Diffusion of Innovation

Sinks, showers and drains water-related risk in healthcare facilities

Göteborg 2024

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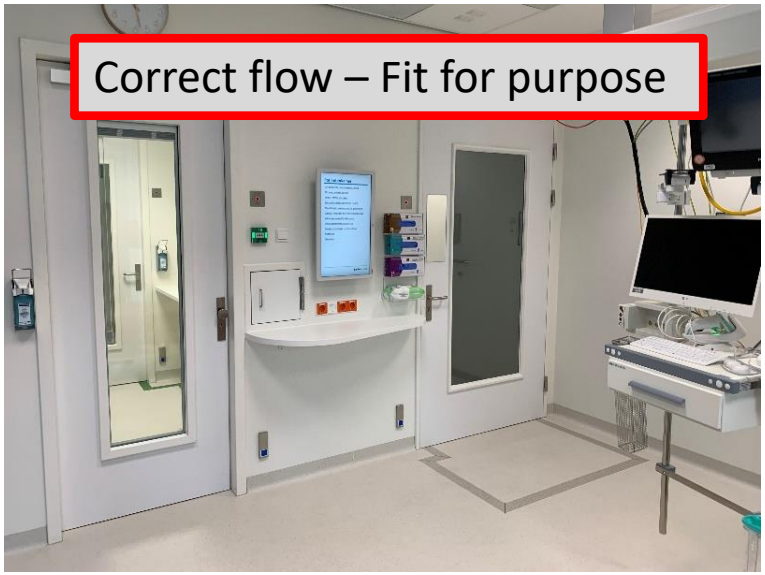
Center for Infectious Diseases
Radboudumc

Radboudumc masters Design Built environment

How does built environment and service design interact?


Simple – clear process steps


Correct flow – Fit for purpose


Oversight


Learning

Why is the diffusion of innovations in the field of the hospital built environment so slow?

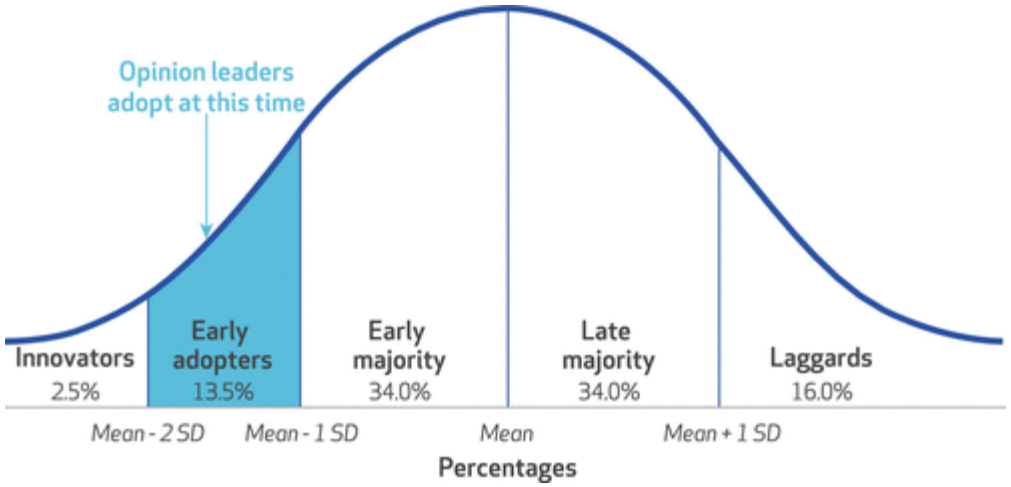
Slow diffusion of innovations

- Expensive interventions
- Interdisciplinary approach is needed
- Long-term consequences of the built environment
- Low grade of evidence available
- Conservative field

Diffusion of innovation the theory

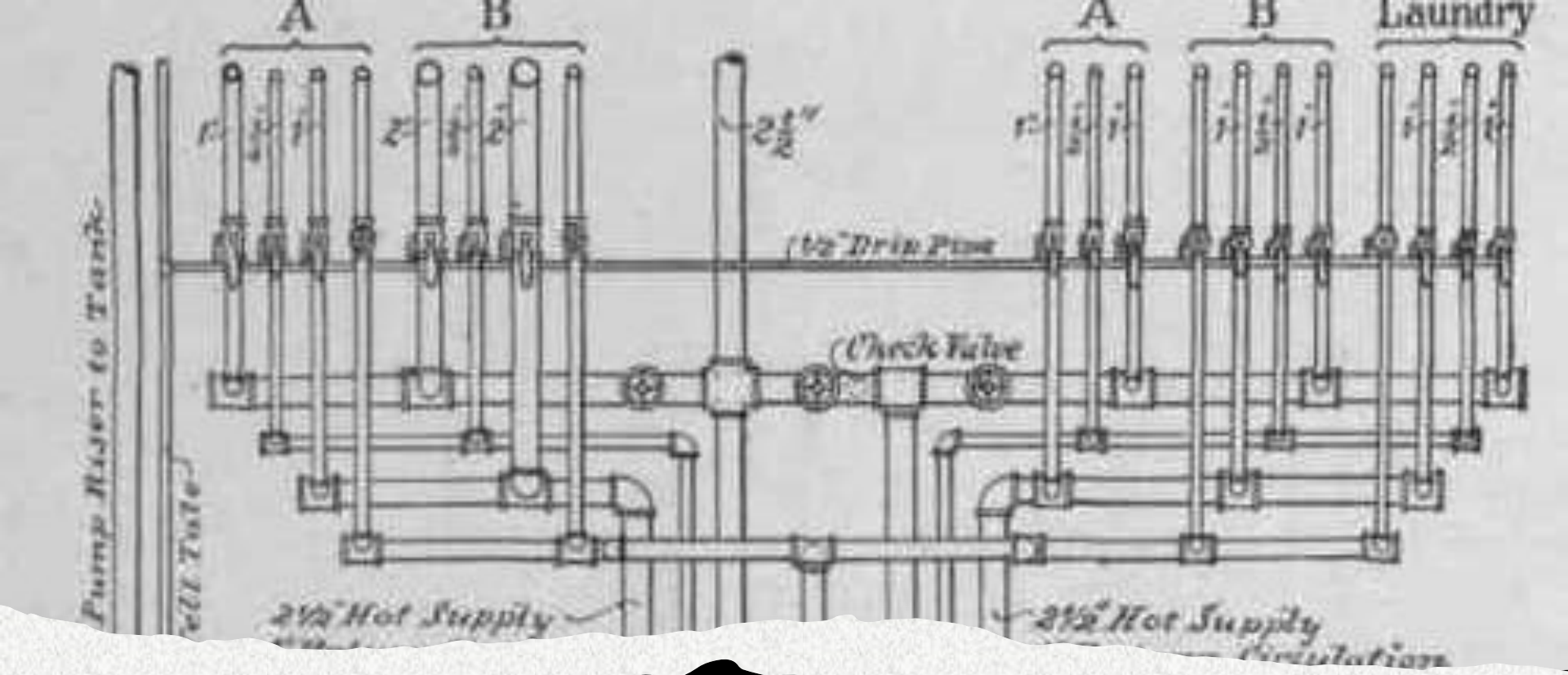
- What Are the Steps In the Diffusion of Innovations?
- Five-step process of decision-making:

1. Knowledge
2. Persuasion
3. Decision
4. Implementation
5. Confirmation



Let's talk Implementation
My lessons learnt

1. Sense of urgency
2. System approach
3. Leadership involvement
4. Team effort
5. Solid preparation
6. Sustainable solution
7. Buy-in from all stakeholders
8. Board involvement
9. Evaluation – Evidence-based approach
10. Create a good narrative!

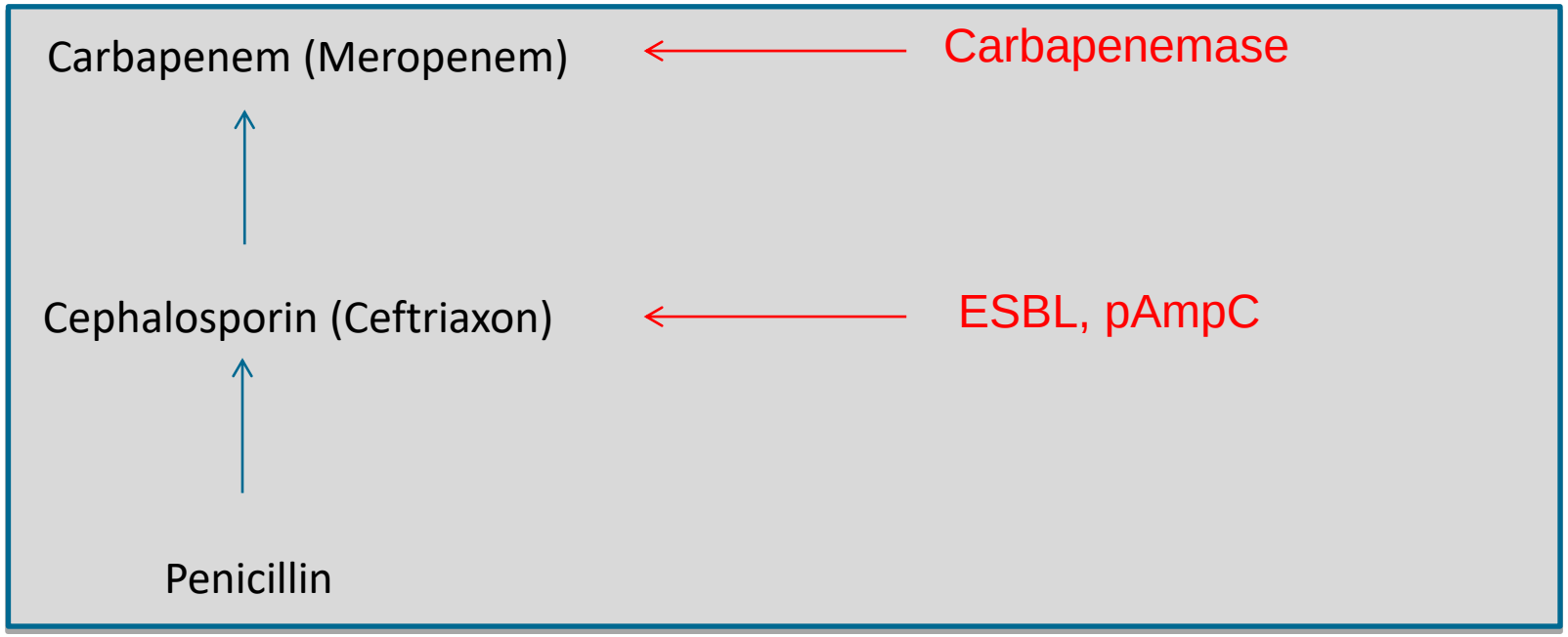


Where are the connections and bacterial communities within the hospital?

Why is it important?

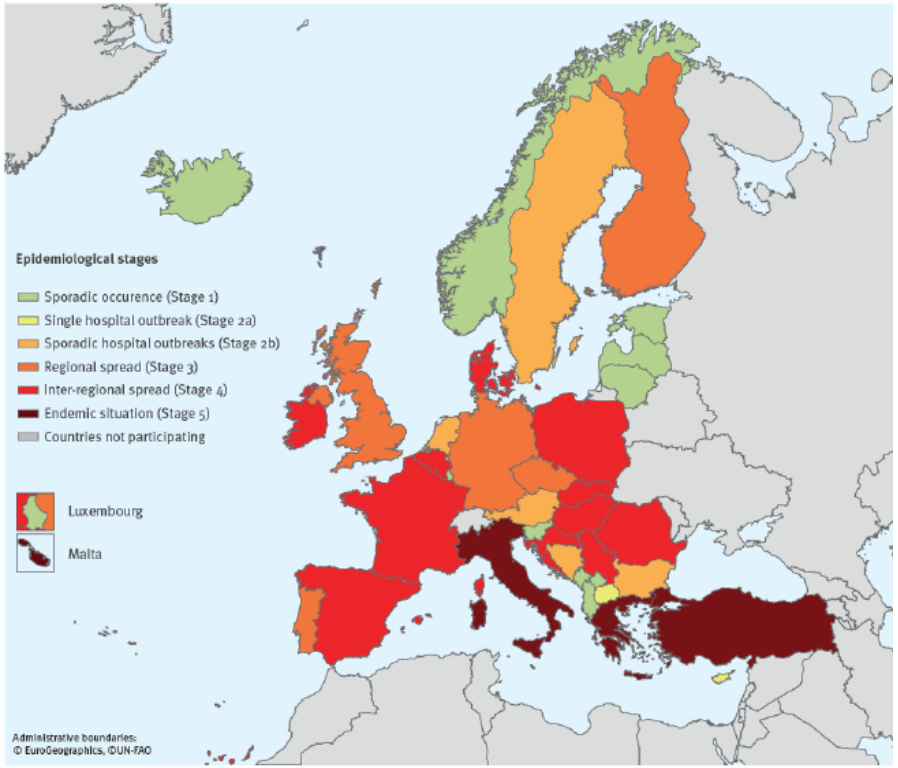
WHY do we care?

Resistance in gram negative bacilli

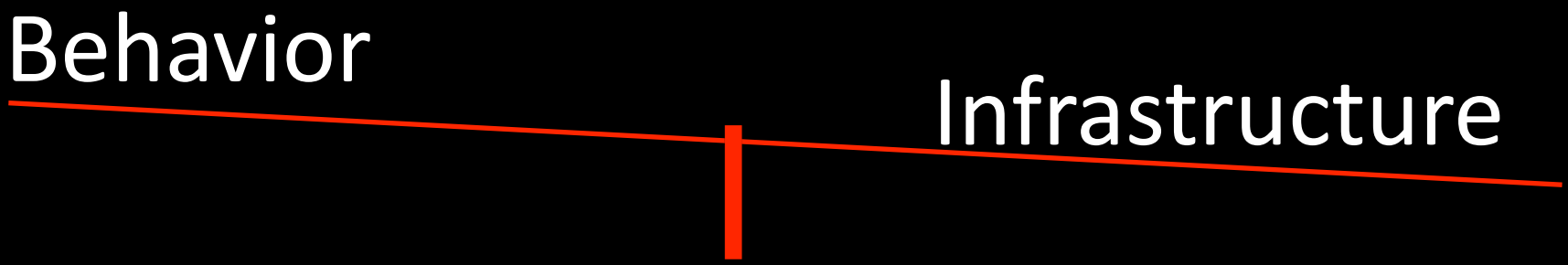


Increased bacterial resistance

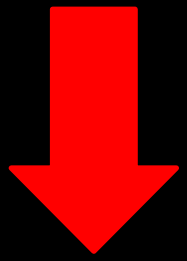
Epidemiological situation of carbapenemase-producing Enterobacteriacea, July 2018



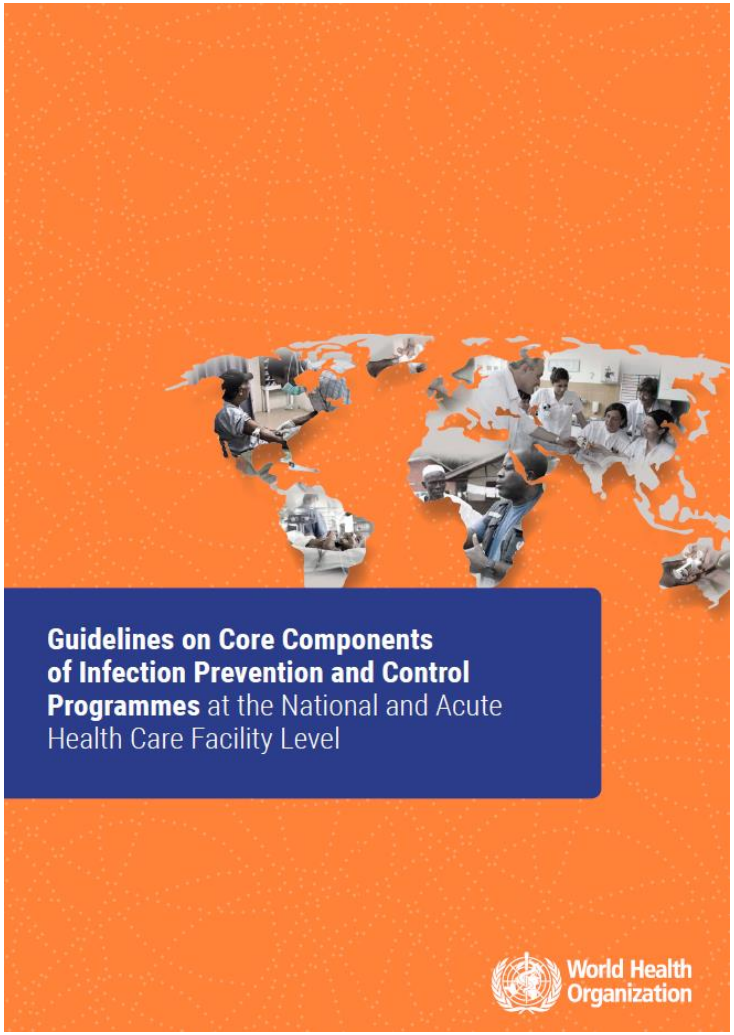
IPC



Infrastructure

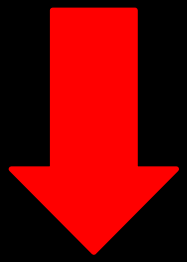


HAI



- 8 Core components
- New
  - Multimodal approach
  - Hospital built environment

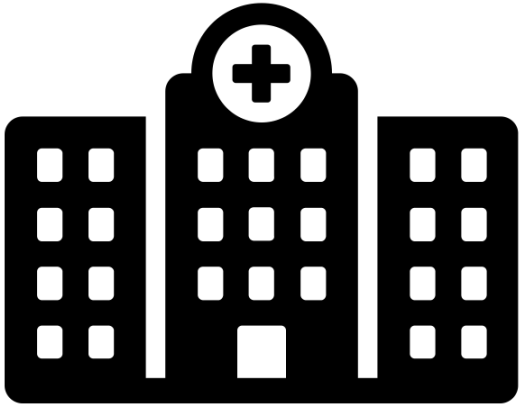
Great variation globally in buillt environment



Driver for outcome differences?

Microbiome
Human versus hospital

- Clear that hospitals are an important reservoir of multidrug-resistant organisms
- Clear that humans are an important reservoir of multidrug-resistant organisms
- Clear that both microbiomes are interconnected



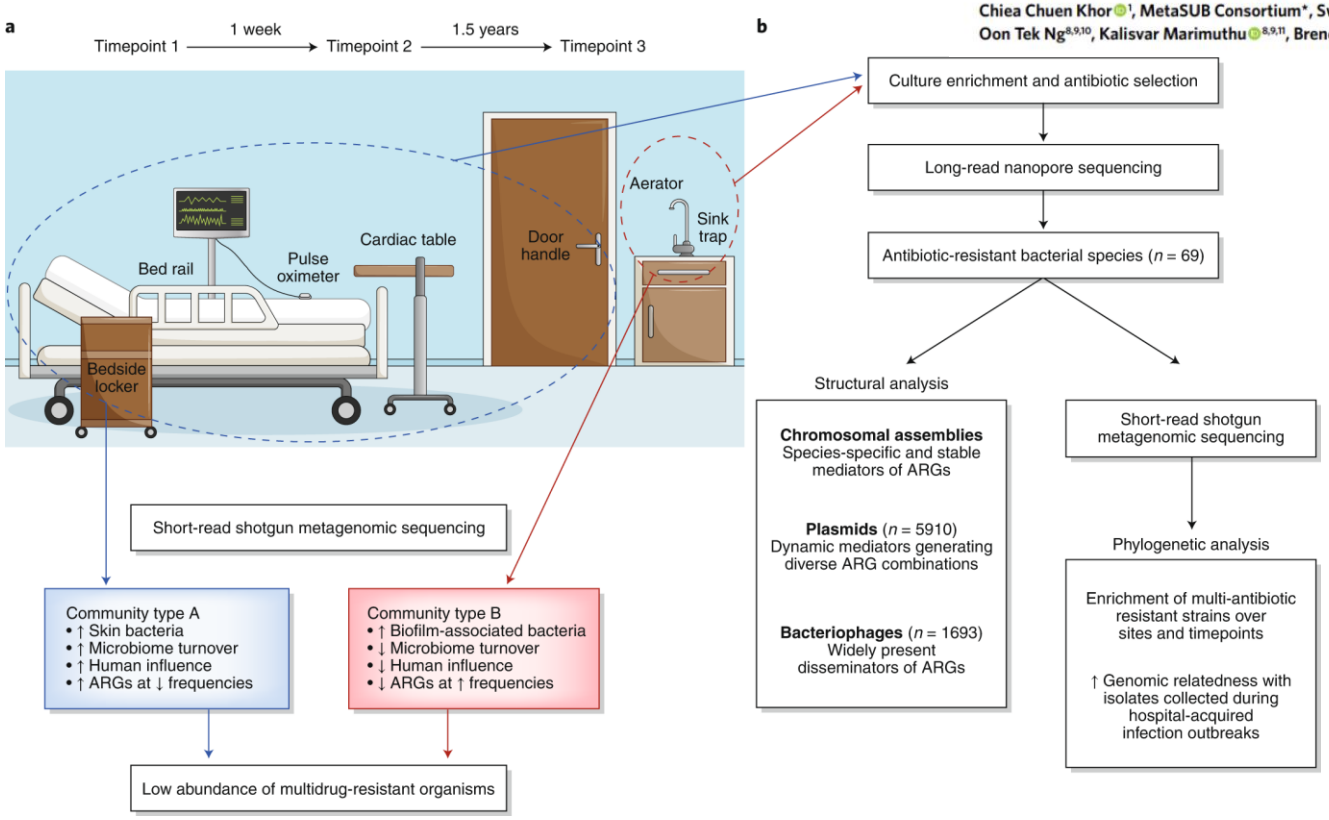
Hospital Microbiome

nature medicine ARTICLES
https://doi.org/10.1038/s41591-020-0894-4
Check for updates

OPEN

Cartography of opportunistic pathogens and antibiotic resistance genes in a tertiary hospital environment

Kern Rei Chng[1,60], Chenhao Li[1,60], Denis Bertrand[1,60], Amanda Hui Qi Ng[1], Junmei Samantha Kwah[1], Hwee Meng Low[1], Chengxuan Tong[1], Maanasa Natrajan[1], Michael Hongjie Zhang[1], Licheng Xu[2], Karrie Kwan Ki Ko[3,4,5], Eliza Xin Pei Ho[1], Tamar V. Av-Shalom[1], Jeanette Woon Pei Teo[6], Chiea Chuen Khor[1], MetaSUB Consortium*, Swaine L. Chen[1], Christopher E. Mason[7], Oon Tek Ng[8,9,10], Kalisvar Marimuthu[8,9,11], Brenda Ang[8,9] and Niranjan Nagarajan[1,11]



Haak, Wiesinga. **Nature medicine**, volume 26, pages 826–828 (2020)

Radboudumc

Water in hospitals – A (dangerous) deep dive

Global outbreak of severe *Mycobacterium chimaera* disease after cardiac surgery: a molecular epidemiological study

)akko van Ingen*, Thomas A Kohl*, Katharina Kranzer*, Barbara Hasse, Peter M Keller, Anna Katarzyna Szafranska, Doris Hillemann, Meera Chand, Peter Werner Schreiber, Rami Sommerstein, Christoph Berger, Michele Genoni, Christian Rüegg, Nicolas Troillet, Andreas F Widmer, Sören L Becker, Mathias Herrmann, Tim Eckmanns, Sebastian Haller, Christiane Höller, Sylvia B Debast, Maurice) Wolfhagen,)oost Hopman, jan Kluytmans, Merel Lange/aar, Daan W Notermans, jaap ten Oever, Peter van den Barse/aar, Alexander BA Vonk, Margreet C Vos, Nada Ahmed, Timothy Brown, Derrick (rook, Theresa Lamagni, Nick Phin, E Grace Smith, Maria Zambon, Annerose Serr, Tim Götting, Winfried Ebner, Alexander Thürmer, Christian Utpatel, Cathrin Spröer, Boyke Bunk, Ulrich Nübel, Guido V Bloemberg t, Erik C Böttgert, Stefan Niemann t, Dirk Wagner t, Hugo Saxt

Summary

Background Since 2013, over 100 cases of *Myrobacterium chimaera* prosthetic valve endocarditis and disseminated disease were notified in Europe and the USA, linked to contaminated heater-cooler units (HCUs) used during cardiac surgery. We did a molecular epidemiological investigation to establish the source of these patients' disease.

lancet *Infect* Dis 2017; 17: 1033-41

Published Online July 12, 2017

Showers

JAMA Network Open

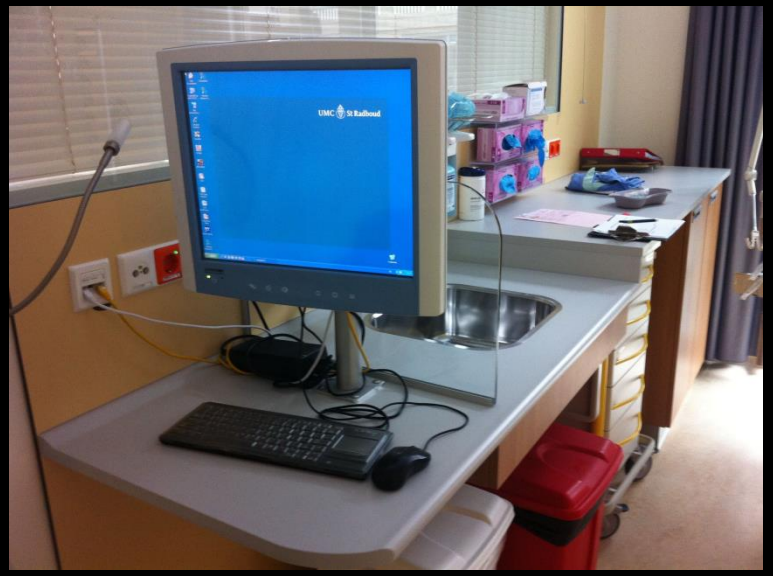
Original Investigation | Infectious Diseases

Risk Assessment After a Severe Hospital-Acquired Infection Associated With Carbapenemase-Producing *Pseudomonas aeruginosa*

Joost Hopman, MD; Corianne Meijer, MSc; Nikki Kenters, BSc; Jordy P. M. Coolen, MSc; Mohammad R. Ghamati, MD; Shaheen Mehtar, MD, PhD; Reinout van Crevel, MD, PhD; Wim J. Morshuis, MD, PhD; Ad F. T. M. Verhagen, MD, PhD; Michel M. van den Heuvel, MD, PhD; Andreas Voss, MD, PhD; Heiman F. L. Wertheim, MD, PhD

- Unexpected detection of carbapenemase-producing (VIM) *P aeruginosa*
- Man in his early 60s, left-sided pneumonectomy and adjuvant radiotherapy
- A total of 5 men (age range, 60-84years) and 6 women (age range, 55-74 years) were admitted to the combined cardiothoracic surgery and pulmonary diseases ward
- No additional cases (colonization or infection) of carbapenemase-producing (VIM) *P aeruginosa* were detected

Sinks



Hopman et al. Antimicrobial Resistance and Infection Control (2017) 6:59
DOI 10.1186/s13756-017-0213-0

Antimicrobial Resistance and Infection Control

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 Wertheim[1], Maria Bos[1], Eva Kolwijck[1], Reinier Akkermans[3], Patrick Sturm[1,4], Andreas Voss[1,2], Peter Pickkers[5] and Hans vd Hoeven[5]

Abstract

Background: Sinks in patient rooms are associated with hospital-acquired infections. The aim of this study was to evaluate the effect of removal of sinks from the Intensive Care Unit (ICU) patient rooms and the introduction of 'water-free' patient care on gram-negative bacilli colonization rates.

Methods: We conducted a 2-year pre/post quasi-experimental study that compared monthly gram-negative bacilli colonization rates pre- and post-intervention using segmented regression analysis of interrupted time series data. Five ICUs of a tertiary care medical center were included. Participants were all patients of 18 years and older admitted to our ICUs for at least 48 h who also received selective digestive tract decontamination during the twelve month pre-intervention or the twelve month post-intervention period. The effect of sink removal and the introduction of 'water-free' patient care on colonization rates with gram-negative bacilli was evaluated. The main outcome of this study was the monthly colonization rate with gram-negative bacilli (GNB). Yeast colonization rates were used as a 'negative control'. In addition, colonization rates were calculated for first positive culture results from cultures taken ≥3, ≥5, ≥7, ≥10 and ≥14 days after ICU-admission, rate ratios (RR) were calculated and differences tested with chi-squared tests.

Results: In the pre-intervention period, 1496 patients (9153 admission days) and in the post-intervention period 1444 patients (9044 admission days) were included. Segmented regression analysis showed that the intervention was followed by a statistically significant immediate reduction in GNB colonization in absence of a pre or post intervention trend in GNB colonization. The overall GNB colonization rate dropped from 26.3 to 21.6 GNB/1000 ICU admission days (colonization rate ratio 0.82; 95%CI 0.67–0.99; $P = 0.02$). The reduction in GNB colonization rate became more pronounced in patients with a longer ICU-Length of Stay (LOS): from a 1.22-fold reduction (≥2 days), to a 1.6-fold (≥5 days; $P = 0.002$), 2.5-fold (for ≥10 days; $P < 0.001$) to a 3.6-fold (≥14 days; $P < 0.001$) reduction.

Conclusions: Removal of sinks from patient rooms and introduction of a method of 'water-free' patient care is associated with a significant reduction of patient colonization with GNB, especially in patients with a longer ICU length of stay.

Keywords: Intensive care unit, Sinks, Gram-negative bacilli, Multidrug resistance, 'Water-free' patient care, Length of stay, Colonization

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ICU in Radboudumc

- Radboud university medical center: 953 patient beds
- 50 single bed ICU rooms, 35 beds operational
- Selective digestive tract decontamination (SDD)[1]
- Low MRSA and VRE rates
- Standard contact precautions
- Increasing global resistance (GNB)
- 2 outbreaks related to the sinks
  - *Klebsiella pneumoniae* ESBL
  - *Enterobacter cloacae* ESBL

[1] N Engl J Med 2009; 360:2138-2141, may 2009

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The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Decontamination of the Digestive Tract and Oropharynx in ICU Patients

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ABSTRACT

BACKGROUND

Selective digestive tract decontamination (SDD) and selective oropharyngeal decontamination (SOD) are infection-prevention measures used in the treatment of some patients in intensive care, but reported effects on patient outcome are conflicting.

METHODS

We evaluated the effectiveness of SDD and SOD in a crossover study using cluster randomization in 13 intensive care units (ICUs), all in the Netherlands. Patients with an expected duration of intubation of more than 48 hours or an expected ICU stay of more than 72 hours were eligible. In each ICU, three regimens (SDD, SOD, and standard care) were applied in random order over the course of 6 months. Mortality at day 28 was the primary end point. SDD consisted of 4 days of intravenous cefotaxime and topical application of tobramycin, colistin, and amphotericin B in the oropharynx and stomach. SOD consisted of oropharyngeal application only of the same antibiotics. Monthly point-prevalence studies were performed to analyze antibiotic resistance.

Lessons from history

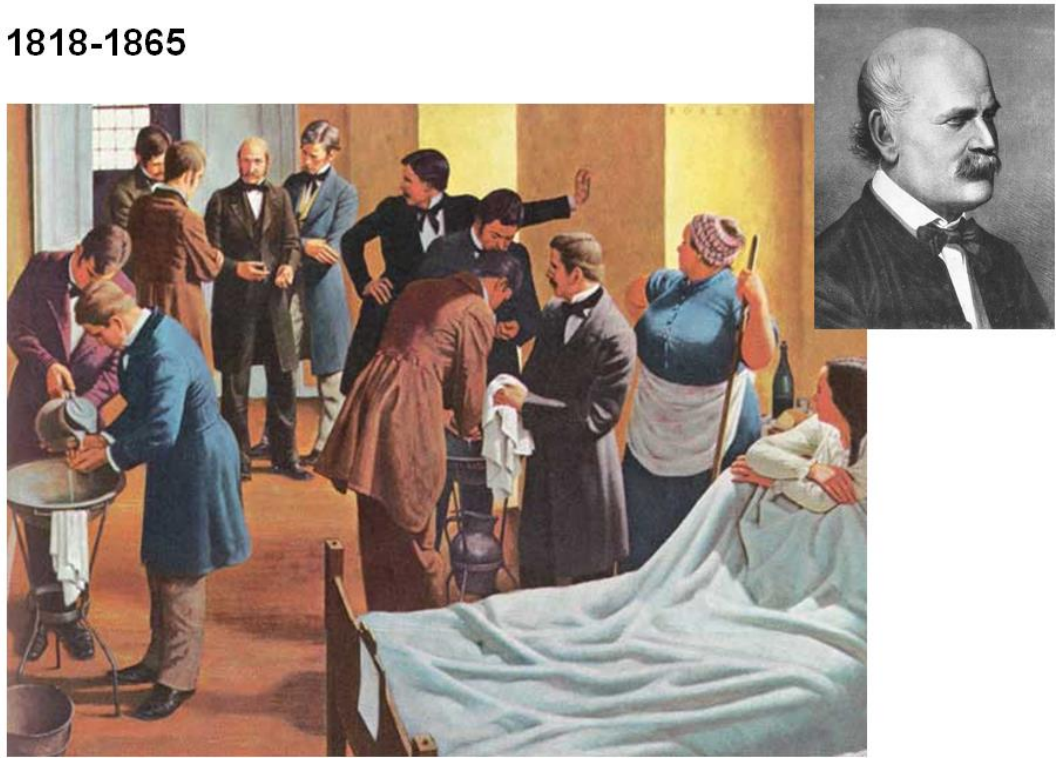
Removal of the ‘Cholera’ handle of the Broad Street Pump, London,1854

GoT made him really famous!

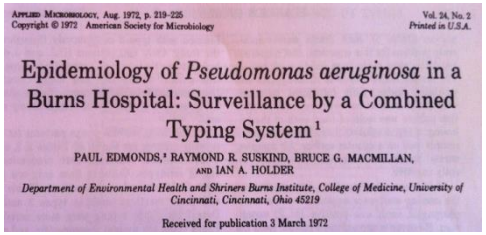
John Snow

Semmelweis

- Observations were about hand hygiene with Chlorine disinfectants
- Over time switch from disinfection to hand washing



Lessons from history - part 2



APPLIED MICROBIOLOGY, Aug. 1972, p. 219-225 Vol. 24, No. 2
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Epidemiology of *Pseudomonas aeruginosa* in a Burns Hospital: Surveillance by a Combined Typing System[1]

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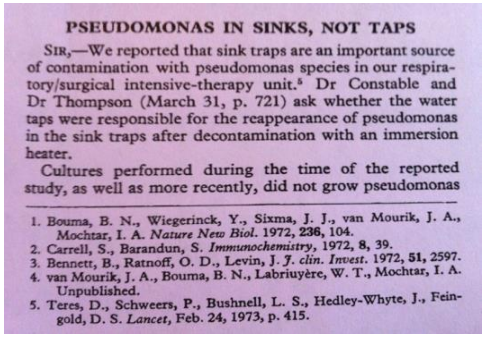
Department of Environmental Health and Shriners Burns Institute, College of Medicine, University of Cincinnati, Cincinnati, Ohio 45219

Received for publication 3 March 1972

Edmonds, *et al*, Applied Microbiology, 1972



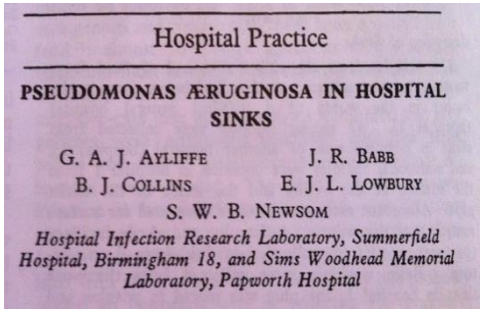
PSEUDOMONAS IN SINKS, NOT TAPS

SIR,—We reported that sink traps are an important source of contamination with pseudomonas species in our respiratory/surgical intensive-therapy unit.[5] Dr Constable and Dr Thompson (March 31, p. 721) ask whether the water taps were responsible for the reappearance of pseudomonas in the sink traps after decontamination with an immersion heater.

Cultures performed during the time of the reported study, as well as more recently, did not grow pseudomonas

1. Bouma, B. N., Wiegerinck, Y., Sixma, J. J., van Mourik, J. A., Mochtar, I. A. *Nature New Biol.* 1972, **236**, 104.
2. Carrell, S., Barandun, S. *Immunochemistry*, 1972, **8**, 39.
3. Bennett, B., Ratnoff, O. D., Levin, J. *J. clin. Invest.* 1972, **51**, 2597.
4. van Mourik, J. A., Bouma, B. N., Labriuyère, W. T., Mochtar, I. A. Unpublished.
5. Teres, D., Schweers, P., Bushnell, L. S., Hedley-Whyte, J., Feingold, D. S. *Lancet*, Feb. 24, 1973, p. 415.

Teres, *et al*, The Lancet, 1973



Hospital Practice

PSEUDOMONAS ÆRUGINOSA IN HOSPITAL SINKS

G. A. J. AYLIFFE J. R. BABB
B. J. COLLINS E. J. L. LOWBURY
S. W. B. NEWSOM

Hospital Infection Research Laboratory, Summerfield Hospital, Birmingham 18, and Sims Woodhead Memorial Laboratory, Papworth Hospital

Ayliffe, *et al*, The Lancet, 1974

Sink-outbreak reports

- Healthcare-associated outbreak due to pan-drug resistant *Acinetobacter baumannii* in a surgical intensive care unit (JHI, 2003)
- Management of a multidrug-resistant *Acinetobacter baumannii* outbreak in an ICU using novel environmental disinfection (AJIC, 2010)
- A Long-term Low-Frequency Hospital Outbreak of KPC-Producing *Klebsiella pneumonia* Involving Intergenus Plasmid Diffusion and a Persisting Environmental reservoir (PLOS, 2013)
- Bad design, bad practices, bad bugs:frustrations in controlling an outbreak of *Elizabethkingia menigoseptica* in intensive care units (JHI, 2013)
- Contaminated sinks in intensive care units: an underestimated source of extended-spectrum beta-lactase-producing Enterobacteriaceae in the patient environment (JHI, 2013)

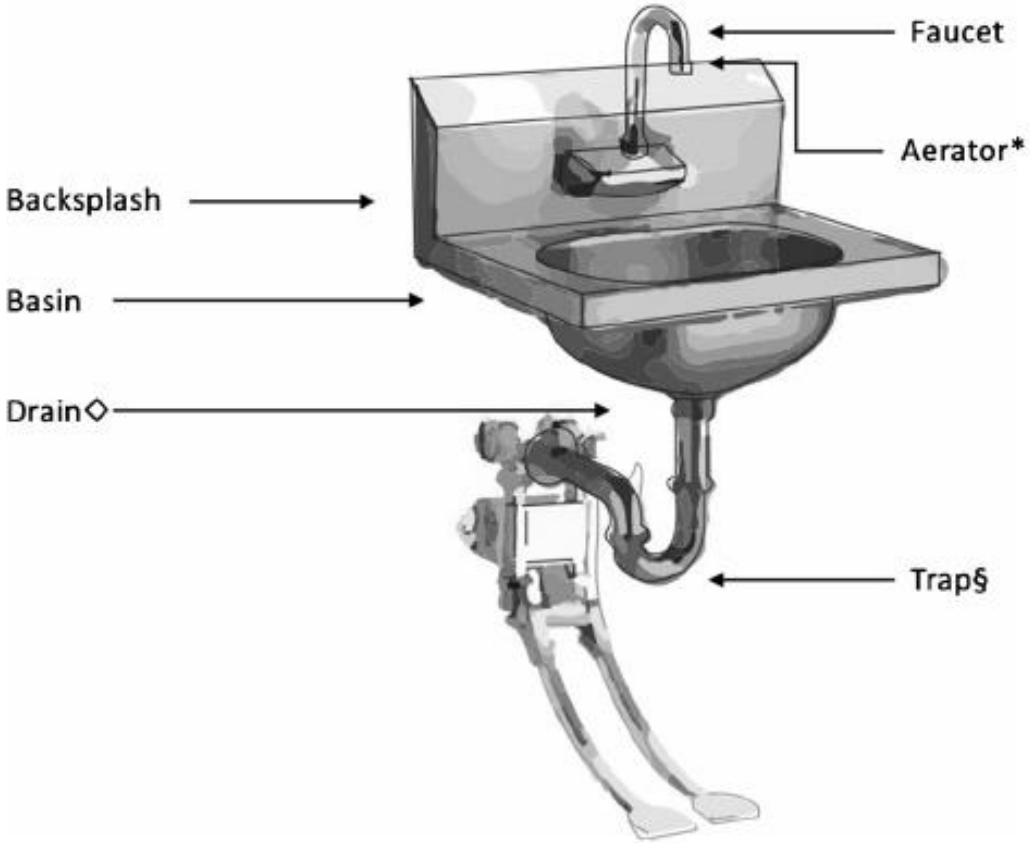
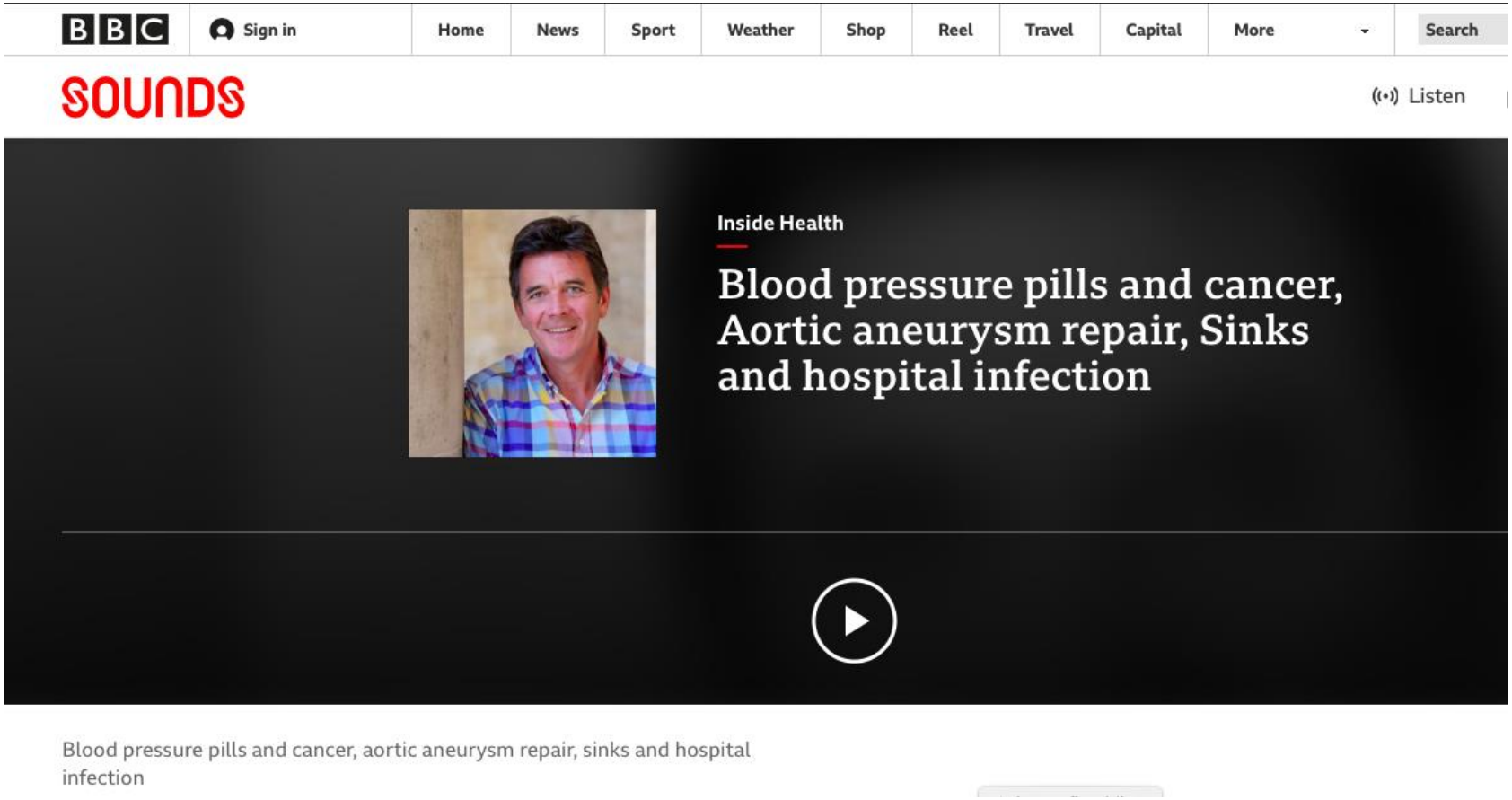


Fig. 1 Anatomy of a hospital sink and associated nomenclature. *Flow modulator; §U-bend/P-trap/S-trap/Siphon; ◊outlet/strainer; image courtesy of Bryan Graham Huck

Parks *et al*, Current Infectious disease reports, 2018



https://www.bbc.co.uk/sounds/play/m0000y9r

Study methods

- **Study design:** intervention study

- **Objective:**to investigate the effect of the removal of all hand washing sinks from the patient rooms at the Intensive Care unit on the MDRO colonisation rate in ICU patients

- **Study period:**
  - Pre-intervention study period: 12 months prior to sink removal
  - Post intervention period: 12 months after sink removal

- **Intervention:** In the summer of 2014, hand washing sinks were removed from all patient rooms at all intensive care units and a ‘water-free’ method of patient care was introduced.

Components
‘Water-free’ patient care

1. Daily wash: disposable washing towels
2. Hands visible contaminated → cleaning (Quick & Clean towels) → disinfection in the patient room → handwashing outside patient room
3. Preparation of medication
4. Drinks
5. Canula care
6. Hair washing (caps with dry-shampoo)
7. Infusion bags disposal
8. Patient materials disposal
9. *Clostridium difficile*: Mobile trolley with sink can be used if needed


kamer
05
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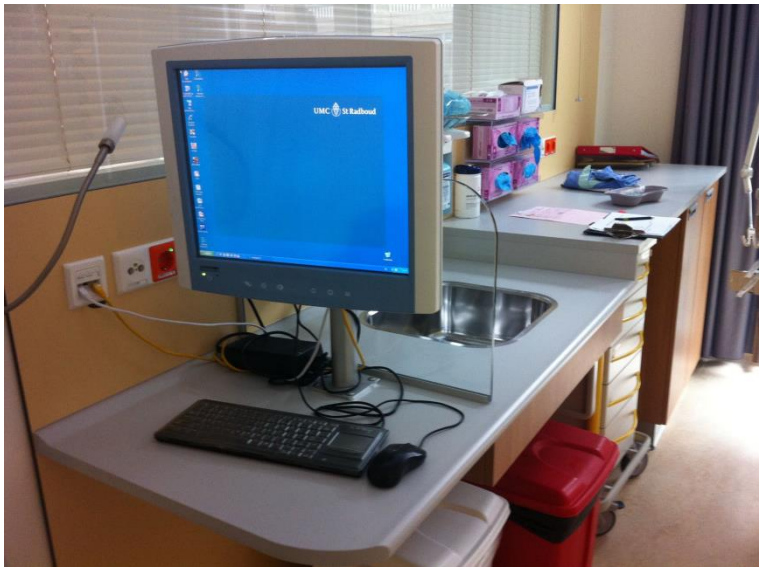
08
Lekker koffie gedronken?
Ruim svp je beker op!


07

ICU-room pre-intervention



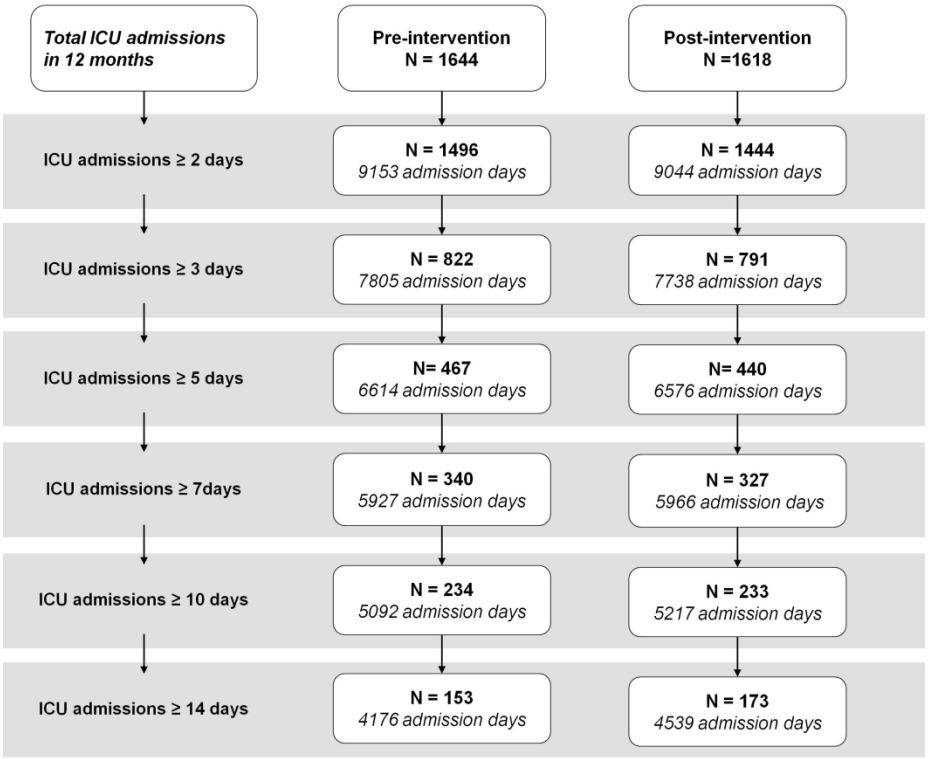
ICU-room post-intervention

Results

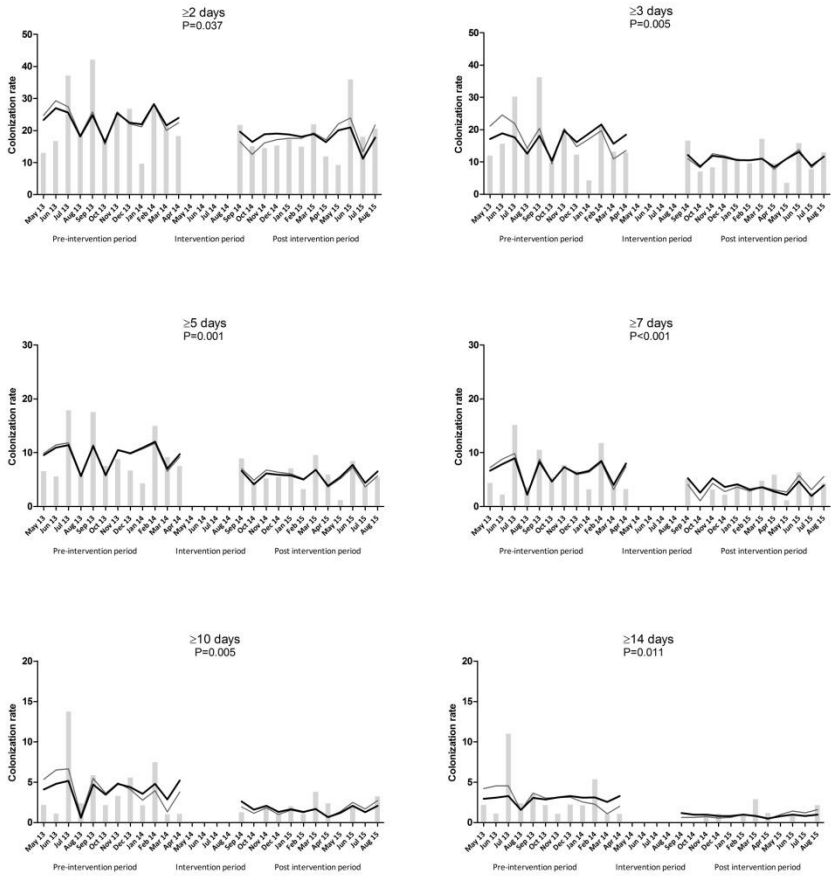
December 2013 - May 2014

September 2014 - February 2015

Pre-intervention → intervention → **Post-intervention**



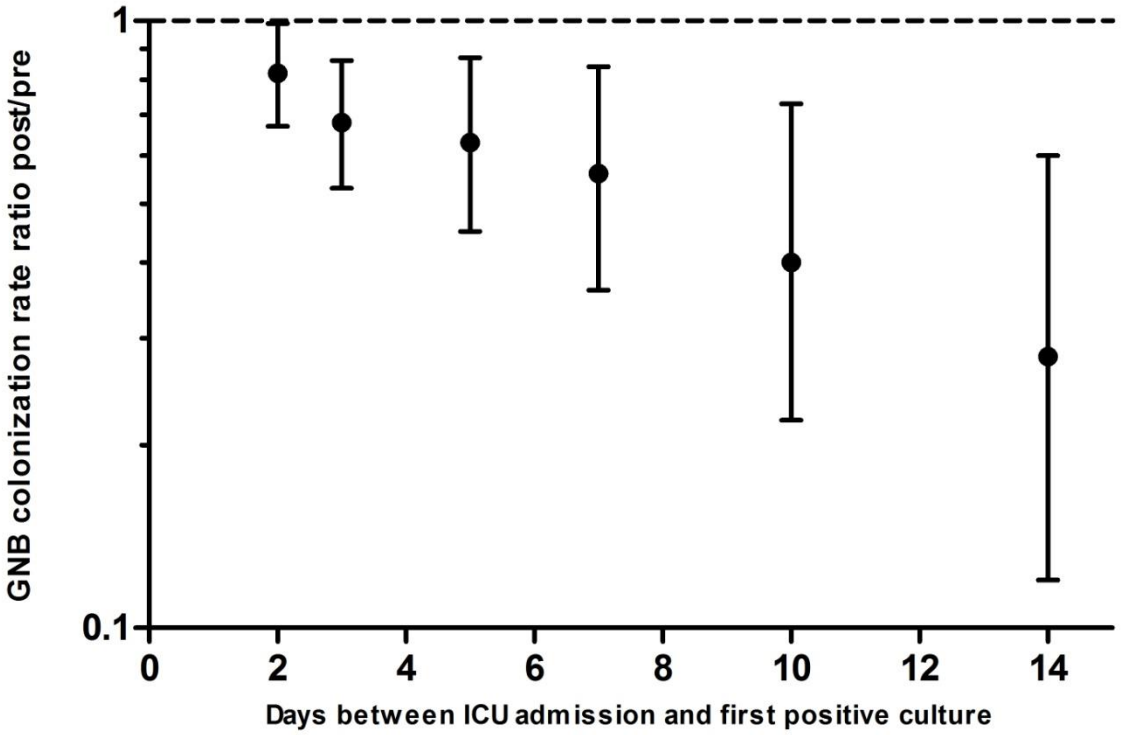
Segmented regression analysis of the interrupted time series data



- Statistically significant immediate effect of the intervention on the colonisation rate of gram negative bacilli

- No effect on the colonisation rate of yeasts

Colonization rate ratios related to ICU-LOS



Conclusion

- This study showed that removal of the sinks from all patient rooms at the ICU and the introduction of ‘water-free’ patient care resulted in a statistically significant decrease of patient colonization with ICU-acquired GNB .

- This decrease in patient colonization was even more apparent with an increased length of Stay (LOS).

Confirmation of our findings

Control of endemic multidrug-resistant Gram-negative bacteria after removal of sinks and implementing a new water-safe policy in an intensive care unit

E. Shaw[a,b,*], L. Gavaldà[c], J. Càmara[d], R. Gasull[e], S. Gallego[e], F. Tubau[d,f], R.M. Granada[e], P. Ciercoles[a], M.A. Dominguez[d,b,g], R. Mañez[e], J. Carratalà[a,b,g], M. Pujol[a,b]

Conclusion: The implementation of a new water-safe policy, which included the removal of sinks from all patient rooms, successfully improved the control of MDR-GNB spread in an ICU with endemic infection. Our results support the contribution of sink use with the incidence of MDR-GNB in endemic environments.

Available online at www.sciencedirect.com

Journal of Hospital Infection

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

Sinks in patient rooms in ICUs are associated with higher rates of hospital-acquired infection: a retrospective analysis of 552 ICUs

G-B. Fucini [a,b,*], C. Geffers [a,b], F. Schwab [a,b], M. Behnke [a,b], W. Sunder [c], J. Moellmann [c], P. Gastmeier [a,b]

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The present study found a higher incidence of HAIs in ICUs that have sinks in patient rooms than in those which do not.

SUMMARY

Background: Sinks in hospitals are a possible reservoir for healthcare-related pathogens. They have been identified as a source of nosocomial outbreaks in intensive care units (ICU); however, their role in non-outbreak settings remains unclear.

Aim: To investigate whether sinks in ICU patient rooms are associated with a higher incidence of hospital-acquired infection (HAI).

Methods: This analysis used surveillance data from the ICU component of the German nosocomial infection surveillance system (KISS) from 2017 to 2020. Between September and October 2021, all participating ICUs were surveyed about the presence of sinks in their patient rooms. The ICUs were then divided into two groups: the no-sink group (NSG) and the sink group (SG). Primary and secondary outcomes were total HAIs and HAIs associated with *Pseudomonas aeruginosa* (HAI-PA).

Findings: In total, 552 ICUs (NSG *N*=80, SG *N*=472) provided data about sinks, total HAIs and HAI-PA. The incidence density per 1000 patient-days of total HAIs was higher in ICUs in the SG (3.97 vs 3.2). The incidence density of HAI-PA was also higher in the SG (0.43 vs 0.34). The risk of HAIs associated with all pathogens [incidence rate ratio (IRR)=1.24, 95% confidence interval (CI) 1.03–1.50] and the risk of lower respiratory tract infections associated with *P. aeruginosa* (IRR=1.44, 95% CI 1.10–1.90) were higher in ICUs with sinks in patient rooms. After adjusting for confounders, sinks were found to be an independent risk factor for HAI (adjusted IRR 1.21, 95% CI 1.01–1.45).

Conclusions: Sinks in patient rooms are associated with a higher number of HAIs per patient-day in the ICU. This should be considered when planning new ICUs or renovating existing ones.

RESEARCH Open Access

Outbreak of *Pseudomonas aeruginosa* producing VIM carbapenemase in an intensive care unit and its termination by implementation of waterless patient care

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Abstract

Background: Long-term outbreaks of multidrug-resistant Gram-negative bacilli related to hospital-building water systems have been described. However, successful mitigation strategies have rarely been reported. In particular, environmental disinfection or replacement of contaminated equipment usually failed to eradicate environmental sources of *Pseudomonas aeruginosa*.

Methods: We report the investigation and termination of an outbreak of *P. aeruginosa* producing VIM carbapenemase (PA-VIM) in the adult intensive care unit (ICU) of a Swiss tertiary care hospital with active case finding, environmental sampling and whole genome sequencing (WGS) of patient and environmental strains. We also describe the implemented control strategies and their effectiveness on eradication of the environmental reservoir.

Results: Between April 2018 and September 2020, 21 patients became either infected or colonized with a PA-VIM strain. For 16 of them, an acquisition in the ICU was suspected. Among 131 environmental samples collected in the ICU, 13 grew PA-VIM in sink traps and drains. WGS confirmed the epidemiological link between clinical and environmental strains and the monoclonal pattern of the outbreak. After removing sinks from patient rooms and implementation of waterless patient care, no new acquisition was detected in the ICU within 8 months after the intervention.

Discussion: Implementation of waterless patient care with removal of the sinks in patient rooms was successful for termination of a PA-VIM ICU outbreak linked to multiple environmental water sources. WGS provides highly discriminatory accuracy to investigate environment-related outbreaks.

Keywords: *Pseudomonas aeruginosa*, VIM, Carbapememase, Sink, Waterless, Outbreak, Aquatic reservoir, cgMLST

Interventions that fail to stop the outbreak

SOD regimen was interrupted. Due to a concomitant endemic problem with *Serratia marcescens* in the ICU detected in 2017 with a suspected water reservoir, several preventive interventions were already implemented in 2018 to mitigate contamination of sinks and reduce transmission of Gram-negative bacteria from potentially colonized sinks [17]. Educational rounds to reinforce compliance with hand hygiene, proper use of gloves and aseptic care procedures while using water were regularly performed. Mitigation strategies focused on re-enforced training of nursing staff on hand hygiene. Modification of behaviors to minimize drain colonisation were implemented, including limitation of the use of sinks for hand hygiene when specifically indicated only, procedures for patient bathing, separation of non-contaminated and contaminated areas and tasks, dedicated storage space > 1 m from sinks, and no use of sinks dedicated to direct care to the patient for hand washing. No disinfection of the sinks was performed.

World Health Organization | iris. Institutional Repository for Information Sharing

English

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Implementation manual to prevent and control the spread of carbapenem-resistant organisms at the national and health care facility level: interim practical manual supporting implementation of the Guidelines for the prevention and control of carbapenem-resistant Enterobacteriaceae, Acinetobacter baumannii and Pseudomonas aeruginosa in health care facilities

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BOX 26. SPECIAL FOCUS ON CLINICAL HANDWASH BASINS

Clinical handwash basins have been implicated in numerous outbreaks of CROs.

- Health care providers should have policies in place to ensure that clinical **handwash basins are not used for other purposes.** For example, they must not be used for the disposal of any amount of liquid waste or the soaking/cleaning of any items and equipment.
- The following should be adhered to when handwash basins are installed.
  - **Size** - the dimension of the handwash basin should be large enough to contain most splashes during handwashing procedures.
  - **Hand hygiene products** - handwash basins should be fitted ideally with liquid soap dispensers and good quality paper towels. When liquid soap is unavailable and bar soap is used, small bars of soap in racks that facilitate drainage should be used to allow the bars to dry.
  - **Installation** – handwash basins should be wall mounted using concealed brackets and fixings that should also be sealed to a waterproof splashback to allow effective cleaning of all surfaces. The surrounding area should be made of non-porous material to resist fungal growth.
  - **Taps/faucets**
    - Taps should be fitted with a hands-free control (for example, elbow-operated) to avoid contamination. If a handwash basin with conventional tap handles is used, the water should be turned off using a paper towel rather than bare fingers or hands to avoid recontamination of hands.
    - Taps should not be aligned to run directly into the drain aperture as contamination from the waste outlet could be mobilized and generate aerosols responsible for cross-infection, especially with Gram-negative bacteria (Pseudomonas spp., multidrug-resistant Enterobacteriaceae, etc.) that colonize 'U bends', and then dispersed by splashing if disturbed by a stream of water.
    - Swan-neck tap outlets are not recommended as they do not empty after use. Similarly, strainers, aerators and flow restrictors should not be used as they become colonized with bacteria.
  - **Plugs** – handwash basins should not have a plug or a recess capable of taking a plug as hands must be washed in running water. Provision of a plug allows the basin to be used to soak and clean items and equipment and this must not be done.
  - **Overflow** – handwash basins should not have an overflow as this is not amenable to cleaning.
  - **Location** – alcohol-based handrub at the point of care (that is, within the patient zone) is the gold standard for routine hand hygiene. Ideally, clinical hand washbasins should not be located within the patient zone. Do not locate hand basins where a patient may get splashed when the handwash basin is used. They should also be readily available and accessible when needed, for example, not behind curtains.

So what is the real challenge we are facing?

Journal of Hospital Infection

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

Characterizations of handwashing sink activities in a single hospital medical intensive care unit

M. Grabowski [a], J.M. Lobo [a], B. Gunnell [b], K. Enfield [c], R. Carpenter [d], L. Barnes [e], A.J. Mathers [f,g,*]

Findings: We analysed 4810 sink videos from 60 days in patient rooms (3625) and adjoining bathrooms (1185). There was a false-positive rate of 38% (1837 out of 4810) in which the camera triggered but no sink interaction occurred. Of the 2973 videos with analysed behaviours there were 5614 observed behaviours which were assessed as: 37.4% medical care, 29.2% additional behaviours, 17.0% hand hygiene, 7.2% patient nutrition, 5.0% environmental care, 4.2% non-medical care. Handwashing was only 4% (224 out of 5614) of total behaviours. Sub-analysis of 2748 of the later videos further categorized 56 activities where a variety of nutrients, which could promote microbial growth, were disposed of in the sink.

Handwashing was 4% of total behaviors

4 % of Sink use is hand washing..

Thus, rethinking waste management!

Root cause analysis for sink use

- Hand hygiene —> ABHR

Focus on:

- Discarding of detergents en disinfectants
- Discarding of biological waste
- Discarding of drugs, infusion fluids, including antibiotics

Future of sinks
patient zones and rooms

- **Sinks** are a known and **continuous source** for (MDR) gram-negative bacilli

- **1. No sinks but Alcohol Based Hand Rub (ABHR) in patient zone**
- 2. No sinks but Alcohol Based Hand Rub (ABHR) in patient zone
- 3. No sinks but Alcohol Based Hand Rub (ABHR) in patient zone

- Reduction of number of sinks (if placed preferably with heat disinfection syphons)
- Correct placement of sinks
  - Not in proximity of clean supplies, patients, medication etc.
- Correct type of sink

- **Rethinking waste management!**

Nigeria
Lagos University Teaching Hospital

November 2024

Radboudumc

New Hospital Programme (NHP)- UK

- The need for continuous investment in healthcare infrastructure
- The New Hospital Programme will become part of a rolling programme of investment in new health capital infrastructure to deliver new hospitals up to 2030 and beyond
- Further future investment to upgrade NHS facilities across the country
- Improve care for staff and patients, with details agreed periodically to provide greater certainty
- This will mean more than 40 new hospitals will be built in the longer term

- Prevention of AMR transmission in healthcare through the built environment – a proposed way forward. Accepted in JHI

  Manuja Meda, Mike Weinbren, Wolfgang Sunder, Giovanni Fucini, Joost Hopman

Just do it! And don't forget:

1. Sense of urgency
2. System approach
3. Leadership involvement
4. Team effort
5. Solid preparation
6. Sustainable solution
7. Buy-in of all stakeholders
8. Board involvement
9. Evaluation – Evidence-based approach
10. Create a good narrative!

We are **10 years** down the road:

1. Nurses and MDs don't even understand why people bother to come over from the UK.. It's standard of care
2. No serious adverse events in 10 years, besides contamination through commercial SPA bottles.

Future Built environment
High- and low-resources

RADBOUDUMC MAIN BUILDING

Building S: the main entrance to the medical area of the campus

- Single patient rooms
- No sinks in patient rooms, only in bathrooms


Questions?