Broadcast live from the 2019 Infection Prevention and Control Canada Conference

Adapting IPAC in Unconventional Spaces

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Design for IPC in “unconventional” locations

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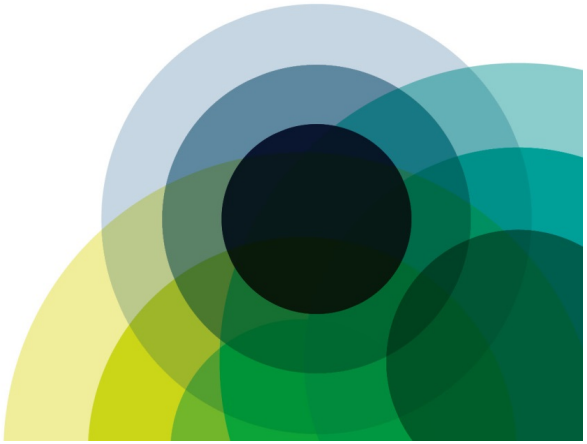

Preamble – the presenter

Takes part in devising guidance – always aiming for the ideal situation
Advises and investigates on outbreaks of infection – often far from ideal

The approach for this presentation – I will try to outline the ideal, but also give ideas of the relative value of measures.

- Often the more resource-intense measures are relatively low payback interventions and the more affordable measures yield good results.

I have no conflict of interests

One point of definition: I will be using "decontamination" to mean any process or sequence of processes that make a reusable medical device safe for reuse – cleaning, cleaning + disinfection, cleaning + sterilization, cleaning + disinfection + sterilization.

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Preamble – The problem

Hospital design – Planning a facility that will serve its purpose for the next 30 – 50 years is impossible. No ideal approach – just looking for the least worst.

What will change?

The services and interventions, but also the microbial challenges.

The concept of a “hospital biome”?

- I am sceptical when it comes to the dry environment – this is just transient contamination
- I believe it when focussed on the wet environment – more from my co-presenters in this session

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Design for IPC in “unconventional” locations

This presentation will focus on those areas of healthcare not normally covered in sufficient IPC detail in guidance.

First:

Operating room surgical instrument “preparation” areas – those areas where sterile instruments are unpacked and prepared for use: “layup”.

In UK use: “preparation” or “prep” rooms.

Much detail on ORs, little on prep rooms

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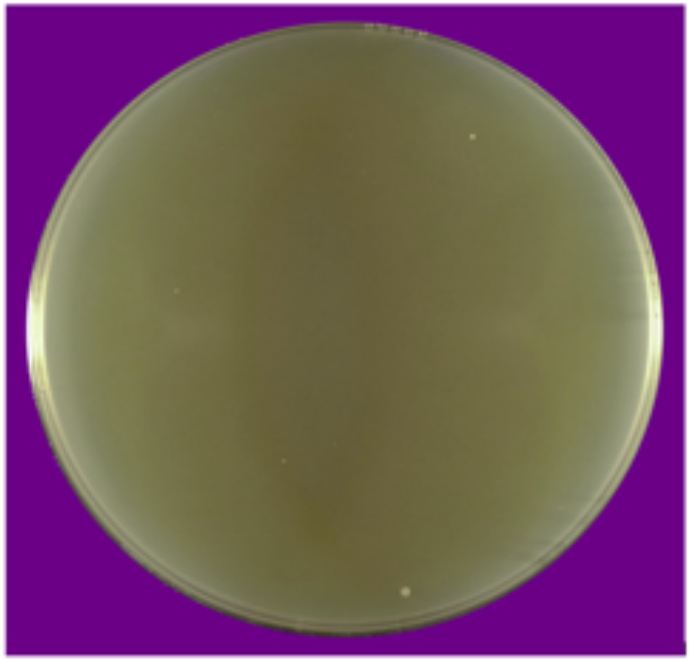
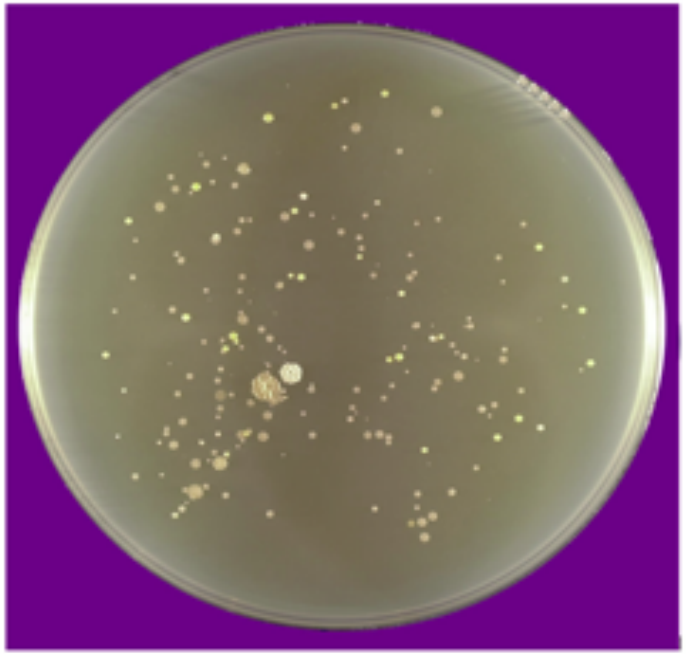
Airborne contamination in OR suites

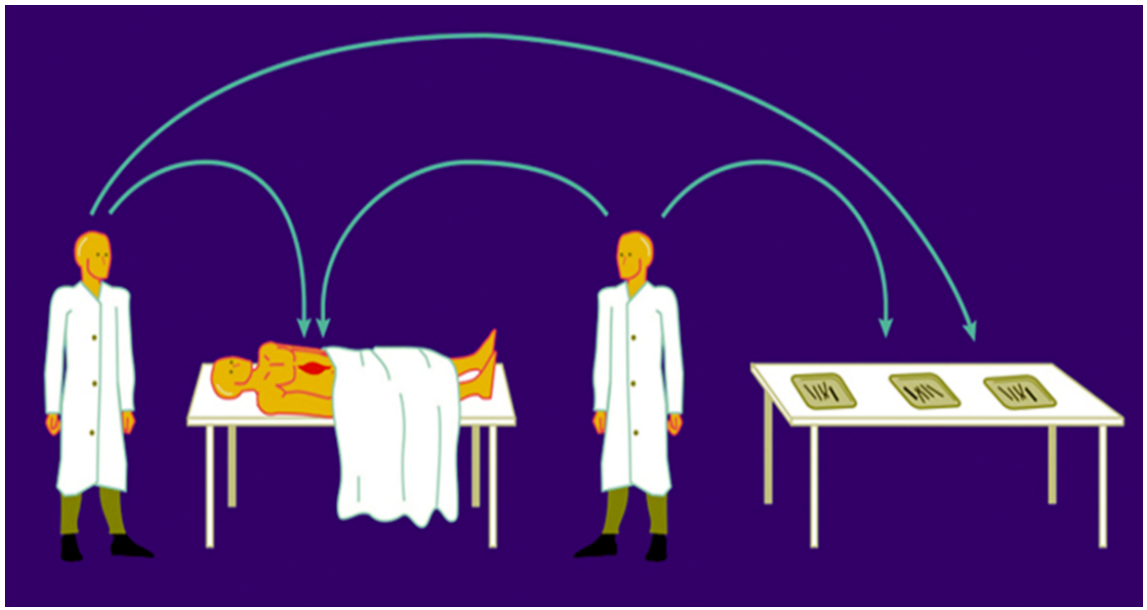


1,000 litres of air in an empty room



Same - but now person walking by sampler

A critical purpose of OR suite ventilation is to keep exposed instruments clean



Probably the majority of airborne bacteria that end-up in a surgical wound, do so via exposed instruments. Anywhere that sterile instruments are exposed should be ventilated to be at least as clean as the OR

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OR suites – layup for conventional and laminar flow ventilation

- In conventional (i.e. non-laminar flow) ORs, either the preparation room is ventilated to the same standard as the OR, or layup occurs in the OR.
- For ultraclean ventilated (“laminar flow”) ORs, layup should occur under the ultraclean airflow.
  - If that is not possible, consider horizontal laminar flow in the preparation room

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Interventional imaging and minimally invasive surgery

These are surgical procedures that have “evolved” via a different route.

Many facilities not ventilated to any particular standard.

Just because there is no effective wound does not mean there is no exposure to airborne microbes via the instruments used, but generally use individually packed items opened immediately before use.

UK Healthcare Infection Society guidance that these should have ventilation that gives 15 air changes per hour

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Minor surgical procedures

Poor definition but "*those that are carried out under local anaesthesia and that are superficial. The operative site is usually limited in size by whether it can be anaesthetized locally*." is a reasonable place to start – but exclude intraocular procedures.

Here airborne contamination with skin microbes is not a particular problem.

Can be naturally ventilated rooms (opening windows with fly screens), cleanable surfaces, dedicated sterile instrument store.

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Guidance on facilities for minimally invasive and minor surgery is freely available on the Healthcare Infection Society website

Journal of Hospital Infection 80 (2012) 103–109

Guidelines

Guidelines on the facilities required for minor surgical procedures and minimal access interventions

H. Humphreys [a,b,*], J.E. Coia [c], A. Stacey [d], M. Thomas [e], A.-M. Belli [f], P. Hoffman [g], P. Jenks [h], C.A. Mackintosh [i]

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ORs in specialist burns units

In the UK, specialist burns units often have their own OR on the unit – debridement, skin grafts and dressings changes

With burns, the skin flora dispersed from the staff is of minimal risk to a burns patient

It is probable that there is significant aerosolisation of the bacteria infecting/colonising during surgical procedures/dressings changes

The main task in a burns OR would be to prevent these aerosols flushed-out into common wards area – as would happen with standard OR ventilation.

Consider burns ORs being designed with negative pressure ventilation

Will still get dilution of airborne contaminants for the safety of subsequent patients and dilution of anaesthetic gases, but no escape of aerosols into common ward areas

Currently the topic of a Healthcare Infection Society working group.

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Acinetobacter – the trojan horse of infection control?

L. Teare [a,*], N. Martin [b,c,d], W. Elamin [a], K. Pilgrim [a], T. Tredoux [b], J. Swanson [e], P. Hoffman [f]

Journal of Hospital Infection 102 (2019) 45–53

Conclusion: In an outbreak where contact precautions and environmental cleaning are optimal, it is important to give careful consideration to other mechanisms of spread. If there is a failure to do this, it is likely that the true causes of transmission will not be addressed and the problem will recur. It is recommended that burn theatres within burn facilities should be designed to operate at negative pressure; this is the opposite of normal operating theatre ventilation. Where showers are used, both the shower head and the hose should be changed after a patient with a resistant organism. The role of non-contact disinfection (e.g. hydrogen peroxide dispersal) should be reconsidered, and constant vigilance should be given to any 'trojan horse' item in the room.

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Isolation of infectious patients: “source isolation”

The vast majority of “isolation” is procedural (isolation of the microbes rather than the patient) – the facility has to enable and encourage good procedures.

- Lobbies – for storage and disposal of PPE, and handwashing. Useful space but negotiable.
- Shower/toilet – higher priority (except for immobile ITU patients)
  - can’t isolate a patient with highly resistant Enterobacteriaceae adequately if they have to use a communal toilet
  - commode decontamination can be poor QA
  - bedpans usually need to be transported to a different location for disposal – with same gloves on staff hands (*no 5 moments of glove hygiene*)

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Isolation of airborne infectious patients: “airborne isolation”

Need to ensure all gaps in a patient room’s integrity do not leak out to adjacent occupied spaces

Negative pressure – more air extracted than supplied, deficit made up by air coming in through gaps

Also a high turnover of air to dilute infectious particles in the air

Comparatively easy to do if there is a mechanical ventilation system

In resource limited areas where this is not practical, local extract should be possible

- Local ducted extract, or fan in wall or window.
- Only staff should have control of that fan
- No opening windows

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Protective isolation

Most protection of patients is procedural

A small number of highly neutropenic patients need protection against inhalation of fungal spores – one of the few occasions when patients need protection against the environment outside the hospital

Air to their rooms supplied via HEPA filter; more air supplied than extracted ("positive pressure") so gaps leak outwards preventing ingress of unfiltered air

- Positive pressure without HEPA filtration is pointless
- The air change rate is irrelevant – the ventilation is to exclude not dilute

As these are usually cohortable patients, e.g. bone marrow transplant, can put HEPA filters in the air handling unit so the whole ward can be free of fungal spores

Air passes from patient room, out into common ward spaces and then out into the rest of the hospital

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Endoscopy procedure rooms

Much guidance says that these should be at positive pressure to protect the patient

Not sure how this protects patients and against what?

For lower GI endoscopy, no airborne risk to patients and negative pressure would contain smells

For those bronchoscopies where there may be a TB risk, negative pressure in both the procedure and the recovery area would contain infectious aerosols.

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Endoscope decontamination areas

Need to have a clear sequential flow from dirty to clean, with no cross over – to prevent recontamination.

These do not need special ventilation to control microbial contamination (but may do if toxic vapours from the disinfectant)

Ideally 2 rooms, with pass-through endoscope washer-disinfectors

Still possible to use 1 room dedicated to decontamination, but staff behaviour becomes much more critical.

Decontamination is far more difficult to do in the procedure room – not recommended

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Intracavity ultrasound devices – transvaginal, transrectal and trans(o)esophageal (TOE/TEE) probe decontamination

These are less complex than endoscopes (no lumens), but still present difficulties

Currently their decontamination is usually at the point of use and poorly controlled

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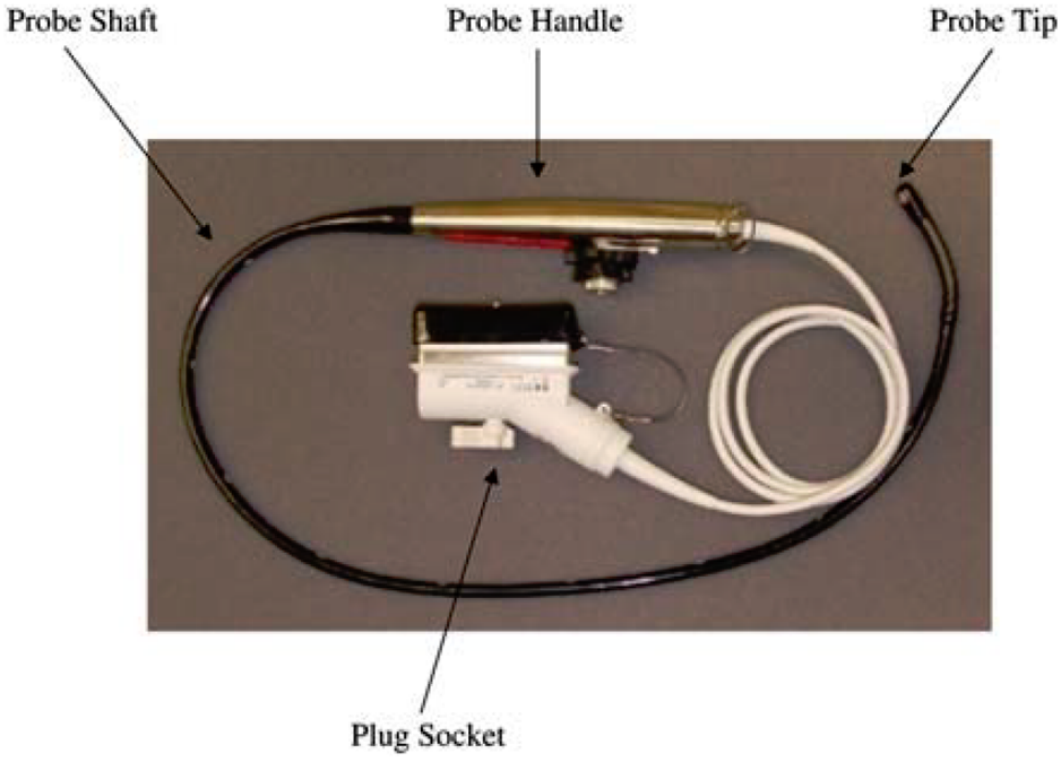
TOE/TEE probe



Probe insertion tube immersible but not angulation wheels or plug body, unlike endoscopes where they are totally immersible.

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My first encounter with TOE/TEE probes

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Then

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Home | World | UK | England | N. Ireland | Scotland | Wales | Business | Politics | Health | Education | Sci/Env

Wales Politics | North West | North East | Mid | South West | South East | Newyddion

5 April 2012 Last updated at 13:17

74 Share

Morriston Hospital hepatitis B death: Lessons learned, says ABM health board

A cardiac patient who died after contracting hepatitis B at a Swansea hospital did not receive a high standard of care, say health chiefs.

An independent external review panel was asked to investigate the circumstances surrounding the hepatitis B infection.

The panel has made several recommendations about decontamination, infection prevention and control, staff training and auditing procedures.

It found that the most likely cause of the infection was a contaminated probe.

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2 subsequent publications

Guidelines for transoesophageal echocardiographic probe cleaning and disinfection from the British Society of Echocardiography[†,‡]

P. Kanagala[1], C. Bradley[2], P. Hoffman[3], and R.P. Steeds[4*]

European Journal of Echocardiography (2011) 12; i17 – i23

Guidance for the decontamination of intracavity medical devices: the report of a working group of the Healthcare Infection Society

C.R. Bradley[a], P.N. Hoffman[b,*], K. Egan[c], S.K. Jacobson[d], A. Colville[e], W. Spencer[f], S. Larkin[g], P.J. Jenks[h]

Journal of Hospital Infection 101 (2019) 1–10

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Intracavity probe decontamination – the future

- Covers/sheathes can not be relied on to protect the probe. Areas not covered will make contact with user's contaminated hands

Decontamination of the probe (typically transvaginal and transrectal) when still connected to its associated equipment is likely to be poor QA

There need to be adequate facilities for probe decontamination, either at the location of use or elsewhere.

- As with endoscopes, there needs to be a defined dirty to clean flow. Preferably good facilities to clean, then controlled disinfection

Some automated systems do not disinfect the whole probe including parts that do not make patient contact; still need a manual element for these.

Redesigning the probes so that they are fully immersible would be a major step forward

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Neonatal intensive care units

Incubator decontamination

To dismantle, clean and disinfect an incubator and associated components (mattress, leads, stethoscope etc.) in a clear dirty to clean flow requires a lot of work space.

In a typical UK NICU, there are occasions when several incubators will need to decontaminated in a short time

The facility in which this is done is almost always too small and has insufficient space for optimal decontamination

This is not high technology and does not differ much between health economies

This requirement should be considered as a fundamental design parameter

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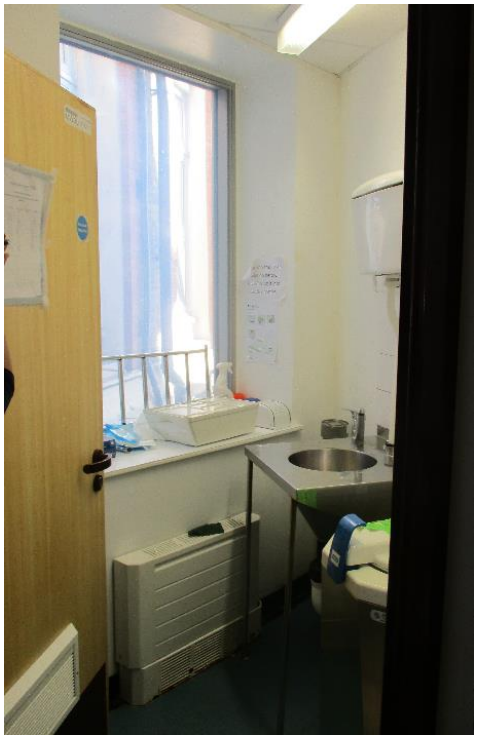
Dirty utility (“sluice”) rooms

Used for disposal of body fluids, disposal or decontamination of bedpans and urinals, decontamination and storage of commodes, usually other storage as well, some point-of-use tests (e.g. urine dipsticks) and temporary storage of waste

Problem 1 – These are rarely large enough. Disassembly and decontamination of commode, plus their storage, requires space

Problem 2 – Contaminated gloved HCW hand opening sluice room door – common contact point. Solution unclear – non-touch door opening? Sluice room with no door?

In an era of multi-resistant Enterobacteriaceae, these rooms have become far more important.



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The Healthcare Infection Society as a resource

https://www.his.org.uk/

Has freely available resources –

- HIS guidelines
- other UK resources
- "*IPC in 5*" – 5 minute digested presentations from the HIS trainee program

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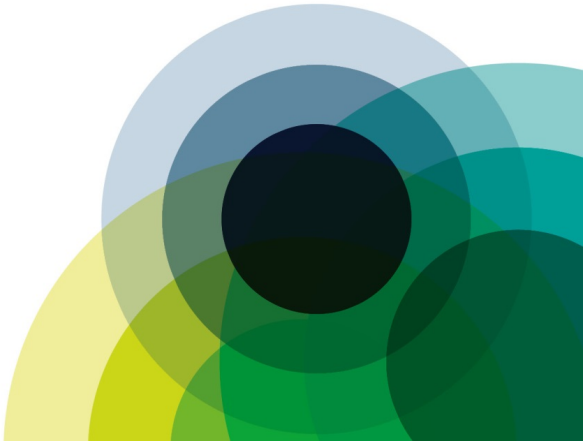
Risks and Competing Priorities in Water Management

Karren Staniforth, Clinical Scientist

Nottingham University Hospitals, UK



Overview, Aims and Conflicts of Interest

The presenter: a Clinical Scientist working within the Infection Prevention and Control Team of a large teaching hospital in the UK

The Approach and aim of this presentation is to demonstrate, through various examples, evidence that:

- Potentially infectious organisms are present wherever there is water (unless this is sterile, which in most cases it is not)
- Eradication of these risks may not be possible or may depend on actions which produce undesirable consequences
- Decisions around water management may not be easy or clear-cut; forcing us to balance conflicting risks
- Whilst general principles are discussed every situation will be different

The presenter has no conflicts of interest to declare

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Nottingham University Hospitals

Queen's Medical Centre

Nottingham City Campus

Nottingham University Hospitals

https://www.nuh.nhs.uk says

- Serves 2.5 million residents
- ~15,000 staff
- ~ 90 Wards
- ~ 1,700 beds
- ~ 50 Operating Theatres
- 3 sites, City Campus, QMC Campus, Rope Walk
- Annual income of £824million (NHS Choices 2017)

- Plus 3-4 million for regional specialist units:

- Stoke, Renal, Neurology, Cancer Services, Major Trauma, Burns and Plastics, Orthopaedics, Cardiac Surgery, Haematology and BMT, Obstetrics and two neonatal units
- QMC incorporates the Nottingham Children's Hospital

Jimma University Hospital, Ethiopia

NUH has had a partnership with The Jimma University Hospital, since 1993 and many staff have visited to share ideas

This is Christine (NUH Infection Prevention & Control Nurse) learning about water management at the Jimma University Hospital

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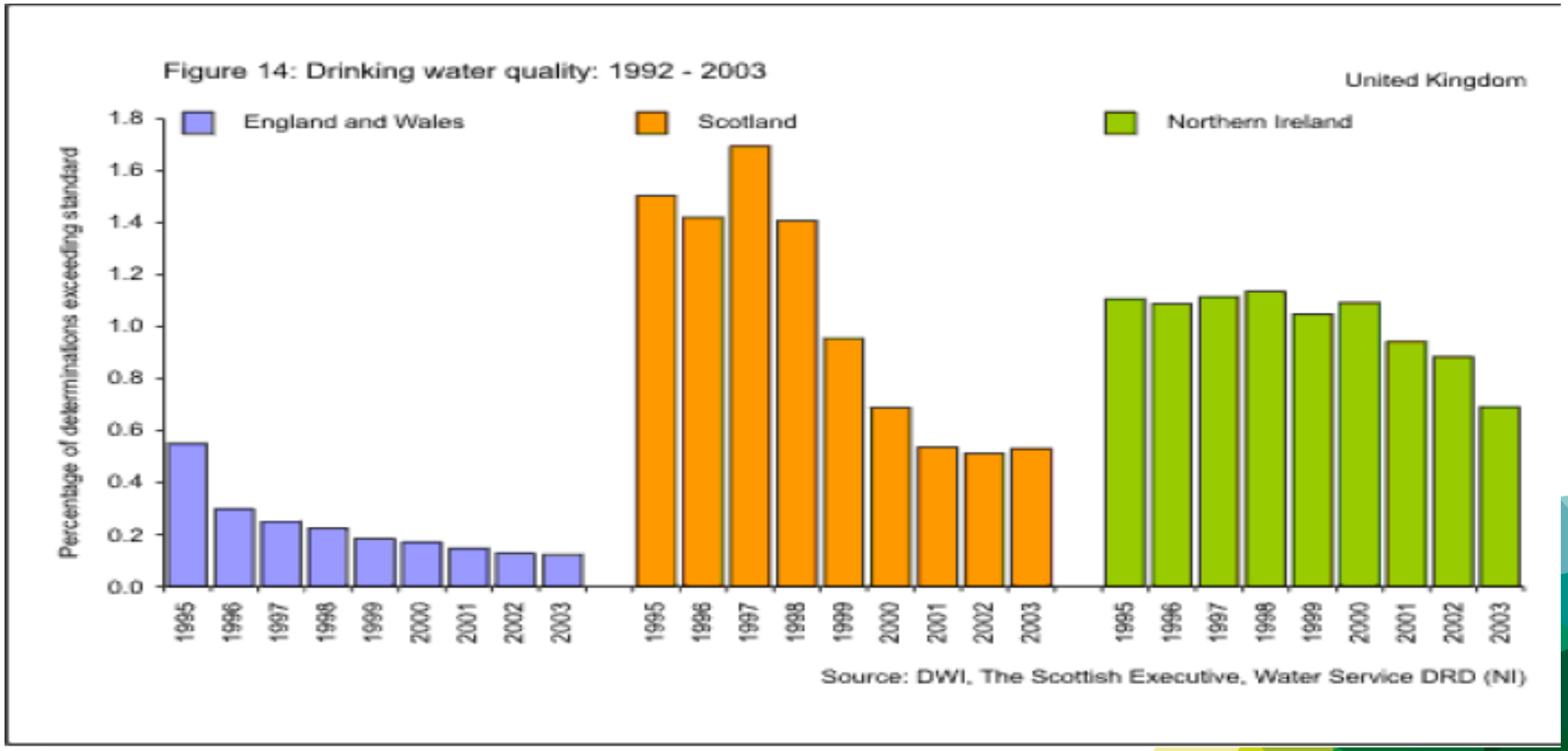
“Safe to Drink” – Not Sterile!



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Prolonged Outbreak of *Mycobacterium chimaera* Infection After Open-Chest Heart Surgery

Hugo Sax,[1,*] Guido Bloemberg,[2,*] Barbara Hasse,[1,*] Rami Sommerstein,[1] Philipp Kohler,[1] Yvonne Achermann,[1] Matthias Rössle,[3] Volkmar Falk,[4] Stefan P. Kuster,[1] Erik C. Böttger,[2,5] and Rainer Weber[2,5]

[1]Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, [2]Institute of Medical Microbiology, National Centre for Mycobacteria, University of Zurich, [3]Institute of Surgical Pathology, and [4]Division of Cardiac Surgery, University Hospital Zurich, Switzerland

Background. Invasive *Mycobacterium chimaera* infections were diagnosed in 2012 in 2 heart surgery patients on [illegible]poreal circulation. We launched an outbreak investigation to identify the source and extent of the potential [illegible]to implement preventive measures.

Legionella (1976)
Mycobacteria (2012)

GOV.UK

Departments Worldwide How government works Get involved
Publications Statistics Announcements

Health and social care › Health protection › Infectious diseases

Collection

Mycobacterium chimaera: infections linked to heater cooler units

Guidance for healthcare professionals on infection control and clinical aspects of M. chimaera infection associated with cardiopulmonary bypass.

Published [illegible]
Last updated 10 Sept[illegible]
From: Public Health England

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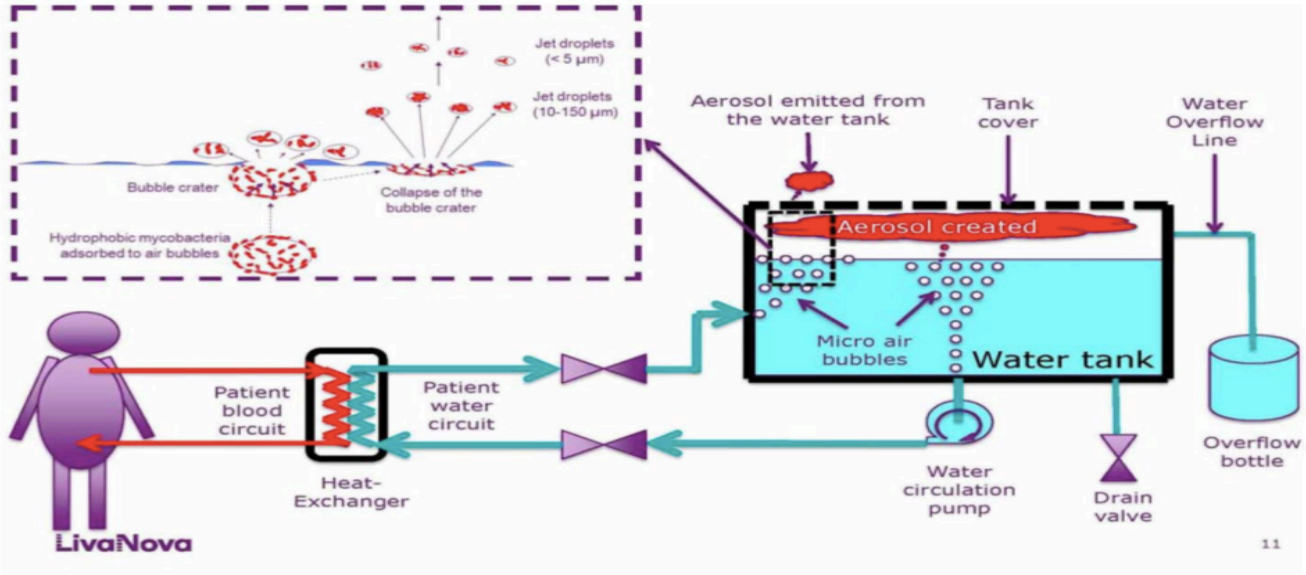
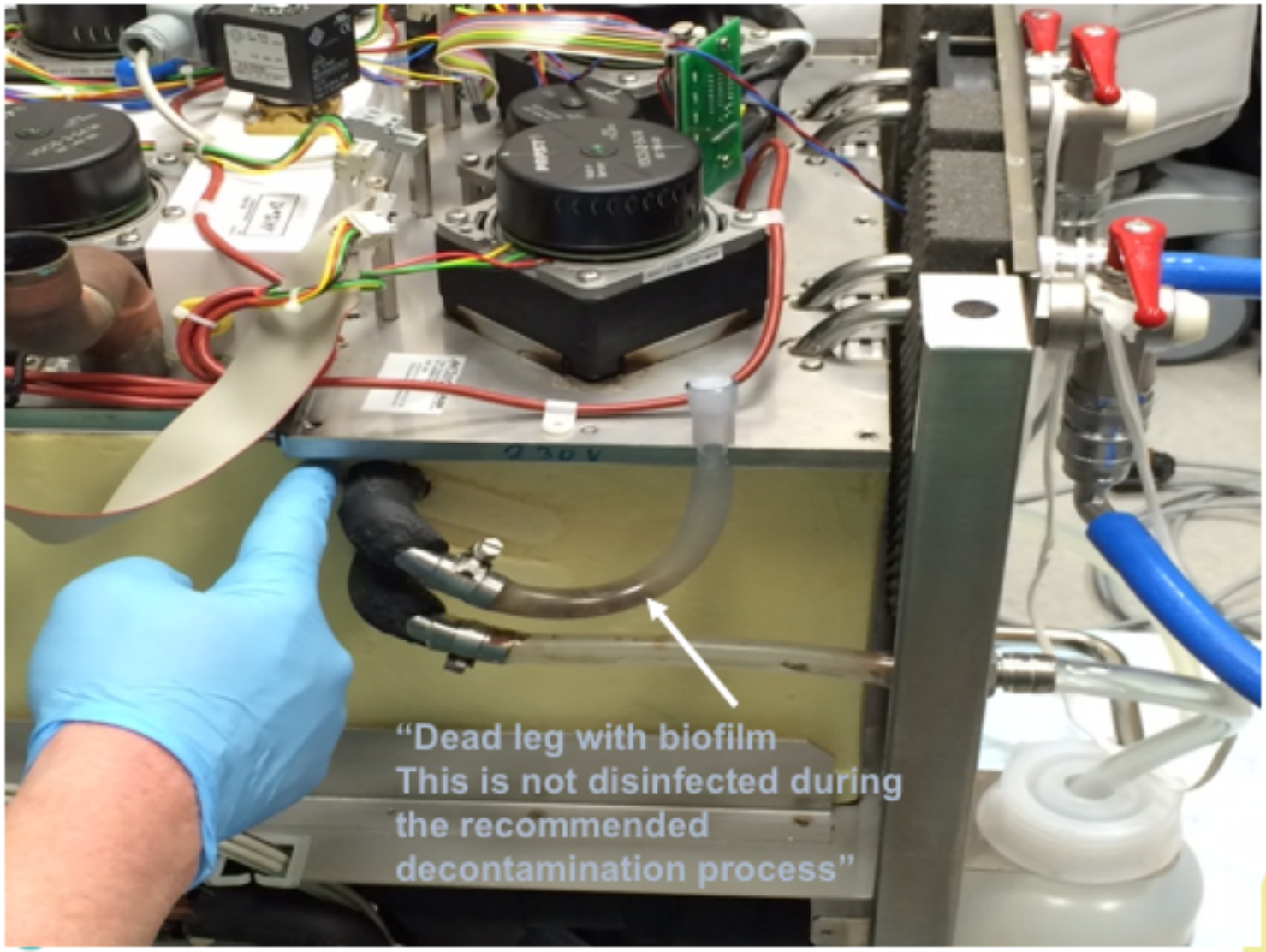
1° C Temperature reduction decreases oxygen consumption by 10 %




“Dead leg with biofilm
This is not disinfected during
the recommended
decontamination process”

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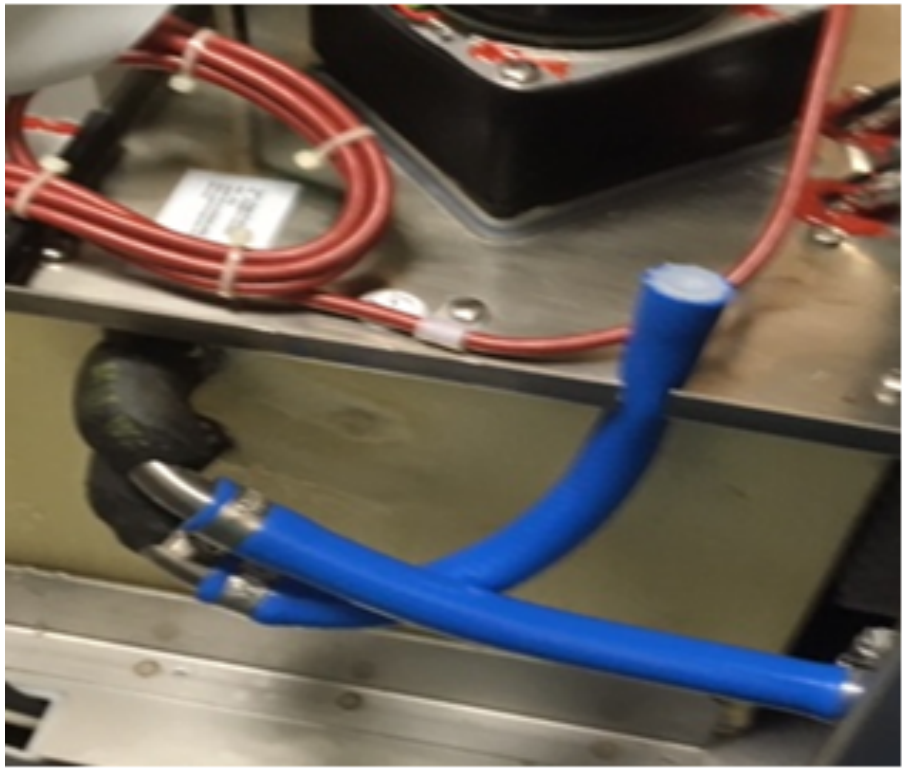

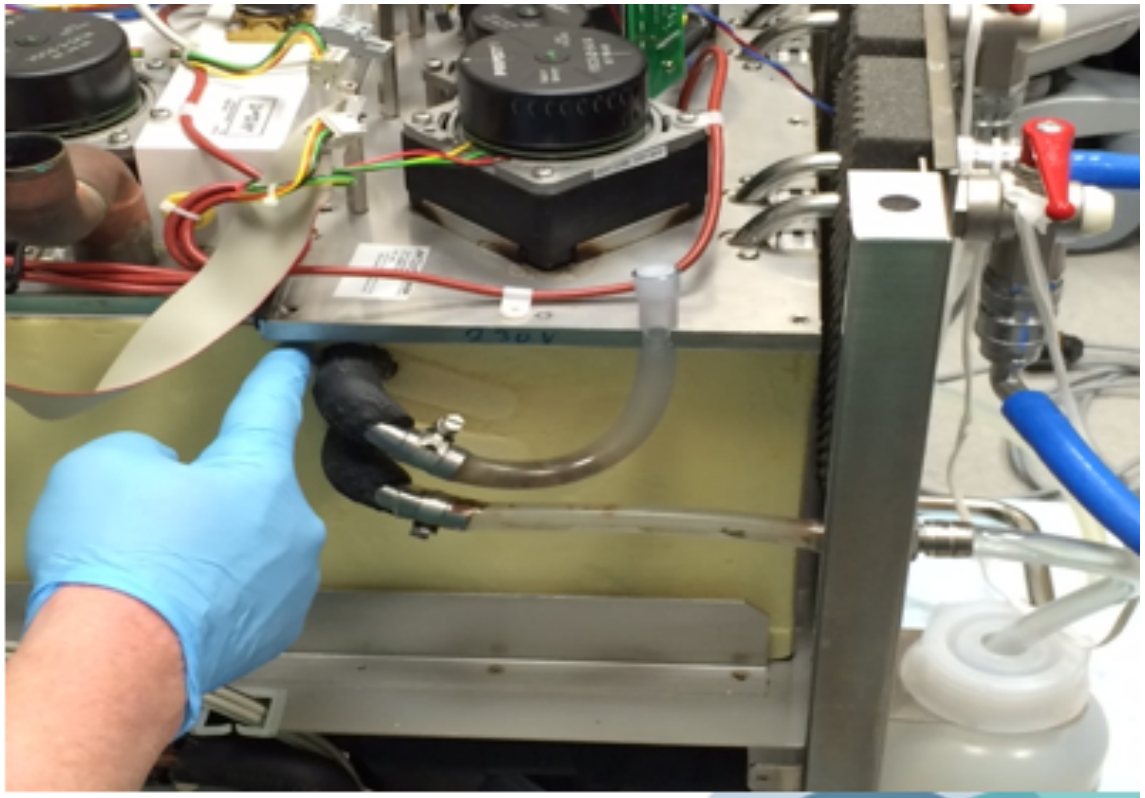

www.his.org.uk
@HIS_Infection

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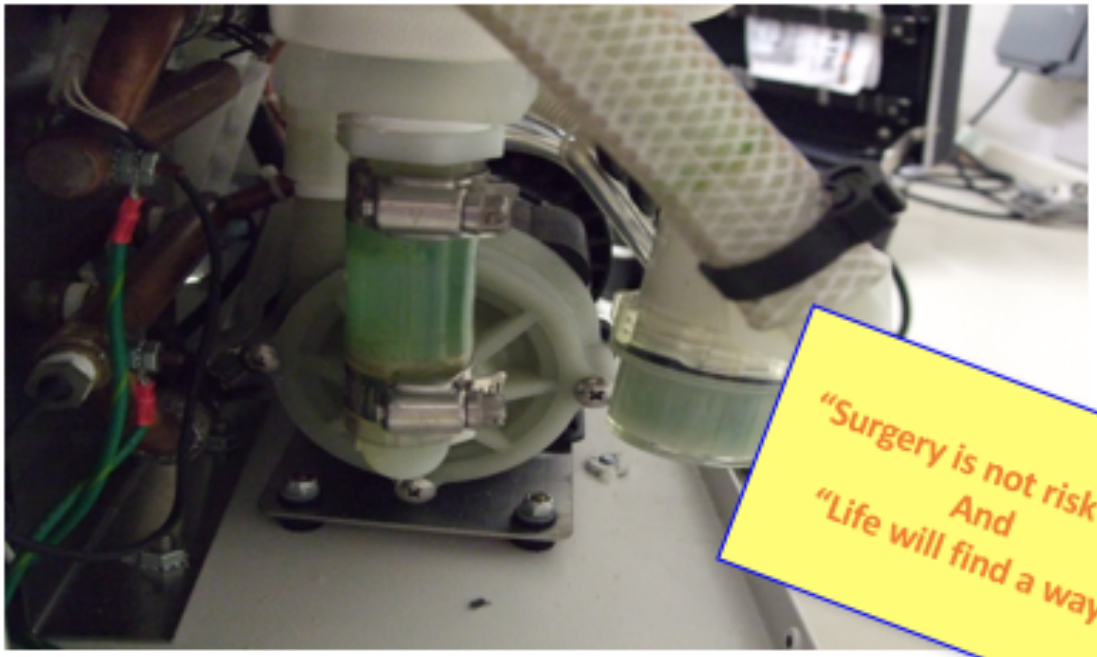
Biofilm is a risk in all water based heating and cooling systems



"Surgery is not risk free"
And
"Life will find a way"

But failure to modulate temperature during surgery is also a risk…

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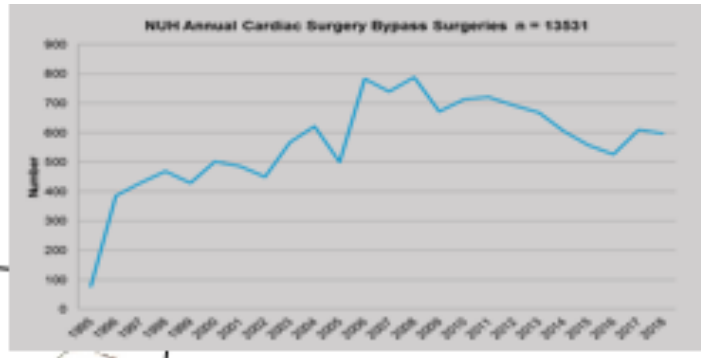


Public Health England

Infections Associated with Heater Cooler Units Used in Cardiopulmonary Bypass and ECMO

Information for healthcare providers in the UK

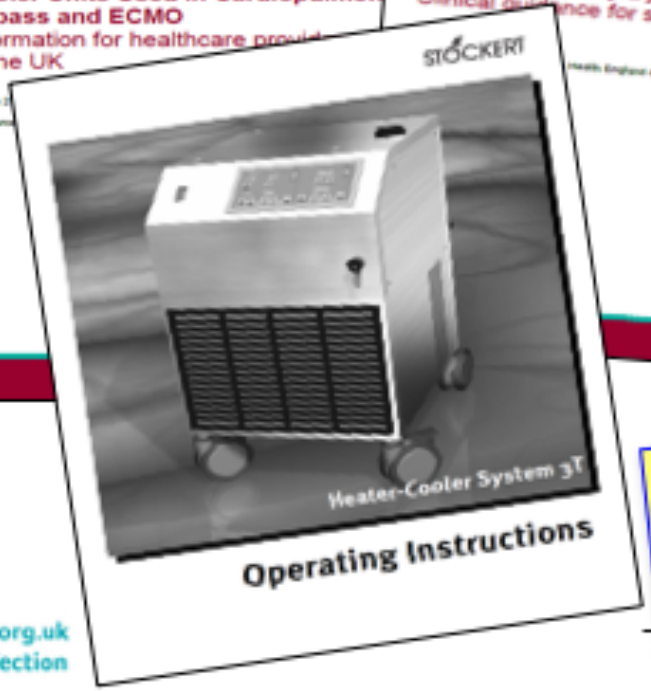
Public Health England

Mycobacterium chimaera Infections Associated with Cardiopulmonary Bypass

Clinical guidance for secondary care

Report of Case Finding Investigation to identify *Mycobacterium chimaera* infections potentially associated with Heater-Cooler Units used during Cardiothoracic Surgery in Ireland

NIMLT 50944



Cardiac Surgery commenced in Nottingham in 1995

Should cardiac Surgery stop?

→ Risk based approach

www.his.org.uk

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Legionella 1976
Mycobacteria 2012
Pseudomonas 2012

BBC News Sport Weather iPlayer

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9 October 2012 Last updated at 20:41

Share

Baby dies in Southmead Hospital pseudomonas outbreak

A premature baby died and 12 others were given treatment after an outbreak of a water-borne bacterium at a Bristol neonatal unit, it has been confirmed.

Southmead Hospital said it had found traces of pseudomonas aeruginosa in the water system for its neonatal intensive care unit.

The hospital said the baby died in August after contracting the bacterium.

Filters have been fitted to the unit's water system

Four babies died after contracting the bug in hospitals in Northern Ireland in December and January.

It was also found at the Norfolk and Norwich University Hospital in March.

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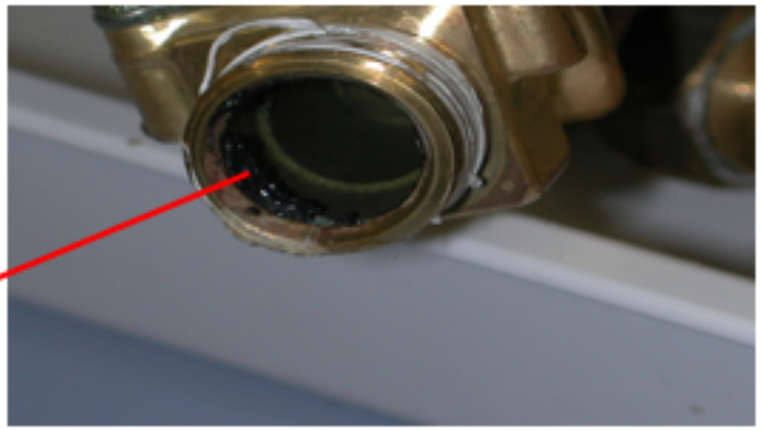
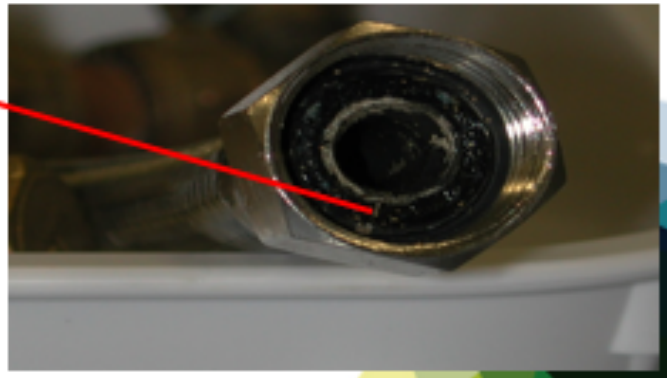
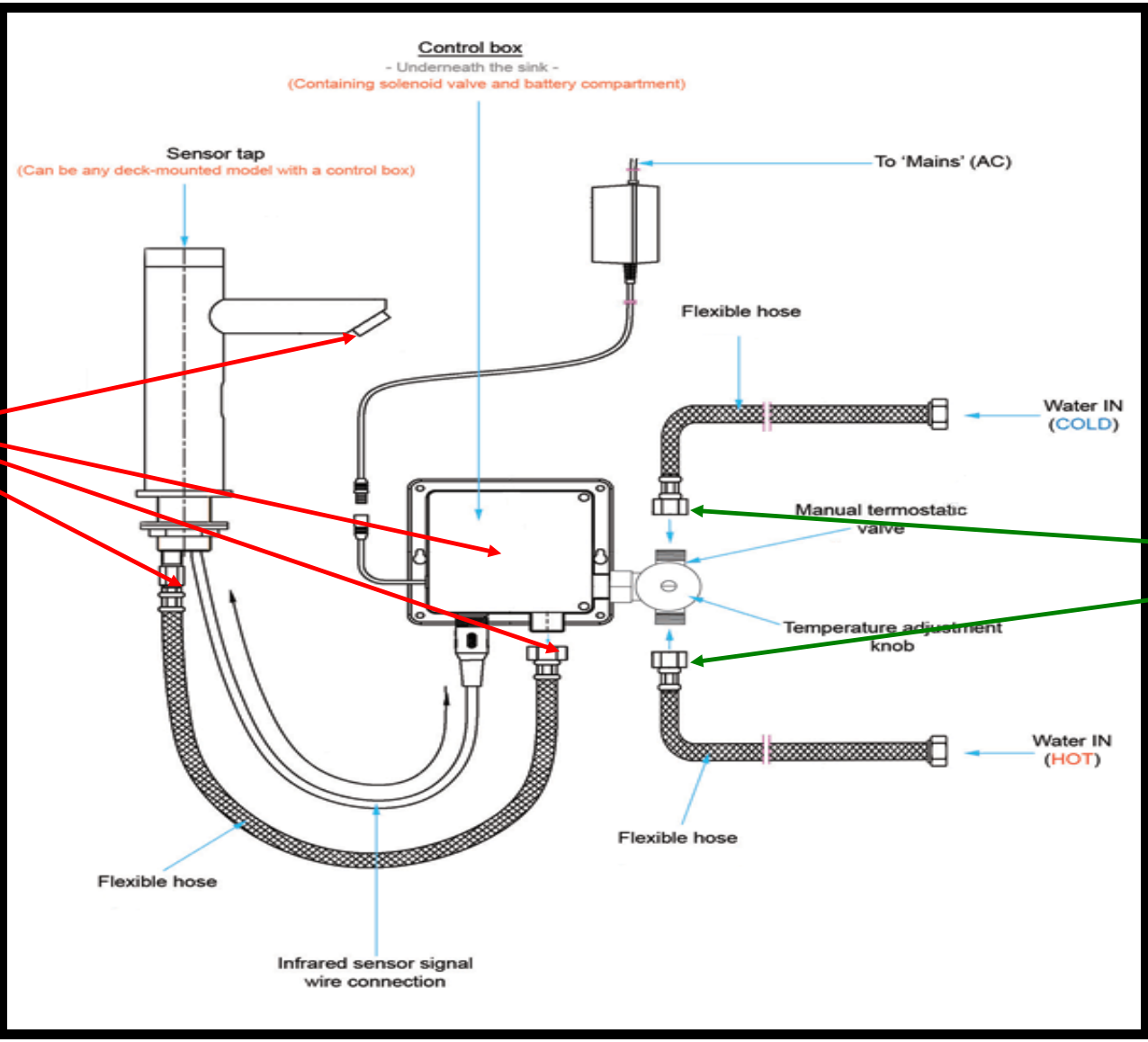




Areas positive



Areas Negative

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QMC opened in 1977
QEHB opened in 2010
Both had water contamination issues at occupation

Is it just "Older hospitals?"

Garvey *et al.*, J Hosp Infect 2018

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The "Hand-Wash Only" WHB

But it is not just about engineering-out the problems

Pseudomonas aeruginosa **POSITIVE**

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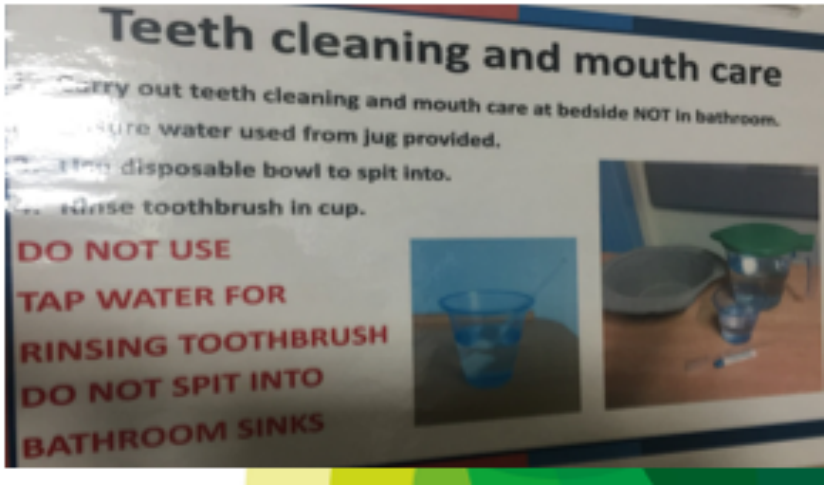


PRO
NIVEA
Please avoid leaving any toiletries/belongings around the sink area or bathroom. THANK YOU

Assisted Baths

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Burns Hydrotherapy

"Our burns patients are contaminated with dirty water before they are admitted"

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What about the waste pipes?

Garvey MI *et al.*, J Hosp Infect 2017; De Geyter *et al.*, Antimicrobial Resist Infect Control 2017

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Are there places where sinks add more risk?

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Shower Drains

Results	
:	
1) Enterobacter cloacae	
	1)
Amikacin	(R)
Amoxicillin	R
Co-amoxiclav	R
Ceftazidime	(R)
Cefuroxime	R
Ceftriaxone	(R)
Ciprofloxacin	R
Ertapenem	(R)
Gentamicin	R
Meropenem	(R)
Piptazobactam	R
Trimethoprim	(R)
New Delhi Metallo-beta-lactamase (NDM) enzyme detected.	

Legionella 1976
Mycobacteria 2012
Pseudomonas 2012
CRE / CPE 2016

IMPORTANT

Please let a member of staff know if your shower is not draining

Does increased flow reduce the risks?

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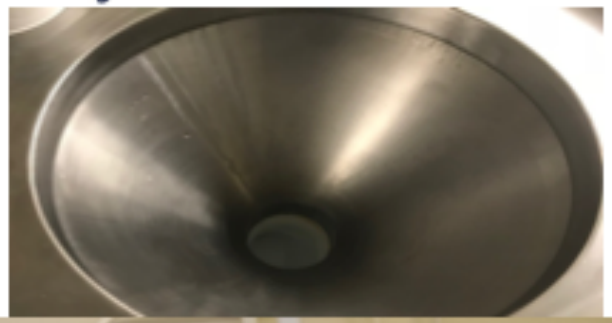
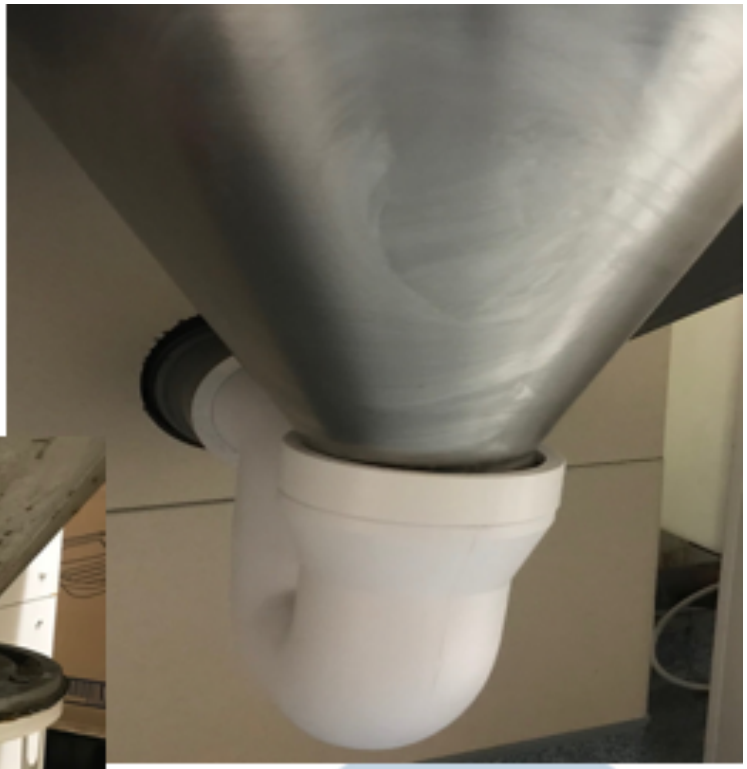
Sluice Hoppers





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Even the kitchen sink

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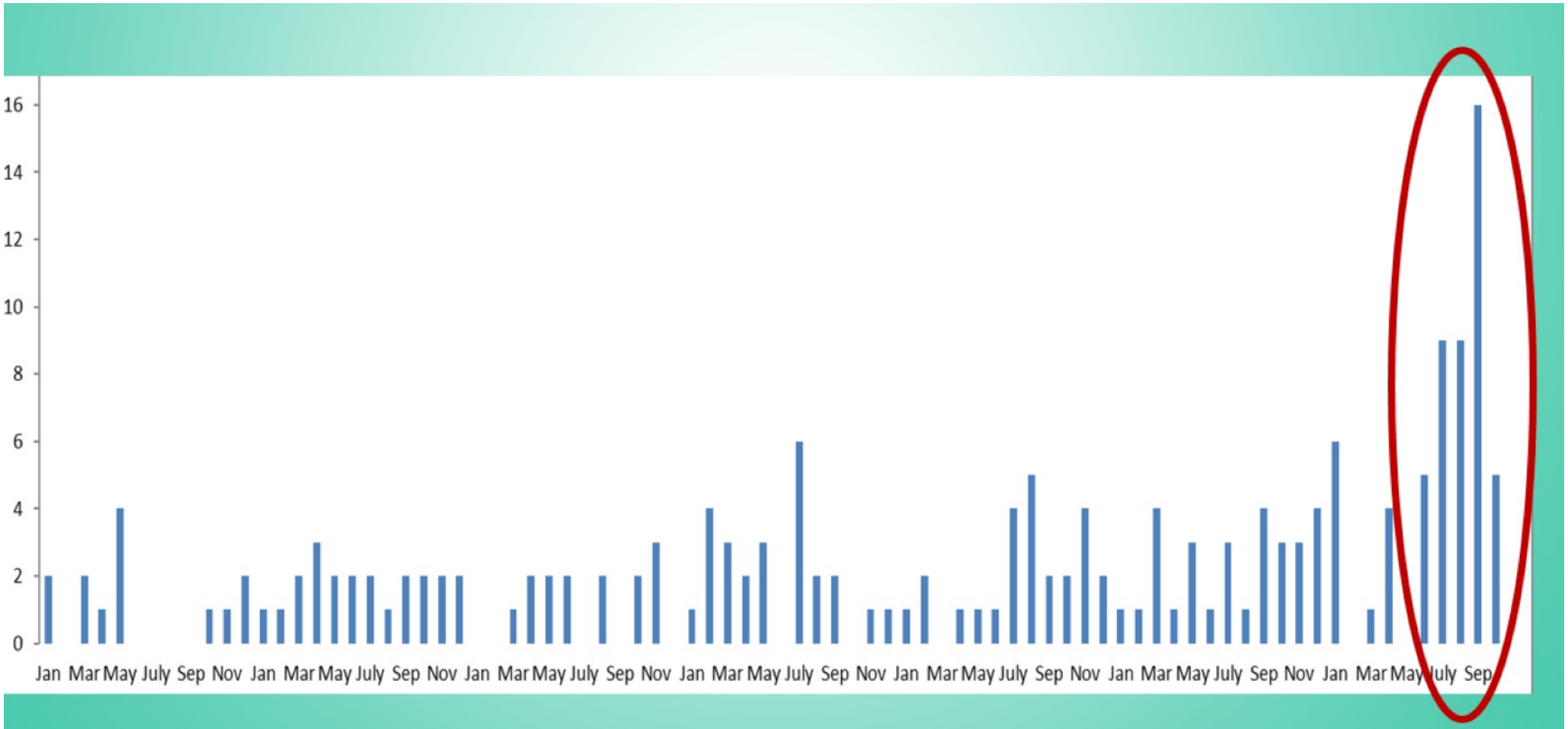
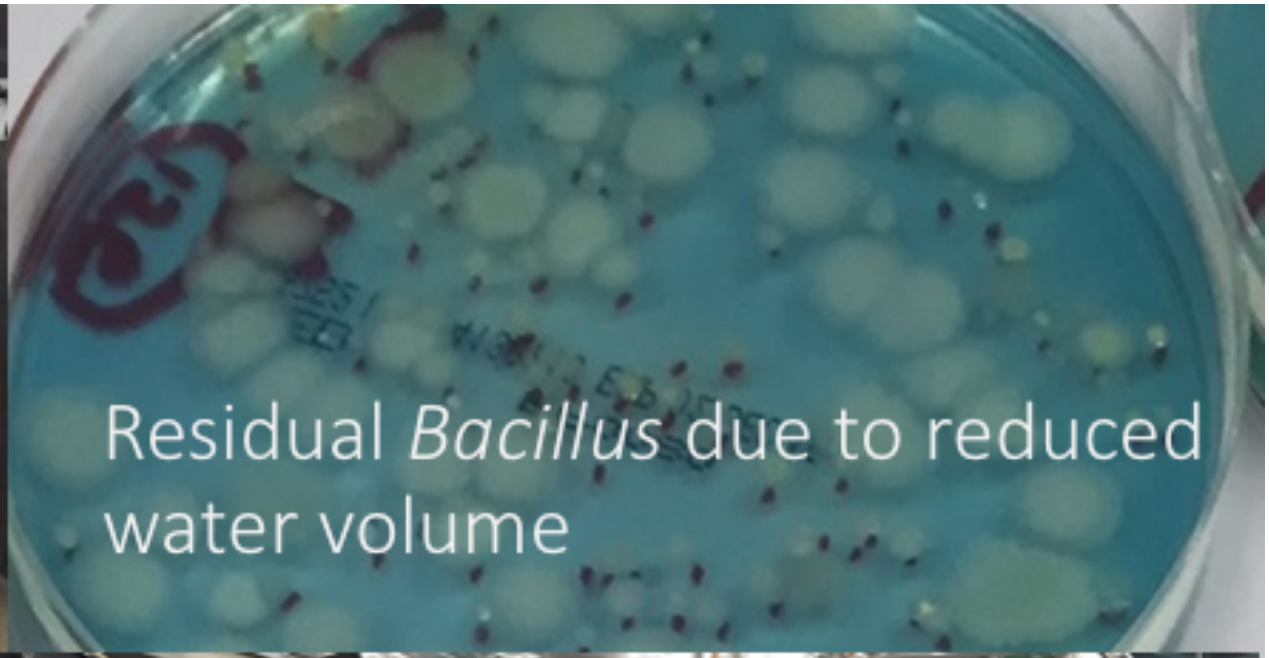
Floor Cleaning Equipment



JULY-SEPT. 2016 ARE THE 3 HIGHEST MONTHS IN 7 YEARS
(DE-DUPLICATED BC +VE FOR ASB)



Residual *Bacillus* due to reduced water volume

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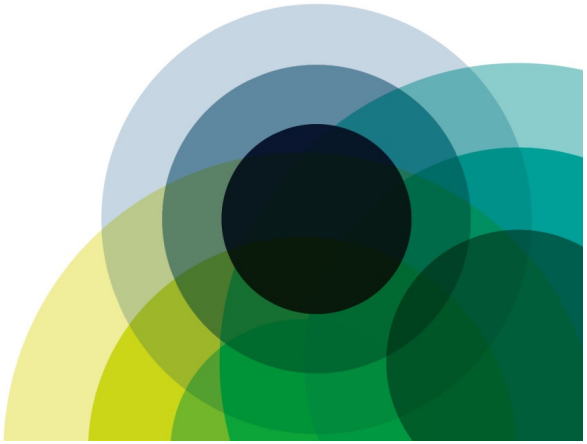
Balancing our risks

Life saving surgery with an increased risk of infection (and patient consent)

Patient safety or pain relief (baths and bubble tubes)

Automated cleaning versus labour intensive mopping

Clean sheets or clean looking sheets and heating etc.



Basic Principles

- People need clean safe water, bacteria are less exacting and will contaminate anything which contains water
- Water which is safe to drink is not usually sterile
- Keep things simple
- Keep things clean
- Consider hygienic design and maintenance requirements
- Do not buy, borrow, accept or install anything which you can't keep clean and in good working order
- Know your most vulnerable patients?

Summary

- However rapidly we adapt our environment the microbes will easily keep up
- Antimicrobial resistance makes water management (and cleaning) more important then ever but…

-Resistant organisms could be the key

Highlighting routes of transmission

which historically went unnoticed

If the water is not safe then stick to alcohol:-

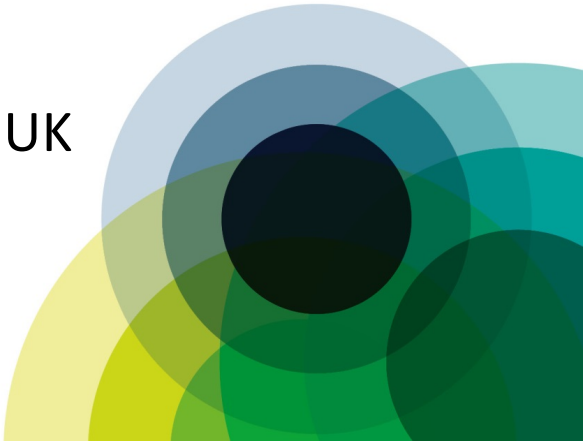
Can we design-out our non-essential water risks…

Acknowledgements

- Healthcare Infection Society

- Team NUH, Nottingham University Hospitals, UK
  - John Campbell, Chief Percussionist
  - Natalie Vaughan & The Infection Prevention & Control Team
  - Estate & Facilities Staff

- Mark Garvey – Queen Elizabeth Hospital, Birmingham, UK



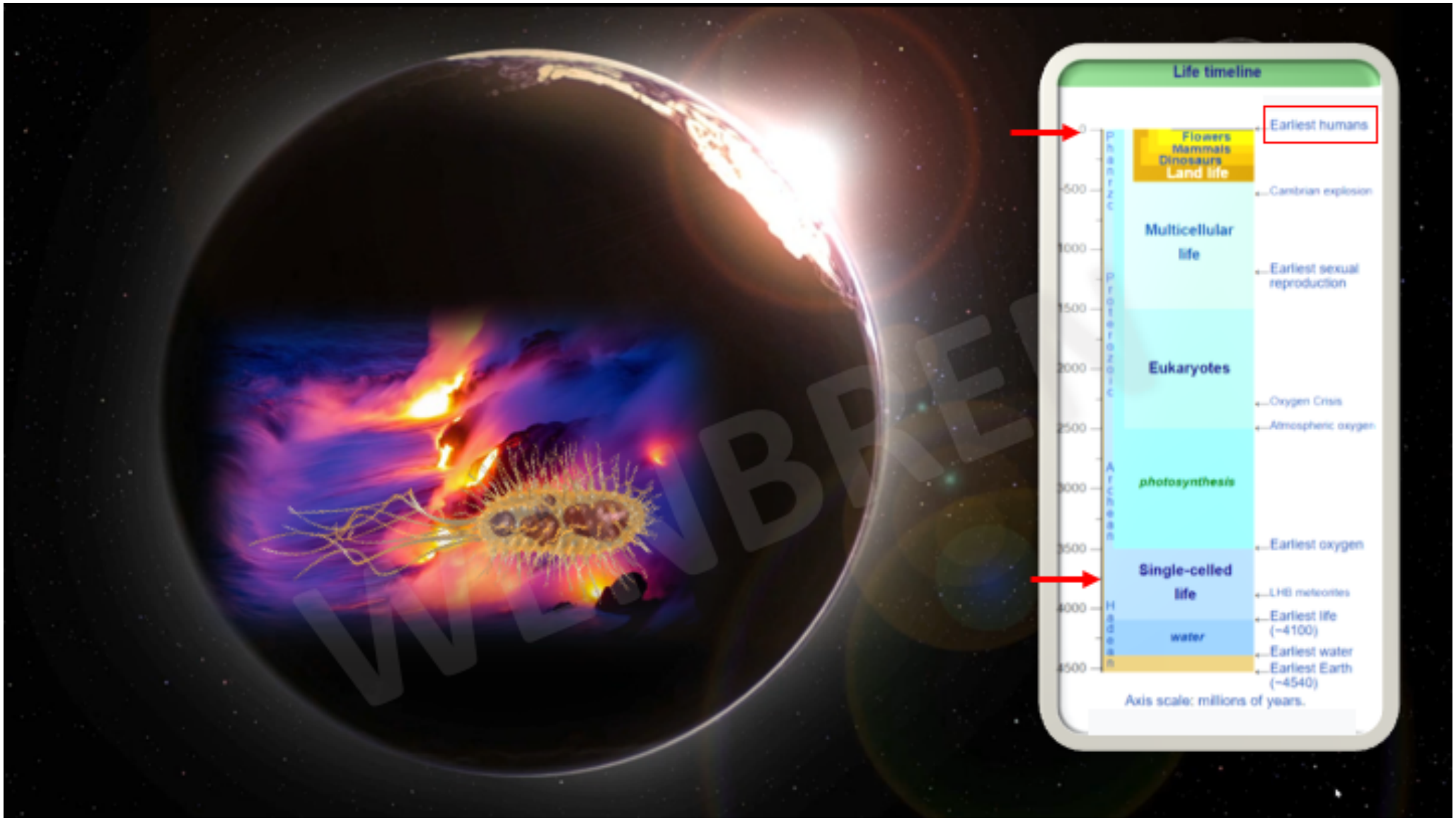
Thank you

Healthcare Infection Society

Healthcare Infection Society

The hand wash station friend or fiend??

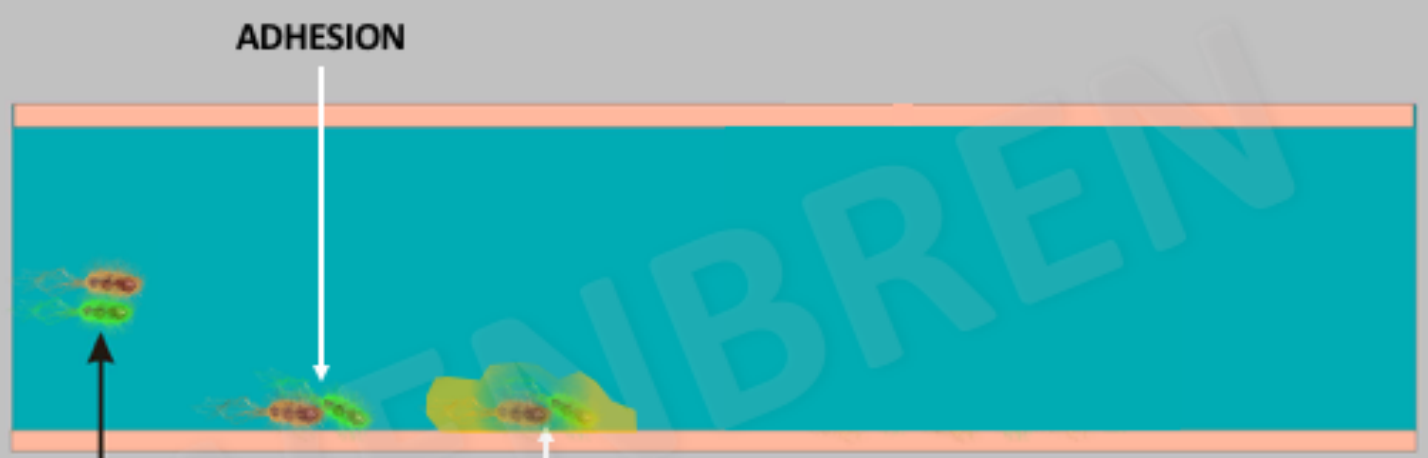
Dr. Michael Weinbren, University Hospitals Coventry


Life timeline
Earliest humans
Flowers
Mammals
Dinosaurs
Land life
Cambrian explosion
Multicellular life
Earliest sexual reproduction
Eukaryotes
Oxygen Crisis
Atmospheric oxygen
photosynthesis
Earliest oxygen
Single-celled life
LHB meteorites
Earliest life (~4100)
water
Earliest water
Earliest Earth (~4540)
Axis scale: millions of years.

BIOFILM FORMATION

Hea
Infe
Soc

BIOFILM FORMATION



Healthcare Infection Society

1967

1850 1900 1950 2000 2012

1854

2007

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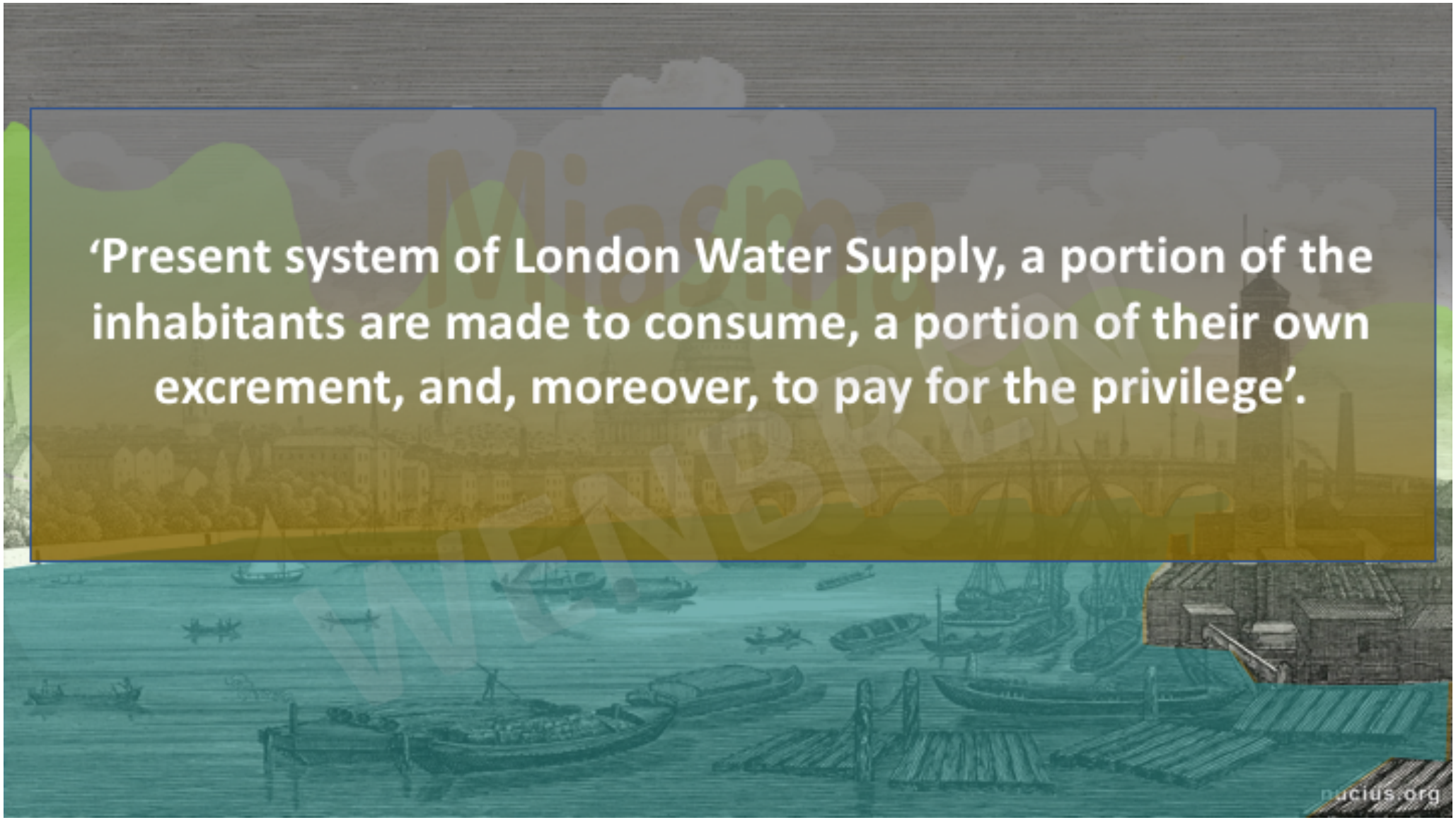
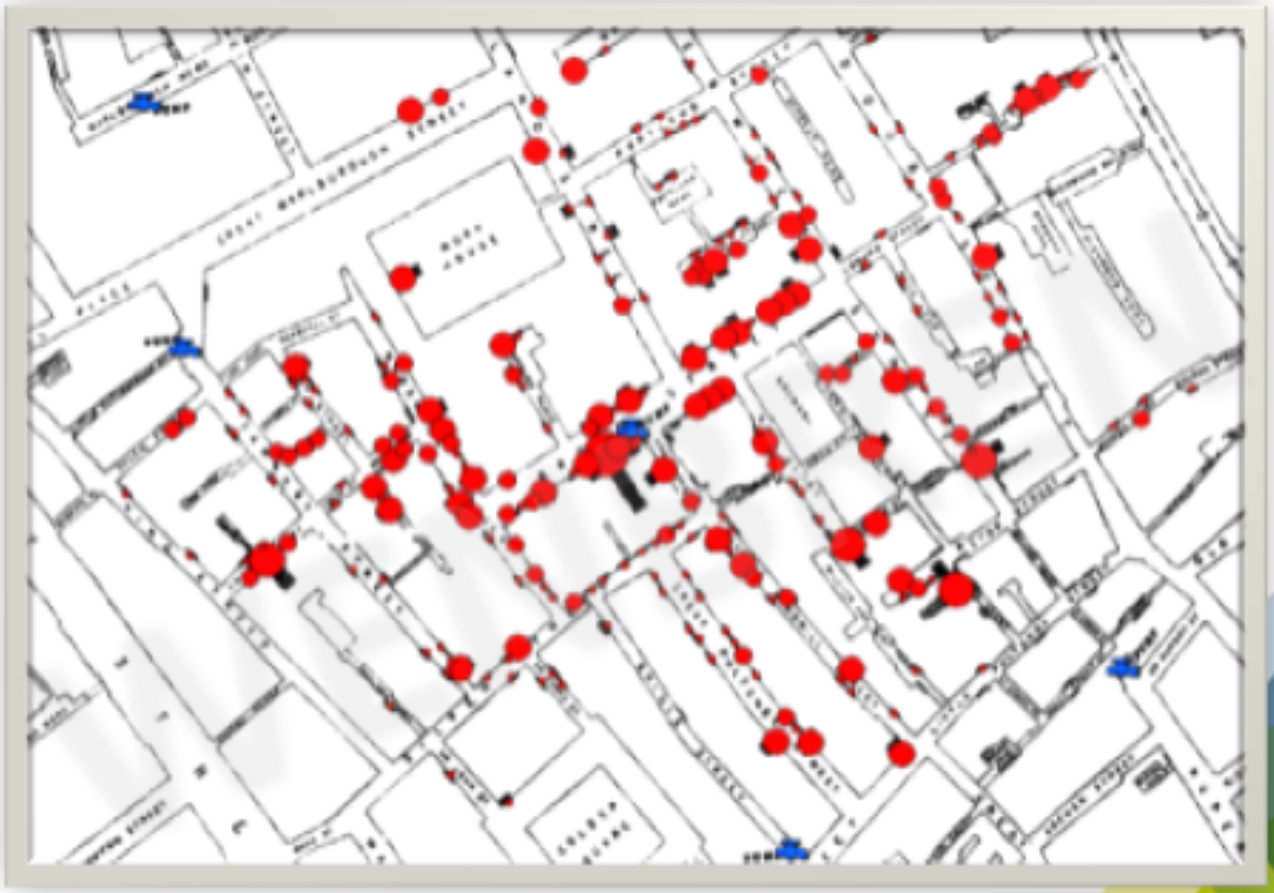
John Snow


Miasma


‘Present system of London Water Supply, a portion of the inhabitants are made to consume, a portion of their own excrement, and, moreover, to pay for the privilege’.
Miasma
MEMBRANE
nucius.org

Healthcare Infection Society



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1847

Germ theory

1967

1850 1900 1950 2000 2012

1854

2007

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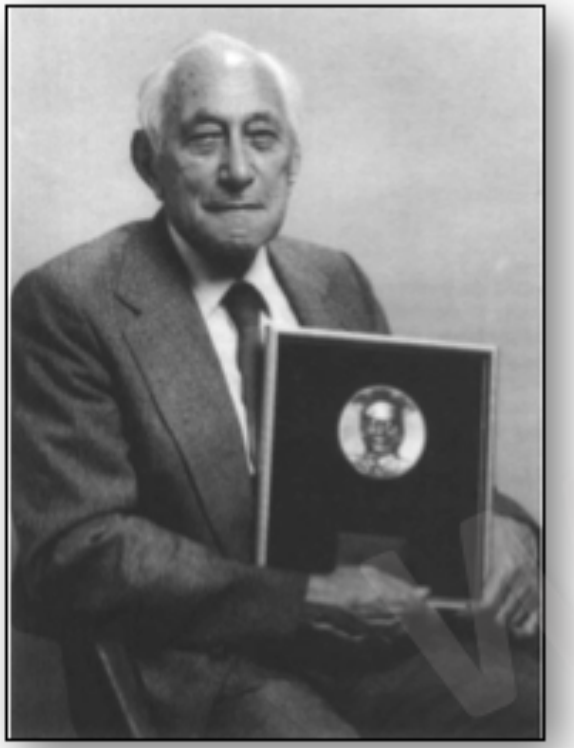

Joachim Kohn 1912-1987

544 2 December 1967

Correspondence

Letters to the Editor should not exceed 500 words.

Pseudomonas Infection in Hospital

This brings me to the role of the drainage and plumbing system—that is, sinks, wash-basins, and traps. Your leading article is perhaps too cautious in saying that the evidence of infection from sinks and drains, etc., is not clearly established. In fact traps and wash-basins undoubtedly are a reservoir and can and do become a source of cross-infection. On a number of occasions patients' raw areas were colonized or infected by strains isolated from the traps of the wash-basins previous to the patient's admission.

I am, etc.,

J. KOHN.

Queen Mary's Hospital,
Rochampton,
London S.W.15.

Healthcare Infection Society

Professor Kevin Kerr

Healthcare Infection Society

Journal of Hospital Infection (2009) 73, 338–344

Available online at www.sciencedirect.com

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www.elsevierhealth.com/journals/jhin

REVIEW

Pseudomonas aeruginosa: a formidable and ever-present adversary

K.G. Kerr [a,*], A.M. Snelling [b]

[a] Department of Microbiology, Harrogate District Hospital, Harrogate, North Yorkshire, UK
[b] Division of Biomedical Sciences & Bradford Infection Group, University of Bradford, Bradford, West Yorkshire, UK

Available online 21 August 2009

KEYWORDS
Healthcare-associated infection;
Hospital environment;
Infection control;
Pseudomonas aeruginosa

Summary *Pseudomonas aeruginosa* is a versatile pathogen associated with a broad spectrum of infections in humans. In healthcare settings the bacterium is an important cause of infection in vulnerable individuals including those with burns or neutropenia or receiving intensive care. In these groups morbidity and mortality attributable to *P. aeruginosa* infection can be high. Management of infections is difficult as *P. aeruginosa* is inherently resistant to many antimicrobials. Furthermore, treatment is being rendered increasingly problematic due to the emergence and spread of resistance to the few agents that remain as therapeutic options. A notable recent development is the acquisition of carbapenemases by some strains of *P. aeruginosa*. Given these challenges, it would seem reasonable to identify strategies that would prevent acquisition of the bacterium by hospitalised patients. Environmental reservoirs of *P. aeruginosa* are readily identifiable, and there are numerous reports of outbreaks that have been attributed to an environmental source; however, the role of such sources in sporadic pseudomonal infection is less well understood. Nevertheless there is emerging evidence from prospective studies to suggest that environmental sources, especially water, may have significance in the epidemiology of sporadic *P. aeruginosa* infections in hospital settings, including intensive care units. A better understanding of the role of environmental reservoirs in pseudomonal infection will permit the development of new strategies and refinement of existing approaches to interrupt transmission from these sources to patients.

* Corresponding author. Address: Department of Microbiology, Harrogate District Hospital, Lancaster Park Road, Harrogate, North Yorkshire HG2 7SX, UK. Tel.: +44 1423 553077.
E-mail address: kevin.kerr@hdft.nhs.uk

0195-6701/$ - see front matter © 2009 The Hospital Infection Society. Published by Elsevier Ltd. All rights reserved.
doi:10.1016/j.jhin.2009.04.020


RANGERS
FOOTBALL

Healthcare

Healthcare Infection Society

1847

Germ theory

1850

1854

1900

1950

1967

2007

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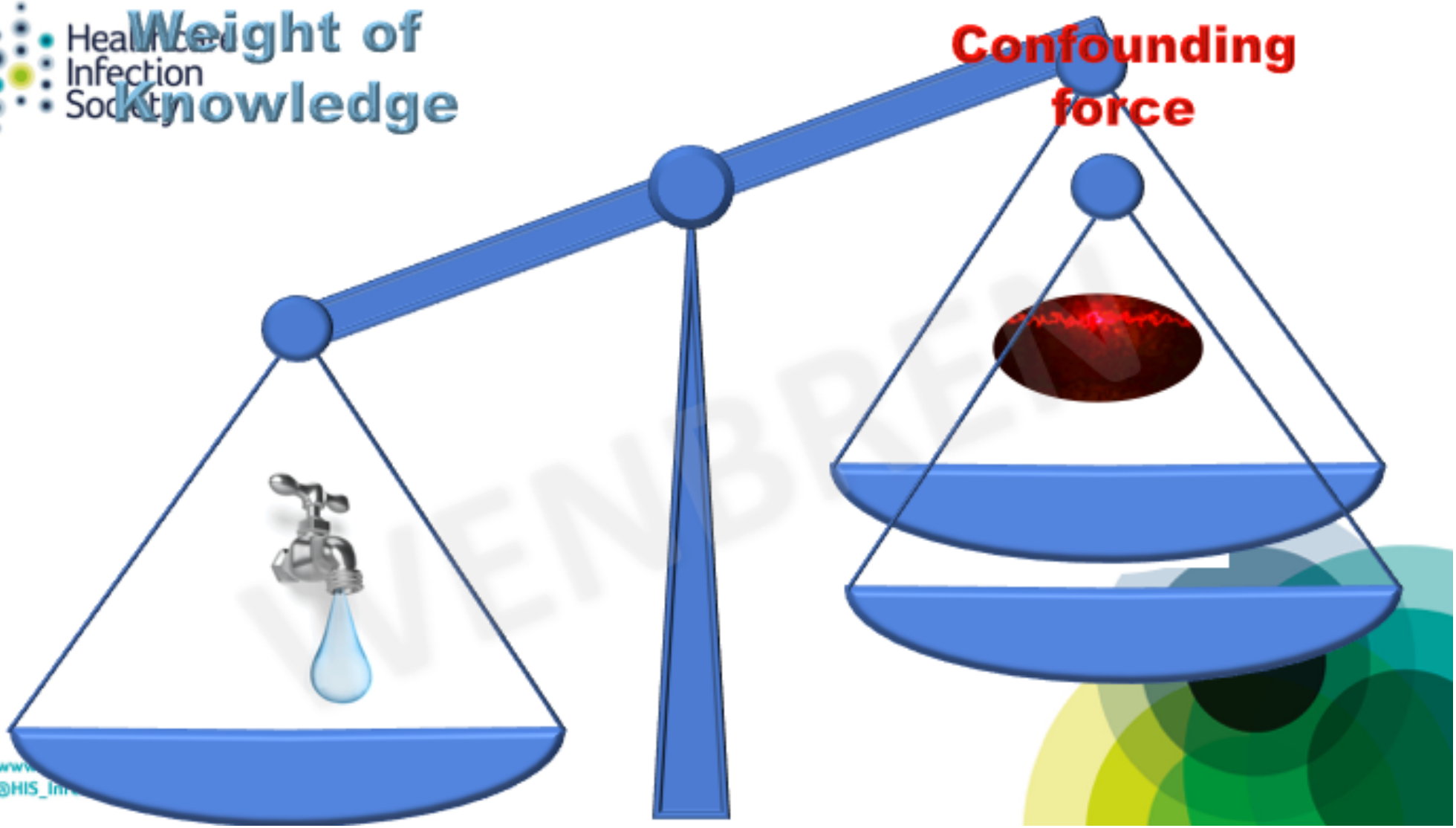
Weight of Knowledge



The Semmelweis reflex is a metaphor for the reflex-like tendency to reject new evidence or new knowledge because it contradicts established norms, beliefs or paradigms.

Philosopher F.C.S. Schiller holds that belief perseverance "deserves to rank among the fundamental 'laws' of nature."[4]

WATER SUPPLY

LARGE WATER PIPES IN BUILDING

PERIPHERY OF SYSTEM

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Legionella

INTERFACE BETWEEN WATER SUPPLY AND WASTE SYSTEM

Wide range of organisms
Size of problem?


CEFTAZIDIME
CIPROFLOXACIN

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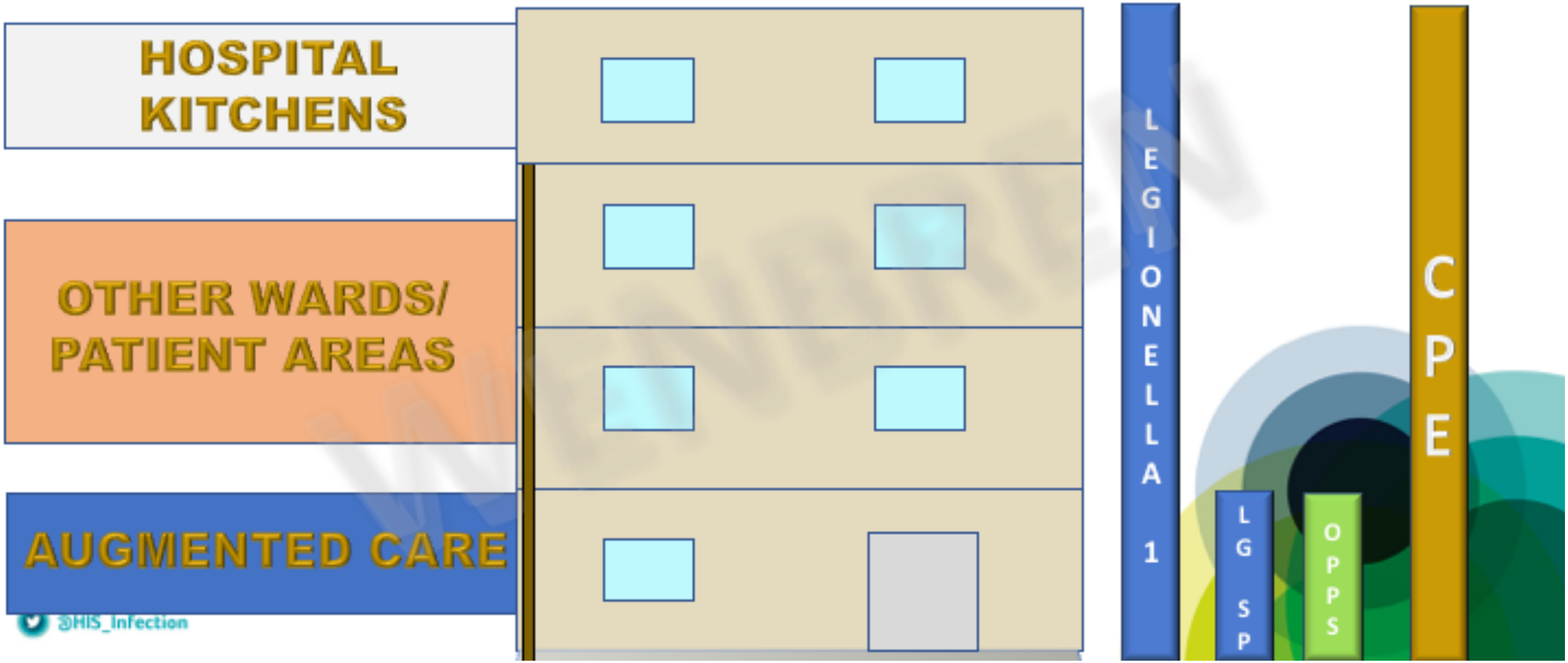
HOSPITAL

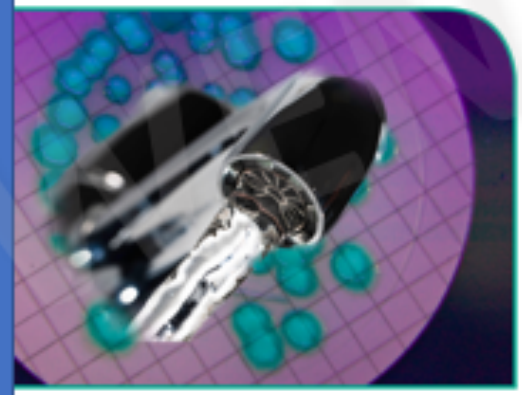



NPSA
WENBREN

Department of Health

Health Technical Memorandum 04-01: Safe water in healthcare premises

C: *Pseudomonas inosa* – advice for ented care units



Controls less easily monitored

Part time involvement

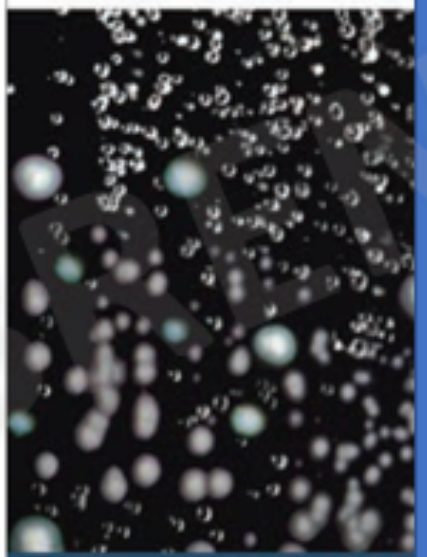
No proper training

The clinical interface not the province of most water management companies

HSE

Legionnaires' disease

The control of legionella bacteria in water systems



Approved Code of Practice and guidance on

L8 (Fourth edition)
Published 2013

Engineering controls

Full time job

Trained

Industry supporting water management

Healthcare Infection Society

WORLD HEALTH ORGANISATION

Thousands of people die every day around the world from infections acquired while receiving health care

Hands are the main pathways of germ transmission during health care

Hand hygiene is therefore the most important measure to avoid the transmission of harmful germs and prevent health care-associated infections

ALCOHOL HAND RUB

Healthcare

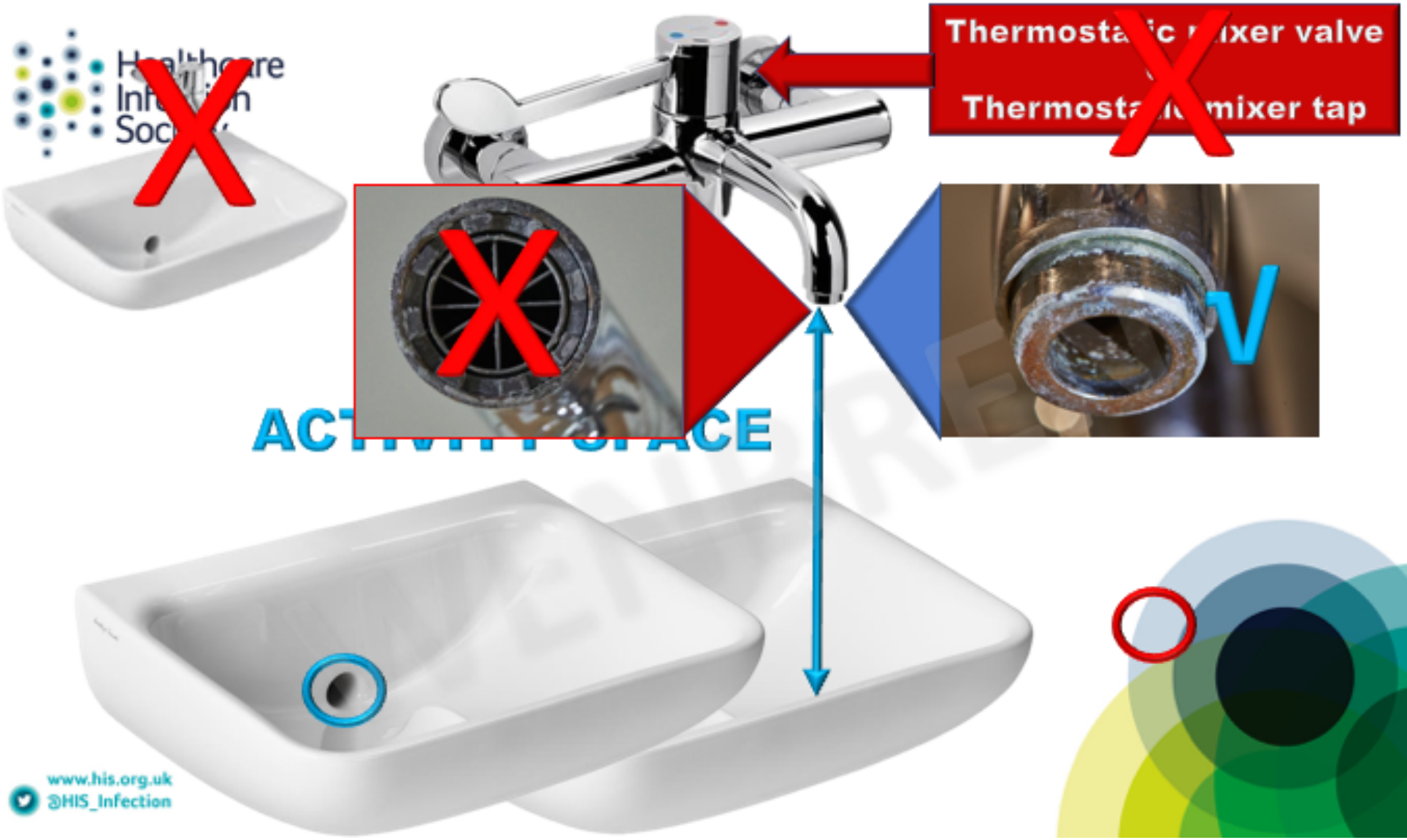
Preferred method of hand decontamination

Do not use if hands visibly soiled, or resistant organisms

HAND WASH STATION

USE if hands visibly soiled, or resistant organisms


SOAP
Towels


Thermostatic mixer valve
Thermostatic mixer tap
ACTIVITY SPACE
www.his.org.uk
@HIS_Infection

SOLE PURPOSE – DECONTAMINATION OF HANDS


H
C

NON-CLINICAL AREAS

CLINICAL AREAS

Health Building Note 00-1
Part C: Sanitary assemblie

2.37 Basin taps used in clinical areas and food-preparation and laboratory areas are required to be operated without the use of hands.


In the interests
of food hygiene
wash only
hands here
SISSONS
ART
ITAL
HENS

Healthcare

@HIS_Infection

Health
Infect
Societ

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clinell
CW200
FOR
USED
ITEMS
ONLY

CLINICAL AREAS ± COMMUNAL AREAS

2.37 Basin taps used in clinical areas and food-preparation and laboratory areas are required to be operated without the use of hands.

NON-CLINICAL AREAS FACILITIES NON-SHARED AREAS

Sensor or elbow operated?

TMVs placed everywhere.
One sided risk assessment.


Thank You
B BRAUN

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98% staff used hands to turn on outlets

68% staff used hands to turn off outlets

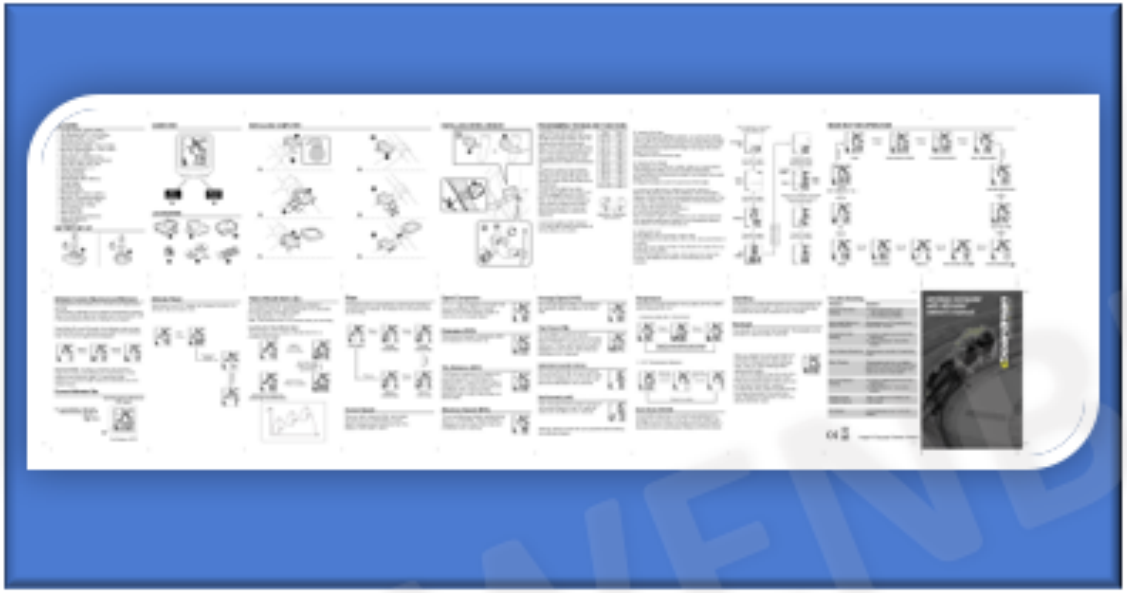

DaRo
UV SYSTEMS LTD

ANGLE OF SETUP OF ELBOW LEVER

44% FLUSH OR END OF LEVER WITHIN 3 CMS OF BACK PANEL


B BRAUN

Healthcare Infection Society



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World Health Organization | Patient Safety | SAVE LIVES Clean Your Hands

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

0 Wet hands with water;

1 Apply enough soap to cover all hand surfaces;

2 Rub hands palm to palm;

3 Right palm over left dorsum with interlaced fingers and vice versa;

4 Palm to palm with fingers interlaced;

5 Backs of fingers to opposing palms with fingers interlocked;

6 Rotational rubbing of left thumb clasped in right palm and vice versa;

7 Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8 Rinse hands with water;

9 Dry hands thoroughly with a single use towel;

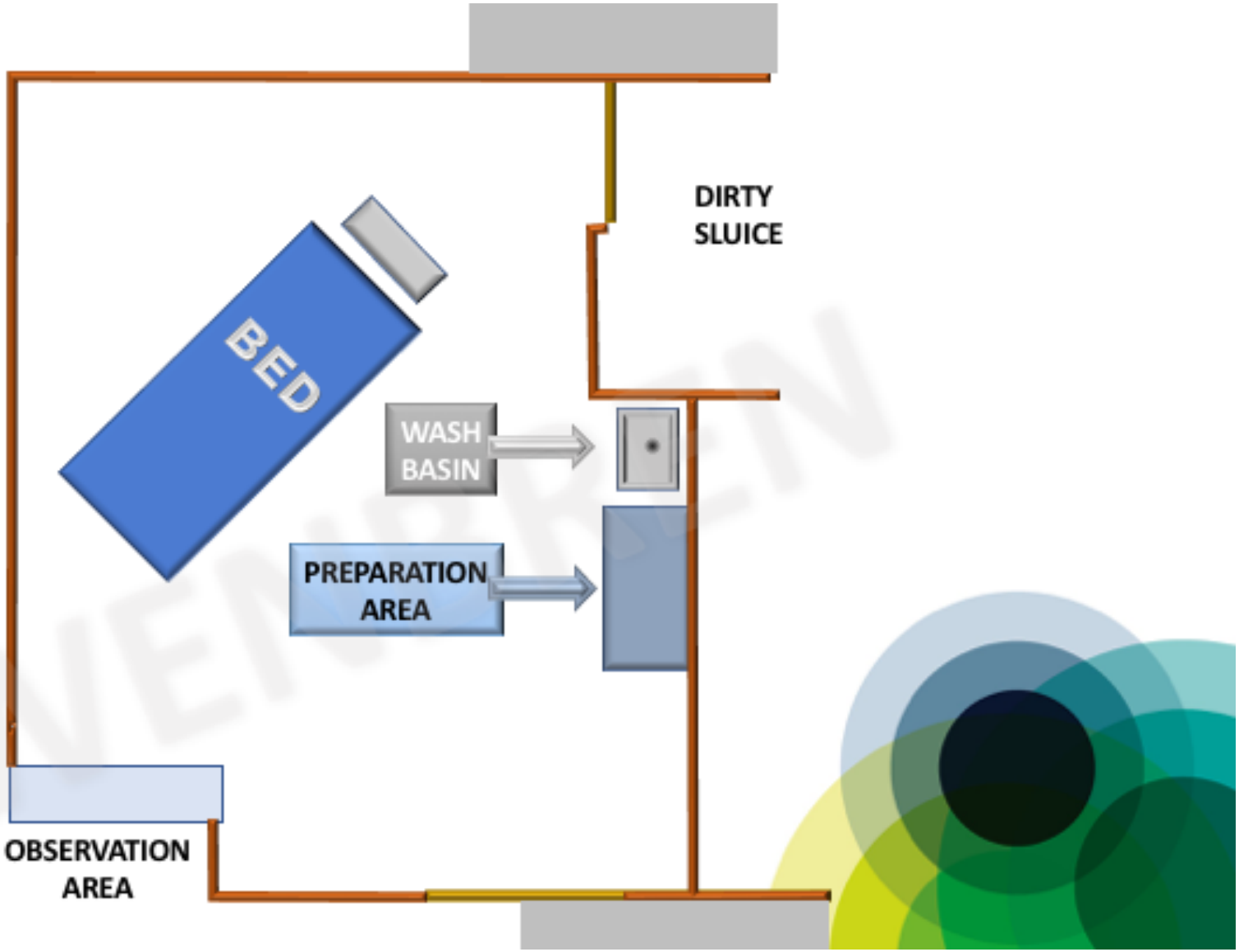
10 Use towel to turn off faucet;

11 Your hands are now safe.

Healthcare Infection

Hota et al

Outbreak of multi-drug resistant *Pseudomonas aeruginosa*



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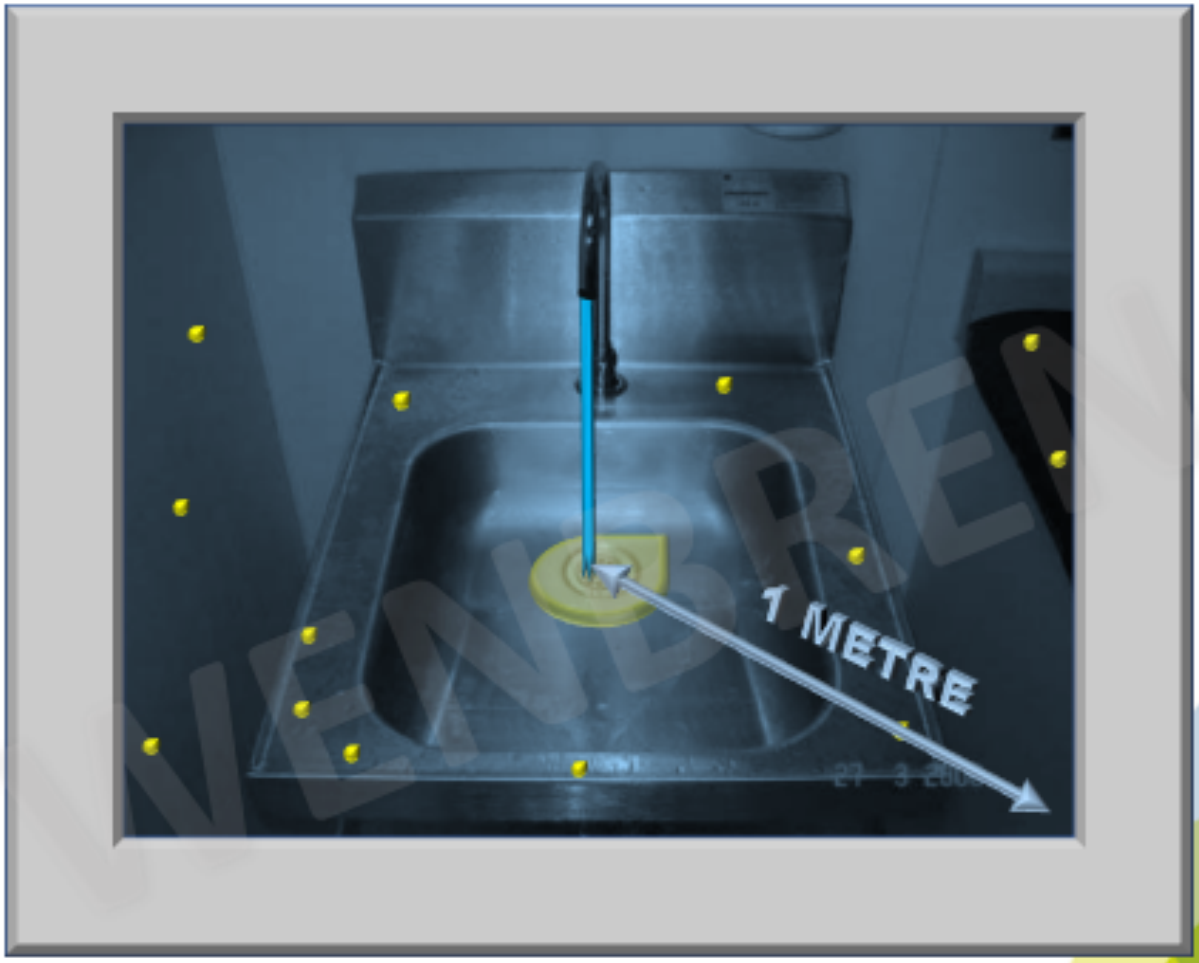
Healthcare Infection Society



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WENBREN


WENBREN


WENBREN

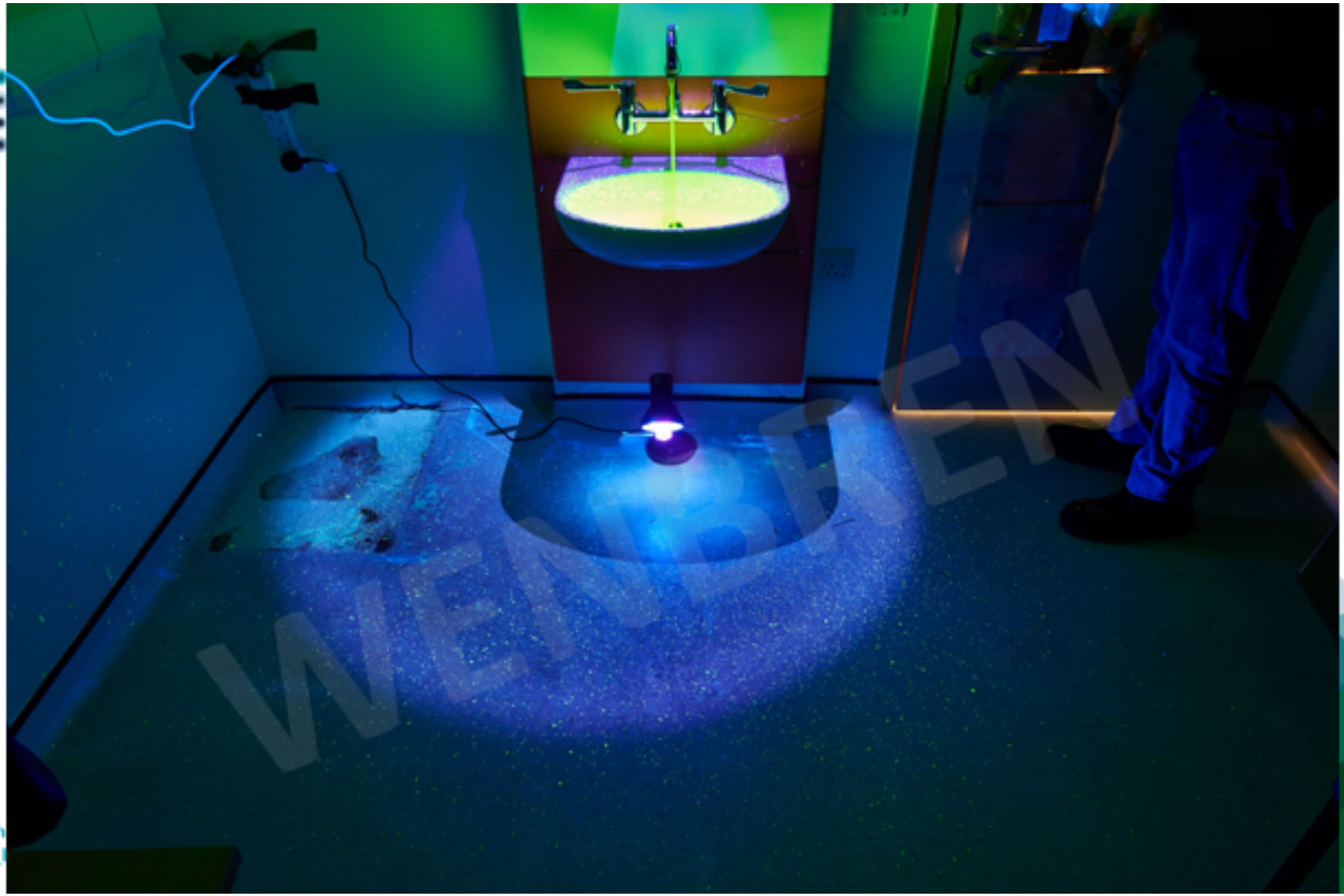

WEINBERG

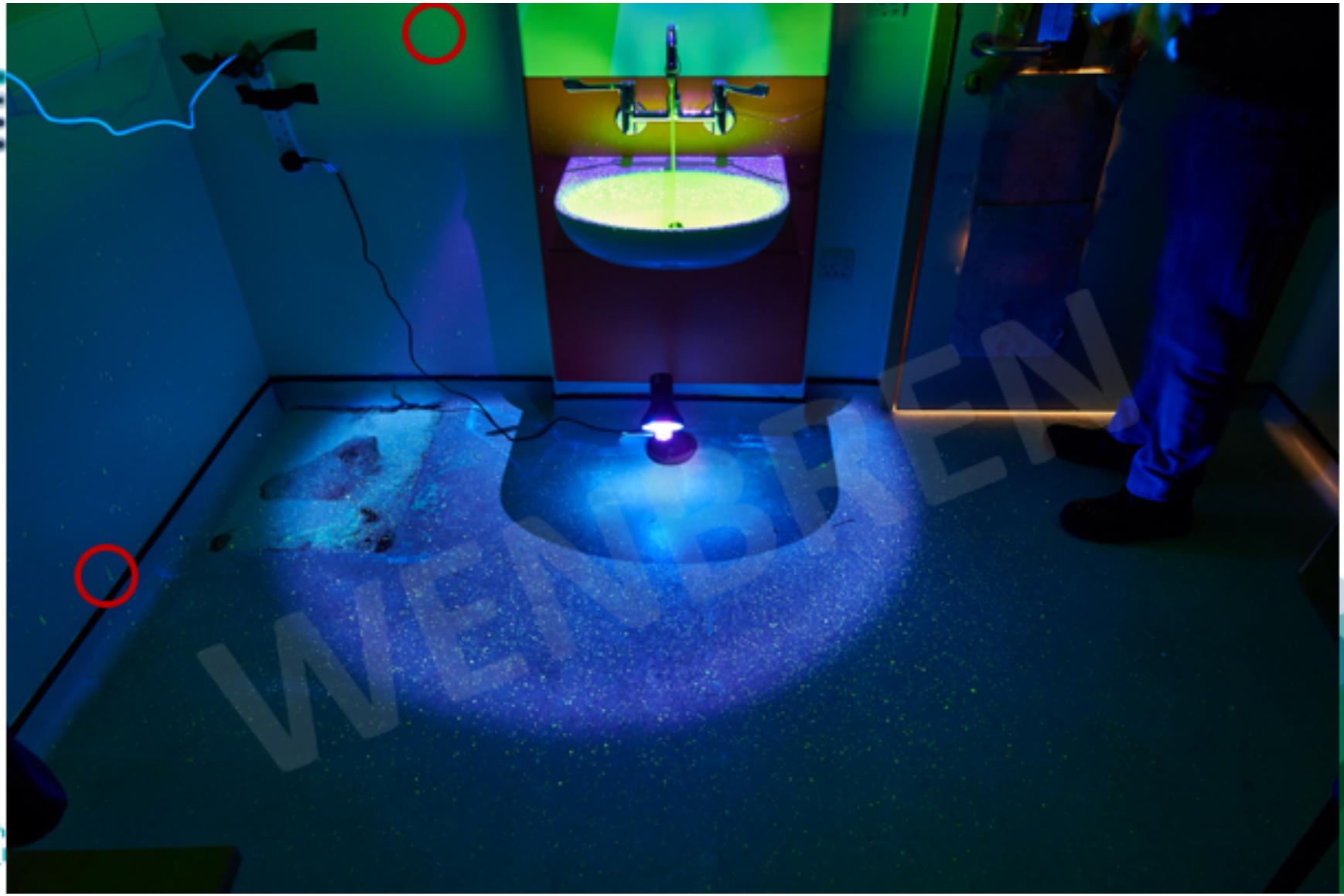

WENDEN

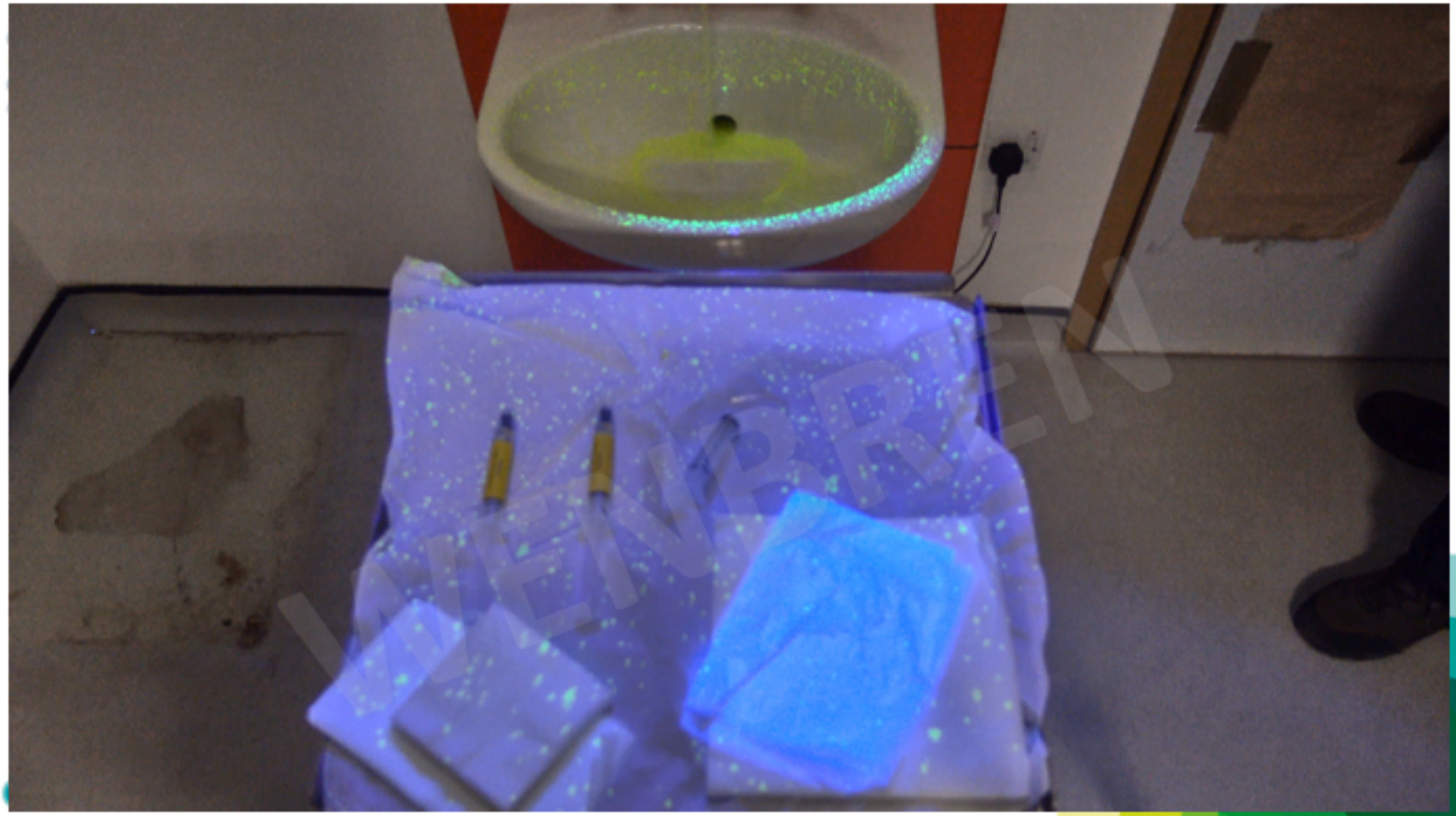

WIENBERGEN


WIENBRÄEN


WIENBERGEN


WIENBEEN

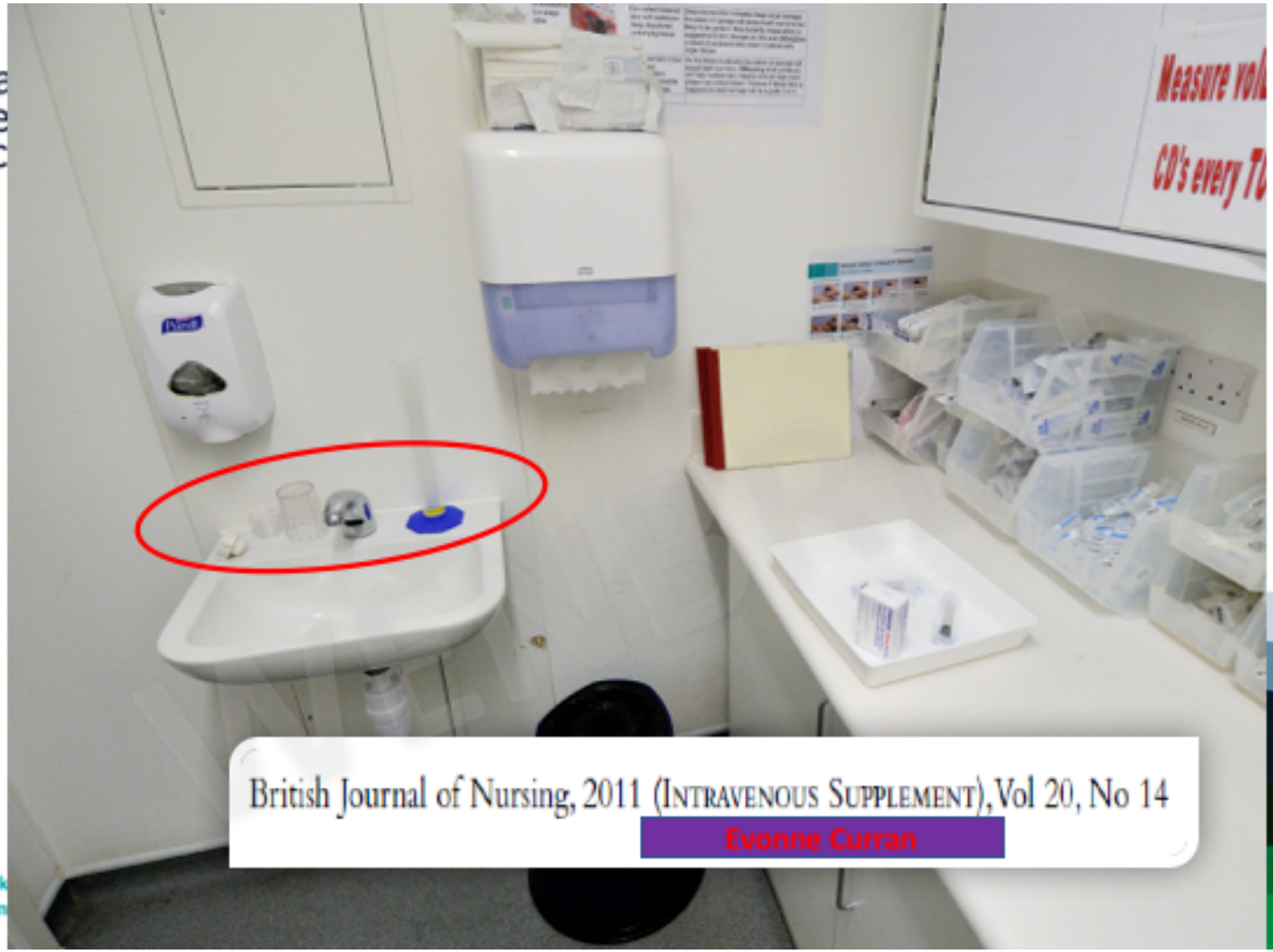

WERKBEEN




COVER IT
REPORT IT
clinell
enteral
enteral
Baxter


Courtesy of
Professor Matthias Trautmann

FARWELL REPORT 1995
PAEDIATRIC DEATHS LINKED TO CONTAMINATED TPN
WATER FROM SINK


British Journal of Nursing, 2011 (Intravenous Supplement), Vol 20, No 14
Evonne Curran

Healthcare Infection

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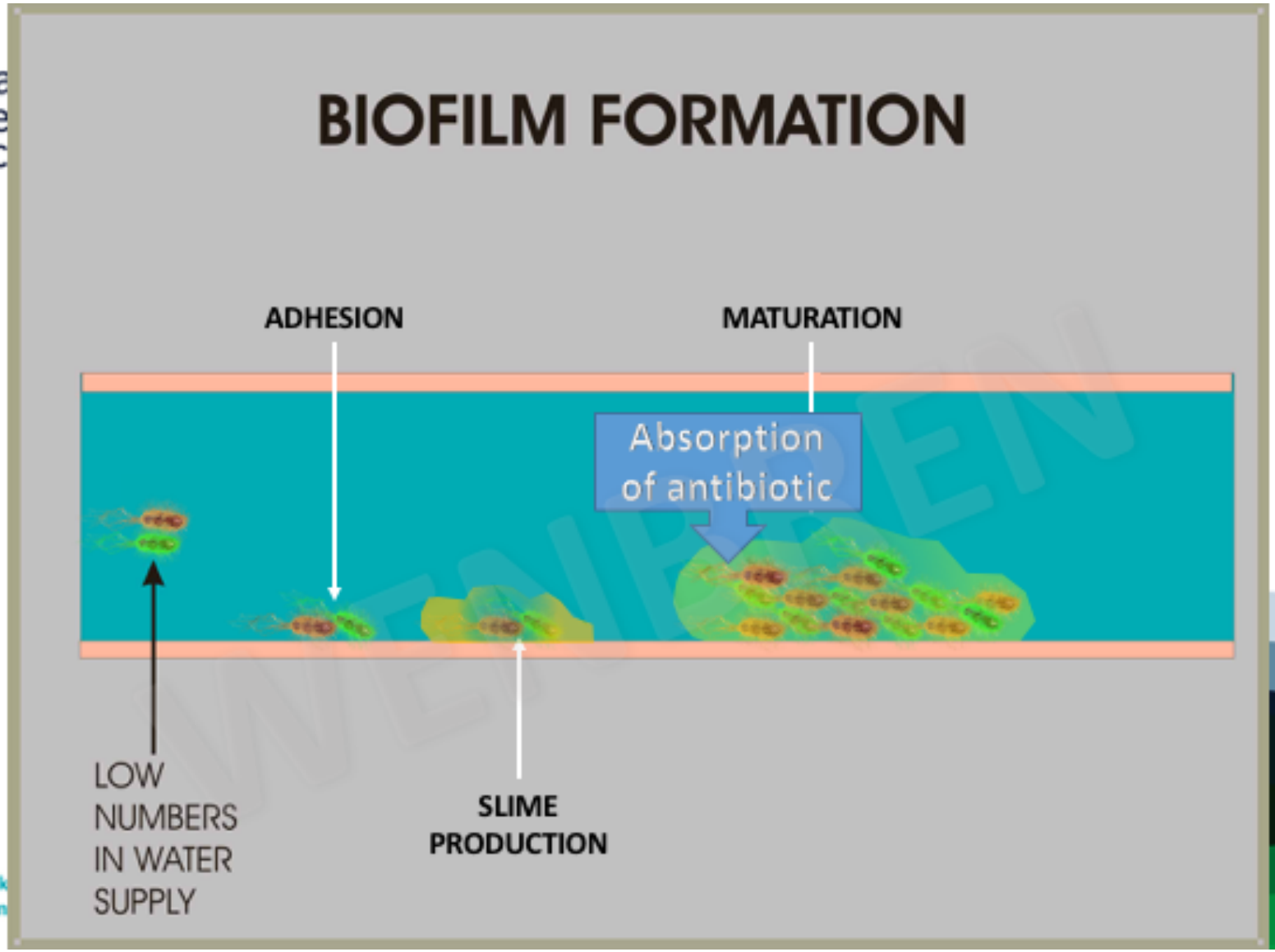
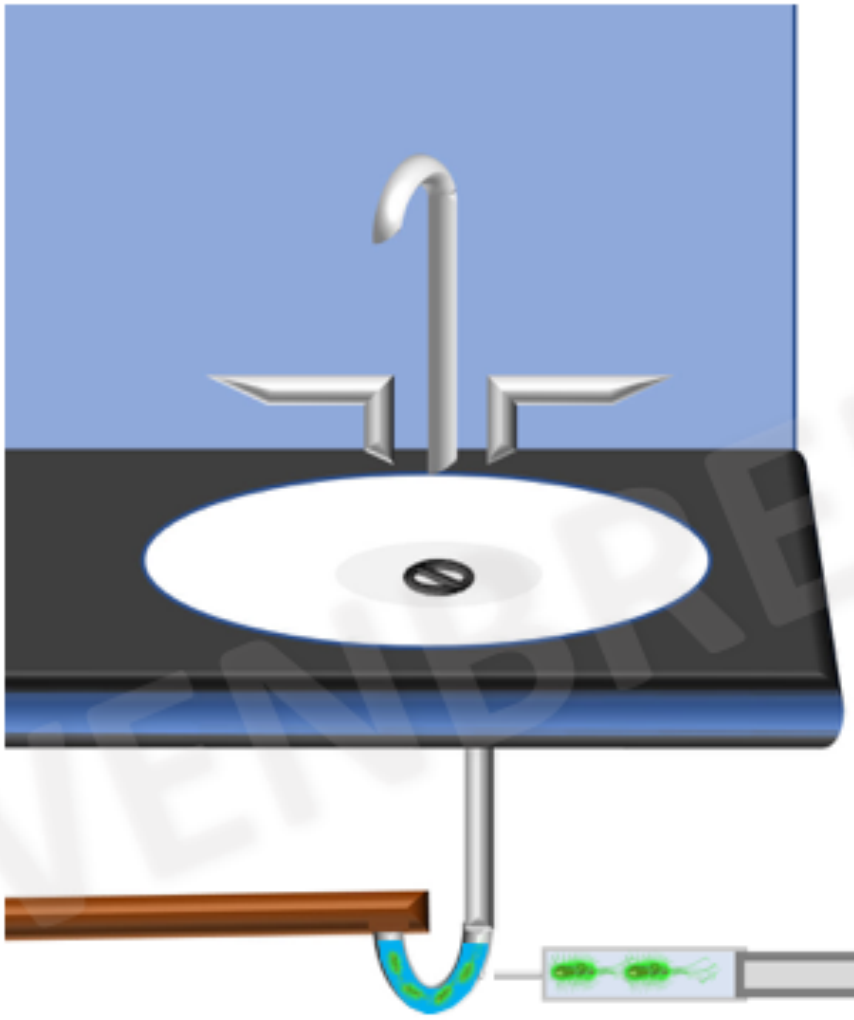
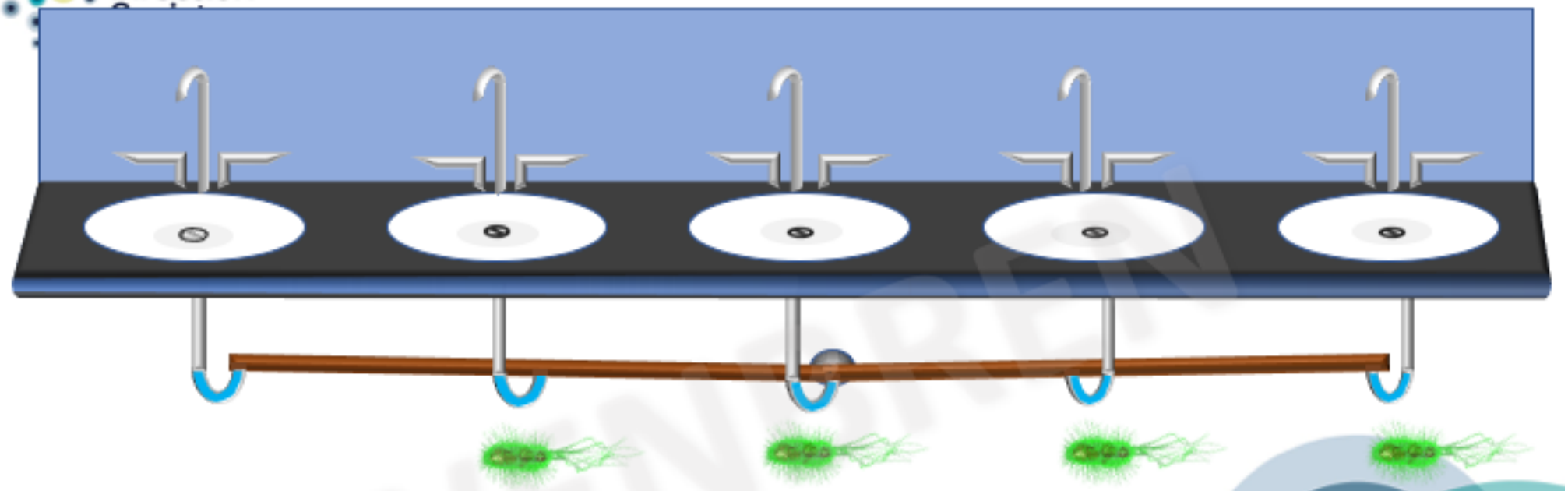

BIOFILM FORMATION
ADHESION
MATURATION
Absorption of antibiotic
LOW NUMBERS IN WATER SUPPLY
SLIME PRODUCTION

Healthcare Infection Society



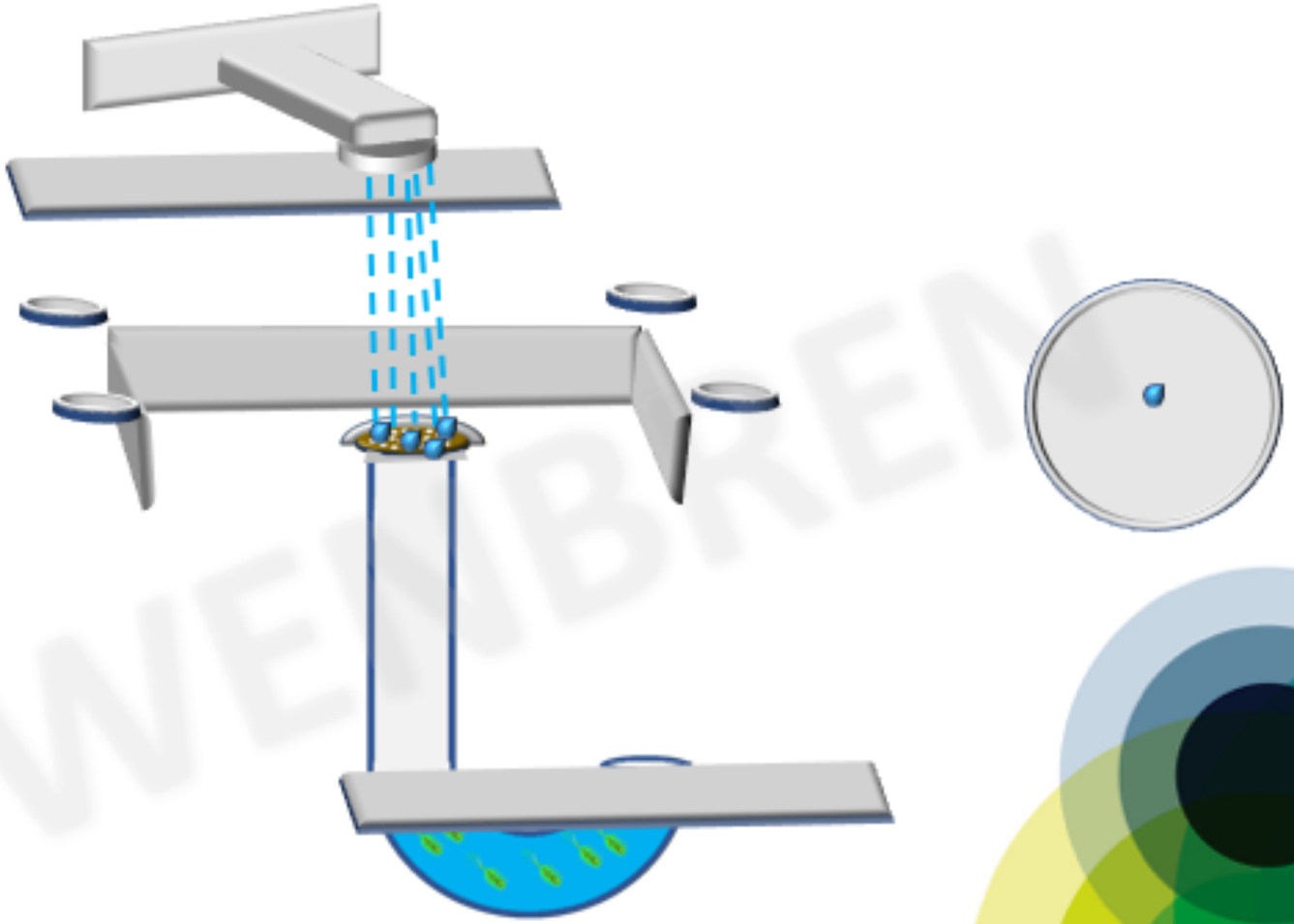
Healthcare Infection

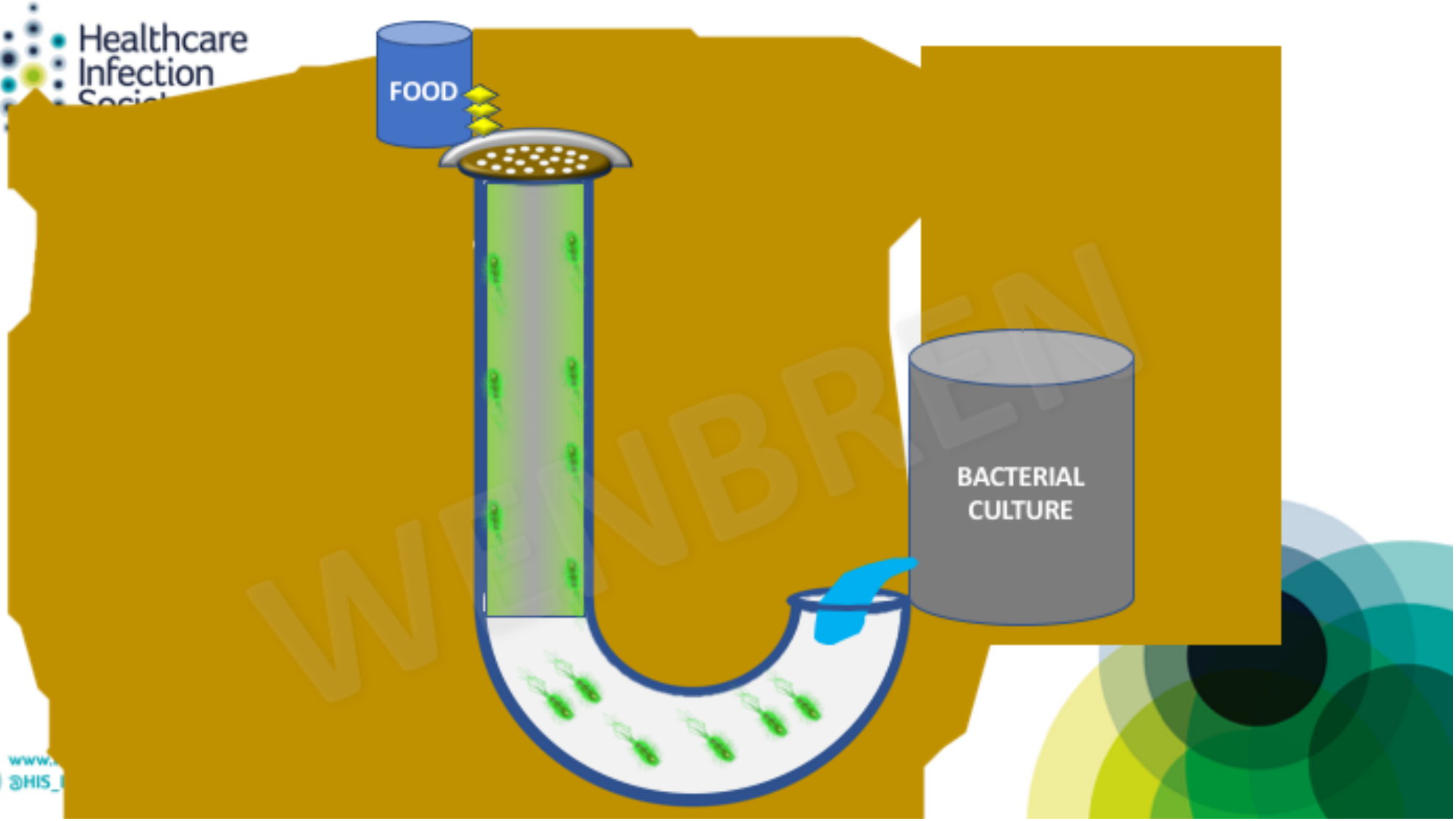


DETECTED WITHIN 7 DAYS OF INOCULATING FIRST SINK TRAP

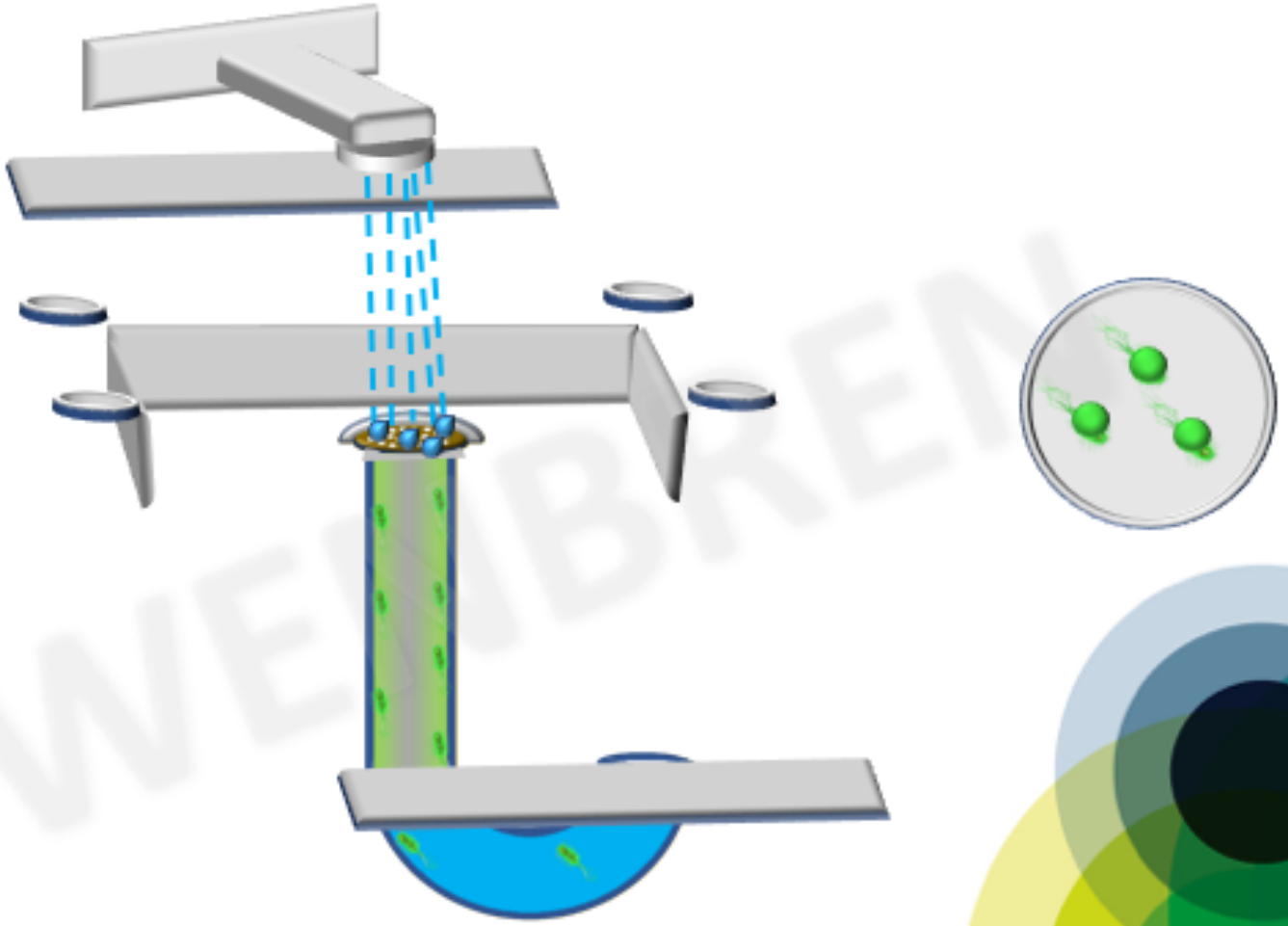

Healthcare
Infection
BACTERIAL
CULTURE

Healthcare Infection Society




Healthcare
Infection
FOOD
BACTERIAL
CULTURE

Healthcare Infection Society



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Characterisations of hand washing sink activities in a single hospital medical intensive care unit.

Marika Grabowski., Jennifer M. Lobo, Brian Gunnell, Kyle Enfield, Rick Carpenter, Laura Barnes, Amy Mathers, Journal of Hospital Infection In Press

- Of the 2,973 videos with analysed behaviours there were 5,614 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.
- Hand washing was only 4% (224/5,614) of total behaviours.

Subanalysis of 2,748 of the later videos further categorised 56 activities where a variety of nutrients, which could promote microbial growth, were disposed of in the sink.

Table 1: Action counts and percentages for behaviours occurring at patient room sinks

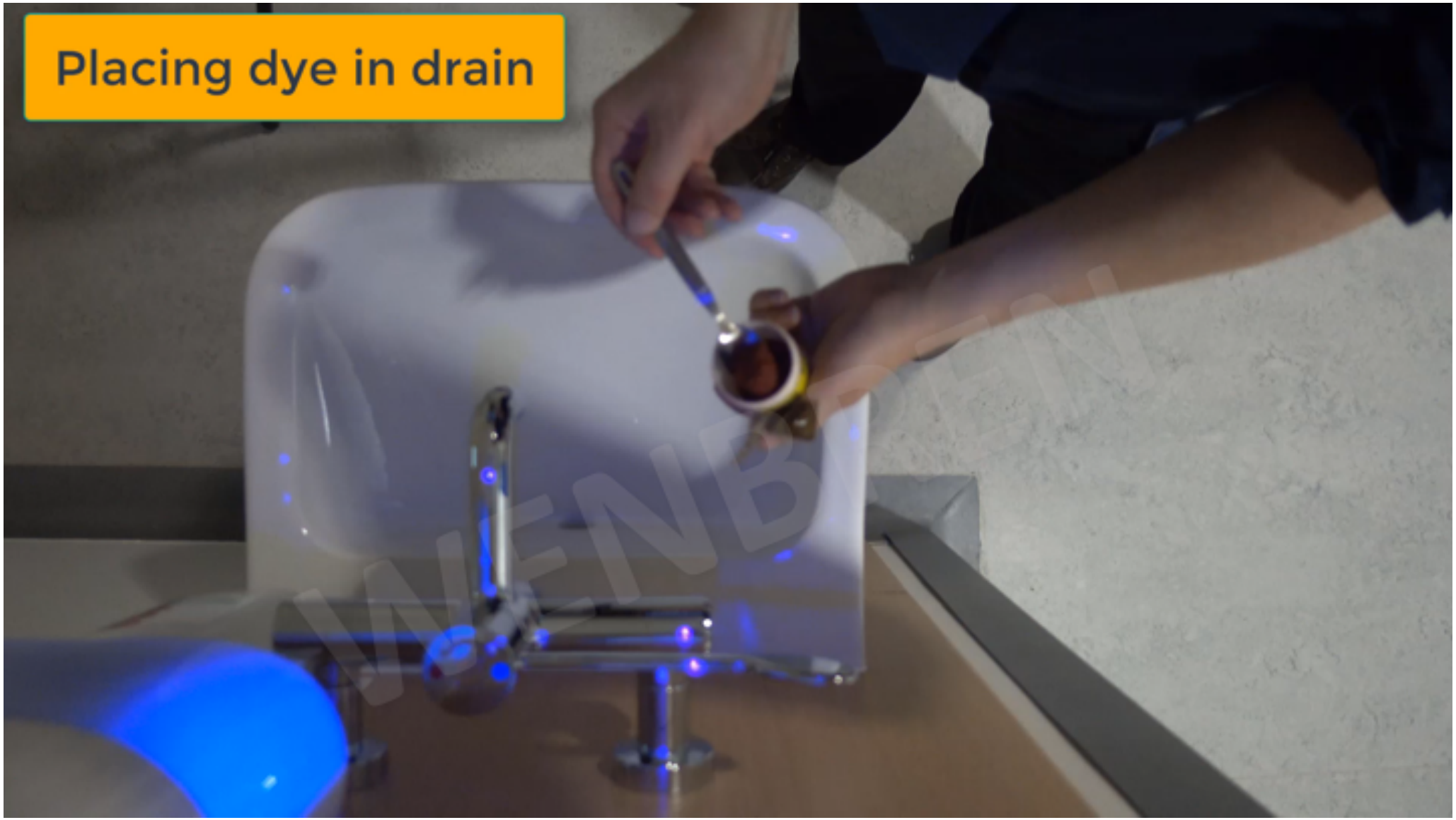
Group	Action name	Action count	Count /room/day	Percent group	Percent total
Medical	Fill syringe or med cup*†	590	9.83	32.92	13.24
	Empty syringe or med cup†	337	5.62	18.81	7.56
	Drain IV bag†	112	1.87	6.25	2.51
	Medical item cleaned	53	0.88	2.96	1.19
	Medical item placed	297	4.95	16.57	6.66
	Medical item removed	331	5.52	18.47	7.43
	Medical sealant/cap placed	24	0.40	1.34	0.54
Patient nutrition	Food/beverage placed	66	1.10	19.94	1.35
	Food/beverage removed	61	1.02	17.89	1.37
	Non-water beverage emptied	46	0.77	13.49	1.03
	Tube feed bag filled	23	0.38	6.74	0.52
	Tube feed bag emptied	4	0.07	1.17	0.09
	Water glass filled*	37	0.62	10.85	0.83
	Water glass emptied†	102	1.70	29.91	2.29
	Total	**341**	**5.68**	**100**	**7.65**
Environmental care	Paper towel	444	7.40	53.30	9.96
	Hand wash	195	3.25	23.41	4.38
	Total	**833**	**13.88**	**100**	**18.69**
	EVS staff wiped sink	40	0.67	23.39	0.90
	Non-EVS wiped sink	24	0.40	14.04	0.54
	Cleaning supplies placed	43	0.72	25.15	0.96
	Cleaning supplies removed	48	0.80	28.07	1.08
	Total	171	2.85	100	3.84
Overall total		4457	74.28		100

CONCLUSION

Several non hygiene activities commonly took place in ICU handwashing sinks which may provide a mechanism for nosocomial transmission and promotion of bacterial growth in the drain. Redesigning hospital workflow and sink usage may be necessary as sink drains as a reservoir for transmission of multidrug resistant bacteria are increasingly realised.


Softasan
B BRAUN


15/11/2018 10:27


Placing dye in drain

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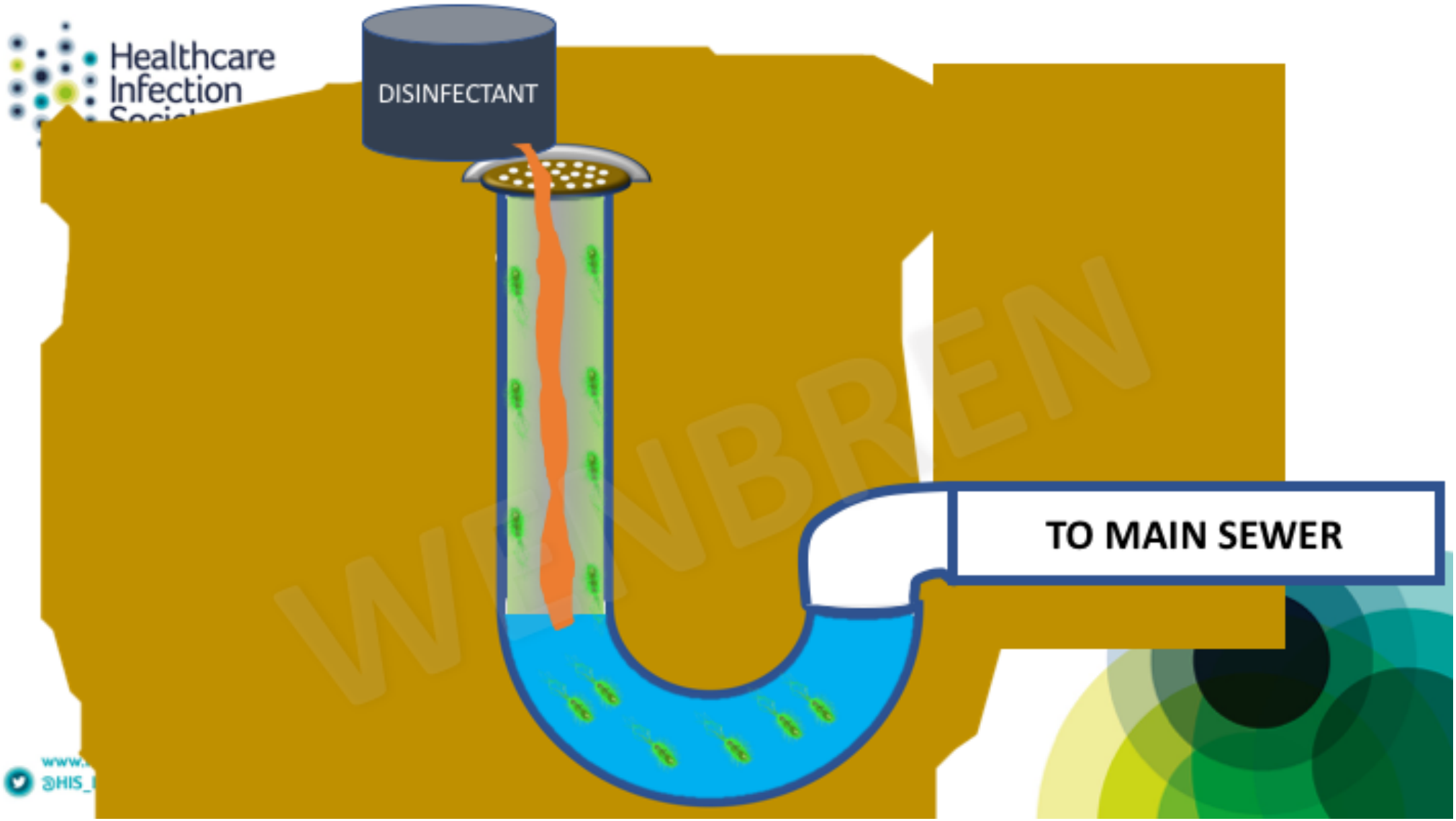
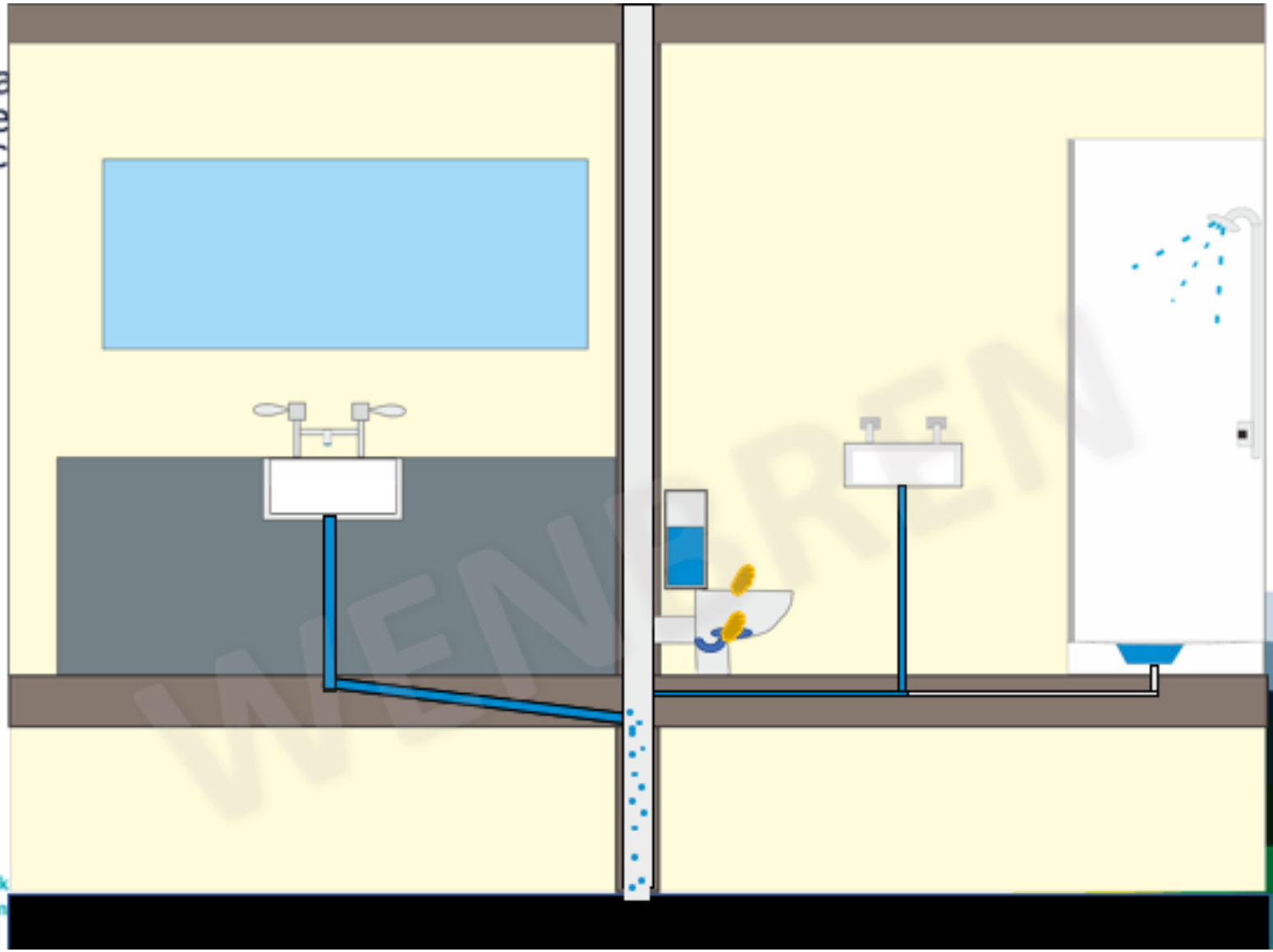
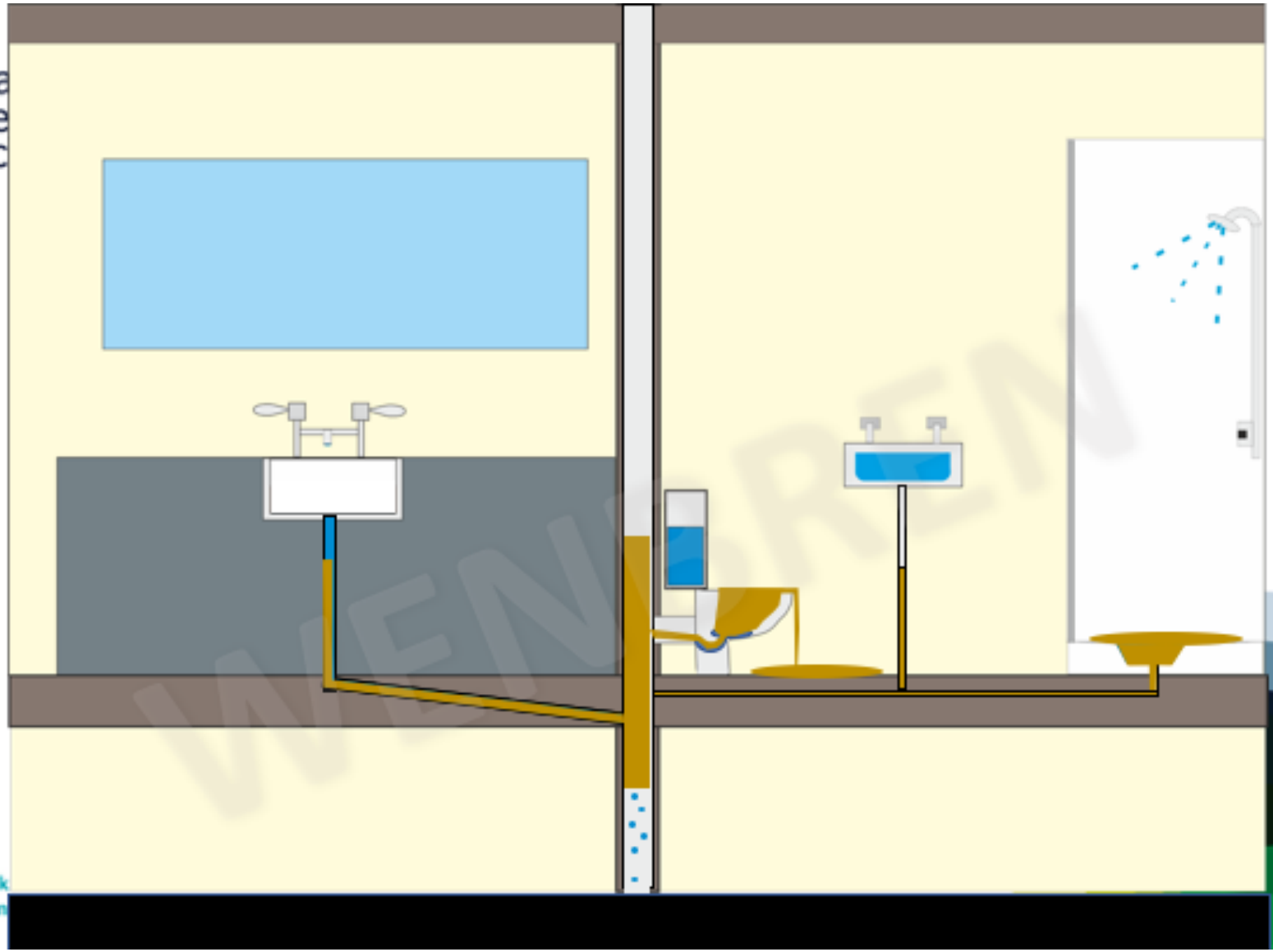
SAFE SINK
DO NOT EMPTY DRINKS DOWN THE SINK
Do not wash your hands in the sink
Caution


Healthcare
Infection
DISINFECTANT
TO MAIN SEWER





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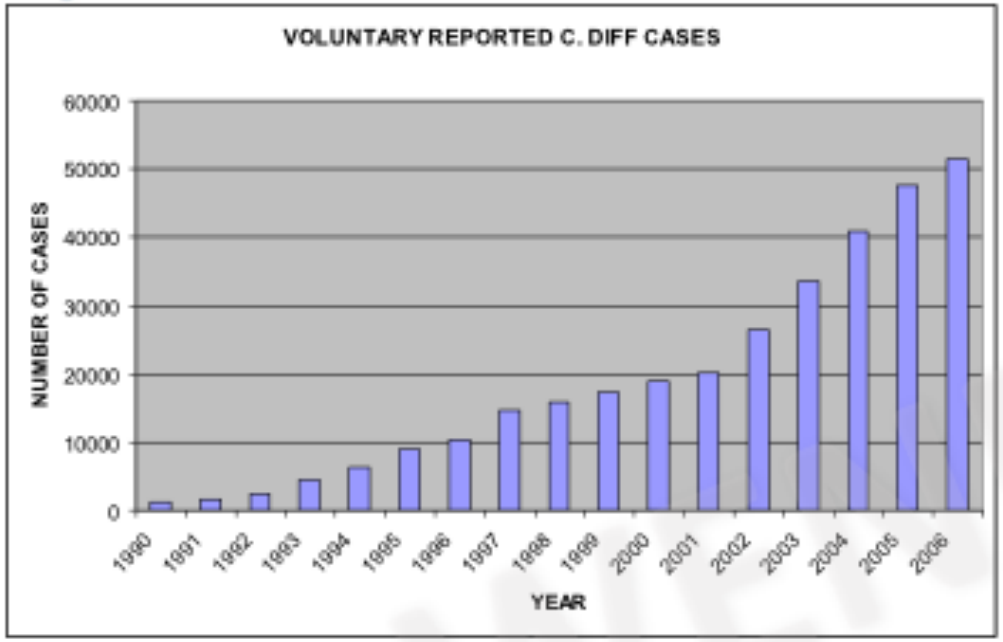
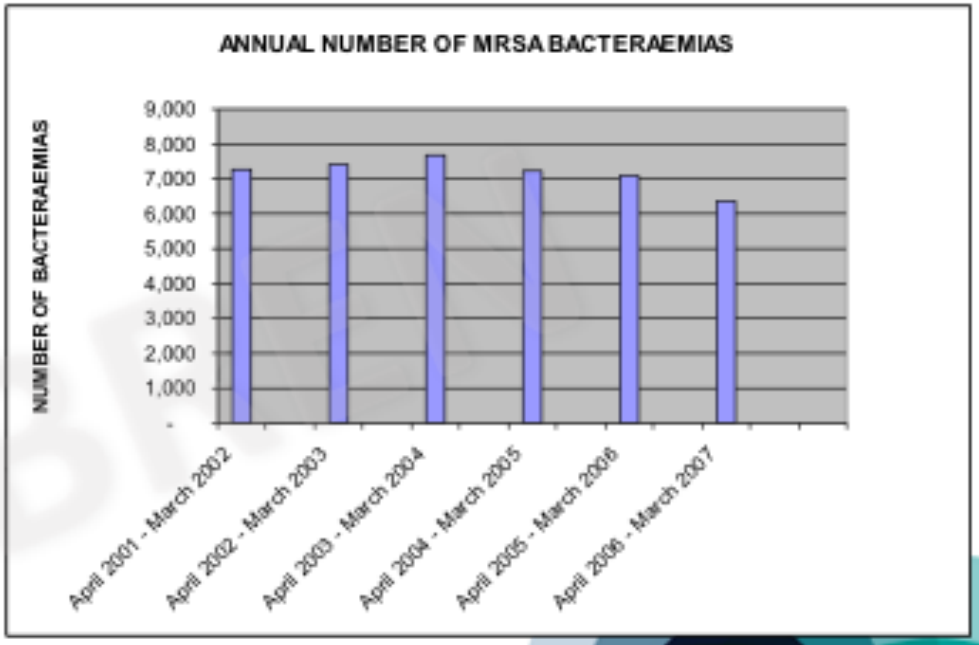
CASE ASCERTAINMENT





CASE ASCERTAINMENT WATERBORNE INFECTIONS

Pseudomonas aeruginosa

NEONATES

ADULTS- endogenous carriage

Unusual organisms

Stenotrophomonas

Elizabethakingia

Cupriavidus

Atypical mycobacteria


Healthcare Infection Society
We may be 'sensitive' but we cause the most damage to humans
Two or more antibiotic resistant isolates may prompt an incident/ outbreak meeting
Sensitive strains
Invisible
'Stealth bacteria'
WENDRE
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@HIS_Infection

Hea
Infe
Soc

KleaniK™

THE POWER TO PREVENT

The 'Kohn trap'

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THE LANCET, SEPT

A WASTE-TRAP-STER

J. KOHN

Queen Mary's Hospital, Roeh

BACTERIOLOGICAL examinatio
effluent side of a hospital plu
reveals the presence of pathoge
waste-traps in particular act
bacteriological flora, predomine
group of pathogens, the most c
æruginosa. The mechanism of
way from the trap of the basin to
ing under running water is easi
This mode of transmission has
mentally and under ward conditions using a marker organism. Estimates of the frequency with which patients become infected from washbasins vary, and the risk may vary from place to place. There can be little doubt that a contaminated plumbing system plays a role in the spread of infection, especially where a susceptible patient population is at risk. This applies particularly to premature-baby units, burns units, or where immunosuppressive and cytotoxic drugs are used. In this situation the elimination of every possible source of infection is justified, even when the risk is relatively small. All attempts to eliminate bacterial

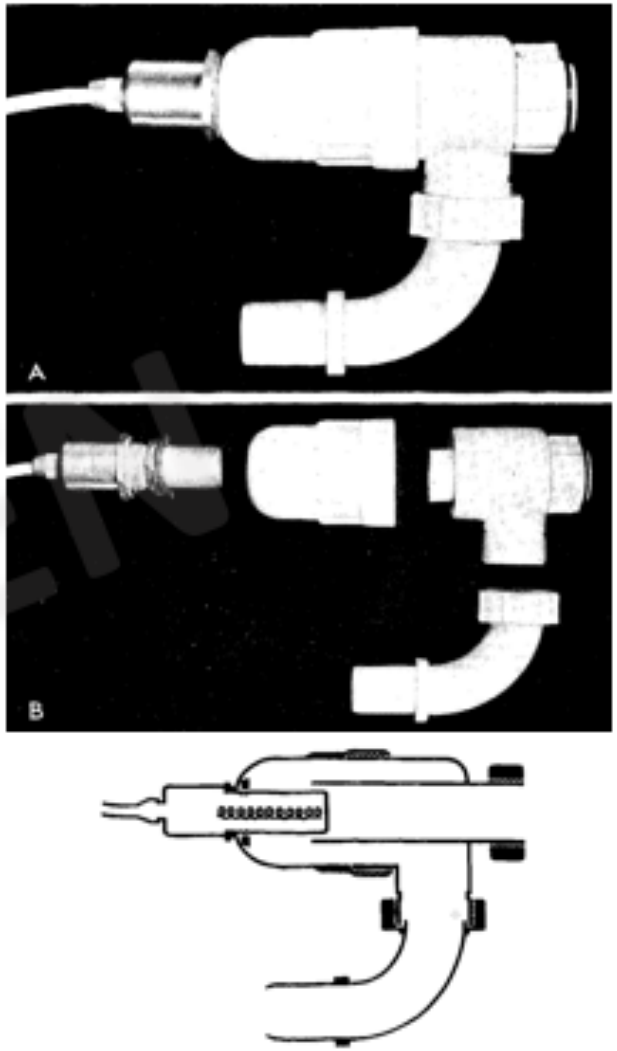

Fig. 2—Diagram of waste-trap unit with cylindrical electric heating element.

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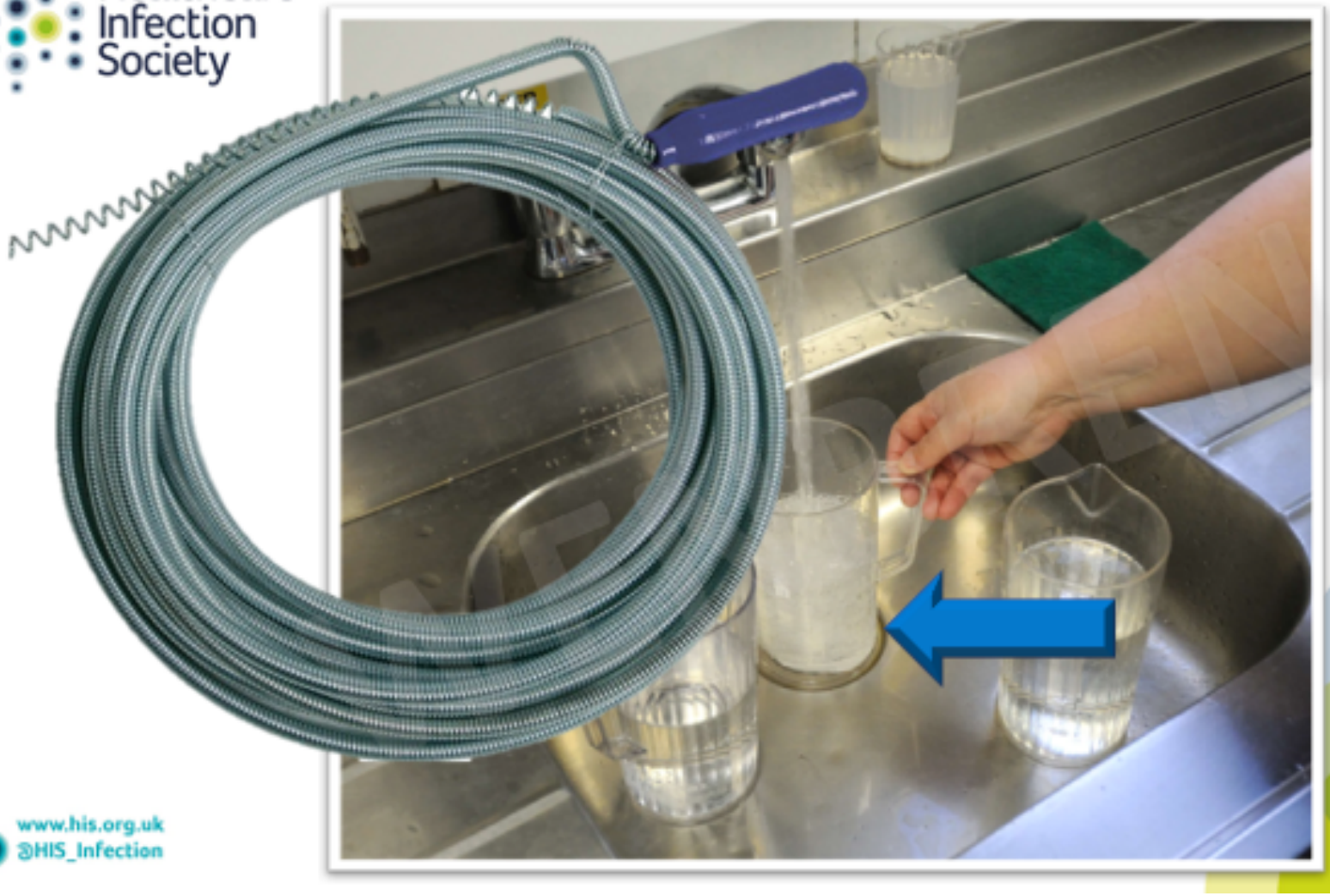
MULTI-RESISTANT GRAM NEGATIVE OUTBREAK




Please keep
fans clear
for ventilation

DEATH'S DISPENSARY.

OPEN TO THE POOR, GRATIS, BY PERMISSION OF THE PARISH.

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Hopman et al. Antimicrobial Resistance and Infection Control (2017) 6:59
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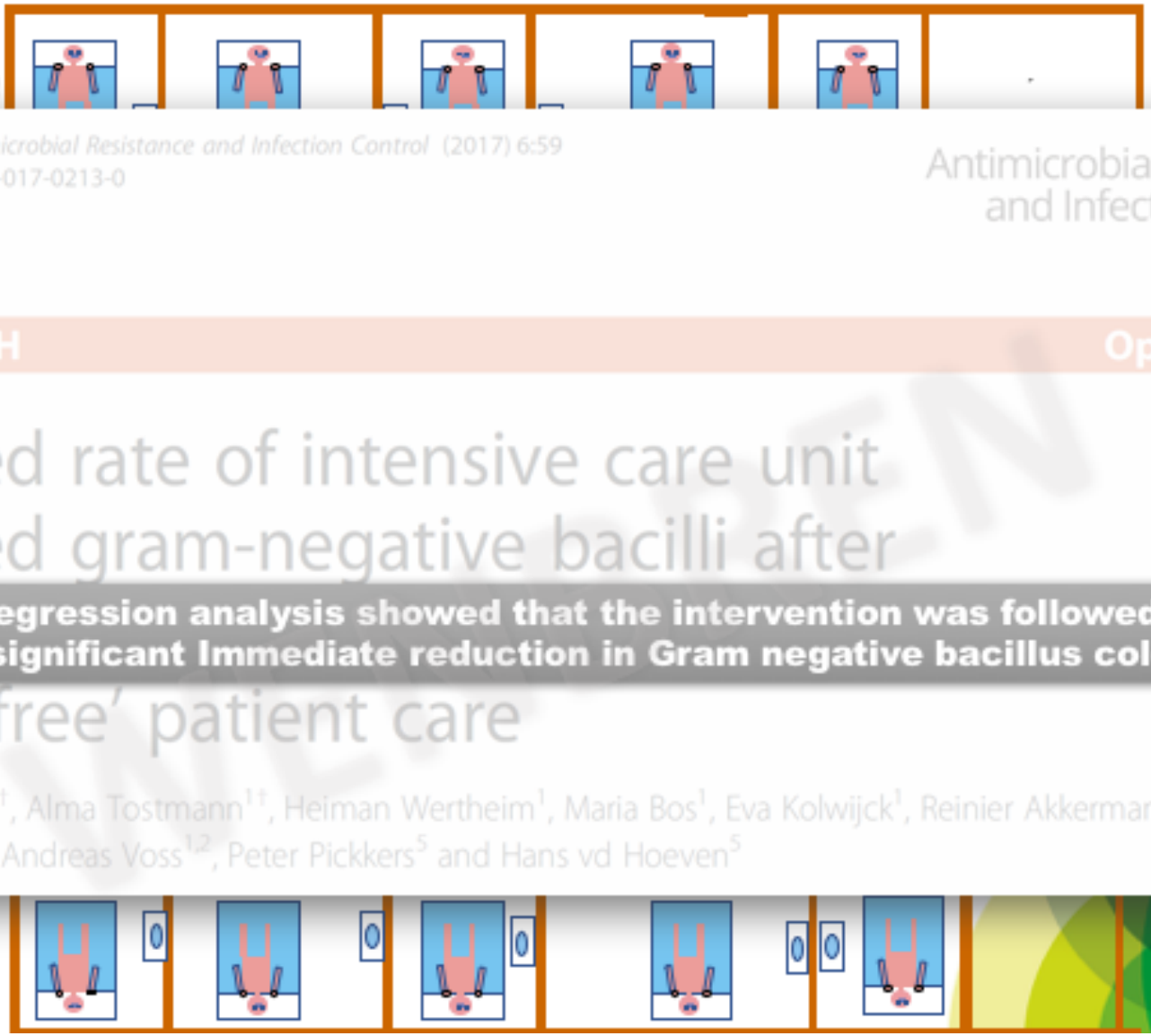
Antimicrobial Resistance and Infection Control

RESEARCH Open Access

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

Segmented regression analysis showed that the intervention was followed by a statistically significant Immediate reduction in Gram negative bacillus colonization

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]



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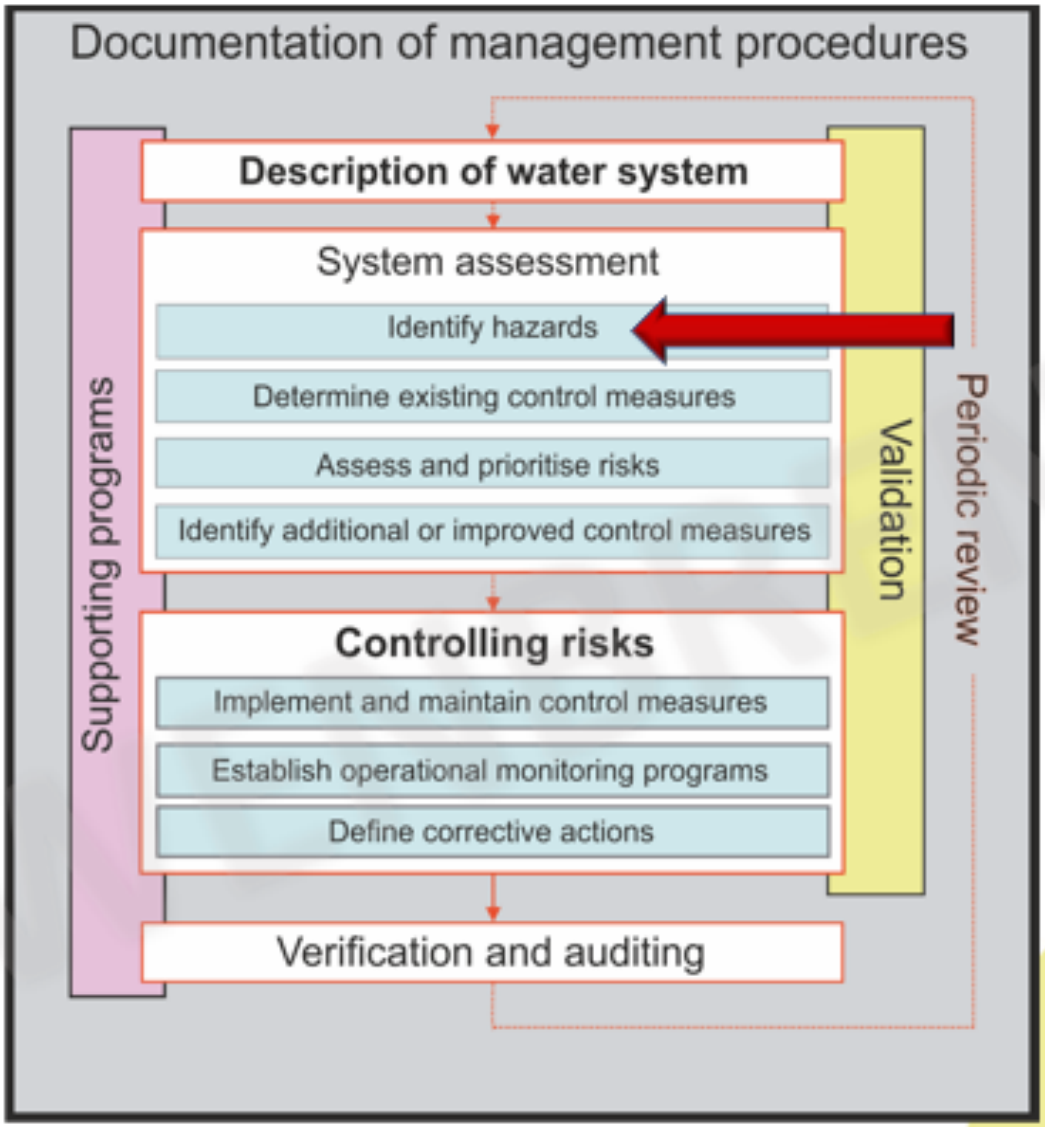

Unused Kalashnikov Vs old hand wash station

Do you need a license to own?

Do you require intense training to use?

Does operator perceive a risk?

Does victim / patient see as a risk?

Has use of this harmed anyone?

Has use of this killed anyone?

If it harms / kills anyone is it likely to be recognised?

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Is the current infection control structure able to deliver water safety?

Should we be developing experts in certain areas of infection control who have a regional remit ?

'We spend a great deal of time studying history, which, let's face , is mostly the history of stupidity'

S. Hawking

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DETECTED WITHIN 7 DAYS OF INOCULATING FIRST SINK TRAP

Thanks to Teleclass Education

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