

How effective are interventions to improve cleaning of healthcare environments in low resourced settings?

Prof. Giorgia Gon, London School of Hygiene & Tropical Medicine

A Webber Training Teleclass

How effective are interventions to improve cleaning of healthcare environments in low resourced settings?

Giorgia Gon

Hosted by Martin Kiernan
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June 28, 2022

Outline



- Available evidence
- Ongoing systematic review
- CLEAN Workshop
- Exciting prospects ahead

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Available evidence – linked to patient outcomes (HICs)



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Review

Cleaning and disinfecting surfaces in hospitals and long-term care facilities for reducing hospital- and facility-acquired bacterial and viral infections: a systematic review

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Keywords:
Multiply drug-resistant organisms
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Long-term care facilities
Cleaning
Disinfecting
Surfaces

SUMMARY

Background: Multiply drug-resistant organisms (MDROs) in hospitals and long-term care facilities (LTCFs) of particular concern include methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci, multi-drug-resistant *Acinetobacter* species, and extended-spectrum β -lactamase-producing organisms. Respiratory viruses include influenza and SARS-CoV-2.

Aims: To assess effectiveness of cleaning and disinfecting surfaces in hospitals and LTCFs.

Methods: Cochrane CENTRAL, Register of Controlled Trials, Embase, Medline, and Scopus searched inception to June 28th, 2021, no language restrictions, for randomized controlled trials (RCTs), cleaning, disinfection, hospitals, LTCFs. Abstracts and titles were assessed and data abstracted independently by two authors.

Findings: Of 14 cluster (c) RCTs in hospitals and LTCFs, interventions in ten were focused on reducing patient infections of four MDROs and/or healthcare-associated infections (HAIs). In four c) RCTs patient MDRO and/or HAI rates were significantly reduced with cleaning and disinfection strategies including bleach^a, quaternary ammonium detergent^b, ultraviolet irradiation^c, hydrogen peroxide vapour^d and copper-treated surfaces^e or fabrics. Of three c) RCTs focused on reducing MRSA rates, one had significant results and one on Clostridioides difficile had no significant results. Heterogeneity of populations, methods, outcomes and data reporting precluded meta-analysis. Overall risk of bias assessment was low but high for allocation concealment, and GRADE assessment was low risk. No study assessed botulism.

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Review

Hospital and long-term care facility environmental service workers' training, skills, activities and effectiveness in cleaning and disinfection: a systematic review

R.E. Thomas^{a,*}, B.C. Thomas^b, D. Lorenzetti^{c,d}, J. Conly^{e,f}

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Keywords:
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Healthcare-associated infections
Environmental service workers
Cleaning
Disinfection
Effectiveness
Systematic review

SUMMARY

Background: Multi-drug-resistant organisms (MDROs) (methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant enterococci, MRSA, *Acinetobacter* spp., extended-spectrum β -lactamase-producing Gram-negative organisms), Clostridioides difficile, viral respiratory pathogens and healthcare-associated infections (HAIs) are major concerns in medical facilities.

Aims: To assess environmental service workers' (ESWs) training, workload, numbers of surfaces and pieces of medical equipment cleaned per shift, how long they worked on each surface, how they cleaned, supervision, MDRO and HAI status, and measurement of effectiveness in reducing MDROs and HAIs in patients and on surfaces.

Methods: Cochrane CENTRAL, Register of Controlled Trials, EMBASE, Medline and Scopus were searched from inception to 28th June 2021 (no language/date limits). Searches combined terms from three themes: (a) hospitals and acute/long-term care facilities (e.g. assisted living, long-term care facilities, nursing homes); (b) disinfectants (e.g. antiseptic, bleach, cleaning, copper plating) of surfaces and copper impregnation of surfaces; disinfection, decolonization, hydrogen peroxide, quaternary ammonium disinfectants, and ultraviolet rays; and (c) randomized controlled trials (RCTs).

Findings and conclusions: Fourteen cluster RCTs provided data on a series of interventions. Ten trials focused on reducing patient infections from MDROs/HAIs, and four found significant reductions in patient infection rates with strategies including: quaternary ammonium detergents, ultraviolet light and hydrogen peroxide vapour. Minimal information was provided on ESW numbers, MDRO/HAI status, workload, numbers of

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Methods: Cochrane CENTRAL, Register of Controlled Trials, EMBASE, Medline and Scopus were searched from inception to 28th June 2021 (no language/date limits). Searches combined terms from three themes: (a) hospitals and acute/long-term care facilities (e.g. assisted living, long-term care facilities, nursing homes); (b) disinfectants (e.g. antiseptic, bleach, cleaning, copper plating) of surfaces and copper impregnation of surfaces; disinfection, decolonization, hydrogen peroxide, quaternary ammonium disinfectants, and ultraviolet rays; and (c) randomized controlled trials (RCTs).

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Review

Effects of environmental cleaning bundles on reducing healthcare-associated Clostridioides difficile infection: a systematic review and meta-analysis

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Environmental cleaning
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Healthcare-associated infection
Meta-analysis

SUMMARY

Environmental contamination with *Clostridioides difficile* plays an important role in the transmission of *C. difficile* infection (CDI) in healthcare and long-term care facilities, which results in prolonged length of stay, higher risk of mortality and increased healthcare costs. Environmental cleaning bundles are introduced to improve environmental cleanliness. This study aimed to evaluate whether environmental cleaning bundles applied in hospital, community and long-term care settings reduce the incidence of healthcare-associated CDI compared with conventional cleaning practices. Relevant databases, websites and trial registration platforms were searched. Two reviewers conducted study screening and selection, data collection, risk of bias assessment and evidence quality assessment independently. Meta-analyses were conducted using Review Manager 5.3. Ten eligible studies (one randomized controlled trial (RCT) and nine non-RCTs) were included. The significant effect of environmental cleaning bundles on the CDI incidence rate was found (RR: 0.89, 95% confidence interval (CI) 0.71–1.20; studies=2; $I^2=49%$; very low quality). However, the removal of surface markers was improved significantly (RR: 1.55, 95% CI 1.30–1.84; studies=3; $I^2=98%$; very low quality), and the percentage of CDI rooms with positive cultures was reduced (RR: 0.68, 95% CI 0.68–0.71; studies=4; $I^2=7%$; moderate quality) was reduced significantly after the implementation of environmental cleaning bundles. Environmental cleaning bundles may consequently be helpful in improving the thoroughness of cleaning of environmental surfaces in hospital and long-term care settings. More well-conducted RCTs are expected to provide stronger evidence.

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Every year, Clostridioides difficile (C. difficile) causes approximately 451,000 healthcare-associated infections and 29,000 deaths in US hospitals [1]. According to another US study, the prevalence of C. difficile infection (CDI) among residents in long-term care facilities is up to 33%, which is more than twice the prevalence in acute hospitals [2]. C. difficile is the leading cause of antibiotic-associated diarrhoea and colitis among patients in hospital and long-term care settings [1,3]. Healthcare-associated CDI prolongs length of hospital stay, increases the costs of hospitalization, and poses the risk of acquisition of C. difficile or CDI by other patients [4–7].

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Available evidence – disinfection products



MDPI

Systematic Review
Evidence Map and Systematic Review of Disinfection Efficacy on Environmental Surfaces in Healthcare Facilities

Elizabeth C. Christenson¹, Ryan Cook^{1,2}, Helen Atkinson¹, Aravish Bhatti¹, Faillie Beedat¹, Michelle Cavley³, Grace Cho⁴, Collin Knox Coleman^{4,5}, Callie Harrington¹, Kylie Hefferty¹, Don Fejfar^{1,6}, Emily J. Grant¹, Karen Grigg¹, Tammy Joshi¹, Sumit Mishra¹, Grace Pitak¹, Yukang Shi^{1,6} and Jamie Bartram^{2,4,*}

Abstract: Healthcare-associated infections (HAIs) contribute to patient morbidity and mortality with an estimated 17 million infections and 19,600 deaths costing 150–200 billion annually in the United States alone. There is little understanding as to if current environmental surface disinfection practices reduce pathogen load, and subsequently HAIs, in critical care settings. This evidence map includes a systematic review on the efficacy of disinfecting environmental surfaces in healthcare facilities. We screened 17,264 abstracts, 835 full texts, and included 181 articles for data extraction and study quality assessment. We reviewed ten disinfectant types and compared disinfectants with respect to study design, outcome measures, and fourteen indicators of study quality. We found important areas for improvement and gaps in the research related to study design, implementation, and analysis. Implementation of disinfection, a determinant of disinfection outcomes, was not measured in most studies and few studies assessed fungi or viruses. Assessing and comparing disinfection efficacy was impeded by study heterogeneity; however, we categorized the outcomes and results for each disinfectant type. We concluded that guidelines for disinfectant use are primarily based on laboratory data rather than systematic reviews of in situ disinfection efficacy. It is critically important for practitioners and researchers to consider system-level efficacy and not just the efficacy of the disinfectant.


Keywords: disinfectants; healthcare facilities; healthcare-associated infections; environmental surface; infection prevention and control

1. Introduction

Healthcare-associated infections (HAIs) contribute to patient morbidity and mortality with an estimated 167,200 infections and 72,000 deaths in the United States in 2015 [1] and an additional 2.6 million annual infections in the European Union [2]. The burden of HAIs is higher in low- and middle-income countries [3]. HAIs are often correlated with the presence of contaminated environmental surfaces and are exacerbated by multi-drug resistance and compounded by spore-producing or biofilm-associated pathogens that are difficult to disinfect [4]. Healthcare-associated pathogens with high morbidity and mortality, including vancomycin-resistant *Enterococci* (VRE), methicillin-resistant *Staphylococcus*

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Gaps



1. No reviews in low-income countries
2. No reviews of behavioral or multimodal interventions not linked to HAIs
3. Included higher quality studies

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Search strategy

Protocol available on PROSPERO: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022324137

Topic	Terms
<ol style="list-style-type: none"> 1. Surface/equipment type 2. Cleanliness/contamination 3. Measures/methods 4. Healthcare context 5. <i>LMICs OR Author affiliation (two pools)</i> <p>1 AND 2 AND 3 AND 4 AND 5</p>	<p>1. Surfaces (including some medical equipment) <i>No equipment or instruments that require sterilisation or high level disinfection</i></p> <p>2. Cleanliness/Contamination</p> <p>3. Measures/methods to assess cleanliness</p> <ul style="list-style-type: none"> • Method to assess bioburden • Outputs (ACC, S. aureus, MRSA) • Method for assessing cleaning action (fluorescent or observation)
	<p>TEXT terms: Surface* or environment* or hand touch or high touch or bed* or table or light or trolley or floor or mattress* or pillow or desk* or cabinet or "patient zone" or window or door* or toilet or sink or tap or "door handle" or telephone or handset or note or chair or locker or trolley or counter* or "nurse station" or "examination couch" or "drug cupboard" or rail or "surgical equipment" or "Oxygen cylinder" or "Oxygen valve and flow rate monitor" or "Blood pressure cuff OR Blood pressure monitor" or "SpO2 probe" or "ECG machine" or "ECG lead" or Ventilator or incubator or "Warmer baby fluid" or "Temperature probe" or "Dialysis machine" or "Blood glucose monitoring machine" or "Portable suction machine" or "Piped suction" or "IV stand" or "Oxygen masks" or "Oxygen tubing" or "Oxygen nasal specs" or "Resuscitator bag" or "resuscitator valve" or "resuscitator mask" or Stethoscope or Otoscope or Otoscope or Laryngoscope</p> <p>TEXT terms: (Clean* OR hygiene* OR disinfect* OR decontam* OR detergent* OR housekeep* OR Contamin* OR unclean* OR bioburden OR "viable bioburden" OR "organism debris" OR dirt OR dust OR debris OR scum OR "organic soil") NOT "clean*catch"</p> <p>TEXT terms: Dipslide* OR Swab OR "swab culture*" OR "Contact plate" OR "RODAC plates" OR "environmental screening" OR "Replicate Organism Detection And Counting" OR Petri dish OR agar OR "ATP Bioluminescence" OR "ATP Tool" OR bioluminescence OR "residual adenosine triphosphate" OR "adenosine triphosphate" OR "luciferase assay" OR "luminometer" OR "agar slide culture*" OR "agar slide" OR ACC OR "aerobic colony count" OR "aggregate ACC" OR "Staphylococcus aureus" OR "S. aureus" OR "Staphylococcus aureus" OR "MRSA" OR multi drug resistant Staphylococcus aureus* OR Multi drug resistant Gram negative bacilli OR Carbapenemase producing Enterobacteriaceae* OR Vancomycin resistant enterococci OR "Clostridium difficile" OR Clostridioides difficile OR Acinetobacter OR Norovirus OR rotavirus OR adenovirus OR "respiratory syncytial virus" OR RSV OR corona OR COVID OR pathogen* OR microb* OR Bacteria OR organism*</p>

Inclusion criteria



Articles reporting on **surface cleanliness levels** in **healthcare environment** in **LMICs**

Outcome

– Either

- Use objective measures of cleanliness (bioburden/microbiological outcomes, OR mechanical e.g. through florescent markers or observed)
- Report frequency of cleanliness (proportion, prevalence etc)

– OR

- Measure HAIs

Articles reporting on intervention to improve cleanliness levels

Published/peer-reviewed articles

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Exclusion criteria



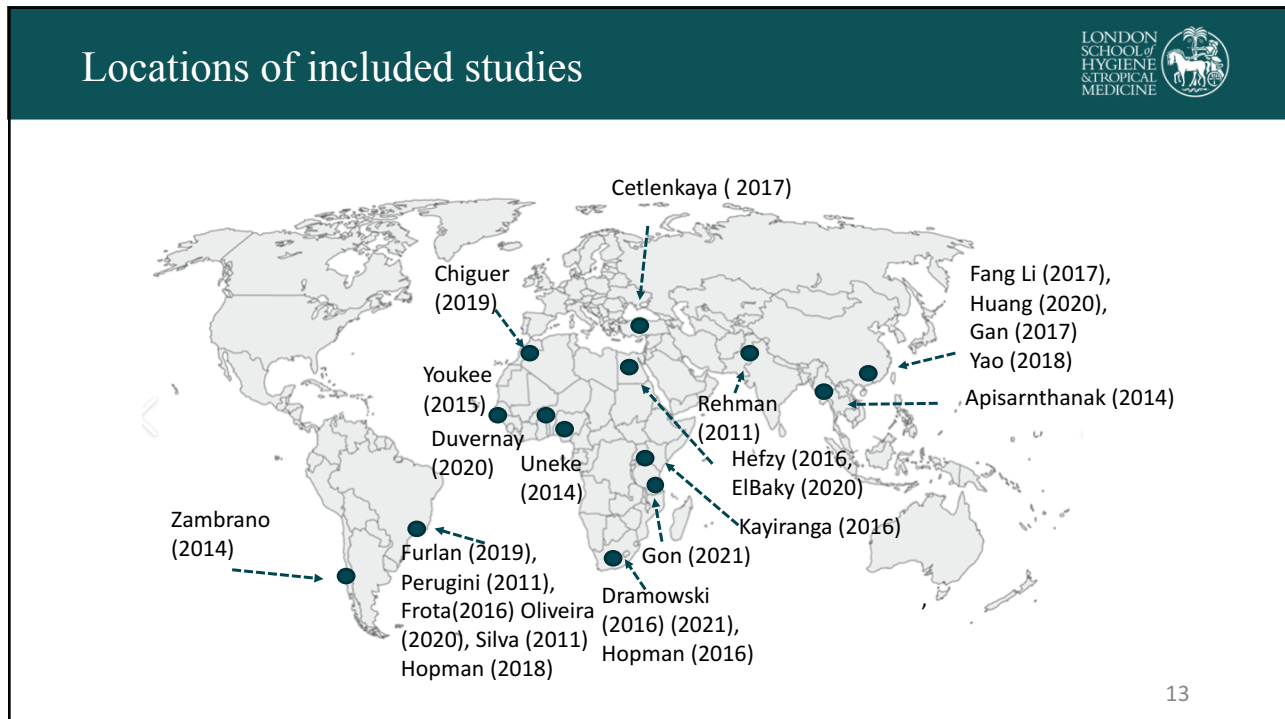
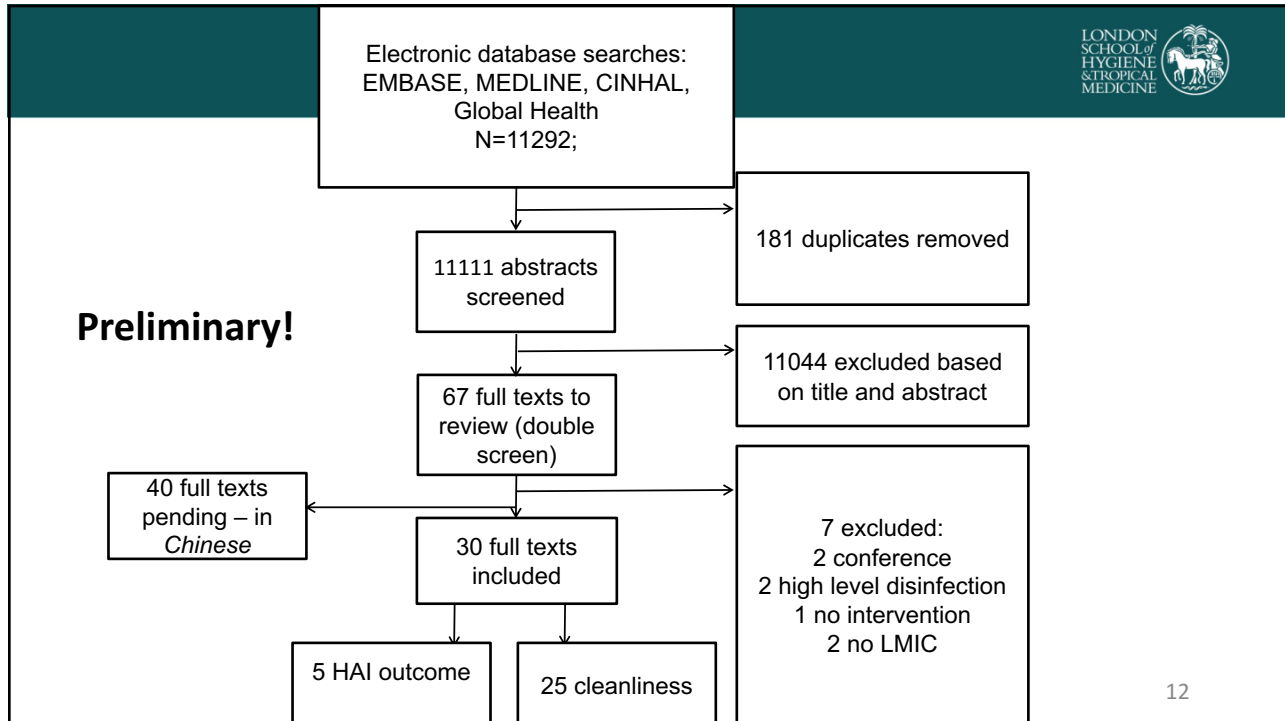
- Articles assessing cleanliness of equipment that requires high-level disinfection or sterilisation
- Cleaning intervention performed in spaces dedicated to animals (veterinary or animal laboratory)
- Studies focusing on the efficacy of specific disinfection products or surface coating (*because recent review on the topic*) unless included in a wider intervention bundle or taking a health system approach
- Studies evaluating ongoing cleaning and disinfection practice (no new intervention)

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Quality Assessment

1. Study design
2. Intervention
3. Outcomes
4. Sampling
5. Blinding
6. Confounders
7. Statistical methods

Yes	Yes	Yes	describes i	says cross	Yes	describes i	pilot study	Yes	prob befor	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Yes	Yes	Content at	Not well d	Yes	Yes	only clean	yes but no	Yes	environme	Yes	Yes	Yes	Yes	Yes	trained at	No	Yes	Yes
Yes	100RL	Yes 250 RL	Yes 250 RL	VRE indica	appears to	Yes 5 RLU	No	reporting	Yes 250 RL	No	vario	only MRSA	no criteria	Yes 250RL	Yes 250 RL	Yes	Yes	Yes
Site sampl	Yes	Yes same	No	says h	only for pc	Yes	No	but no	No	Yes	No	no CF	No	Yes only o	Yes	Yes		
No	Yes in pha	Yes	Not descri	No	Yes in pha	No	No	No	No	No	not clear v	No	No	No	No	No	Yes	Yes
included c	No	Not descri	No	No	No	No	No	No	No	confounde	No	No	used the s	No	No	No	Yes	Yes
Yes	No	Yes (small	stats expla	Stats clear	Yes	Yes	No	Yes	No	envir	Stats clear	Yes and sa	Yes	Yes and sample	size powered in	i	Yes	Yes

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Preliminary results

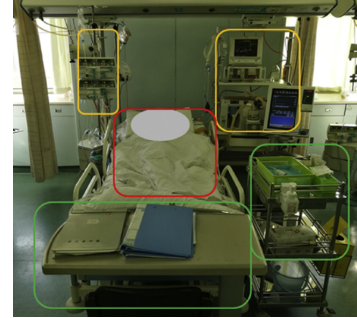
1. Initial data extraction of English language papers
2. To translate and extract non-English papers
3. Full extraction of results and comparative synthesis yet to be completed.

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Study design and scope



- Most studies based on before and after designs.
- Almost all studies based in a single facility and many only in one department
- More studies in middle-income countries; those in low-income are still based in national referral or teaching hospitals → Little representation from district hospitals or rural health facilities.
- Often small sample sizes and brief periods of follow up.
- Most studies based in higher risk care settings, e.g. ICU, NICU, maternity units.
- Heterogeneity between surface sampling approaches



T. Gan et al. / Journal of Critical Care 41 (2017) 216–221

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Interventions



- Most included education but often precise elements of this not described in detail.
- Some are multimodal interventions (including preparatory contextualization of approach, physical infrastructure and materials, policy and organizational changes) but other studies included a single intervention.
- Target: audiences, those who have cleaning as a primary role, clinicians and patient relatives.

Neo CLEAN CARE programme

ROOM 1	Table + surfaces	IV + feed pumps	Sats + BP monitors	Keyboard + phones	Emergency trolley	Passage trolley	Mecas + incubators	Bed trolley
Phase 1	Hand hygiene stations, disinfectant dispensers, hand sanitizer, disinfectant spray, disinfectant wipes, disinfectant solution							
Phase 2	Hand hygiene stations, disinfectant dispensers, hand sanitizer, disinfectant spray, disinfectant wipes, disinfectant solution							
Phase 3	Hand hygiene stations, disinfectant dispensers, hand sanitizer, disinfectant spray, disinfectant wipes, disinfectant solution							
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After Dramowski et al (2021)

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Cleanliness outcome definition



- Heterogeneity in standards, even when using the same approach e.g. anything from 3 to 250 RLUs considered clean when using ATP monitoring.
- Some targeting sampling for specific organisms e.g. MRSA, VRE or other MDROs.
- Microbiological methods included contact plates, swabs and dipslides. Some results reported as CFU per cm² others binary presence/absence of indicator organisms.



Impact on cleanliness (preliminary)




Author	County	Design	Facility/dept	Method	Surface/sample (High touch)
Dramowski (2016)	South Africa	Before and after	1 pediatric hospital/25 isolation rooms	ATP, ACC and florescent markers	e.g. bedrail, bedside table, sink, and mattress

How effective are interventions to improve cleaning of healthcare environments in low resourced settings?

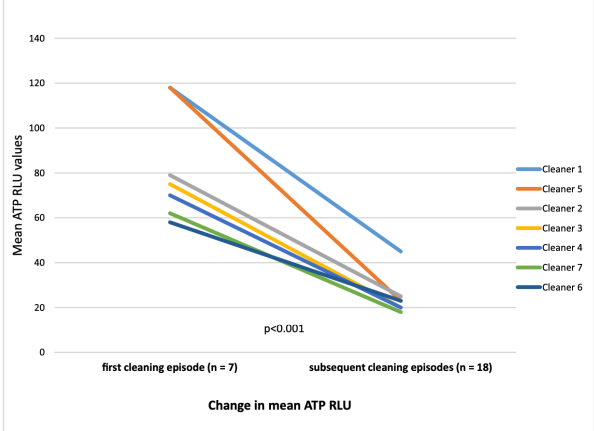
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Mean ATP RLU values


Change in mean ATP RLU

p < 0.001

Fig 2. Decline in ATP relative light unit readings, by cleaner.

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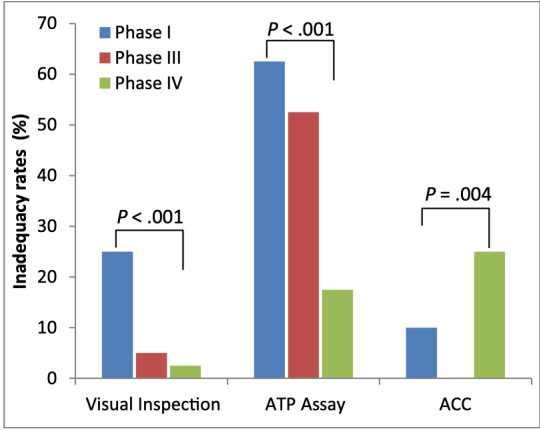
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Method	Phase I (%)	Phase III (%)	Phase IV (%)
Visual Inspection	~25	~5	~2
ATP Assay	~62	~52	~18
ACC	~10	~0	~25

O.P. Frota et al. / American Journal of Infection Control 44 (2016) 1572-7

22



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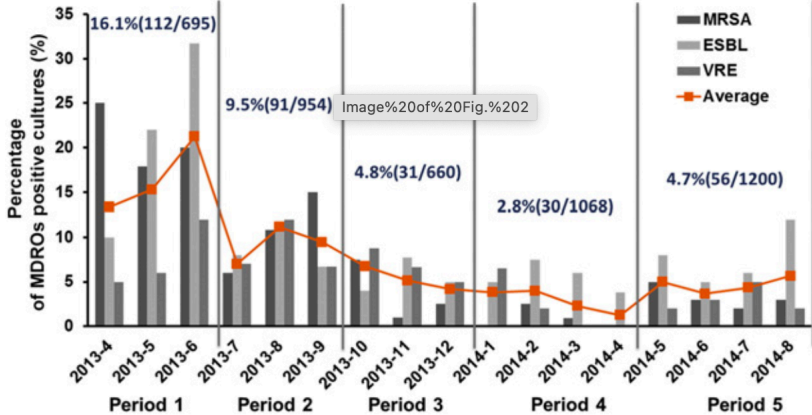
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Frota (2016)					Heart monitor and mattress
Gan (2017)					Handle; supply cart; chair arm;




Percentage of MDROs positive cultures (%)

Year	MRSA (%)	ESBL (%)	VRE (%)	Average (%)
2013-4	16.1	11.2	6.95	16.1
2013-5	18.0	22.0	6.0	15.0
2013-6	20.0	32.0	12.0	21.0
2013-7	7.0	11.0	11.0	9.5
2013-8	11.0	12.0	11.0	11.0
2013-9	15.0	7.0	7.0	10.0
2013-10	8.0	7.0	7.0	7.0
2013-11	7.0	7.0	7.0	7.0
2013-12	4.8	3.1	6.60	4.8
2014-1	4.0	4.0	4.0	4.0
2014-2	2.8	3.0	10.68	2.8
2014-3	2.0	2.0	2.0	2.0
2014-4	1.0	1.0	1.0	1.0
2014-5	5.0	5.0	5.0	5.0
2014-6	3.0	3.0	3.0	3.0
2014-7	4.0	4.0	4.0	4.0
2014-8	4.7	5.6	12.00	4.7

T. Gan et al. / Journal of Critical Care 41 (2017) 216–221

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Impact on cleanliness (preliminary)



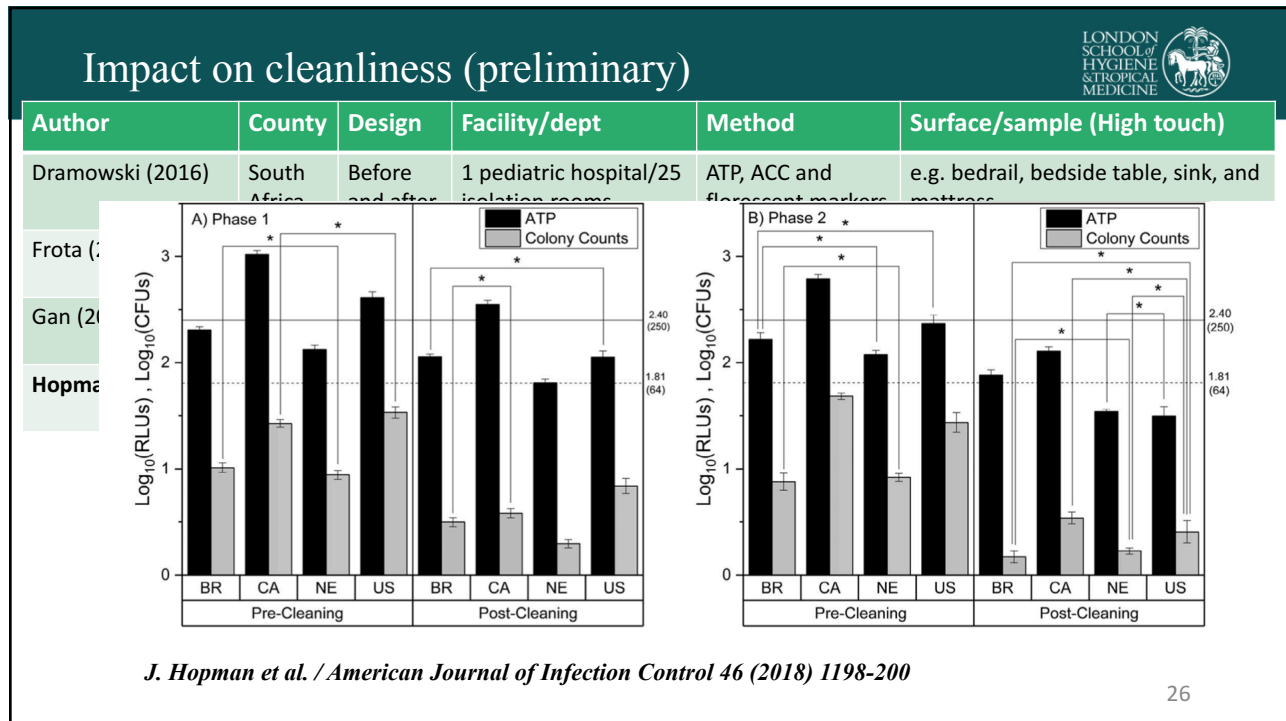
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Hopman (2018)	Brazil (+ 3 HICs)	Before and after	1 hospital/35 ICU beds	ATP, cultures, reflective markers	e.g. bedside table and rails, keyboard, infusion pump

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Impact on cleanliness (preliminary)



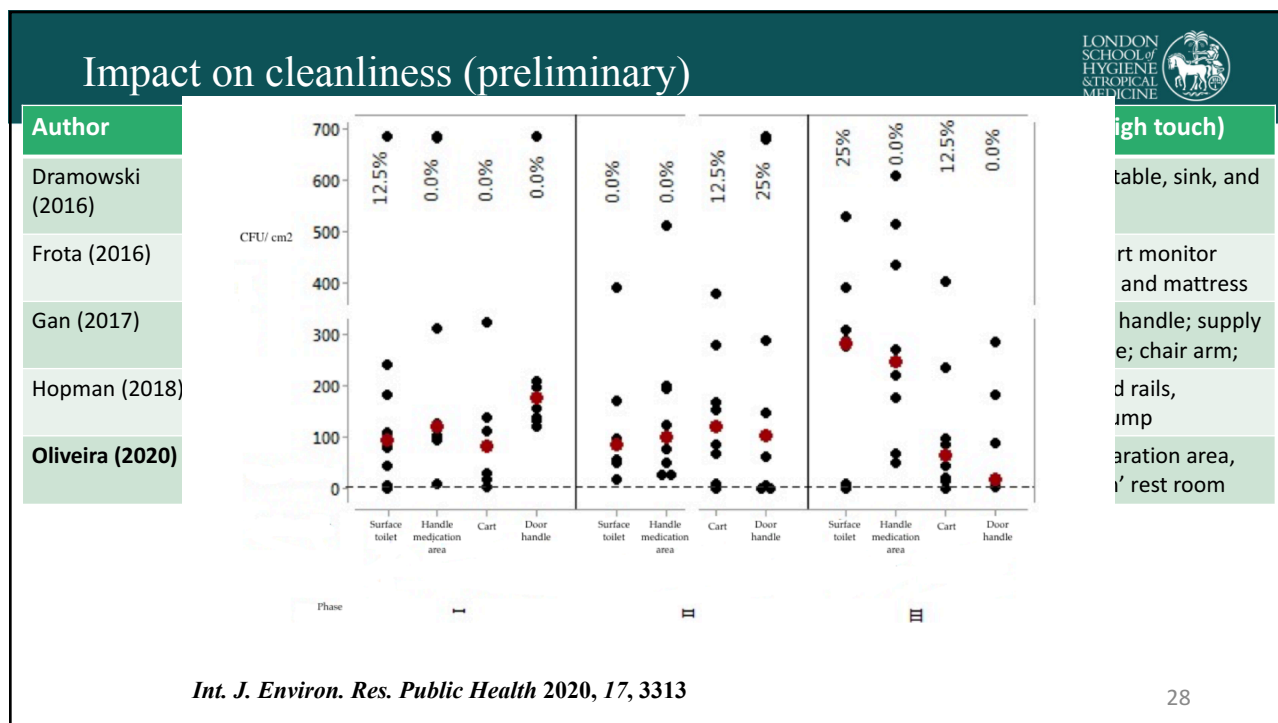
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Oliveira (2020)	Brazil	Before and after	1 hospital/65-bed Emergency unit	Visual inspection, CFU count and ATP	e.g. medication preparation area, dressing cart, women' rest room

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Impact on cleanliness (preliminary)

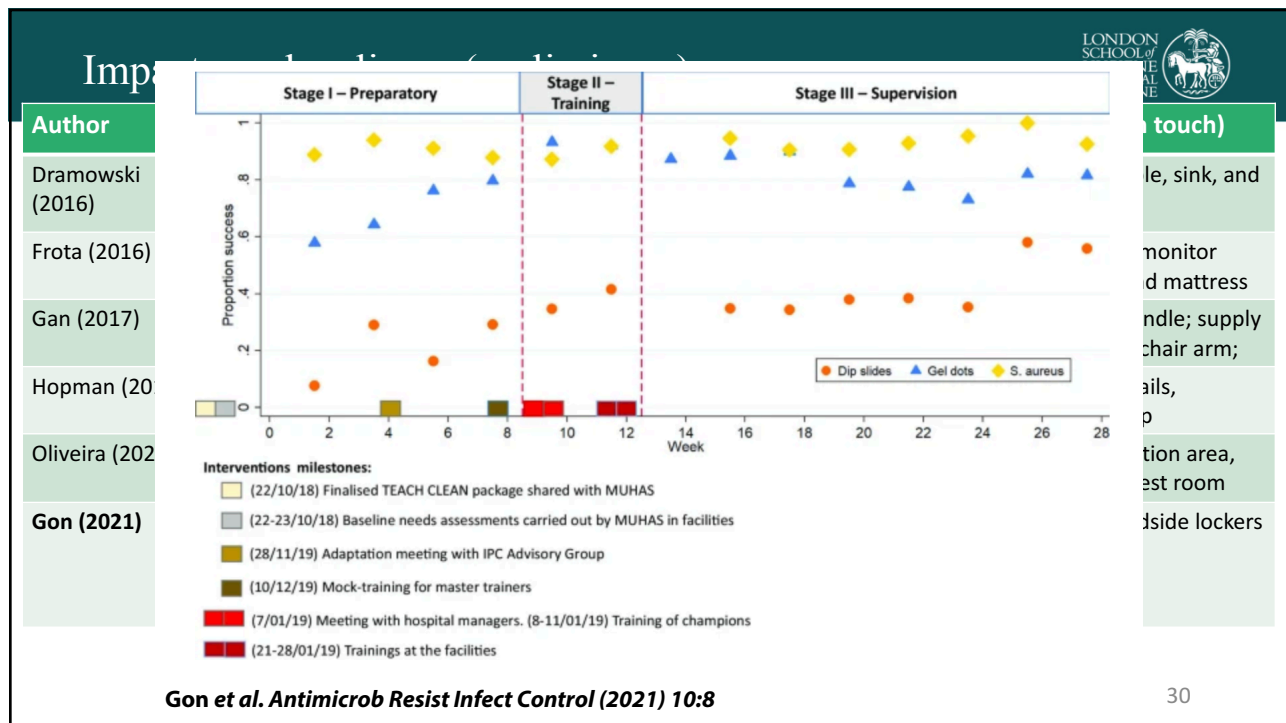
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Gon (2021)	Tanzania	Before and after	3 hospitals/labour, post-natal (vaginal and CS), neonatal wards	ACC, fluorescent markers	Bed rail, mattresses, bedside lockers

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Dramowski (2021)	South Africa	Before and after	1 hospital/30-bed acute neonatal ward	ATP, florescent markers, cultures	mattresses, cots, saturation monitors, infusion pumps

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Impact on

Author	Country
Dramowski (2016)	South Africa
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Hopman (2018)	Brazil, HIC
Oliveira (2020)	Brazil
Gon (2021)	Tanzania
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NeoCLEAN intervention assessment phases

Sample (High touch)

- bedside table, sink, and
- ops, heart monitor
- ing cart, and mattress
- bedside handle; supply
- side table; chair arm;
- table and rails,
- fusion pump
- on preparation area,
- , women' rest room
- tresses, bedside lockers
- ots, saturation
- usion pumps

Dramowski et al. *Antimicrob Resist Infect Control* (2021) 10:35

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Effectiveness (and power)

- Promising effect size of higher quality studies – but weak designs
- Often weak correlations between testing approaches when used alongside each other, e.g. visual inspection, florescent marker, ATP and microbiological results.
- Even when strong effects noted the mechanism and process for change rarely explored in depth.
- Effects rarely sustained when studies did include longer follow up periods.
- Indication of interactions within complex systems in discussion sections, even if not formally studied, e.g. *immediate sharing of results to cleaners also having an advocacy effect among facility managers.*

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Summary findings (evidence gaps so far)



- Few thorough study designs (RCT/quasi-experimental)
 - Reporting quality – poor
 - Few on cleaning medical equipment that does not require sterilization
 - No standard outcome definition for cleanliness
 - Few from minimal resourced settings (just one healthcare facility, often teaching hospitals)
 - Lacking contextual descriptions (e.g. WASH infrastructure) in the majority of studies
- **more primary research needed**

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So...



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So... the CLEAN Workshop



Focus: Research needed to **inform** or **enhance** implementation of **best practices** in **surface and non-critical equipment cleaning** in **LMIC** healthcare facilities

- Evidence-based gaps
- Select research questions
- Prioritise together

Output: Produce a brief based on consensus which describes the research agenda (strategic thinking) targeting researchers, policy experts and funders

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Positioning



- Regional representatives from across Europe, Africa, Australia, Asia, North and South America. Largest representation from Europe and Africa.
- Group of civil servants, academics, policy developers and operational implementers from government ministries and agencies, academic institutions and I/NGOs.
- Conducting high-level work that is addressing the needs of cleaning staff in LMI countries who currently have no direct involvement in this project.
- A few operational implementers present and so valuable evidence from other sectors may be missed.

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Why? *The invisible workforce*



- Evidence suggests that in many LMICs hospitals environmental hygiene faces substantial gaps in policies, resources and training.
- Research gaps in current published work
- The neglected role of cadre
 - In most contexts cleaning staff are recognized to predominantly be women and of low-social-economic status
 - Hierarchical hospital structure
 - Poorer working conditions

38

Why? *The invisible workforce*



- Evidence suggests that in many LMICs hospitals

[Glob Health Action](#). 2019; 12(1): 1480085.

PMCID: PMC6338282

Published online 2019 Jan 15. doi: [10.1080/16549716.2018.1480085](https://doi.org/10.1080/16549716.2018.1480085)

PMID: [31154993](https://pubmed.ncbi.nlm.nih.gov/31154993/)

An invisible workforce: the neglected role of cleaners in patient safety on maternity units

[Suzanne Cross](#),^a [Giorgia Gon](#),^b [Emma Morrison](#),^a [Koasar Afsana](#),^c [Said M. Ali](#),^d [Tina Manjang](#),^e [Lamin Manneh](#),^f [Atiya Rahman](#),^g [Deepak Saxena](#),^h [Kranti Vora](#),^h and [Wendy J. Graham](#)^{a,b}

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Why? *The invisible workforce*

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Suzanne
Atiya Ra
▶ Author

> [Antimicrob Resist Infect Control](#). 2021 Mar 24;10(1):59. doi: 10.1186/s13756-021-00922-x.

Time for a renewed focus on the role of cleaners in achieving safe health care in low- and middle-income countries

Julie Storr ¹, Claire Kilpatrick ², Karen Lee ³

– Poorer working conditions

40

Why? *The invisible workforce*

LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE 

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> [Antimicrob Resist Infect Control](#). 2021 Mar 24;10(1):59. doi: 10.1186/s13756-021-00922-x.

Review > [Antimicrob Resist Infect Control](#). 2020 Jun 9;9(1):81. doi: 10.1186/s13756-020-00747-0.

Challenges regarding the control of environmental sources of contamination in healthcare settings in low- and middle-income countries – a narrative review

Folasade T Oguniola ^{1 2}, Shaheen Mehtar ^{3 4}

– Poorer

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Theme-based streams




1. HEALTH SYSTEMS

RQ: What is the optimum number of cleaners required for each area, and how would this be calculated?

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Theme-based streams



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RQ: What is the optimum number of cleaners required for each area, and how would this be calculated?

2. BEHAVIOUR CHANGE

RQ: What are effective behaviour change techniques to establish a facility culture (values) of environmental cleanliness?

44

Theme-based streams



1. HEALTH SYSTEMS

RQ: What is the optimum number of cleaners required for each area, and how would this be calculated?

2. BEHAVIOUR CHANGE

RQ: What are effective behaviour change techniques to establish a facility culture (values) of environmental cleanliness?

3. INNOVATION

RQ: Are detergents alone non-inferior to the use of detergents plus disinfectants in reducing bioburden on non-critical/low-touch surfaces in low resourced setting HCF?

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In the pipeline



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In the pipeline



World Health Organization

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In the pipeline

Safe Healthcare Facilities: A Systematic Review on the Costs of Establishing and Maintaining Environmental Health in Facilities in Low- and Middle-Income Countries

Darcy M. Anderson^{1,*}, Ryan Cronk², Donald Fejfar¹, Emily Pak¹, Michelle Cawley³ and Jamie Bartram^{1,4}

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In the pipeline

Safe Healthcare Facilities: A Systematic Review on the Costs of Establishing and Maintaining Environmental Health in Facilities in Low- and Middle-Income Countries

Darcy M. Anderson^{1,*}, Ryan Cronk² and Jamie Bartram^{1,4}

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Thank you for listening



These slides represent the work of the CLEAN Workshop organizing committee: *Angela Dramowski, Emilio Hornsey, Wendy J Graham, Claire Kilpatrick, Nasser Fardousi* and the CLEAN Workshop participants!

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www.webbertraining.com/schedulep1.php

July 14, 2022	<u>HEALTHCARE INFORMATICS LESSONS FROM THE PANDEMIC</u> Speaker: Prof. Keith Woeltje & Debbie Cray , Froedtert & Medical College of Wisconsin
July 27, 2022	<i>(European Teleclass)</i> <u>RISK FACTORS FOR THE ENVIRONMENTAL SPREAD OF DIFFERENT MULTI DRUG-RESISTANT ORGANISMS</u> Speaker: Dr. Jean Ralph Zahar , Hôpitaux de Paris, France
August 10, 2022	<i>(South Pacific Teleclass)</i> <u>HEALTHCARE ASSOCIATED PNEUMONIA – WHY SHOULD WE BOTHER AND WHAT CAN WE DO?</u> Speaker: Prof. Brett Mitchell , University of Newcastle, Australia
August 23, 2022	<i>(European Teleclass)</i> <u>DATA QUALITY INDICATORS IN NATIONAL TB INFECTION CONTROL PROGRAMS: READING BETWEEN THE LINES</u> Speaker: Dr. Eltony Mugomeri , Africa University, Zimbabwe

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