
License:	GPL-3
NeedsCompilation:	no
CRAN checks:	BHAI results

Downloads:

Reference manual: BHAI.pdf
Package source: BHAI_0.99.2.tar.gz
Windows binaries: r-devel: BHAI_0.99.2.zip, r-devel-gcc8: BHAI_0.99.2.zip, r-release: BHAI_0.99.2.zip, r-oldrel: not available
OS X binaries: r-release: BHAI_0.99.2.tgz, r-oldrel: not available

Linking:

Please use the canonical form https://CRAN.R-project.org/package=BHAI to link to this page.

RESEARCH

Application of a new methodology and R package reveals a high burden of healthcare-associated infections (HAI) in Germany compared to the average in the European Union/European Economic Area, 2011 to 2012

Benedikt Zacher[1,2], Sebastian Haller[1,2], Niklas Willrich[1], Jan Walter[1], Muna Abu Sin[1], Alessandro Cassini[3], Diamantis Plachouras[3], Carl Suetens[3], Michael Behnke[4], Petra Gastmeier[4], Lothar H. Wieler[1], Tim Eckmanns[1]

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Thomas Harder, Muna Abu Sin, Tim Eckmanns, FG37