30 års erfaring med bakteriæmier

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1. møde i Arbejdsgruppen for bakteriæmi under DSKM

The interrelationship between systemic inflammation response syndrome (SIRS), sepsis, and infection.

Kilde: Chest 1992; 101: 1644-55.

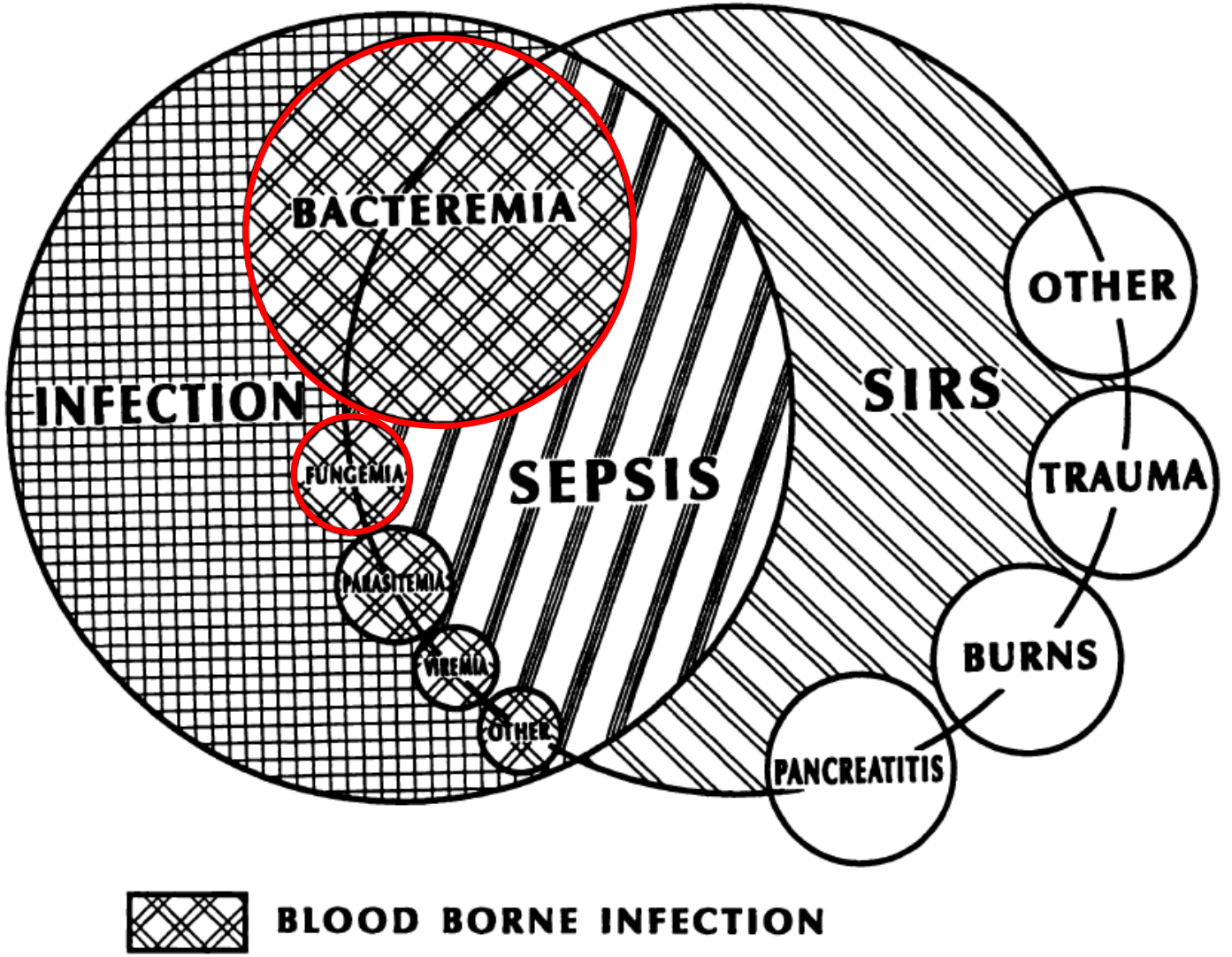
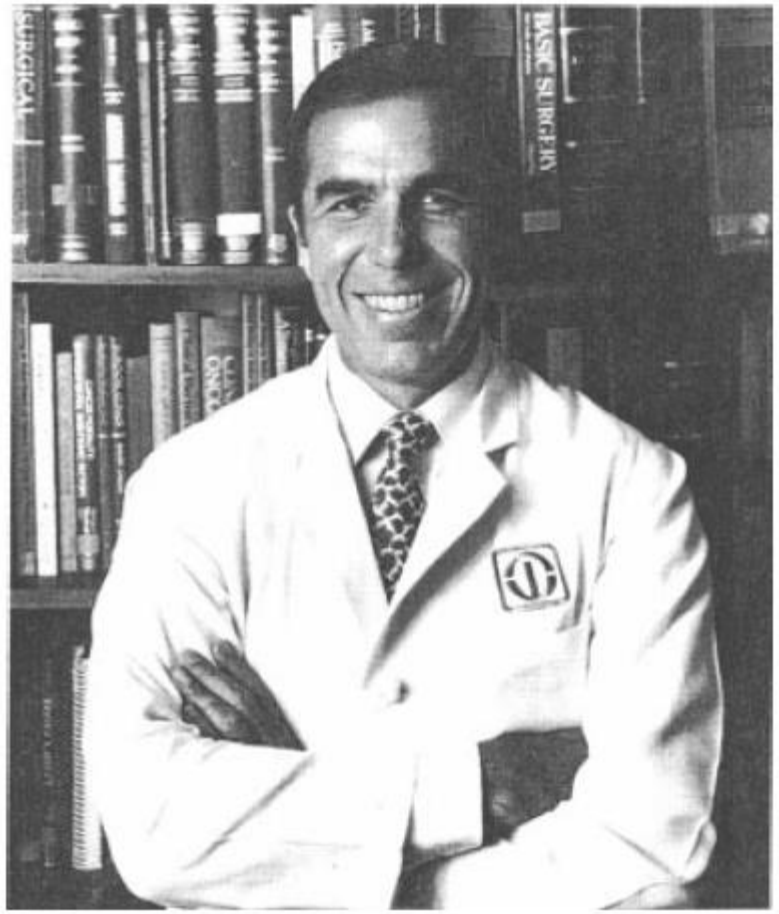


FIGURE 1. The interrelationship between systemic inflammatory response syndrome (SIRS), sepsis, and infection.

IN MEMORIAM



Roger C. Bone MD

Død 1997

Biografi 1980'erne

Denne afhandling er i forbindelse med de nedenfor anførte, tidligere offentliggjorte afhandlinger af det lægevidenskabelige fakultet ved Aarhus Universitet antaget til offentligt at forsvares for den medicinske doktorgrad.

Århus, den 10.5.1987 — Palle Juul-Jensen, *dekan*

This thesis is based on the following papers. In the text these papers are referred to by capital letters.

A. Schønheyder H, Andersen P. An indirect immunofluorescence study of antibodies to *Aspergillus fumigatus* in sera from children and adults without aspergillosis. Sabouraudia 1982; 20: 41–50.

B. Schønheyder H, Andersen P, Stenderup A. Serum antibodies to *Aspergillus fumigatus* in patients with pulmonary aspergillosis detected by immunofluorescence. Acta Pathol Microbiol Immunol Scand Sect B 1982; 90: 273–279.

C. Schønheyder H, Andersen P. Complement-binding antibodies to *Aspergillus fumigatus* in patients with pulmonary aspergillosis. Acta Pathol Microbiol Immunol Scand Sect B 1983; 91: 1–7.

D. Schønheyder H, Andersen P, Pedersen AT. Antibodies against *Aspergillus fumigatus* in bronchial secretions from patients without aspergillosis. Acta Pathol Microbiol Immunol Scand Sect B 1983; 91: 187–191.

E. Schønheyder H, Andersen P. Determination of antibodies to partially purified aspergillus antigens by an enzyme-linked immunosorbent assay. Int Arch Allergy Appl Immunol 1983; 70: 108–111.

F. Schønheyder H, Andersen P. Fractionation of *Aspergillus fumigatus* antigens by hydrophobic interaction chromatography and gel filtration. Int Arch Allergy Appl Immunol 1984; 73: 231–236.

G. Schønheyder H, Andersen P. IgG antibodies to purified *Aspergillus fumigatus* antigens determined by enzyme-linked immunosorbent assay. Int Arch Allergy Appl Immunol 1984; 74: 262–269.

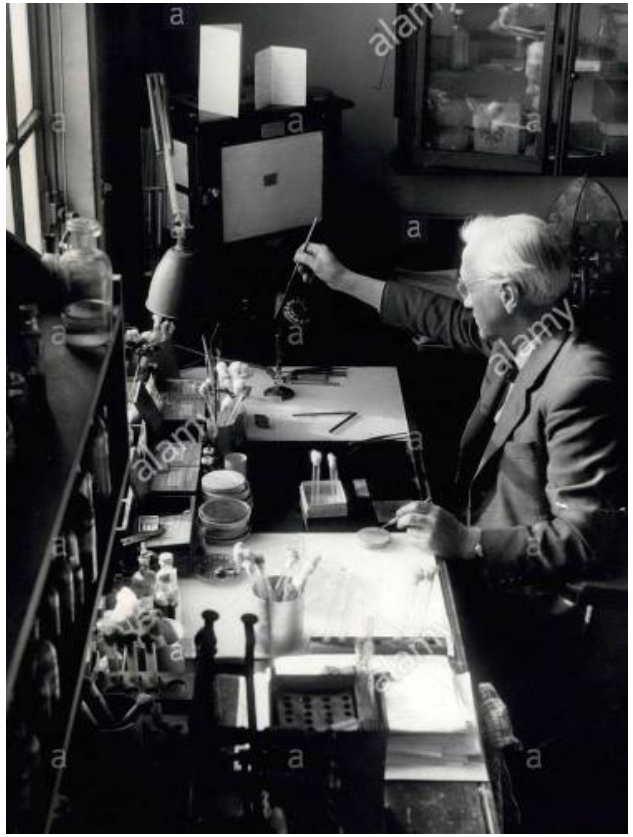
H. Schønheyder H, Andersen P. Serum IgA antibodies to *Aspergillus fumigatus* determined by enzyme-linked immunosorbent assay. Acta Pathol Microbiol Immunol Scand Sect B 1984; 92: 279–282.

I. Schønheyder H, Jensen T, Høiby N, Andersen P, Koch C. Frequency of *Aspergillus fumigatus* isolates and antibodies to aspergillus antigens in cystic fibrosis. Acta Pathol Microbiol Immunol Scand Sect B 1985; 93: 105–112.

J. Schønheyder H, Møller-Hansen C, Andersen P, Stenderup A. Serum antibodies to *Aspergillus fumigatus* in Danish farmers. Sabouraudia J Med Vet Mycol 1985; 23: 93–99.

K. Schønheyder H, Andersen P, Munck Petersen JC. Rapid immunoelectrophoretic assay for detection of serum antibodies to *Aspergillus fumigatus* catalase in patients with pulmonary aspergillosis. Eur J Clin Microbiol 1985; 4: 299–303.

L. Schønheyder H, Storgaard L, Andersen P. Variation of a 470 000 daltons antigen complex and catalase antigen in clinical isolates of *Aspergillus fumigatus*. Sabouraudia J Med Vet Mycol 1985; 23: 339–349.



Pathogenetic and Serological Aspects of Pulmonary Aspergillosis

By

Henrik Schønheyder

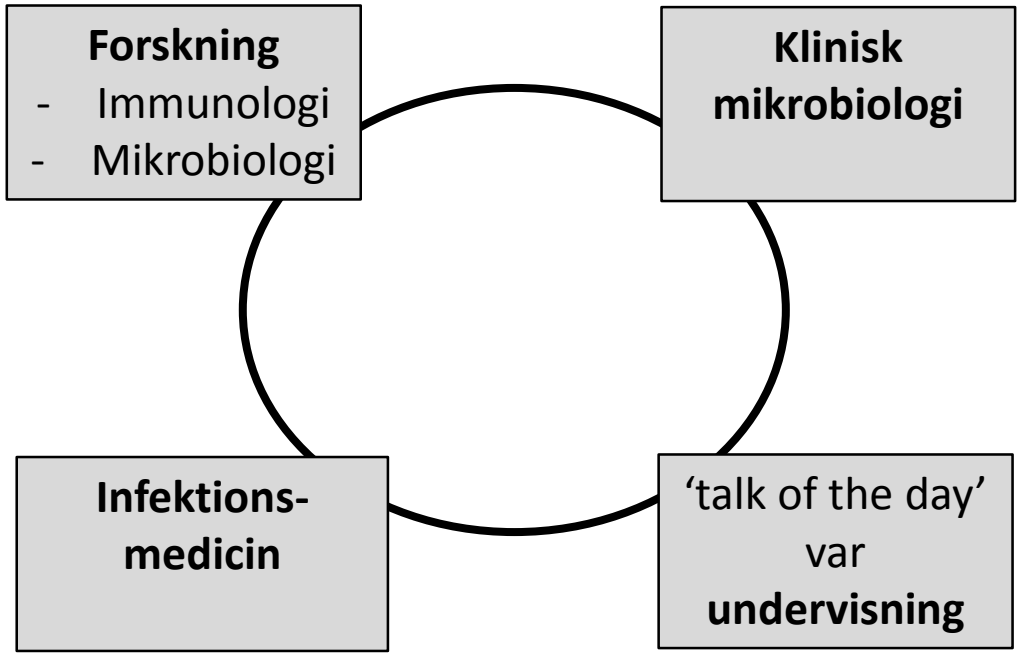
Institute of Medical Microbiology, University of Aarhus, DK-8000 Aarhus C, Denmark

Scand J Infect Dis
Suppl. 51 1987

1. møde i Arbejdsgruppen for bakteriæmi under DSKM

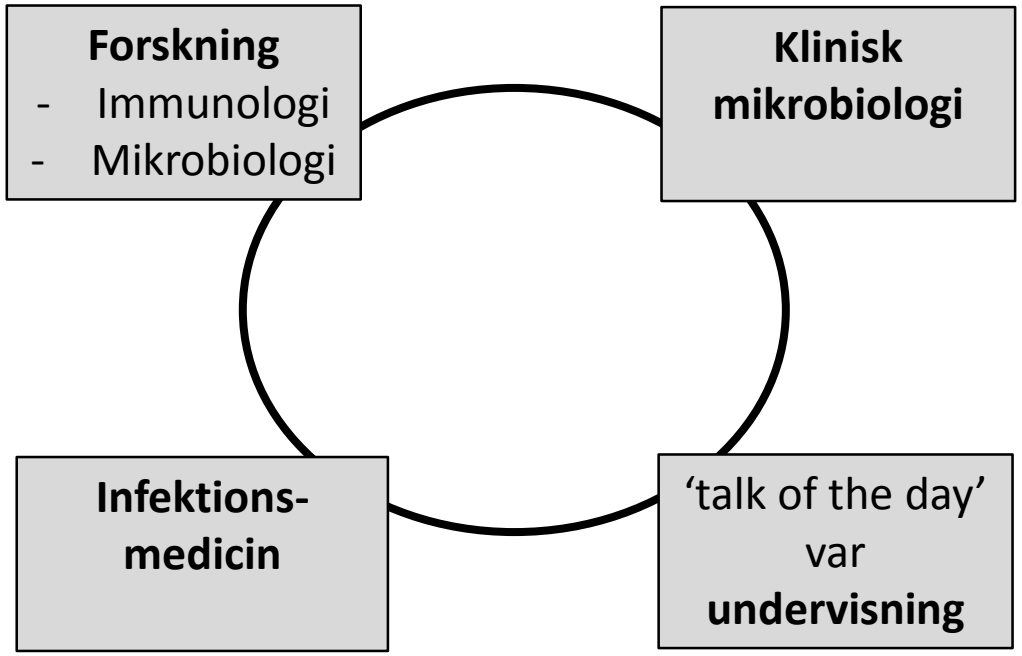
St. Mary’s Hospital – Wright-Fleming Institute

Karriereskifte



1. møde i Arbejdsgruppen for bakteriæmi under DSKM

Karriereskifte



1987

Skifte af karrierespor

Uddannelse i klinisk mikrobiologi

Aalborg : Klinisk Mikrobiologisk Afdeling

Indtil midt-80'erne regional afdeling af SSI

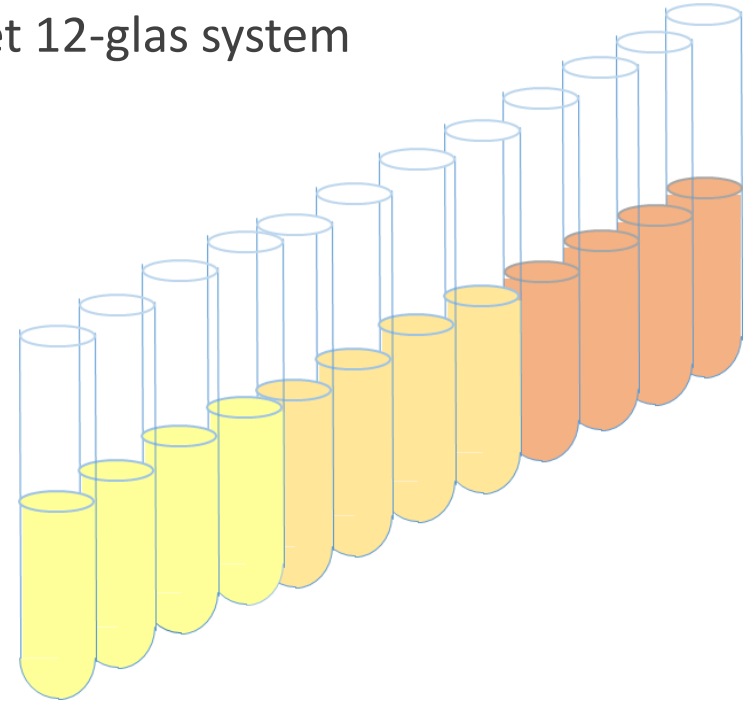
Klinisk og farmakologisk orienteret

"Evidence-based medicine før det blev moderne"

1. møde i Arbejdsgruppen for bakteriæmi under DSKM

Hvorfra den særlige interesse for bakteriæmier?

Som yngre læge udsåede man venüler i vagten med et 12-glas system



Kjeld Truberg Jensen & Olaf Scheel

- Bacteremia in the County of North Jutland.
- Antibiotic resistance of gram-negative bacteria from blood cultures
- Resistance to antibiotics in gram-positive bacteria from blood cultures

Artiklerne er publiceret i Ugeskr. Læger I 1988

1. møde i Arbejdsgruppen for bakteriæmi under DSKM

De første artikler relateret til bakteriæmi

Ebbesen F, Schønheyder HC

Tidligt indsættende neonatal sepsis med ikke-kapsulate Haemophilus influenzae - et nyt problem i Danmark. Ugeskrift for Læger **1991**; 153: 1271-1273

Schønheyder HC, Ebbesen F, Grunnet N, Ejlertsen T.

Non-capsulated Haemophilus influenzae in the genital flora of pregnant and post-puerperal women. Scandinavian Journal of Infectious Diseases **1991**; 23: 183-187

Prognose for bakteriæmi, de første trin

Schønheyder H, Gottschau A, Friland A, Rosdahl VT.

Mortality rate and magnitude of Staphylococcus aureus bacteraemia as assessed by a semiquantitative blood culture system. Scand. J. Infect. Dis. **1995**; 27: 19-21

Grad af bakteriæmi målt ved proportion af positive glas	Antal bakteriæmi episoder	Case fatality (%)
0,30	62	18
0,30 – 0,69	49	23
0,70 – 0,99	59	30
1,00	83	37

Chi2 for trend

DF =1

P = 0,0095

Prognose for bakteriæmi, det første trin

Schønheyder HC, Højbjerg T

The impact of the first notification of positive blood cultures on antibiotic therapy. A one-year survey. *APMIS **1995**; 103: 37-44*

Ændring af behandling ved 1. kontakt	**Total**	**Behandling Dækkende**	**Behandling Ikke optimal**	**Ingen behandling**
Antal bakteriæmier	694	418	90	186
Ingen ændring	379	299	32	48
Start eller justering	315	199	58	138
+ Aminoglykosid	*109*	*25*	*21*	*63*
+ S. aureus dækning	*73*	*25*	*22*	*24*

1. møde i Arbejdsgruppen for bakteriæmi under DSKM

Søgning efter danske studier i PubMed

1. Søgeperiode fra PubMeds start i 60'erne til ultimo 2017 (>50 år)
2. MeSH terms og fritekst dækkende bakteriæmi, candidæmi, "bloodstream infection" (mulighed for flere stavemåder), og "blood culture".
3. Termer for bakterier og svampe koblet med blod eller bloddyrkning.
4. Søgning på "Denmark" i alle felter for at identificere danske studier.
5. Håndplukkede referencer fra 60'erne og enkelte senere år.

Søgeresultater

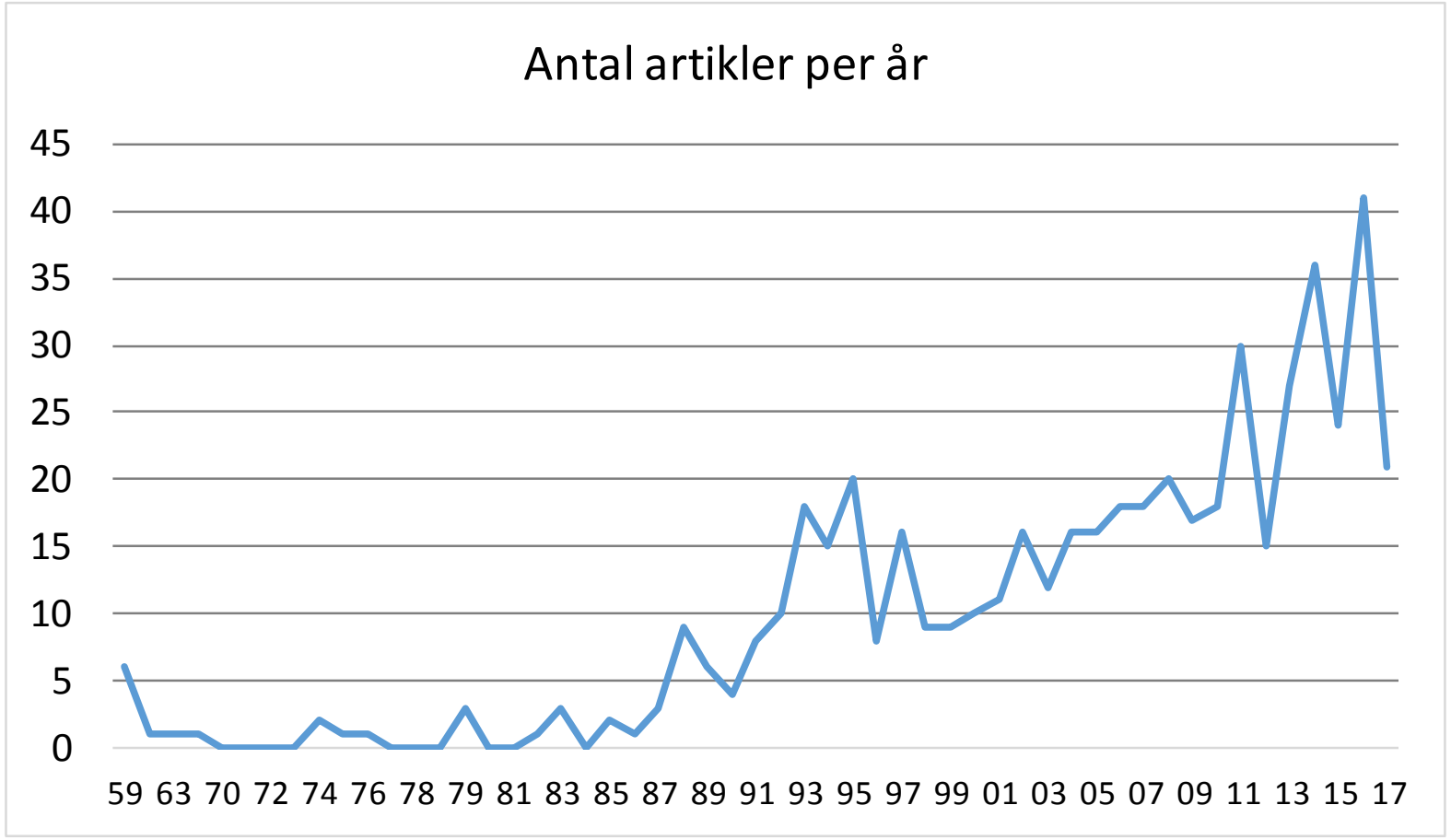
	Emne	Antal
Primært søgeresultat	Bakterier	502
- do -	Svampe	36
Supplerende udtræk	S. pneumoniae m.fl.	30
Supplerende udtræk	Tidlige S. aureus studier	11
I alt		579

Nettoresultat

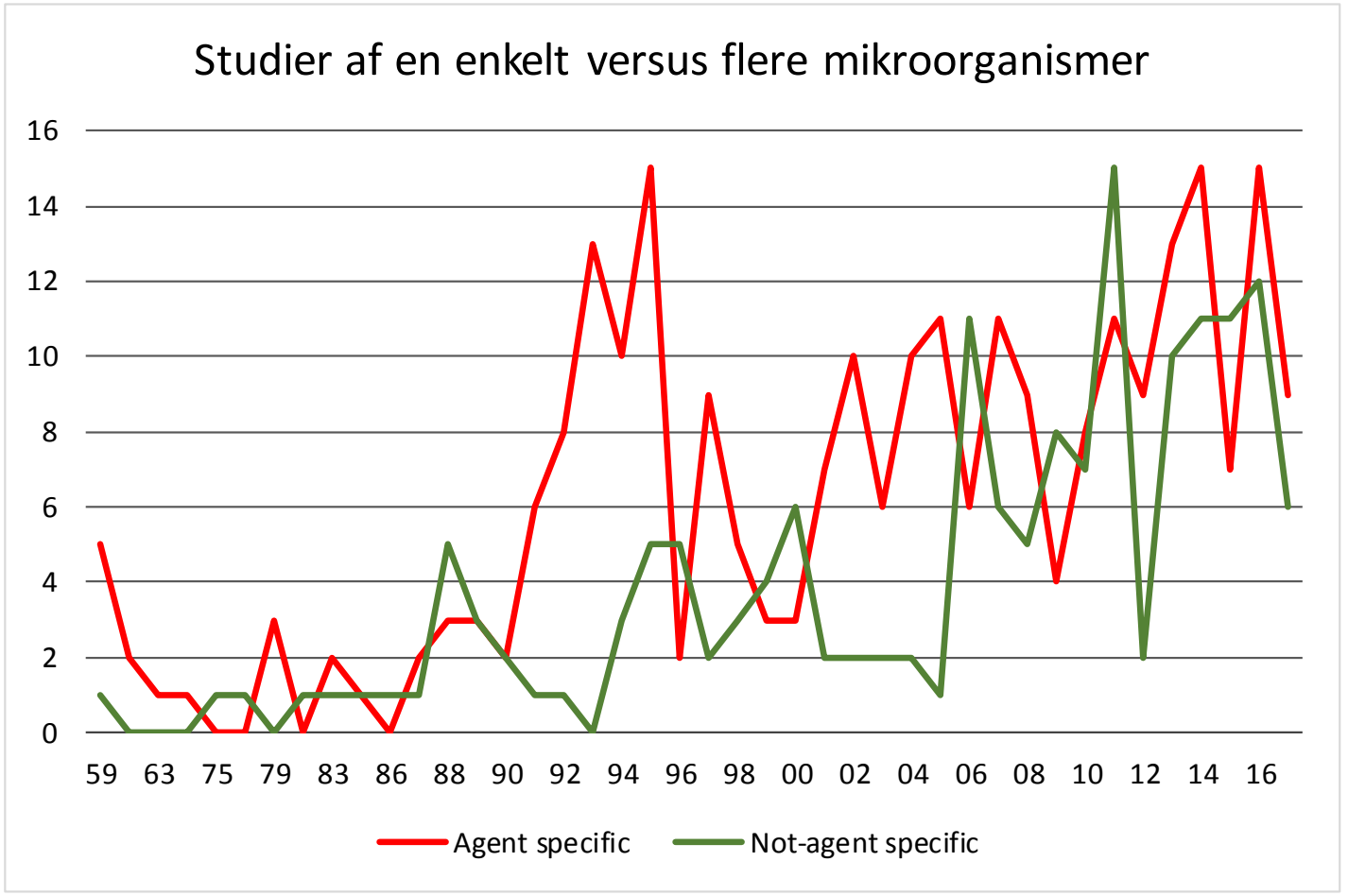
Renset for ”Denmark Str.”, reference stammer o. lign.	530
”Not eligible”	25
”Not known yet”	2
”Inflammation\sepsis”	46
”Animal models”	6
I alt	451

1. møde i Arbejdsgruppen for bakteriæmi under DSKM

Artikler


Antal artikler per år
45
40
35
30
25
20
15
10
5
0
59 63 70 72 74 76 78 79 81 83 85 87 89 91 93 95 97 99 01 03 05 07 09 11 13 15 17

Emnevalg


Studier af en enkelt versus flere mikroorganismer
16
14
12
10
8
6
4
2
0
59 63 75 79 83 86 88 90 92 94 96 98 00 02 04 06 08 10 12 14 16
Agent specific
Not-agent specific

Studie typer *

Cohorter	121
Case serier	38
Kasuistikker	32

* Baseret på titel eller/og abstract

Mathes and Pieper *BMC Medical Research Methodology* (2017) 17:107
DOI 10.1186/s12874-017-0391-8

BMC Medical Research Methodology

DEBATE Open Access

Clarifying the distinction between case series and cohort studies in systematic reviews of comparative studies: potential impact on body of evidence and workload

Tim Mathes* and Dawid Pieper

1. møde i Arbejdsgruppen for bakteriæmi under DSKM

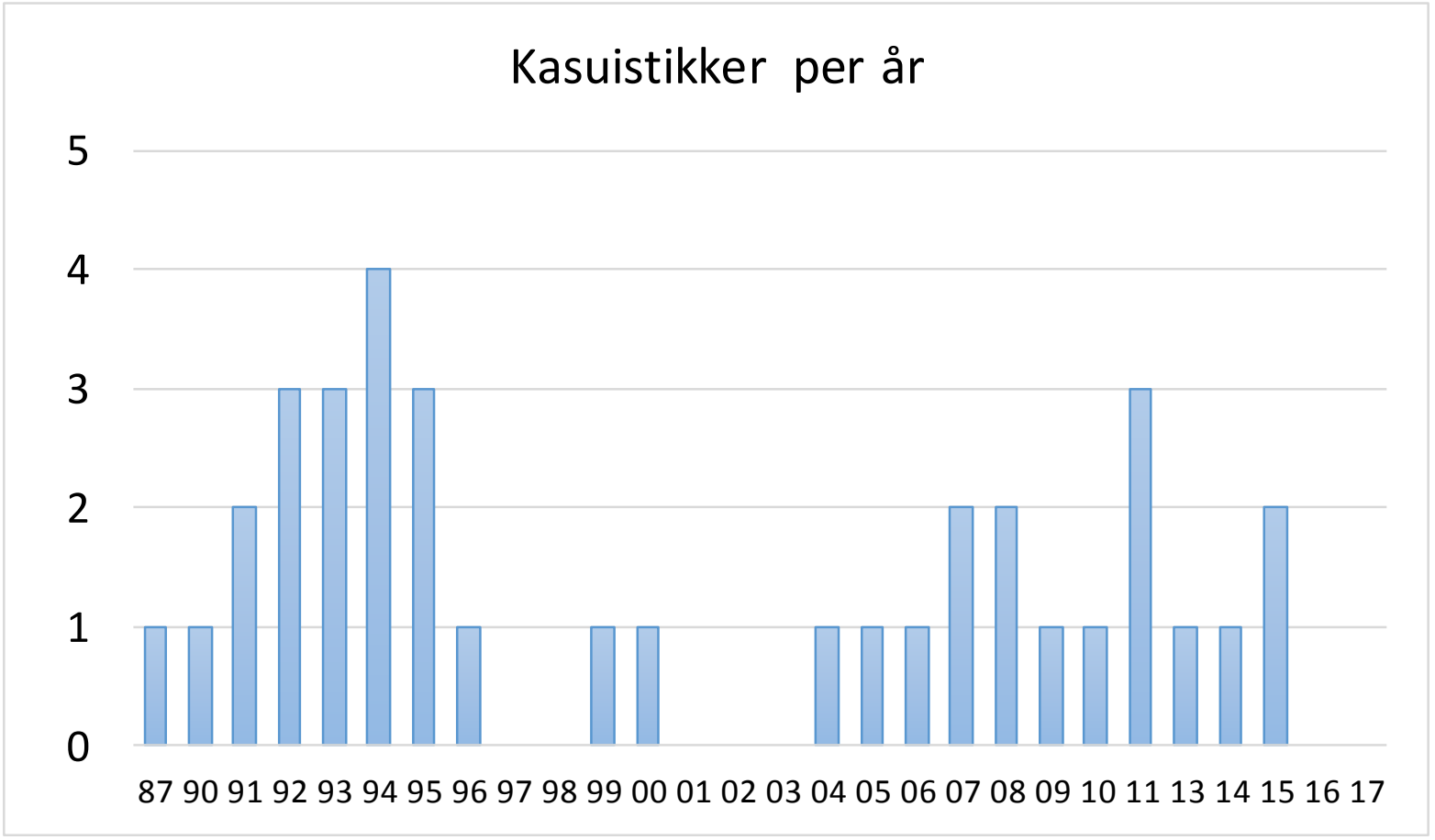
De mest studerede agens (alle typer studier)

Agens	
Staphylococcus aureus	75
Streptococcus pneumoniae	25
Anaerobe bakterier	18
Escherichia coli	17
Hæmolytiske streptokokker	16
Zoonotiske Salmonella	13
Listeria monocytogenes	8
Aerococcus	5
Capnocytophaga/Helicobacter	4

NB Forbehold for mindre fejl i optællingen.

1. møde i Arbejdsgruppen for bakteriæmi under DSKM

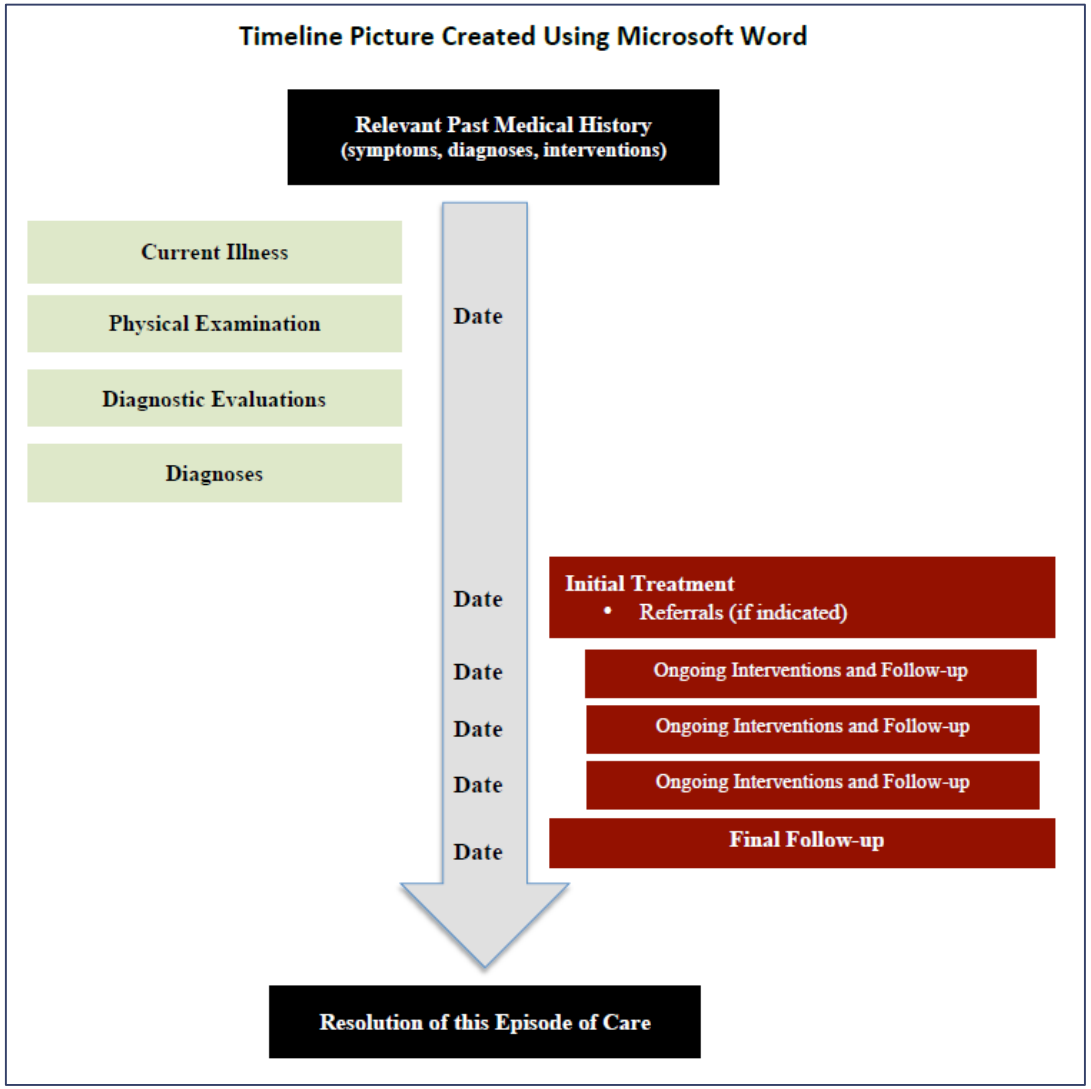
Kasuistikker



BMJ CASE REPORTS

The CARE guidelines: consensus-based clinical case reporting guideline development

Joel J Gagnier,[1,2] Gunver Kienle,[3] Douglas G Altman,[4] David Moher,[5] Harold Sox,[6] David Riley,[7] the CARE Group



1. møde i Arbejdsgruppen for bakteriæmi under DSKM

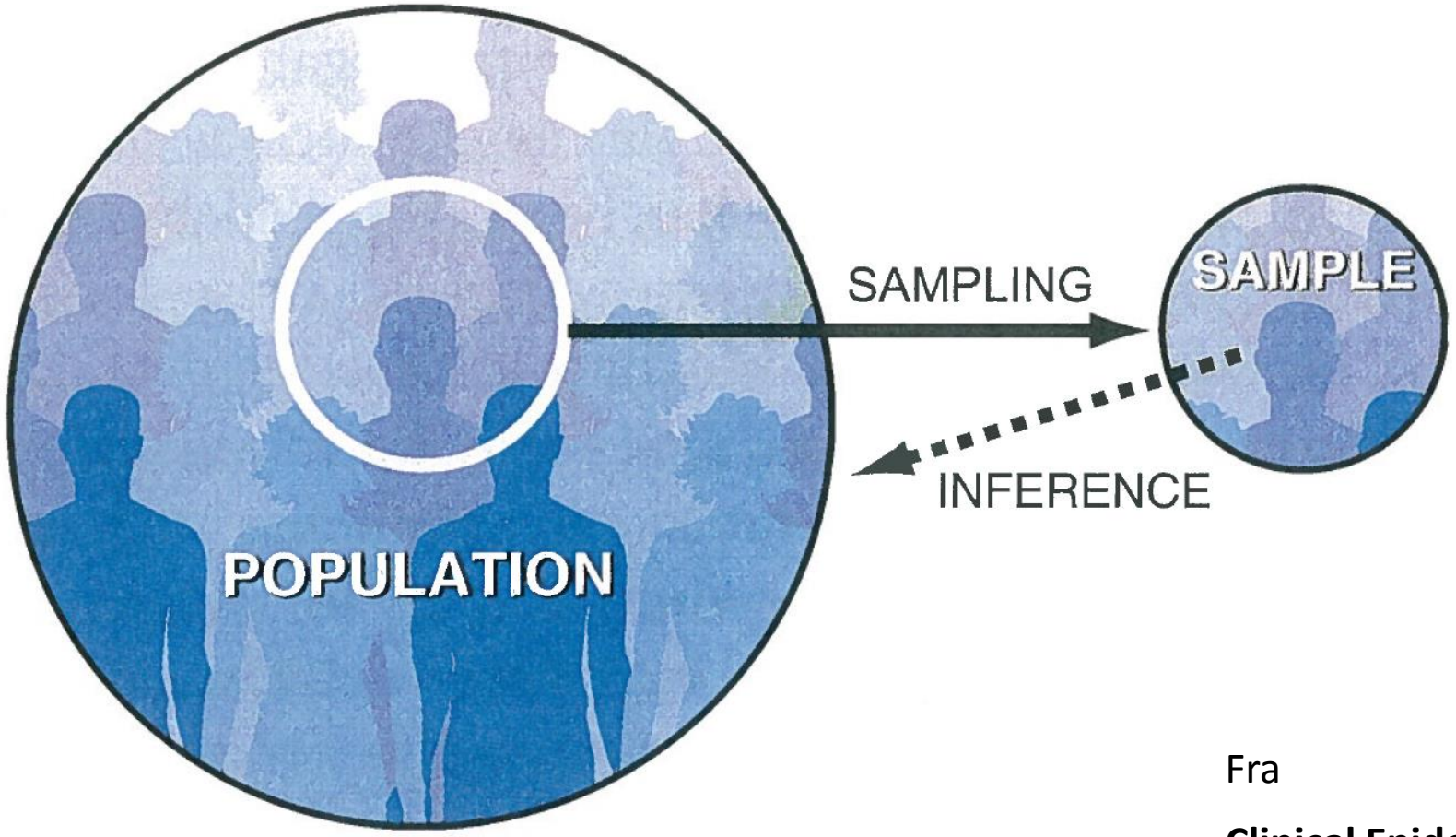


Figure 1.2 ■ Population and sample.

Fra

Clinical Epidemiology, the essntials

Fletcher, Fletcher & Fletcher

Seneste udgave 2014

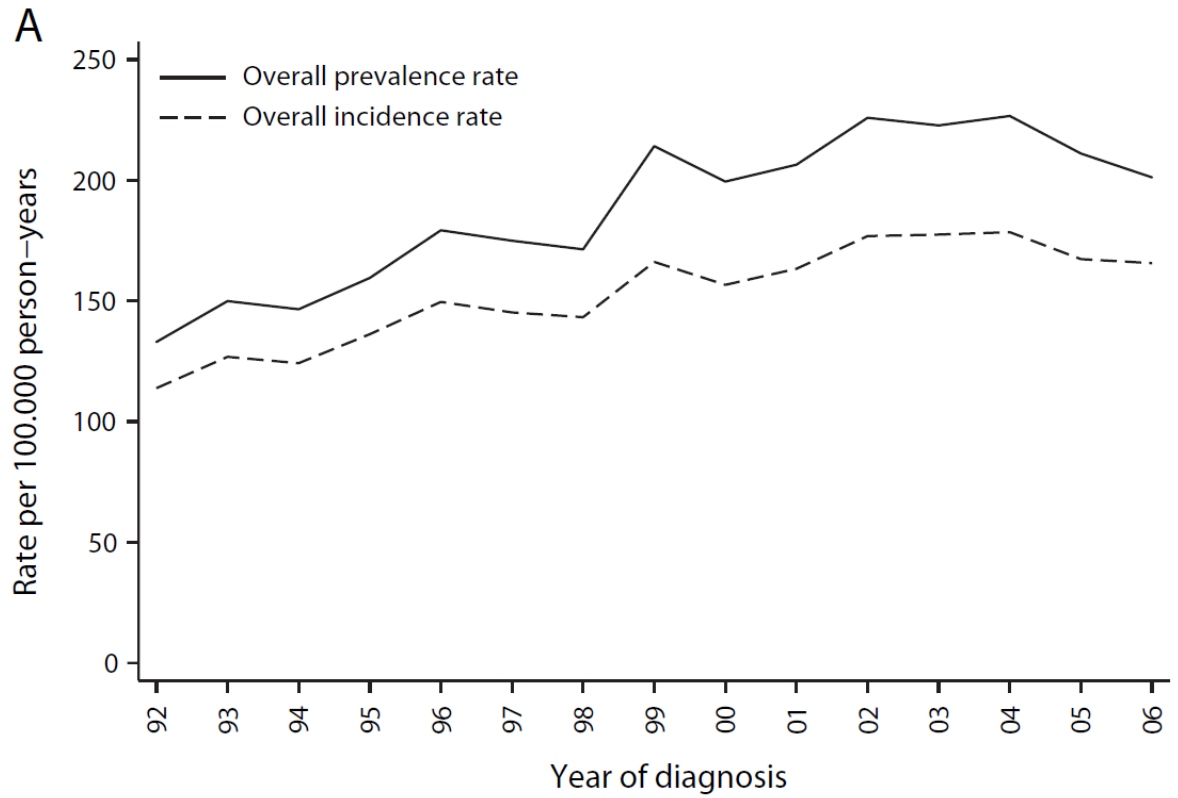
Clin Infect Dis 2011

Temporal Changes in the Incidence and 30-Day Mortality associated with Bacteremia in Hospitalized Patients from 1992 through 2006: A Population-based Cohort Study

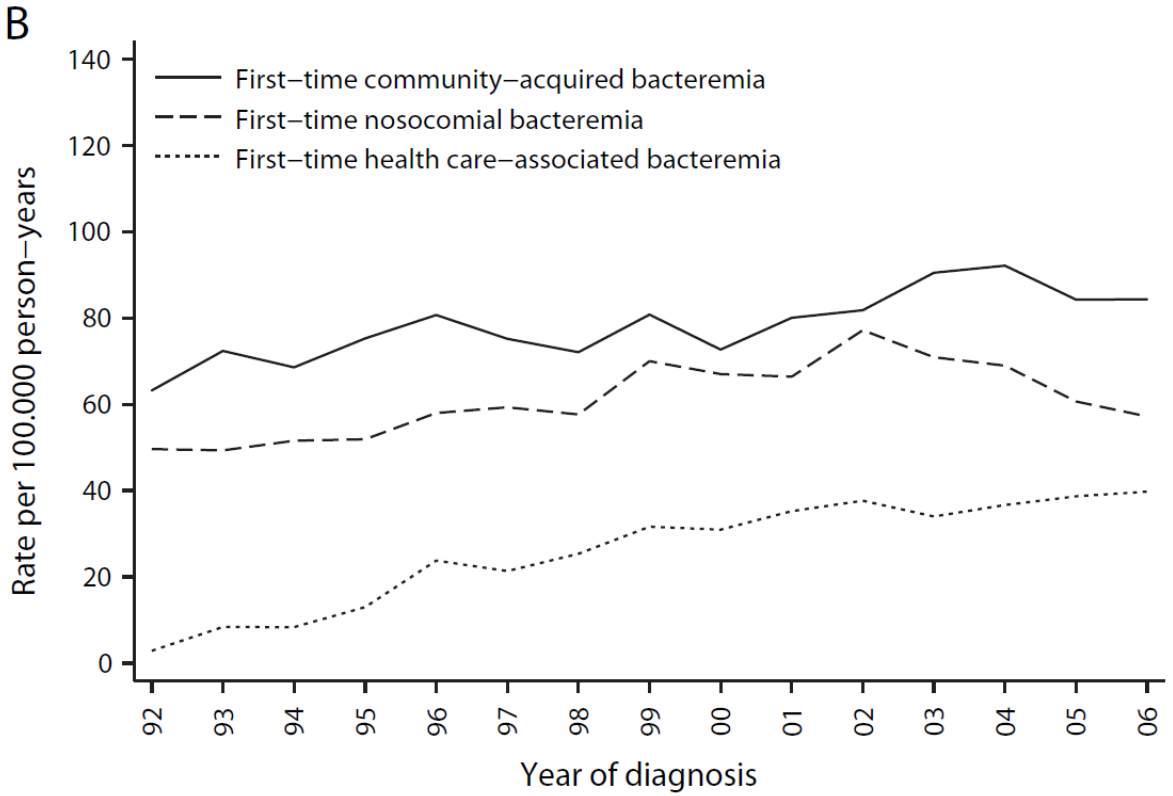
Mette Søgaard,[1,2] Mette Nørgaard,[2] Claus Dethlefsen,[3] and Henrik Carl Schønheyder[1]

[1]Department of Clinical Microbiology, Aarhus University Hospital, Aalborg, [2]Department of Clinical Epidemiology, Clinical Institute, Aarhus University Hospital, Aarhus, Denmark, and [3]Department of Cardiology, Center for Cardiovascular Research, Aarhus University Hospital, Aalborg

Incidence and prevalence rates – North Jutland 1992-2006



Incidence rates comm.-acq., nosocom. & health-case assoc.

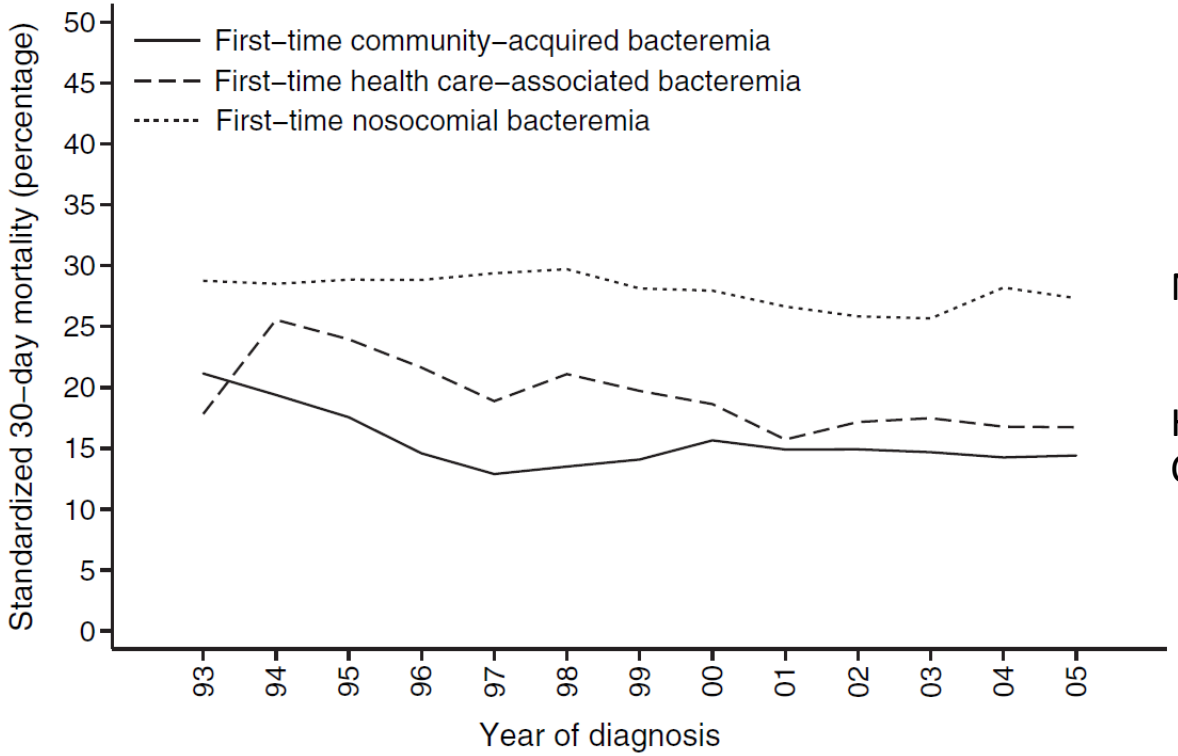


Comm. acq.

Nosocomial

Health-care assoc.

Standardized 30-dage mortality



Nosocomial

Health-care assoc.
Comm. acq.

Table 3. Crude and Adjusted 30-Day Mortality in Patients with a First-Time Diagnosis of Bacteremia from 1992 through 2006 according to Study Period and Place of Acquisition

30-day mortality

Variable	Study period	No. of patients	30-Day mortality		
			No. (%) of patients who died	Crude OR (95% CI)	Adjusted[a] OR (95% CI)
Overall incident episodes of bacteremia	1992–1996	3267	742 (22.7)	1.0 (Reference)	1.0 (Reference)
	1997–2001	3934	835 (21.2)	0.92 (0.82–1.03)	0.77 (0.68–0.88)
	2002–2006	4502	926 (20.6)	0.88 (0.79–0.98)	0.73 (0.64–0.82) ★
First-time community-acquired bacteremia	1992–1996	1772	336 (19.0)	1.0 (Reference)	1.0 (Reference)
	1997–2001	1923	291 (15.1)	0.76 (0.64–0.91)	0.66 (0.54–0.80)
	2002–2006	2246	345 (15.4)	0.78 (0.66–0.91)	0.63 (0.52–0.76) ★
First-time nosocomial bacteremia	1992–1996	1277	356 (27.9)	1.0 (Reference)	1.0 (Reference)
	1997–2001	1609	468 (29.1)	1.06 (0.90–1.25)	0.97 (0.81–1.16)
	2002–2006	1733	479 (27.6)	0.99 (0.84–1.16)	0.84 (0.70–1.00) ★
First-time health care–associated bacteremia	1992–1996	278	65 (23.4)	1.0 (Reference)	1.0 (Reference)
	1997–2001	730	161 (22.1)	0.93 (0.67–1.29)	0.72 (0.50–1.03)
	2002–2006	967	212 (21.9)	0.92 (0.67–1.26)	0.72 (0.51–1.03) ★

NOTE. CI, confidence interval; OR, odds ratio.

[a] Adjusted for place of acquisition, age, sex, level of comorbidity, marital status, and appropriateness of empirical treatment.

Overall reduction in 30-day mortality: 27%

Adj. for age, sex, comorbidity, marital status and empirical treatment

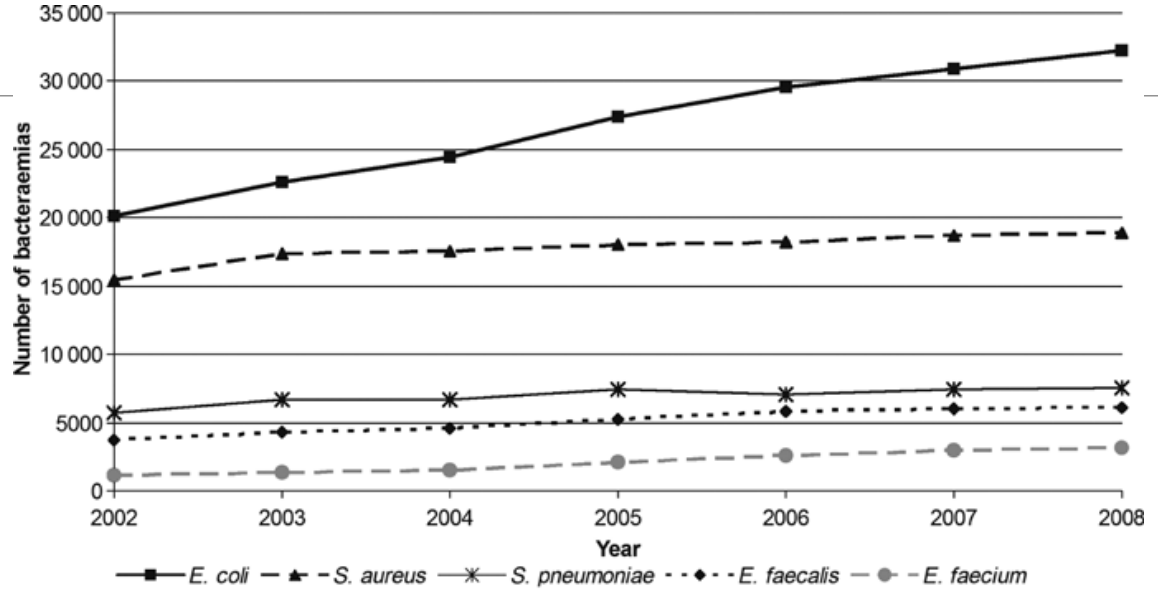
ORIGINAL ARTICLE BACTERIOLOGY

The changing epidemiology of bacteraemias in Europe: trends from the European Antimicrobial Resistance Surveillance System

M. E. A. de Kraker[1,2], V. Jarlier[3], J. C. M. Monen[1], O. E. Heuer[4], N. van de Sande[5] and H. Grundmann[1,2]

Clin Microbiol Infect 2012

The changing epidemiology of bacteraemias in Europe: trends from EARSS



Pathogen	2002	2003	2004	2005	2006	2007	2008
E. coli	20 151	22 620	24 371	27 328	29 543	30 931	32 194
S. aureus	15 422	17 325	17 550	18 003	18 210	18 665	18 894
S. pneumoniae	5725	6674	6721	7458	7051	7421	7555
E. faecalis	3679	4309	4625	5201	5837	6012	6105
E. faecium	1118	1374	1563	2091	2541	2938	3128

Species	Change per year in % (95% CI)	p-value	Relative change per year in % (95% CI)	p-value
E. coli	8.1 (7.8–8.3)	<0.01	**1.7 (1.4–1.9)**	<0.01
S. aureus	2.8 (2.5–3.1)	<0.01	−3.4 (−3.7 to −.1)	<0.01
Streptococcus pneumoniae	3.8 (3.4–4.3)	<0.01	−2.4 (−2.9 to −.0)	<0.01
Enterococcus faecalis	8.7 (8.2–9.3)	<0.01	**2.3 (1.7–2.8)**	<0.01
Enterococcus faecium	19.3 (18.3–20.3)	<0.01	**12.4 (11.5–13.4)**	<0.01

Only laboratories that consistently reported for all years were included. Results are based on generalized linear models with Poisson distribution.

Epidemiol. Infect. (2013), **141**, 2149–2157. © Cambridge University Press 2012
doi:10.1017/S0950268812002725

Defining the epidemiology of bloodstream infections: the 'gold standard' of population-based assessment

K. B. LAUPLAND*

Kevin Laupland highlights 5 themes

- Value of a population denominator
- Importance of age and gender standardization for calculation and comparison of incidence rates
- Implications of selected hospital admission
- Implications of referral bias

BMC Research Notes

BioMed Central

Project Note

Open Access

Rationale for and protocol of a multi-national population-based bacteremia surveillance collaborative

Kevin B Laupland*[1], Henrik C Schønheyder[2], Karina J Kennedy[3], Outi Lyytikäinen[4], Louis Valiquette[5], John Galbraith[6], Peter Collignon[3], Deirdre L Church[1], Daniel B Gregson[1] and Pamela Kibsey[6]

BMC Research Notes 2009, **2**:146 doi:10.1186/1756-0500-2-146

This collaboration now has participation from regions in Canada, England, Denmark, Sweden, Finland, Germany and Australia.

The group plans to meet in Copenhagen in April 2015 in connection with the 25th ECCMID.

The group is open for new particilants!

ORIGINAL ARTICLE BACTERIOLOGY

Utilization of blood cultures in Danish hospitals: a population-based descriptive analysis

S. Gubbels[1], J. Nielsen[1], M. Voldstedlund[1], B. Kristensen[2], H. C. Schønheyder[4,5], C. M. J. E. Vandenbroucke-Grauls[6], M. Arpi[7], M. K. Björnsdóttir[3], J. Dahl Knudsen[8], R. B. Dessau[9], T. Gorm Jensen[10], P. Kjældgaard[11], L. Lemming[12], J. K. Møller[13], D. Schrøder Hansen[14] and K. Mølbak[1]

1) *Department of Infectious Disease Epidemiology,* 2) *Department of Microbiology and Infection Control, Statens Serum Institut,* 3) *Department of Clinical Microbiology, Rigshospitalet, Copenhagen,* 4) *Department of Clinical Microbiology Aalborg University Hospital, Aalborg,* 5) *Department of Clinical Medicine, Aalborg University, Aalborg, Denmark,* 6) *Department of Medical Microbiology and Infection Control, VU University Medical Center, Amsterdam, The Netherlands,* 7) *Department of Clinical Microbiology, Herlev Hospital, Herlev,* 8) *Department of Clinical Microbiology Hvidovre Hospital, Hvidovre,* 9) *Department of Clinical Microbiology, Zealand Region, Slagelse,* 10) *Department of Clinical Microbiology, Odense University Hospital, Odense,* 11) *Department of Clinical Microbiology, Sygehus Sønderjylland, Sønderborg,* 12) *Department of Clinical Microbiology, Aarhus University Hospital, Aarhus,* 13) *Department of Clinical Microbiology, Vejle Hospital, Vejle and* 14) *Department of Clinical Microbiology, Hillerød Hospital, Hillerød, Denmark*

Clin Microbiol Infect 2015; 21: 344.e13 – 344.e21

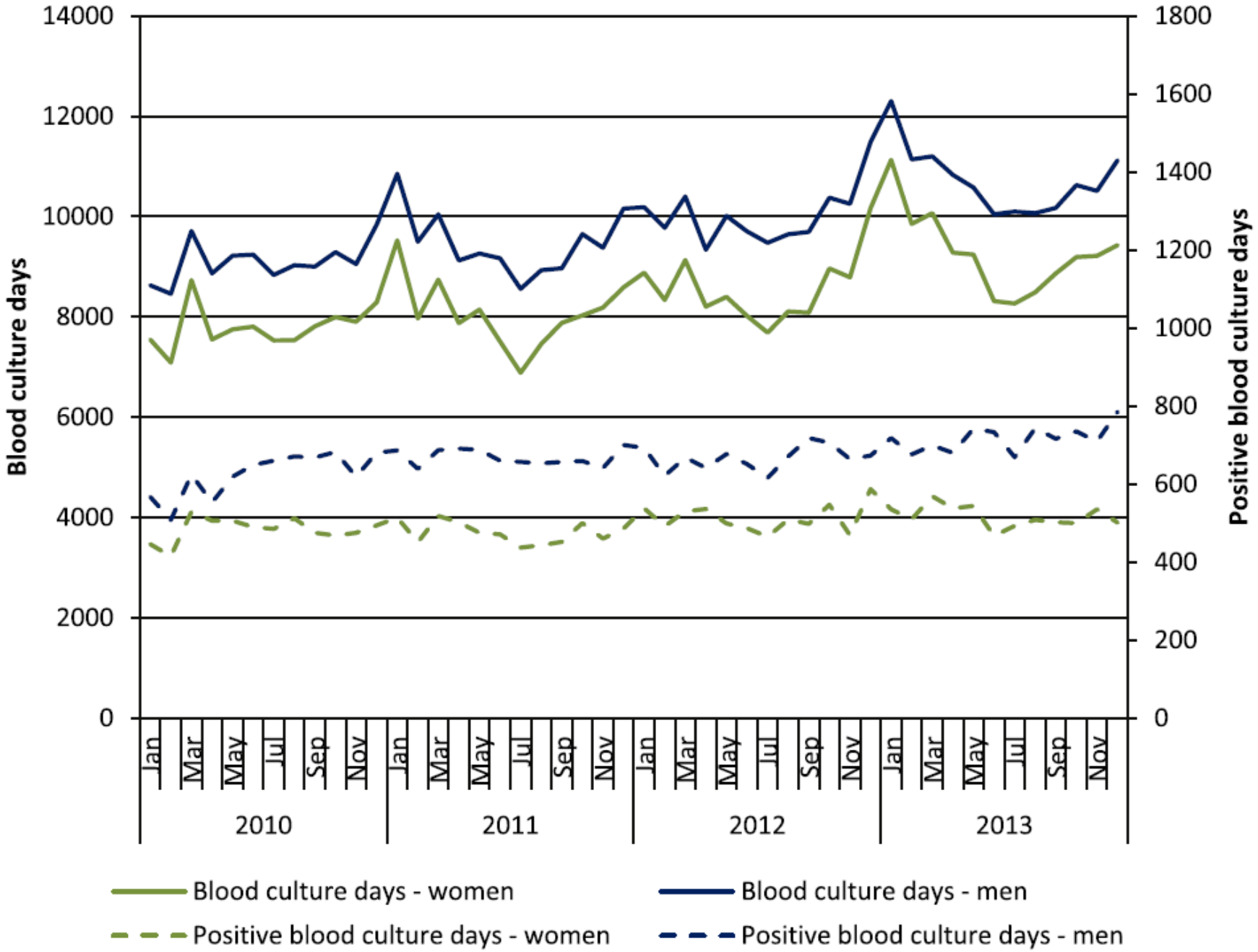
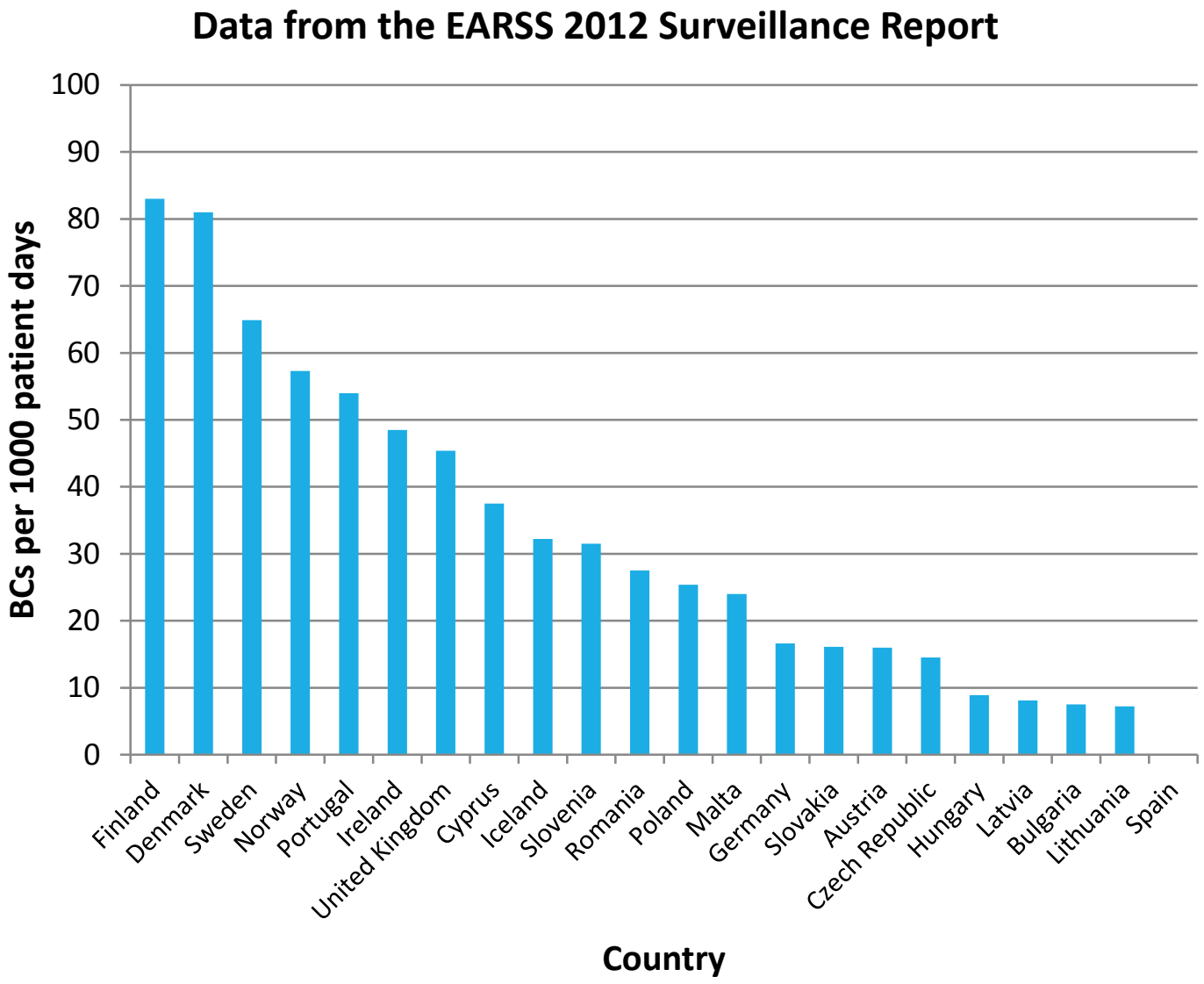
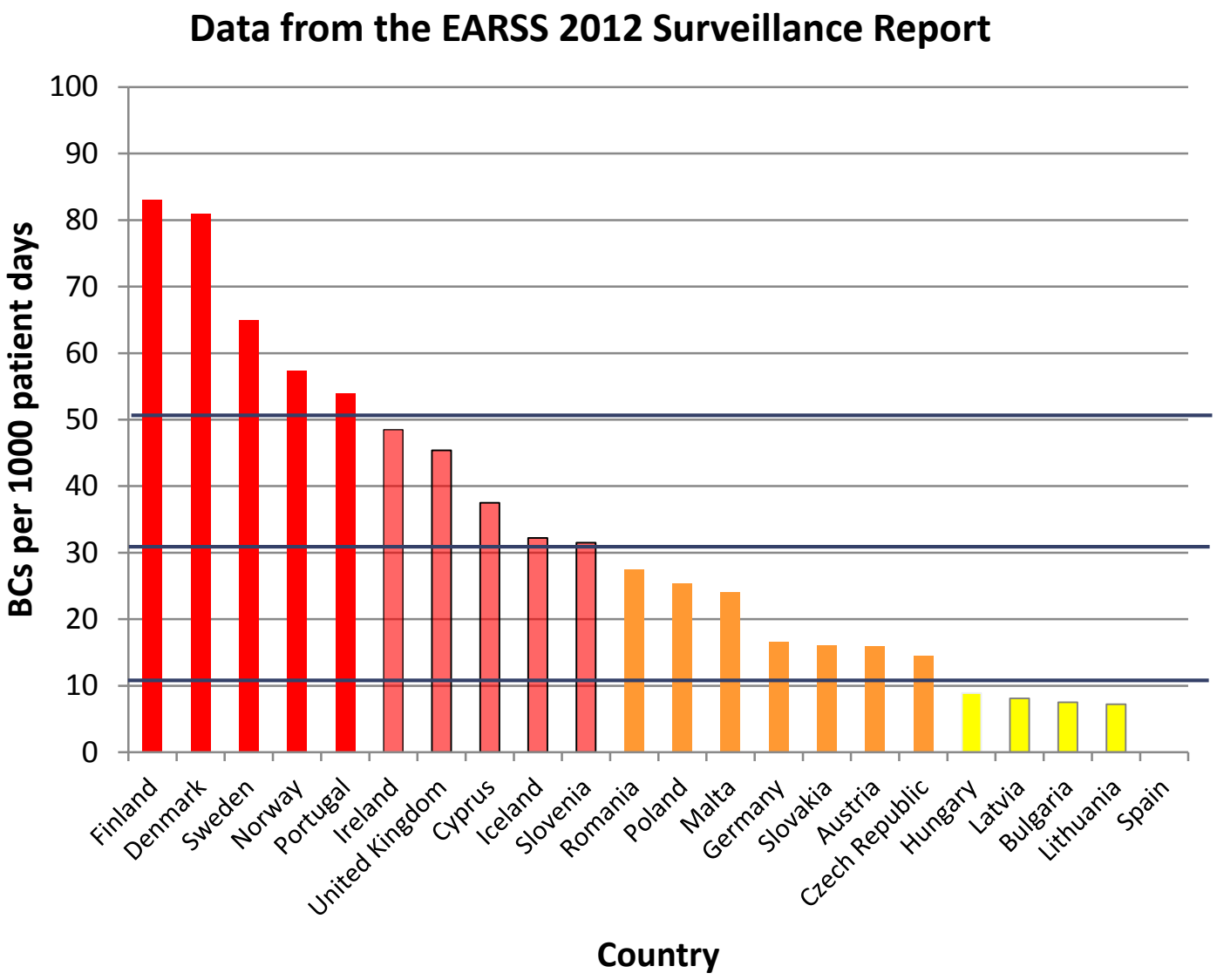


FIG. 1. Number of blood culture (BC) days and positive BC days stratified by sex between 2010 and 2013.

TABLE 1. Ten most common pathogenic microorganisms per blood culture day according to department of clinical microbiology between 2010 and 2013

Departments of clinical microbiology	*Escherichia coli*		*Staphylococcus aureus*		*Klebsiella pneumoniae*		*Streptococcus pneumoniae*		*Enterococcus faecium*		*Enterococcus faecalis*		*Pseudomonas aeruginosa*		*Candida albicans*		*Enterobacter cloacae*		*Klebsiella oxytoca*		Total
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*
Aalborg	1814	41.2	738	16.7	395	9.0	391	8.9	198	4.5	240	5.4	202	4.6	154	3.5	139	3.2	137	3.1	4408
Aarhus	2040	37.0	931	16.9	508	9.2	476	8.6	437	7.9	330	6.0	229	4.1	217	3.9	179	3.2	173	3.1	5520
Esbjerg	628	39.8	279	17.7	139	8.8	122	7.7	67	4.2	102	6.5	69	4.4	85	5.4	42	2.7	44	2.8	1577
Herlev/Hvidovre/ Hillerød	5339	42.1	2201	17.3	1110	8.7	1145	9.0	702	5.5	812	6.4	439	3.5	298	2.3	317	2.5	326	2.6	12 689
Herning/Viborg	1332	38.0	634	18.1	345	9.8	345	9.8	160	4.6	285	8.1	121	3.4	70	2.0	97	2.8	120	3.4	3509
Odense	1616	32.8	787	16.0	415	8.4	324	6.6	568	11.5	437	8.9	211	4.3	233	4.7	182	3.7	147	3.0	4920
Rigshospitalet	567	20.0	610	21.5	327	11.5	78	2.7	523	18.4	245	8.6	114	4.0	168	5.9	132	4.6	78	2.7	2842
Slagelse	2676	42.1	1077	16.9	630	9.9	586	9.2	272	4.3	363	5.7	230	3.6	152	2.4	178	2.8	198	3.1	6362
Sønderborg	577	45.2	224	17.5	116	9.1	108	8.5	48	3.8	77	6.0	37	2.9	22	1.7	36	2.8	32	2.5	1277
Vejle	923	44.2	324	15.5	179	8.6	187	9.0	127	6.1	118	5.6	90	4.3	39	1.9	47	2.2	55	2.6	2089
Total	17 512	38.7	7805	17.3	4164	9.2	3762	8.3	3102	6.9	3009	6.7	1742	3.9	1438	3.2	1349	3.0	1310	2.9	45 193


Data from the EARSS 2012 Surveillance Report
BCs per 1000 patient days
100
90
80
70
60
50
40
30
20
10
0
Finland
Denmark
Sweden
Norway
Portugal
Ireland
United Kingdom
Cyprus
Iceland
Slovenia
Romania
Poland
Malta
Germany
Slovakia
Austria
Czech Republic
Hungary
Latvia
Bulgaria
Lithuania
Spain
Country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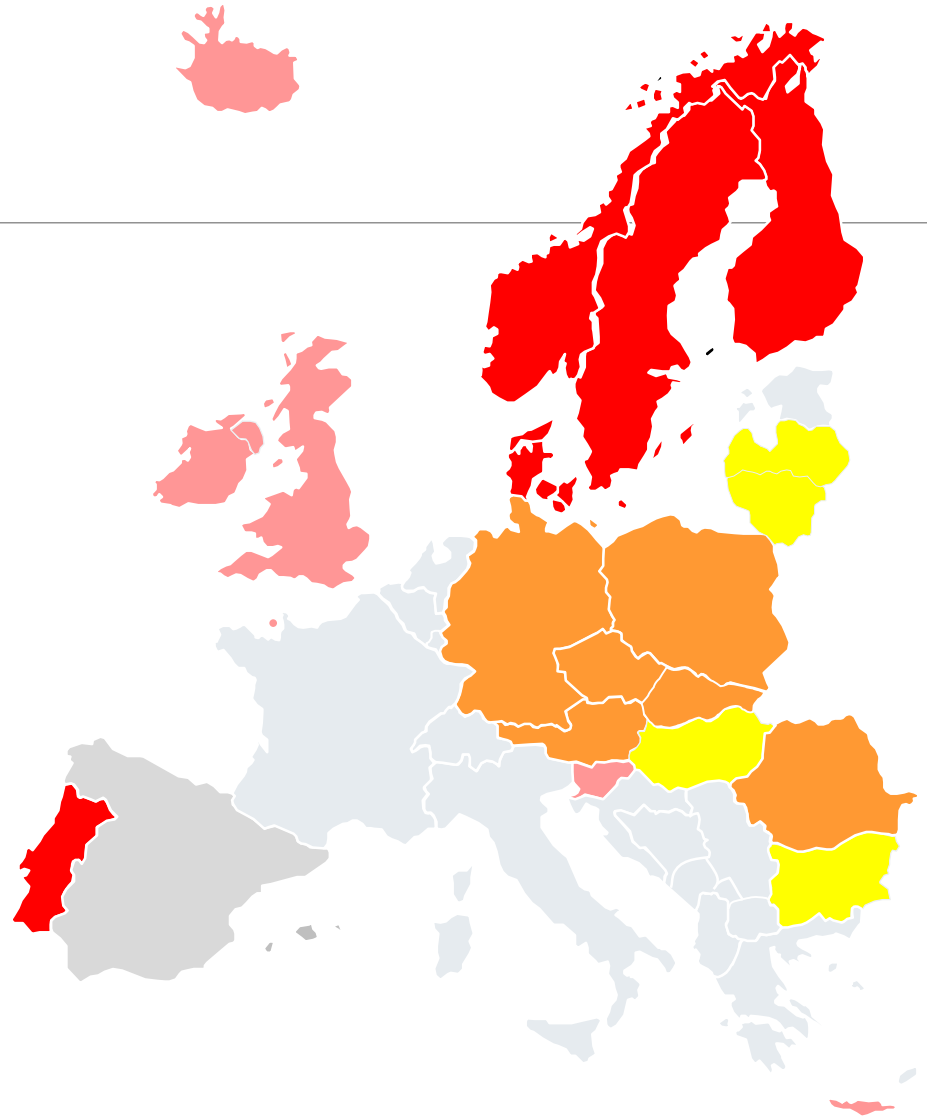
Slovenia
Romania
Poland
Malta
Germany
Slovakia
Austria
Czech Republic
Hungary
Latvia
Bulgaria
Lithuania
Spain
Country

Per 1000 patient days	
	>50 BCs
	31-50 BCs
	10-30 BCs
	>10 BCs
	No statistics
	No data



Special Report

EXPERT REVIEWS

Monitoring the epidemiology of bloodstream infections: aims, methods and importance

Expert Rev. Anti Infect. Ther. 11(12), 1281–1290 (2013)

Mette Søgaard*[1], Outi Lyytikäinen[2], Kevin B Laupland[3] and Henrik Carl Schønheyder[4]

Bloodstream infections (BSI) are a major cause of mortality, morbidity and medical cost. Even though monitoring activities have been on-going for decades, it is difficult to depict a full picture of the burden of BSI. The main reasons for shortcomings include varying study aims, definitions and inclusion criteria for both microorganisms and patients. Incidence studies are commonly hampered by difficulties in delineating the population at risk. The objective of this review was to provide a framework for comprehensive BSI monitoring systems in the future. We highlight the importance of standardized definitions and acquisition of data combined with cautious statistical analyses. Hereby, valid data on BSI can be provided for clinicians and decision makers and ultimately contribute to improvement of the quality of care for BSI patients.

KEYWORDS: bacteremia • epidemiology • monitoring • outcome • surveillance

Box 1. Desirable features of bloodstream infections monitoring programs.

- Clearly defined objectives
- Unambiguous case definition
- High degree of data completeness and accuracy
- Well-defined population denominator data
- Reproducible data
- Data on vital status
- Standardized coding schemes and terminology
- Minimal extra resources
- Integration with other health care databases
- Rapid feedback of information to providers
- Data informing local services and commissioners

Table 3. Bloodstream infections that are currently targeted for monitoring in selected European countries. Supply of data is either mandatory (M) or voluntary (V).

Agents	DK [104]	FI [102]	NO [105]	SE [106]	UK [103]
All BSIs		M			V
Polymicrobial BSI					V
Individual pathogens					
Staphylococcus aureus	V	M	M	M	M
Streptococcus pneumoniae	M	M	M	M	V
HS	V				V
HS group A		M	M	M	
HS group B		M	M		
Listeria monocytogenes	M	M	M	M	V
Neisseria meningitidis	M	M	M	M	M
Haemophilus influenzae	M	M	M	M	M
Escherichia coli		M			M
Salmonella serovar Typhi	M	M	M	M	M
Salmonella serovar Paratyphi	M	M	M	M	M
Zoonotic *Salmonella*			M		M
Fungemias		M			V
Resistance phenotype					
MRSA	M	M[†]	M	M	M
GRE		M		M	M
Enterobacteriaceae producing ESBL or ESBL-CARBA		M[‡]		M	
Place of acquisition					
Nosocomial BSIs					