The ´Outbreak Database´

– A tool for hospital epidemiologists

Prof. Ralf-Peter Vonberg
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Hosted by Paul Webber
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2011 TELECLASS EDUCATION TEN YEARS ANNIVERSARY

Definition of „Nosocomial Outbreak“

… is a sudden
increase in the incidence rate
of nosocomial infections to a value above normal, affecting
large numbers of people or
spread over a wide area.

PART #1

Nosocomial Outbreaks in Medical Literature

Prevalence of nosocomial infections

Journal of Hospital Infection (2008) 69, 230–248
Available online at www.sciencedirect.com
ScienceDirect
ELSEVIER
www.elsevierhealth.com/journals/jhin

Four Country Healthcare Associated Infection Prevalence Survey 2006: overview of the results

E.T.M. Smyth[a,b,*], G. McIlvenny[a], J.E. Enstone[c], A.M. Emmerson[c], H. Humphreys[d,e], F. Fitzpatrick[e,f], E. Davies[g], R.G. Newcombe[h], R.C. Spencer[c], on behalf of the Hospital Infection Society Prevalence Survey Steering Group

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[b] *Infection Prevention and Control, The Belfast HSC Trust, Belfast, UK*
[c] *Hospital Infection Society, London, UK*
[d] *Department of Clinical Microbiology, Royal College of Surgeons in Ireland, Dublin, Ireland*
[e] *Department of Microbiology, Beaumont Hospital, Dublin, Ireland*
[f] *Health Protection Surveillance Centre, Dublin, Ireland*
[g] *National Public Health Service, Cardiff, UK*
[h] *Centre for Health Sciences Research, Cardiff University, Cardiff, UK*

Smyth at al. J.Hosp.Infect. 2008;69:230-248

Prevalence of nosocomial infections

- February 2006 - May 2006
- number of hospitals: 270
  - England (190)
  - Wales (20)
  - Northern Ireland (15)
  - Republic of Ireland (45)
- number of patients: 75,694
  - surgical procedures:19,984
- HCAI prevalence: **7.59 %**

	No. of patients (% of total patients)	No. of patients with HCAI	Prevalence of HCAI	95% CI	Chi-squared test	Odds ratio (95% CI)
Country						
Overall	75694 (100)	5743	7.59	7.40–7.78	$P < 0.001$	
England	58775 (77.6)	4812	8.19	7.97–8.41		1.00
Northern Ireland	3644 (4.8)	198	5.43	4.74–6.22		0.64 (0.56–0.75)
Wales	5734 (7.6)	364	6.35	5.75–7.01		0.76 (0.68–0.85)
Republic of Ireland	7541 (10)	369	4.89	4.43–5.40		0.58 (0.52–0.64)
Trust type[a]						
Large acute	23927 (31.2)	1899	7.94	7.60–8.29	$P = 0.009$	1.00
Medium acute	19637 (25.9)	1472	7.50	7.14–7.87		0.94 (0.88–1.01)
Acute teaching	16301 (22.0)	1356	8.32	7.90–8.75		1.05 (0.98–1.13)
Small acute	6840 (9.0)	513	7.50	6.90–8.15		0.94 (0.85–1.04)
Acute specialist	1448 (1.9)	134	9.25	7.87–10.86		1.18 (0.98–1.42)
Sex						
Male	33240 (44)	2661	8.01	7.72–8.30	$P < 0.001$	1.11 (1.05–1.17)
Female	42215 (56)	3061	7.25	7.01–7.50		1.00
Age group (years)						
<35	6811 (9.0)	217	3.19	2.79–3.63	$P < 0.001$	0.36 (0.32–0.42)
35–64	20308 (26.9)	1300	6.40	6.07–6.75		0.76 (0.71–0.81)
65–84	34739 (45.9)	2877	8.28	8.00–8.58		1.00
≥85	13526 (17.9)	1327	9.81	9.32–10.32		1.20 (1.13–1.29)
Consultant specialty group						
General medicine	44862 (59.5)	3445	7.68	7.44–7.93	$P < 0.001$	1.00
General surgery	12677 (16.8)	1000	7.89	7.43–8.37		1.03 (0.96–1.11)
Trauma & orthopaedics	8877 (11.8)	740	8.34	7.78–8.93		1.09 (1.01–1.19)
Obstetrics & gynaecology	4743 (6.3)	106	2.23	1.85–2.70		0.27 (0.23–0.33)
Cardiothoracic surgery	1207 (1.6)	142	11.76	10.07–13.70		1.60 (1.34–1.92)
Ophthalmology & ENT	1113 (1.5)	34	3.05	2.19–4.24		0.38 (0.27–0.53)
Neurosurgery	962 (1.3)	101	10.50	8.72 –12.60		1.41 (1.14–1.74)
Critical care medicine	465 (0.6)	108	23.23	19.62–27.27		3.64 (2.93–4.52)
Others	478 (0.6)	48	10.04	7.66–13.06		1.34 (1.00–1.81)
Ward specialty group						
General medicine	39885 (52.7)	3153	7.91	7.64–8.17	$P < 0.001$	1.00
General surgery	13741 (18.2)	892	6.49	6.09–6.92		0.81 (0.75–0.87)
Trauma & orthopaedics	9064 (12.0)	726	8.01	7.47–8.59		1.01 (0.93–1.10)
Obstetrics & gynaecology	5254 (6.9)	118	2.25	1.88–2.68		0.27 (0.22–0.32)
Cardiothoracic surgery	1191 (1.6)	120	10.08	8.49–11.92		1.31 (1.08–1.58)
Ophthalmology & ENT	1461 (1.9)	49	3.35	2.55–4.41		0.40 (0.30–0.54)
Neurosurgery	826 (1.1)	78	9.44	7.63–11.63		1.21 (0.96–1.54)
Critical care medicine	1924 (2.5)	448	23.28	21.45–25.23		3.54 (3.16–3.95)
High dependency	801 (1.1)	59	7.37	5.75–9.39		0.93 (0.71–1.21)
Others	1547 (2.0)	100	6.46	5.34–7.80		0.81 (0.66–0.99)

Smyth at al. J.Hosp.Infect. 2008;69:230-248

Nosocomial infections from outbreaks

Hospital-Acquired Infections in Intensive Care Unit Patients: An Overview with Emphasis on Epidemics

Richard P. Wenzel, MD, Robert L. Thompson, MD, Sandra M. Landry, RN, Brenda S. Russell, RN, Patti J. Miller, BA, Samuel Ponce de Leon, MD, Grayson B. Miller, Jr., MD

How Frequent Are Outbreaks of Nosocomial Infection in Community Hospitals?

Robert W. Haley, MD; James H. Tenney, MD; James O. Lindsey II, MD; Julia S. Garner, RN, MN; John V. Bennett, MD

About 5 to 10 % of all nosocomial infections are acquired during an outbreak.

Wenzel et al. Infect.Control 1983;4:371-375
Haley at al. Infect.Control 1985;6:233-236

The Outbreak Database – A Tool for Hospital Epidemiologists
Prof. Ralf-Peter Vonberg, University of Hannover
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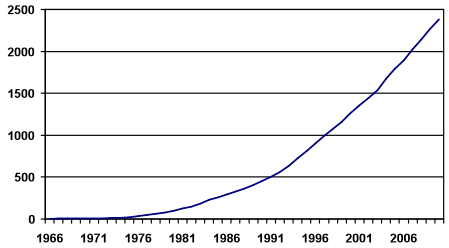
Nosocomial outbreaks in PubMed



(cumulative data using search terms "**OUTBREAK**" and "**NOSOCOMIAL**")

http://www.pubmed.gov

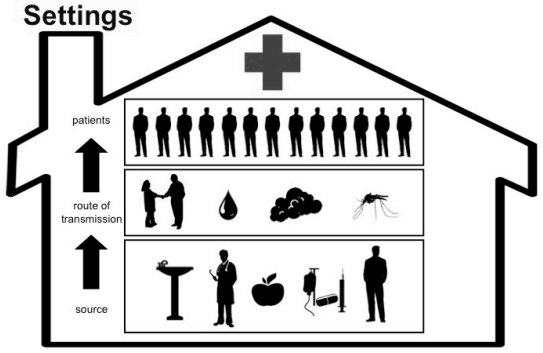
Nosocomial outbreaks worldwide

n = 2,492

PART #2

Learning from Nosocomial Outbreaks

Settings



Nosocomial outbreaks …

- … represent an extraordinary situation
- … are frightening for staff
- … cause morbidity, mortality and costs
- … may contain unknown variables
- … may start anytime
- … may occur anywhere
- … may draw public attention

Learning from nosocomial outbreaks

Outbreaks of nosocomial infections: lessons learned and perspectives

Petra Gastmeier[a] and Ralf-Peter Vonberg[b]

[a]Institute of Hygiene and Environmental Medicine, Charité-University Medicine Berlin, Berlin and [b]Institute for Medical Microbiology and Hospital Epidemiology, Medical School Hannover, Hannover, Germany

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Tel: +49 30 8445 3680; fax: +49 30 8445 4486; e-mail: Petra.Gastmeier@Charite.de

Current Opinion in Infectious Diseases 2008, 21:357–361

Purpose of review
The review summarizes the results of selected outbreak reports and systematic analyses of nosocomial outbreaks from 2007 and focuses on different aspects of hospital epidemiology and infection control.
Recent findings
A single outbreak report is likely be influenced by the local setting. In contrast, a systematic analysis of a large number of similar outbreaks draws a much better picture of the real conditions on the pathogen's reservoirs, on modes of transmission, and on appropriate infection control measures to prevent the spread of the microorganism. Isolation, unit closures, sick leave, cleaning, and diagnostic/therapeutic measures may lead to enormous costs during an outbreak. Thus, cost calculations of outbreaks should be performed to justify future expenses for infection control. Mathematic modeling is a fairly new approach to estimate the risk of pathogen transmission in outbreak settings. Examples are shown to differentiate between epidemic and sporadic infections and to evaluate the influence of infection control interventions.
Summary
Outbreak reports may add some very important information to the understanding of transmission and infection control. There is a need for a more structured publication of nosocomial outbreaks to ensure that no key data are lacking in the article.

Gastmeier at al. Curr.Opin.Infect.Dis. 2008;21:357-361

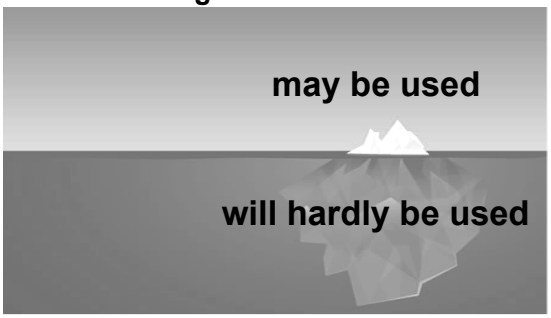
What do we need?

A single outbreak description is most likely not representative for the situation in other hospital settings.

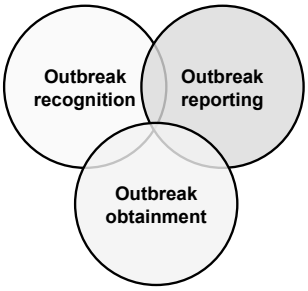
↓

Generalization of findings requires a systematic analysis of a large number of reports of similar nosocomial outbreaks.

What do we get?



The problem of retrieving data



Outbreak recognition

	no …	… yes
awareness of staff	„usual ward“	„high risk patients“
number of patients	small	large
type of pathogen	physiological flora	rare species
severity of illness	colonization only	infection / lethal outcome

Outbreak reporting

RESEARCH LETTERS

Disinfectant contaminated with *Klebsiella oxytoca* as a source of sepsis in babies

Irwin Reiss, Arndt Borkhardt, Roswitha Füssle, Andreas Sziegoleit, Ludwig Gortner

We report an outbreak of sepsis from contaminated disinfectant in a neonatal and paediatric intensive-care unit. 28 infants were infected with *Klebsiella oxytoca* and basic measures to control the outbreak failed. The resistance of *K oxytoca* against the disinfectant was probably mediated by capsule formation, visible as mucoid colonies.

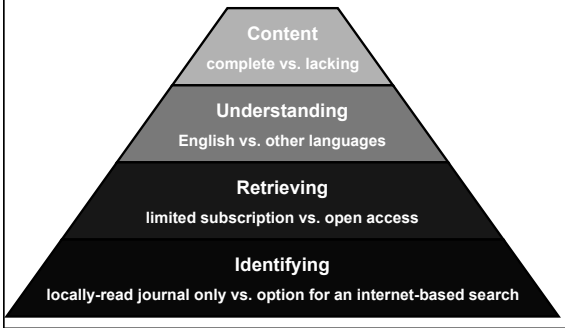
CORRESPONDENCE

Consequences of scientific reports of complications

Sir—In the past few years, public attention has focused on scientific fraud after reports that basic science results and clinical study data were at least partly incorrect. A lot of public interest can influence reports of clinical trials of therapeutic interventions for common diseases such as breast cancer.[1] Consequences of scientific fraud include removal of the responsible scientists from their institutes and hospitals, withdrawal of public funding, as well as damage of reputation in the eyes of the scientific community and the public. Thus, public awareness and scrutiny by the media has increased the pressures on medical and research institutions.[2]

Reiss et al. Lancet 2000;356:310
Gortner at al. Lancet 2000;356:2015

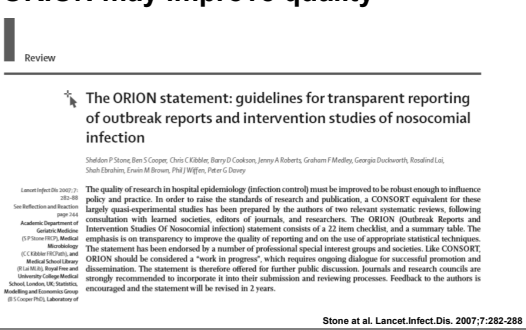
Outbreak obtainment



The problem of evidence

- **randomized controlled trials** cannot be carried out
  - approach to outbreaks is **retrospective** (by definition)
    - loss of time = loss of information
  - **ethical dilemma** of putting persons at risk on purpose
    - determining dose of infection, e.g. in the immuno-compromized
    - tolerating potential risks of nosocomial infections in patient care
    - judging the use of infection control measures by intentional breaks
- **standardized manner** of outbreak reporting lacking
  - data often missing that is required for risk factor analysis

ORION may improve quality


Review

The ORION statement: guidelines for transparent reporting of outbreak reports and intervention studies of nosocomial infection

Sheldon P Stone, Ben S Cooper, Chris C Kibbler, Barry D Cookson, Jenny A Roberts, Graham F Medley, Georgia Duckworth, Rosalind Lai, Shah Ebrahim, Erwin M Brown, Phil J Wilfert, Peter G Davey

The quality of research in hospital epidemiology (infection control) must be improved to be robust enough to influence policy and practice. In order to raise the standards of research and publication, a CONSORT equivalent for these largely quasi-experimental studies has been prepared by the authors of two relevant systematic reviews, following consultation with learned societies, editors of journals, and researchers. The ORION (Outbreak Reports and Intervention Studies Of Nosocomial infection) statement consists of a 22 item checklist, and a summary table. The emphasis is on transparency to improve the quality of reporting and on the use of appropriate statistical techniques. The statement has been endorsed by a number of professional special interest groups and societies. Like CONSORT, ORION should be considered a "work in progress", which requires ongoing dialogue for successful promotion and dissemination. The statement is therefore offered for further public discussion. Journals and research councils are strongly recommended to incorporate it into their submission and reviewing processes. Feedback to the authors is encouraged and the statement will be revised in 2 years.

Stone at al. Lancet.Infect.Dis. 2007;7:282-288

Need for standardized reporting


Reflection and Reaction

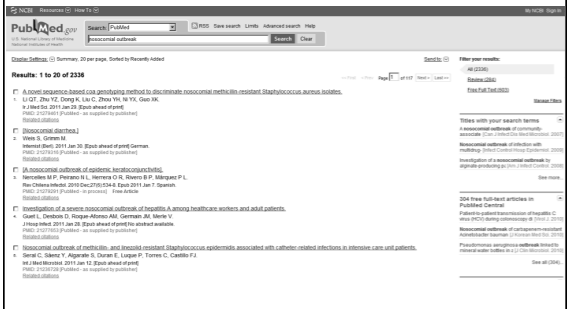
Quality of outbreak descriptions in medical literature

Vonberg at al. Lancet.Infect.Dis. 2007;7:699-700

PART #3

Introducing the Outbreak Database

Data collection is time consuming



There is a need for a tool for …

- … hospital epidemiologists
- … infection control personnel
- … infectious diseases specialists
- … health care workers on the ward
- … staff in microbiology & virology
- … many others

The Outbreak Database – A Tool for Hospital Epidemiologists
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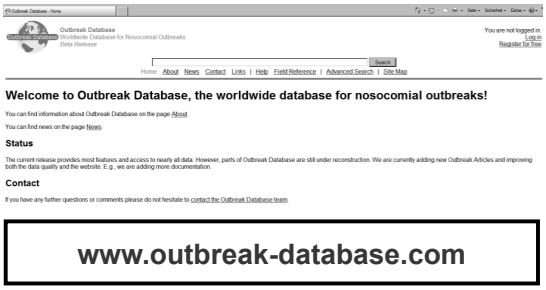
The Outbreak Database

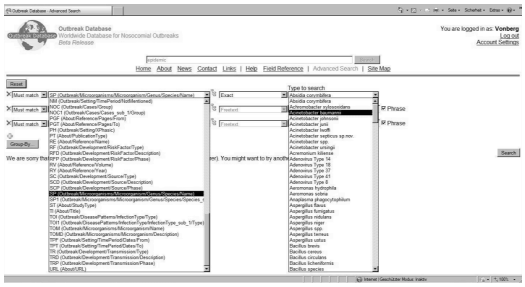


www.outbreak-database.com

The Outbreak Database

- only "real" nosocomial outbreaks are included
- web-based application ⇨ available world wide & 24/7
- user registration ⇨ advanced search mode possible
- relevant outbreak characteristics filed separately
- use free text and / or given search terms
- run by university hospital staff (non-profit organization)
- may be assessed absolutely free of charge

The Outbreak Database



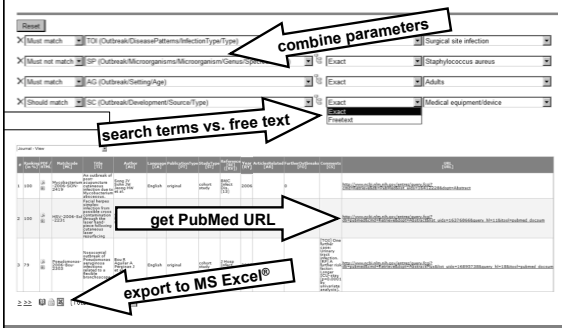
Characteristics

articles	(new files get added regularly)	2,500
setting	countries	87
	medical departments	25
pathogen	possible or proven sources	7
	modes of transmission	4
	causative species	> 250
patients	risk factors	11
	types of infection	52
staff	infection control measures	14

Characteristics (continued)

- year of the outbreak
- year of publication
- type of study report
- outbreak duration
- # of outbreak phases
- type of facility
- total # of cases
- # of fatal cases
- age groups
- typing methods

Search the Outbreak Database



Hosted by Paul Webber paul@webbertraining.com
www.webbertraining.com

Use the "Group-By" function

DE	Count	%
Surgery	97	40.08
Neonatology	65	26.86
Internal medicine	41	16.94
Different Dept. (not listed)	20	8.26
General medicine	16	6.61
Not mentioned	15	6.20
Orthopedics	15	6.20
Gynecology/obstetrics	9	3.72
Pediatrics	9	3.72
Dermatology	8	3.31
Geriatrics	7	2.89
Hematology/Oncology	7	2.89
Neurology/psychiatry	7	2.89
Neurosurgery	6	2.48
Transplantation	6	2.48
Urology	5	2.07
Ear, Nose and throat	3	1.24
Hemodialysis	2	0.83
Rehabilitation	1	0.41
Sums:	339	140.08

PART #4

Application of the Outbreak Database

Prevention of infections by outbreaks

① Support during an investigation of an outbreak

② Education of medical staff

③ New insights in the role of pathogens and potential routes of transmission

④ Preparing infection control guidelines

⑤ Ideas for future applications

Support in an outbreak investigation

Where should one search when confronted with outbreaks of nosocomial infection?

Petra Gastmeier, MD,[a,b] Sabine Stamm-Balderjahn, MD,[b,c] Sonja Hansen, MD,[b,c] Irina Zuschneid, MD,[b,c] Dorit Sohr, PhD,[c] Michael Behnke, PhD,[b,c] Ralf-Peter Vonberg, MD,[a] and Henning Rüden, MD[b,c]
Hannover and Berlin, Germany

The outbreak database (http://www.outbreak-database.com), containing 1561 records of nosocomial outbreaks published in the medical literature in a systematic format, was used to identify the most frequent outbreak sources for the entire database as well as for specific outbreak pathogens. Overall, in 37.1%, no source was identified. The main sources identified were index patients (40.3%), followed by equipment and devices (21.1%), environment (19.8%), and personnel (15.8%). (Am J Infect Control 2006;34:603-5.)

Gastmeier at al. Am.J.Infect.Control 2006;35:603-605

Support in an outbreak investigation

How Often Do Asymptomatic Healthcare Workers Cause Methicillin-Resistant *Staphylococcus aureus* Outbreaks? A Systematic Evaluation

Ralf-Peter Vonberg, MD; Sabine Stamm-Balderjahn, MD; Sonja Hansen, MD; Irina Zuschneid, MD; Henning Rüden, MD; Michael Behnke, PhD; Petra Gastmeier, MD

A systematic search was performed to identify outbreaks of methicillin-resistant *Staphylococcus aureus* infection and colonization caused by healthcare workers (HCWs). Of 191 outbreaks identified, 11 had strong epidemiological evidence that HCWs were the source. In 3 of these outbreaks, asymptomatic carriers were the cause. The frequent practice of screening asymptomatic HCWs should be reconsidered.

Infect Control Hosp Epidemiol 2006; 27:1123-1127

Vonberg at al. Infect.Control.Hosp.Epidemiol 2006;27:1123-1127

Support in an outbreak investigation

① How often do asymptomatic carrier among HCW cause MRSA outbreaks?

② Removal of MRSA positive staff from direct patient care?

③ What about screening of staff during an MRSA outbreak?

Vonberg at al. Infect.Control.Hosp.Epidemiol 2006;27:1123-1127

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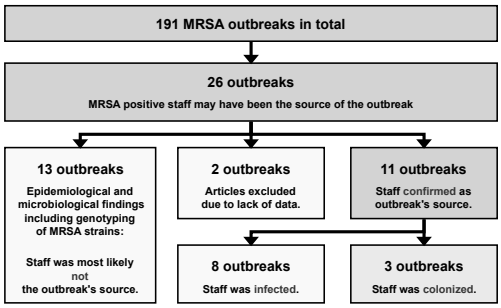
Support in an outbreak investigation



Vonberg at al. Infect.Control.Hosp.Epidemiol 2006;27:1123-1127

Support in an outbreak investigation

Journal of Hospital Infection (2007) 65, 348–353
Available online at www.sciencedirect.com
ScienceDirect
ELSEVIER
www.elsevierhealth.com/journals/jhin

Closure of medical departments during nosocomial outbreaks: data from a systematic analysis of the literature

S. Hansen [a,*], S. Stamm-Balderjahn [a], I. Zuschneid [a], M. Behnke [a], H. Rüden [a], R.-P. Vonberg [b], P. Gastmeier [b]

[a] Institute for Hygiene and Environmental Medicine, Charité – University Medicine Berlin, Germany
[b] Institute for Medical Microbiology and Hospital Epidemiology, Medical School Hannover, Germany

Hansen at al. J.Hosp.Infect. 2007;65:348-353

Support in an outbreak investigation

As total closure of a ward is expensive:

① What are the most critical patients?

② What are the most transmissible pathogens?

Hansen at al. J.Hosp.Infect. 2007;65:348-353

Support in an outbreak investigation

medical department *	No. outbreaks **	No. outbreaks with closure (%)	p-value
surgery	346	44 (12.7%)	n.s.
neonatology	332	53 (16.0%)	n.s.
internal medicine	307	44 (14.3%)	n.s.
pediatrics	132	8 (6.1%)	0.030
hematology-oncology	125	12 (9.6%)	n.s.
geriatrics	79	24 (30.3%)	<0.001
general medicine	76	3 (3.9%)	0.030
dialysis	76	5 (6.6%)	n.s.
neurology / psychiatry	66	7 (10.6%)	n.s.
gynecology / obstetrics	58	10 (17.2%)	n.s.
transplantation	56	5 (8.9%)	n.s.
orthopedics	40	9 (22.5%)	n.s.
neurosurgery	39	9 (17.9%)	0.050
urology	38	5 (13.2%)	n.s.
total	**1,561**	**194 (12.4%)**	-

* affected by at least 20 outbreaks; ** may be mentioned more than once

Hansen at al. J.Hosp.Infect. 2007;65:348-353

Support in an outbreak investigation

species *	No. outbreaks **	No. outbreaks with closure (%)	p-value
S. aureus	223	12 (10.3%)	n.s.
hepatitis virus	150	6 (4.0%)	0.002
Pseudomonas spp.	130	10 (7.7%)	n.s.
Klebsiella spp.	115	10 (8.7%)	n.s.
Acinetobacter spp.	105	24 (22.9%)	0.020
Serratia spp.	94	14 (14.9%)	n.s.
Enterococcus spp.	67	8 (11.9%)	n.s.
Enterobacter spp.	66	10 (15.2%)	n.s.
Streptococcus spp.	63	18 (28.6%)	0.001
Salmonella spp.	56	4 (7.1%)	n.s.
Legionella spp.	48	2 (4.2%)	n.s.
noro virus	34	15 (44.1%)	<0.001
Clostridium spp.	34	4 (11.8%)	n.s.
rota virus	27	7 (25.9%)	0.050
Aspergillus spp.	25	5 (20.0%)	n.s.
influenza virus / parainfluenza virus	26	10 (38.5%)	<0.001
Citrobacter spp.	12	3 (25.0%)	n.s.
adeno virus	11	3 (27.3%)	n.s.
Shigella spp.	11	4 (36.4%)	0.040
total	**1,561**	**194 (12.4%)**	-

* causing at least 10 outbreaks; ** may be mentioned more than once

Hansen at al. J.Hosp.Infect. 2007;65:348-353

Education of staff

Vol. 26 No. 4 INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY 357

HOW OUTBREAKS CAN CONTRIBUTE TO PREVENTION OF NOSOCOMIAL INFECTION: ANALYSIS OF 1,022 OUTBREAKS

Petra Gastmeier, MD; Sabine Stamm-Balderjahn, MD; Sonja Hansen, MD; Frauke Nitzschke-Tiemann, MD; Irina Zuschneid, MD; Katrin Groneberg, MD; Henning Rüden, MD

Gastmeier at al. Infect.Control.Hosp.Epidemiol 2005;26:357-361

Education of staff

Journal of Hospital Infection (2006) 63, 246–254
Available online at www.sciencedirect.com
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www.elsevierhealth.com/journals/jhin

REVIEW

Nosocomial aspergillosis in outbreak settings

R-P. Vonberg*, P. Gastmeier

Institute for Medical Microbiology and Hospital Epidemiology, Medical School Hannover, Germany

Vonberg at al. J.Hosp.Infect. 2006;63:246-254

Education of staff

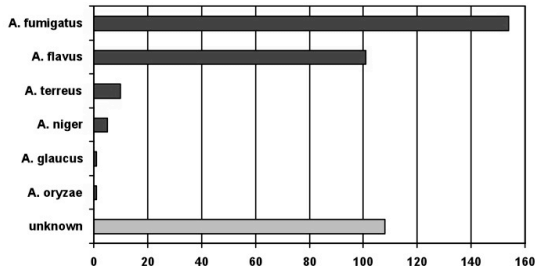
① **May some mold species be considered less virulent than others?**

② **What are the most important mold sources in the hospital area?**

③ **Who are typical types of patients at risk for an invasive mold infection?**

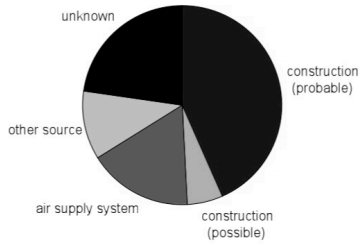
Vonberg at al. J.Hosp.Infect. 2006;63:246-254

Education of staff



Vonberg at al. J.Hosp.Infect. 2006;63:246-254

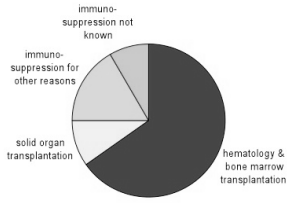
Education of staff



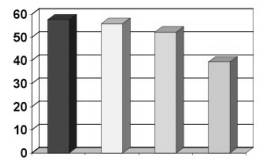
Vonberg at al. J.Hosp.Infect. 2006;63:246-254

Education of staff

type of patients (n = 458)



corresponding mortality (%)



Vonberg at al. J.Hosp.Infect. 2006;63:246-254

Education of staff

Journal of Hospital Infection (2007) 65, 15–23
Available online at www.sciencedirect.com
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www.elsevierhealth.com/journals/jhin

REVIEW

Hospital-acquired infections related to contaminated substances

R.-P. Vonberg*, P. Gastmeier

Institute for Medical Microbiology and Hospital Epidemiology, Medical School Hannover, Hannover, Germany

Vonberg at al. J.Hosp.Infect. 2007;65:15-23

The Outbreak Database – A Tool for Hospital Epidemiologists
Prof. Ralf-Peter Vonberg, University of Hannover
A Webber Training Teleclass

Education of staff

① What are the most risky substances?

② What pathogens cause the outbreak?

③ At what occasion does contamination usually take place?

④ What are the clinical consequences?

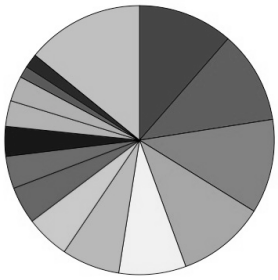
Vonberg at al. J.Hosp.Infect. 2007;65:15-23

Education of staff

type of substance	No. outbreaks	No. patients	mortality (%)
heparin and/or NaCl solutions	30	451	4.3
erythrocyte concentrates	14	39	56.4
thrombocygte concentrates	10	173	1.5
other types of blood products	10	121	4.7
total parenteral nutrition	9	109	48.7
disinfection substances	7	622	4.3
propofol	6	53	13.8
albuterol	4	143	0.0
ultra sound gel	4	36	0.0
fentanyl	3	15	0.0
ranitidine	2	50	0.0
others	25	413	23.2
unknown	4	25	44.0

Vonberg at al. J.Hosp.Infect. 2007;65:15-23

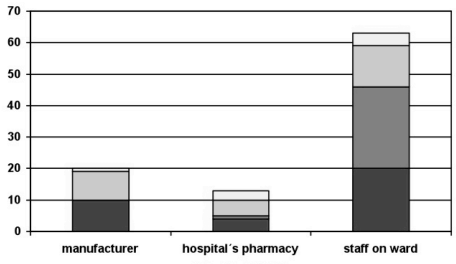
Education of staff



- *B. cepacia*
- *Enterobacter spp.*
- *Serratia spp.*
- hepatitis C virus
- hepatitis A virus
- *R. picketii*
- *S. aureus*
- hepatitis B virus
- *Klebsiella spp.*
- *Plasmodium spp.*
- *Pseudomonas spp.*
- *Candida spp.*
- *Acinetobacter spp.*
- Parvovirus B19
- other

Vonberg at al. J.Hosp.Infect. 2007;65:15-23

Education of staff



Vonberg at al. J.Hosp.Infect. 2007;65:15-23

Education of staff

- **Multi dose vials:** 209 **blood stream infections**
- **Multi dose vials:** 205 transmissions of **hepatitis** virus
- **Multi dose vials:** 178 **other infections**
- **Multi dose vials:** 62 unnecessary **deaths**

Vonberg at al. J.Hosp.Infect. 2007;65:15-23

New insights

Outbreaks in neonatal intensive care units—They are not like others

Petra Gastmeier, MD,[a] Andrea Loui, MD,[b] Sabine Stamm-Balderjahn, MD,[c] Sonja Hansen, MD,[c] Irina Zuschneid, MD,[c] Dorit Sohr, PhD,[c] Michael Behnke, MS,[c] Michael Obladen, MD,[b] Ralf-Peter Vonberg, MD,[a] and Henning Rüden, MD[c]
Hannover, Germany and Berlin, Germany

Background: Outbreaks of health care-associated infections in neonatal intensive care units (NICUs) are frequent and have received more attention in medical literature than outbreaks from other types of intensive care units (ICUs). The objective of this systematic review was to identify differences between outbreaks of health care-associated infections in NICUs and other ICUs as reported to date in the medical literature.
Methods: Screening the outbreak database (http://www.outbreak-database.com), a systematic comparison of outbreaks was performed with the following categories: causing pathogen, type of infection, sources identified, and measures taken to stop the outbreak.
Results: Two hundred and seventy-six outbreaks were reported from NICUs and 455 from other ICU types. *Enterobacteriaceae* were significantly more often responsible for NICU outbreaks, whereas nonfermenting bacteria are more frequently identified in other ICU types. On average, 23.9 patients and 1.8 health care workers were involved in NICU outbreaks. Average mortality in NICU outbreak was 6.4% (1.5 newborns on average). In 48.6% of NICU outbreaks the authors were unable to identify the sources compared with 38.0% in other ICU outbreaks. The most important infection control measures were significantly more often implemented in NICUs than in other ICUs.
Conclusions: Systematic outbreak analysis is essential for gaining insights into the control of NICU outbreaks. (Am J Infect Control 2007;35:172-6.)

Gastmeier at al. Am.J.Infect.Control 2007;35:172-176

New insights

What are the differences in NICU outbreaks compared to other ICUs in terms of …

① … causing pathogens?

② … type of infection?

③ … sources of the outbreak?

④ … infection control measures?

Gastmeier at al. Am.J.Infect.Control 2007;35:172-176

New insights

pathogens

NICU ↑	NICU ↓
Klebsiella spp.	*Pseudomonas spp.*
Serratia spp.	*Acinetobacter spp.*
Enterobacter spp.	
Escherichia spp.	
Salmonella spp.	

infections

NICU ↑	NICU ↓
BSI	pneumonia
GIT	other lower RTI
CNS	UTI
eye-ear-nose-throat	

sources

NICU ↑	NICU ↓
remained unknown	environment
	drugs

measures

NICU ↑	NICU ↓
patient screening	not mentioned
hand hygiene	
isolation / cohorting	
protective clothing	

Gastmeier at al. Am.J.Infect.Control 2007;35:172-176

Infection control recommendations

Infection control measures to limit the spread of *Clostridium difficile*

R.-P. Vonberg[1], E. J. Kuijper[2], M. H. Wilcox[3], F. Barbut[4], P. Tüll[5], P. Gastmeier[1], on behalf of the European C. difficile-Infection Control Group and the European Centre for Disease Prevention and Control (ECDC), P. J. van den Broek[2], A. Colville[6], B. Coignard[7], T. Daha[8], S. Debast[9], B. I. Duerden[10], S. van den Hof[11], T. van der Kooi[11], H. J. H. Maarleveld[2], E. Nagy[12], D. W. Notermans[11], J. O'Driscoll[13], B. Patel[14], S. Stone[15] and C. Wiuff[16]

[1]Institute for Medical Microbiology and Hospital Epidemiology, Medical School Hannover, Hannover, Germany, [2]Leiden University Medical Centre, Leiden, The Netherlands, [3]Department of Microbiology, Leeds Teaching Hospitals and University of Leeds, Leeds, UK, [4]Unité d'Hygiène et de Lutte contre les Infections Nosocomiales, Hôpital Saint-Antoine, Paris, France, [5]European Centre for Disease Prevention and Control (ECDC), Stockholm, Sweden, [6]Royal Devon and Exeter Hospital NHS Foundation Trust, Exeter, UK, [7]Institut de Veille Sanitaire, Saint-Maurice, France, [8]The Dutch Working Party Infection Control, Leiden, [9]Meander Medical Centre, Amersfoort, The Netherlands, [10]Department of Health, London, UK, [11]Centre for Infectious Disease Control Netherlands, National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands, [12]Institute of Clinical Microbiology, Faculty of Medicine, University of Szeged, Szeged, Hungary, [13]Stoke Mandeville Hospital, Stoke Mandeville, Buckinghamshire, UK, [14]Health Protection Agency, London, UK, [15]Academic Department of Geriatric Medicine, Hampstead Campus, Royal Free and University College Medical School, London, UK and [16]Health Protection Scotland, Glasgow, UK

Vonberg at al. Clin.Microbiol.Infect. 2008;14:2-20

Infection control recommendations

① What are feasible infection control measures when dealing with *C. difficile*?

② What should be done particularly in the outbreak setting?

Vonberg at al. Clin.Microbiol.Infect. 2008;14:2-20

Infection control recommendations

MATERIALS AND METHODS

Data acquisition

The following search strategy was applied to identify relevant publications:
1 PubMed was searched using the search term '*difficile*' in combination with either 'nosocomial', 'outbreak', 'transmission', 'control', 'environment', and 'prevention'.
2 The Cochrane Library was searched using the search term '*difficile*'.
3 All outbreaks filed in the Outbreak Database [25] were explored using '*C. difficile*' as 'species' and the grouped-by mode for 'source', 'transmission', and 'measures'.
4 Finally, a manual search of the reference lists of all relevant articles was performed in order to identify as yet unknown publications that deal with infection control measures for *C. difficile*.
There were no restrictions with respect to language or type of article.

Levels of evidence

Level 1a: Systematic review (with homogeneity) of randomised controlled trials
Level 1b: Individual randomised controlled trial (with narrow confidence interval)
Level 1c: Studies with the outcome 'All or none'
Level 2a: Systematic review (with homogeneity) of cohort studies
Level 2b: Individual cohort study (including low-quality randomised controlled trials; e.g., <80% follow-up)
Level 2c: 'Outcomes' research; ecological studies
Level 3a: Systematic review (with homogeneity) of case–control studies
Level 3b: Individual case–control study
Level 4: Case series (and poor quality cohort and case–control studies)
Level 5: Expert opinion without explicit critical appraisal, or based on physiology, bench research or 'first principles'

Categories for implementation in clinical practice

IA: Strongly recommended for implementation and strongly supported by well-designed experimental, clinical or epidemiological studies
IB: Strongly recommended for implementation and strongly supported by some experimental, clinical or epidemiological studies and a strong theoretical rationale
IC: Required for implementation, as mandated by federal and/or state regulation or standard (may vary among different states/countries)
II: Suggested for implementation and supported by suggestive clinical or epidemiological studies or a theoretical rationale
Unresolved issue: Practices for which insufficient evidence exists or no consensus regarding efficacy exists (no recommendation)

Vonberg at al. Clin.Microbiol.Infect. 2008;14:2-20

Modeling on outbreaks

STATISTICS IN MEDICINE
Statist. Med. 2008; **27**:6522–6531
Published online 1 September 2008 in Wiley InterScience
(www.interscience.wiley.com) DOI: 10.1002/sim.3419

Statistical epidemic modeling with hospital outbreak data

M. Wolkewitz[1,*,†], M. Dettenkofer[2], H. Bertz[3], M. Schumacher[1] and J. Huebner[4]

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[2]*Institute of Environmental Medicine and Hospital Epidemiology, University Medical Center Freiburg, Germany*
[3]*Department of Internal Medicine I, Hematology/Oncology, University Medical Center Freiburg, Germany*
[4]*Division of Infectious Diseases University Hospital Freiburg, University Medical Center Freiburg, Germany*

Wolkewitz at al. Statist.Med. 2008;27:6522-6531

The Outbreak Database – A Tool for Hospital Epidemiologists
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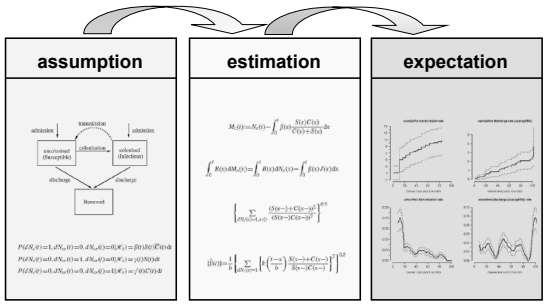
Modeling on outbreaks



Wolkewitz at al. Statist.Med. 2008;27:6522-6531

Summary

- Nosocomial outbreaks have always occurred and (most probably) always will.
- Nosocomial outbreaks may have severe clinical and economical consequences.
- Be aware of nosocomial outbreaks and publish findings for the benefit of future patients.
- The Outbreak Database is an extremly valuable tool in outbreak research.

Suggested reading

Infection (2011) 39:29–34
DOI 10.1007/s15010-010-0068-6

CLINICAL AND EPIDEMIOLOGICAL STUDY

Worldwide Outbreak Database: the largest collection of nosocomial outbreaks

R.-P. Vonberg · D. Weitzel-Kage · M. Behnke · P. Gastmeier

Vonberg at al. Infection 2011;39:29-34

COMING SOON …

12 Apr. 11	***(Free British Teleclass)*** **Voices of the IPS** Speaker: Infection Prevention Society Board
13 Apr. 11	***(South Pacific Teleclass)*** **Prevention of Surgical Site Infections** Speaker: Dr. Matthias Maliwald, KK Women's and Children's Hospital, Singapore
14 Apr. 11	**Healthcare-Associated Infection Prevention Bundles – Preventing The Preventable** Speaker: Dr. William Jarvis, Jason & Jarvis Associates
28 Apr. 11	***(Free British Teleclass – A. Denver Russell Memorial Teleclass)*** **The Spaulding Classification for Disinfection and Sterilization Is it Time to Reconsider?** Speaker: Dr. Gerry McDonnell, Steris Inc.
05 May 11	***(Free WHO Teleclass)*** **The Importance of Worldwide Hand Hygiene Events and Activities** Speaker: Prof. Didier Pittet, University of Geneva Hospitals Sponsored by: WHO Patient Safety Challenge (www.who.int/gpsc/en)

www.webbertraining.com/schedulep1.php