

Pseudomonas Aeruginosa



Anna Stjärne Aspelund
Hygienläkare
Infektionsläkare

Pseudomonas aeruginosa



18l/h

Smittspårning

Två patienter med hematologisk malignitet avled i sepsis orsakad av en metallo-betalactamas (MBL) producerande stam *Pseudomonas aeruginosa*.

Bakterien resistent mot de flesta antibiotika

Patienterna hade vårdats på samma avdelning, i samma rum.

Samma bakterie i tvättstället



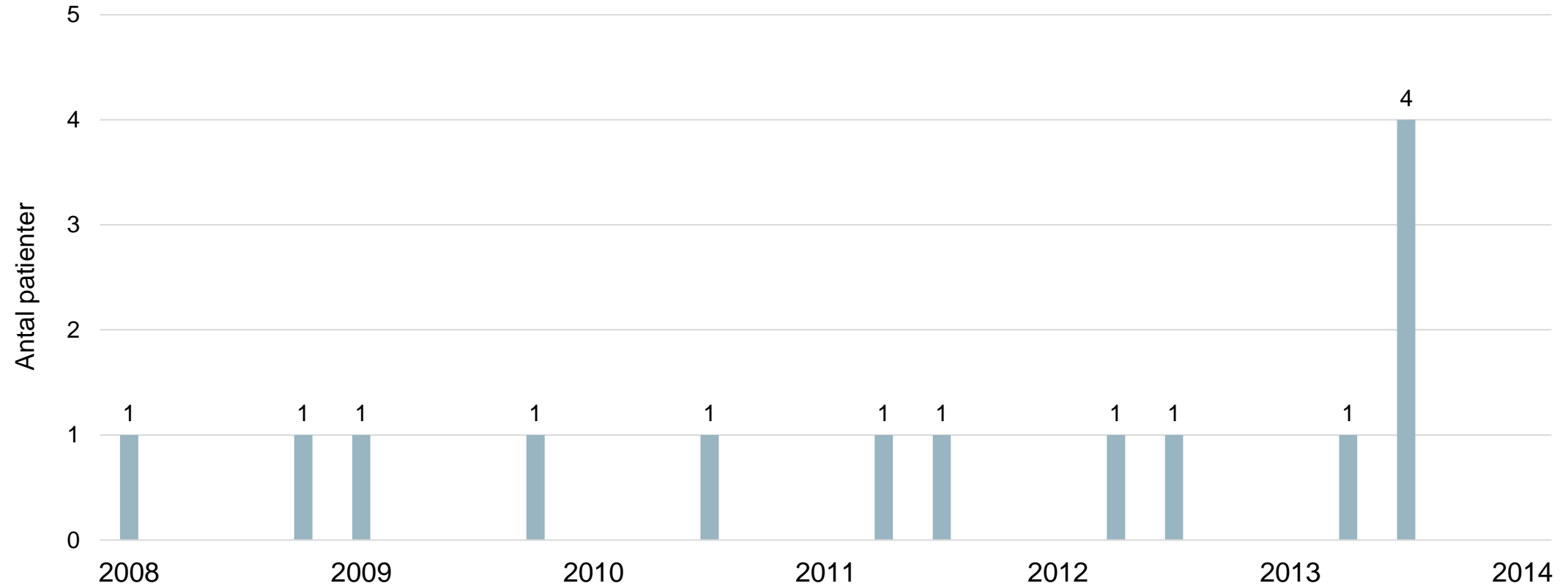
Antibiotics	
Piperacillin-tazobactam	R
Ceftazidim	R
Imipenem	R
Meropenem	R
Aztreonam	R
Colistin	S
Gentamicin	S
Tobramycin	R
Ciprofloxacin	R

Sjukhustvättställ

- Bakteriereservoir
- Biofilm
- Utbrott beskrivna
- Stänker – sprider bakterier
- Utformning



Patienter med MBL producerande *Pseudomonas aeruginosa* i Lund 2008-2014



Pat. no.	Comorbidities	First positive culture/ site of detection	Ward 1	Ward 2	Ward 3	Occupied a room with Pae-MBL in the sink drain
1	Chronic ulcer	Aug. 2008, ulcer	x			NA
2			x			yes
3	Ventil					NA
4	COPD	Dec. 2009, sputum	x			NA
5	UTI, pneumonia	Aug. 2011, urine	x			NA
6	H			x		NA
7			x		x	yes
8	COPD		x			yes
9	Haematological malignancy, neutropenia	July 2013, blood		x		yes
10	Haematological malignancy, neutropenia	July 2013, blood		x		yes
11	Necrotizing fasciitis	July 2013, wound	x		x	yes
12	COPD	Aug. 2013, sputum	x		x	yes

Odlade alla tvättställ på avd 1,2,3 (+4 kontrollavd)

Bakterien hittades i totalt 11 tvättställ.
Alla på patienttoaletten

Underliggande diagnoser:

- 3 hematologisk malignitet
- 7 lungsjuka
- 2 sår

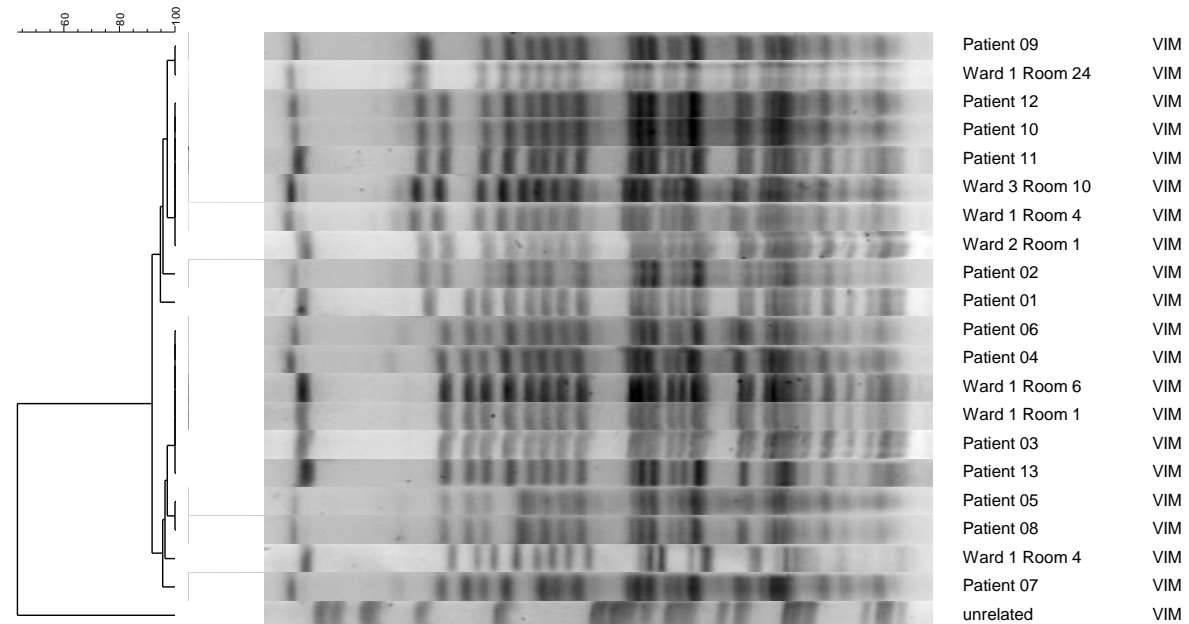
Lokal för positiv odling:

- 3 blododling
- 6 luftvägsprov
- 2 sår
- 1 urin

Molekylär typning med PFGE visade samma stam

12 patienter

7 handfat



Pulsfältgelelektrofores (PFGE)

Åtgärder



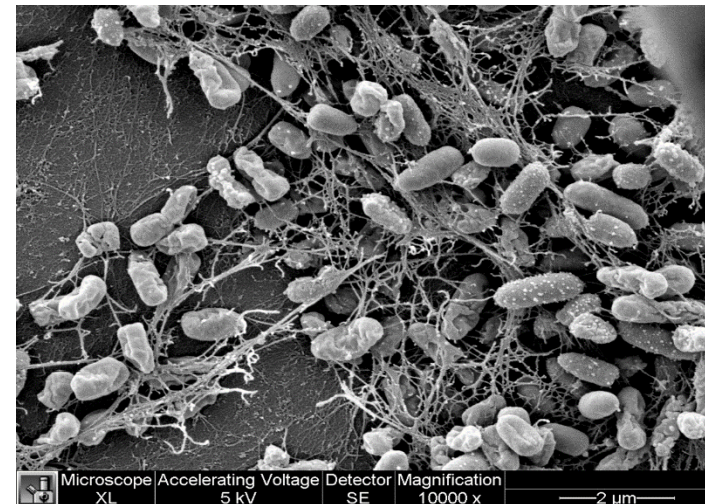
Ättika och MBL producerande *Pseudomonas aeruginosa*

Intervention

2,5 deciliter 24% ättika en gång i veckan

Negativa övervakningsodlingar under behandling med ättika sedan hösten 2013.

	Acetic acid %
MIC	0.047
MBC	0.19
MBEC (12 h)	0.75



Ayliffe, G. A., et al. (1974). "Pseudomonas aeruginosa in hospital sinks." Lancet **2**(7880): 578-581.

kill other gram-negative bacilli in the trap. A simpler solution to the problem would be to ensure that the water from the tap is not directed at the sink outlet, that plugs are never used during handwashing, and that the plumbing near to the sink is occasionally cleaned and replaced when faulty. Overflows could be excluded from basins; washbasins should also be regularly cleaned and not used for disposal of contaminated washing or cleaning water.



Utbrottsbeskrivningar

MDR gramnegativa

Ffa IVA, neonatal, hematologi

Interventioner

- Byt tvättställ/avlopp
- Självsteriliserande vattenlås
- Desinfektionsmedel
- Stänkfria silhåll
- Ättika

Journal of Hospital Infection 102 (2019) 82–88



ELSEVIER

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevier.com/locate/jhin



Acetic acid as a decontamination method for ICU sink drains colonized by carbapenemase-producing Enterobacteriaceae and its effect on CPE infections

D. Smolders^{a,*}, B. Hendriks^b, P. Rogiers^b, M. Mul^a, B. Gordts^a

^a Department of Microbiology, Ziekenhuis Netwerk Antwerpen, Antwerp, Belgium

^b Department of Intensive Care, Ziekenhuis Netwerk Antwerpen, Antwerp, Belgium

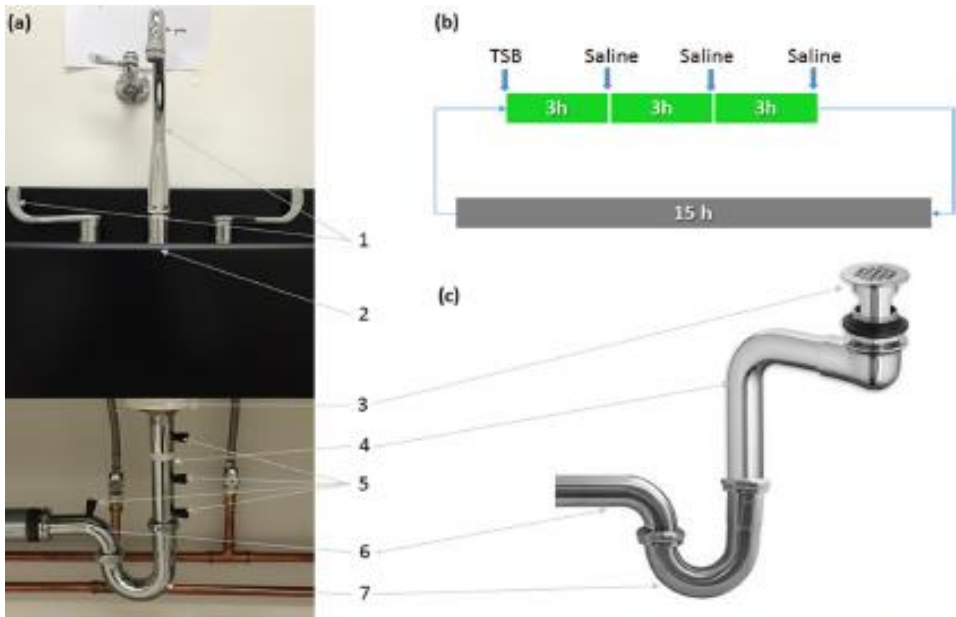
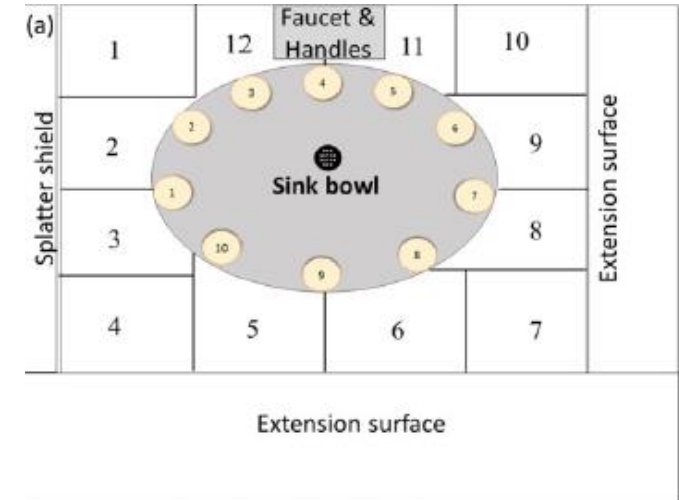
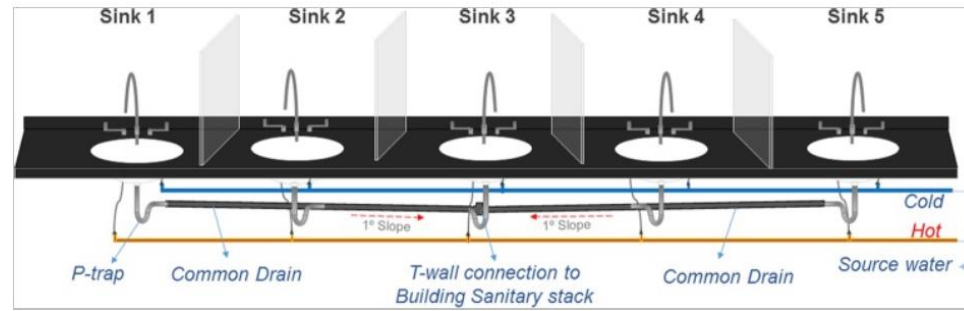
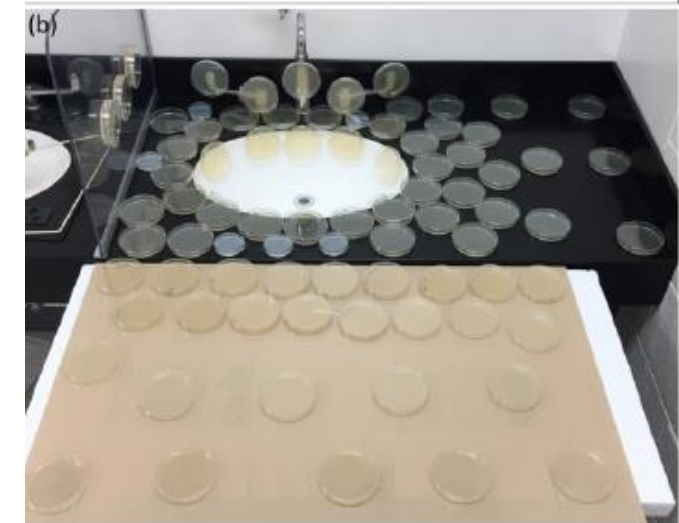


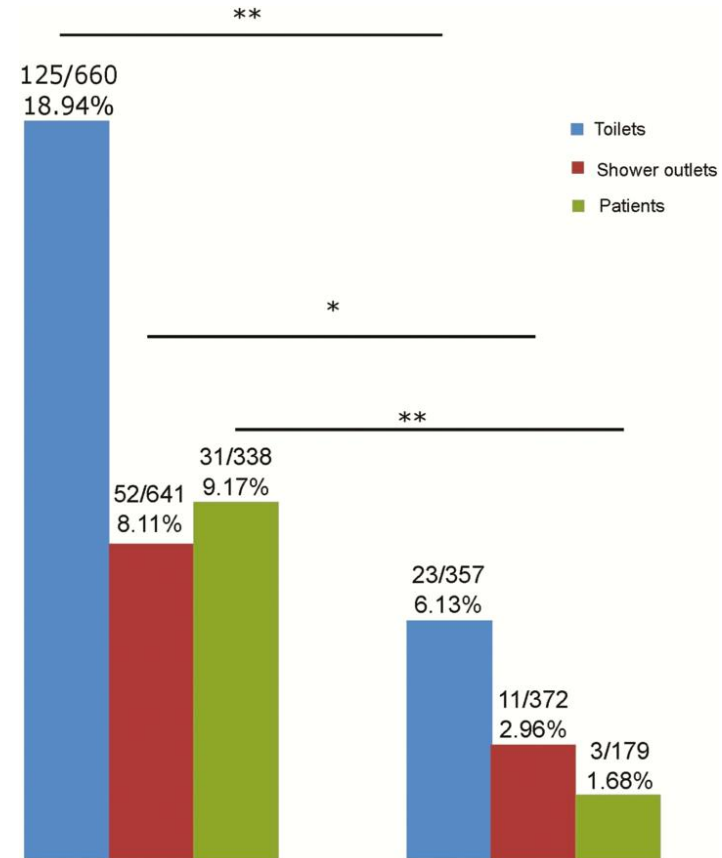
FIG 5 (a) Parts of the sink drain line: 1, faucet and handles; 2, sink counter; 3, strainer; 4, tailpipe; 5, sampling ports; 6, trap arm; 7, P-trap. (b and c) Schematic of the nutrient regimen (b) and offset drain tailpiece used for dispersion experiments (c).



Spread from the Sink to the Patient: *In Situ* Study Using Green Fluorescent Protein (GFP)-Expressing *Escherichia coli* To Model Bacterial Dispersion from Hand-Washing Sink-Trap Reservoirs. Kotay et al. *Appl Environ Microbiol.* April 2017

Bundle - design, monitoring, städning

Kossow A et al. Control of multidrug-resistant *Pseudomonas aeruginosa* in allogeneic hematopoietic stem cell transplant recipients by a novel bundle including remodeling of sanitary and water supply systems. Clin Infect Dis. 2017



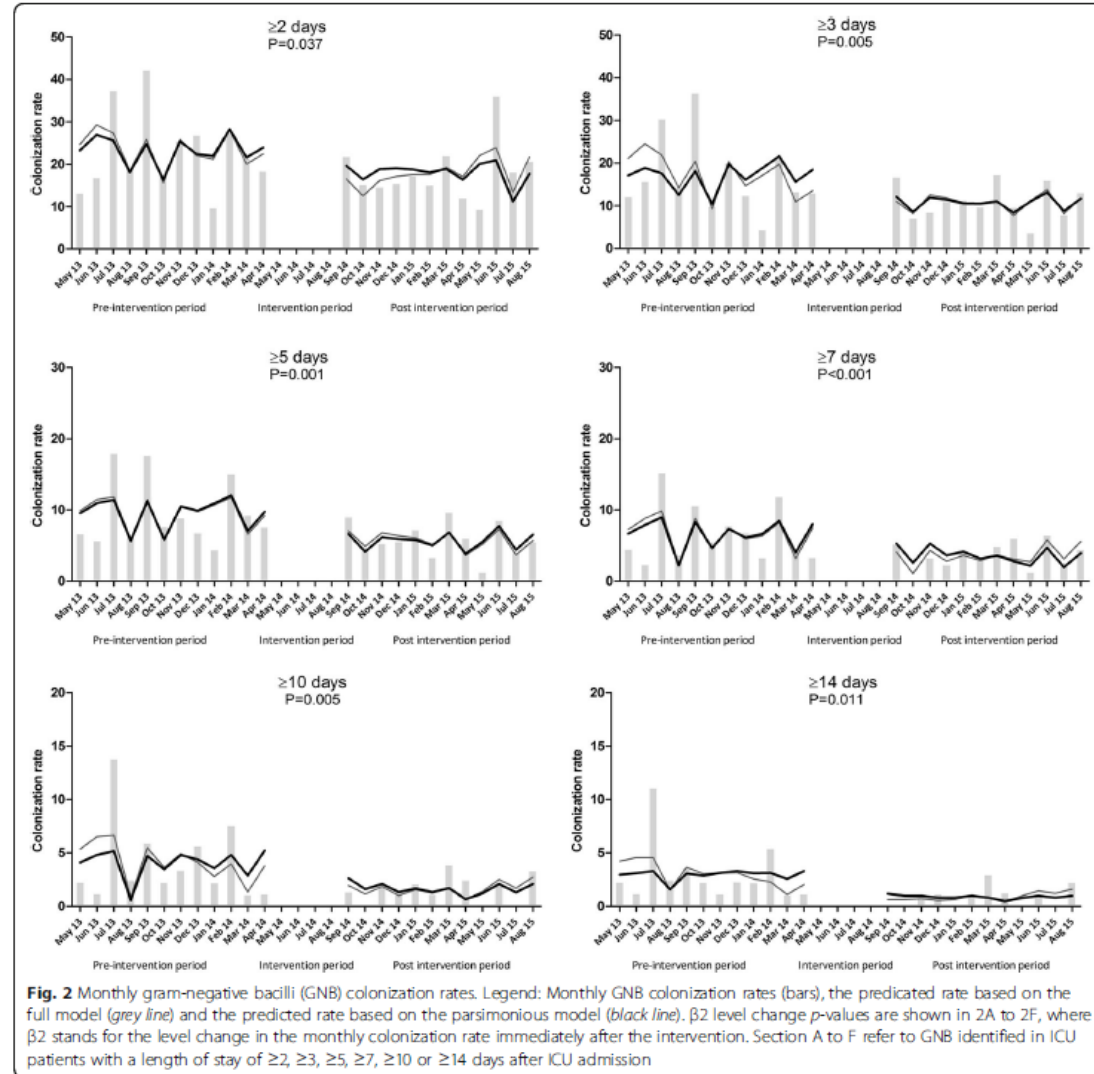
RESEARCH

Open Access



Reduced rate of intensive care unit acquired gram-negative bacilli after removal of sinks and introduction of 'water-free' patient care

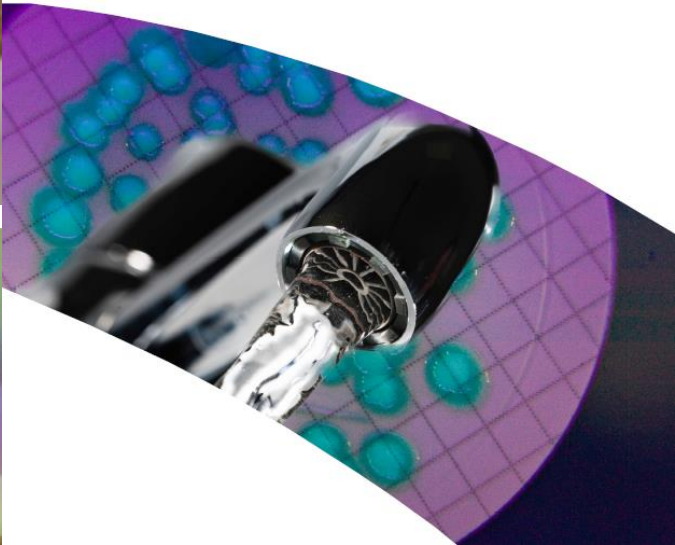
Joost Hopman^{1†}, Alma Tostmann^{1†}, Heiman Wertheim¹, Maria Bos¹, Eva Kolwijck¹, Reinier Akkermans³, Patrick Sturm^{1,4}, Andreas Voss^{1,2}, Peter Pickkers⁵ and Hans vd Hoeven⁵



Invatten – biofilm, bakterier

Water systems
Health Technical Memorandum
04-01: Addendum

Pseudomonas aeruginosa – advice for augmented care units



Kontamination

Ökar om:

- Personal och patienter använder samma tvättställ
- Näring tillförs – typ allt som inte är vatten
- Felaktig städning
- Felaktig design



Hur stort problem egentligen?

Open Forum Infectious Diseases

REVIEW ARTICLE



Are Sink Drainage Systems a Reservoir for Hospital-Acquired Gammaproteobacteria Colonization and Infection? A Systematic Review

Cheryl Volling,¹ Narges Ahangari,¹ Jessica J. Bartoszko,² Brenda L. Coleman,¹ Felipe Garcia-Jeldes,³ Alainna J. Jamal,¹ Jennie Johnstone,¹ Christopher Kandel,¹ Philipp Kohler,⁴ Helena C. Maltezou,⁵ Lorraine Maze dit Mieusement,⁶ Nneka McKenzie,¹ Dominik Mertz,⁷ Adam Monod,¹ Salman Saeed,⁸ Barbara Shea,¹ Rhonda L. Stuart,⁹ Sera Thomas,¹ Elizabeth Uleryk,¹⁰ and Allison McGeer¹

¹Sinai Health System, Toronto, Ontario, Canada, ²McMaster University, Hamilton, Ontario, Canada, ³Centre Hospitalier de l'Université Laval, Quebec City, Quebec, Canada, ⁴Cantonal Hospital St. Gallen, St. Gallen, Switzerland, ⁵National Public Health Organization, Athens, Greece, ⁶Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada, ⁷Hamilton Health Sciences, Hamilton, Ontario, Canada, ⁸Mercy Hospital, Joplin, Missouri, USA, ⁹Monash Health, Clayton, Victoria, Australia, and ¹⁰E.M. Uleryk Consulting, Mississauga, Ontario, Canada

Behövs mer kunskap

VAPmarkers

- Prospektet studie IVA patienter
 - Ventilator associerad pneumoni (VAP)
- Miljöprov tvättställ

Miljöprov silhåll prel. data

- *Pseudomonas aeruginosa* i 44%, 14 av 32 prov
- *Klebsiella pneumoniae*, *enterobacter cloace*, *klebsiella oxytoca*, *serratia marcescens*
- *Citrobacter*, *acinetobacter*, *stenotrophomonas matlophilia*

Vad kan göras?

Fokusera på
riskpatienter/riskavdelningar

Skilj på tvättställ för personal och
patient

Goda rutiner!

Tappkran i köket för dricksvatten
Bakteriefilter?

Design, städning, underhåll

Tvättställ utformat för att minska:

- Stänk
- Biofilm
- Kontamination

Löpande underhåll

Städrutiner