

# The Clean Hospitals Project: let's focus on environmental hygiene, the next frontier in infection control

**Alexandra Peters, PhD**

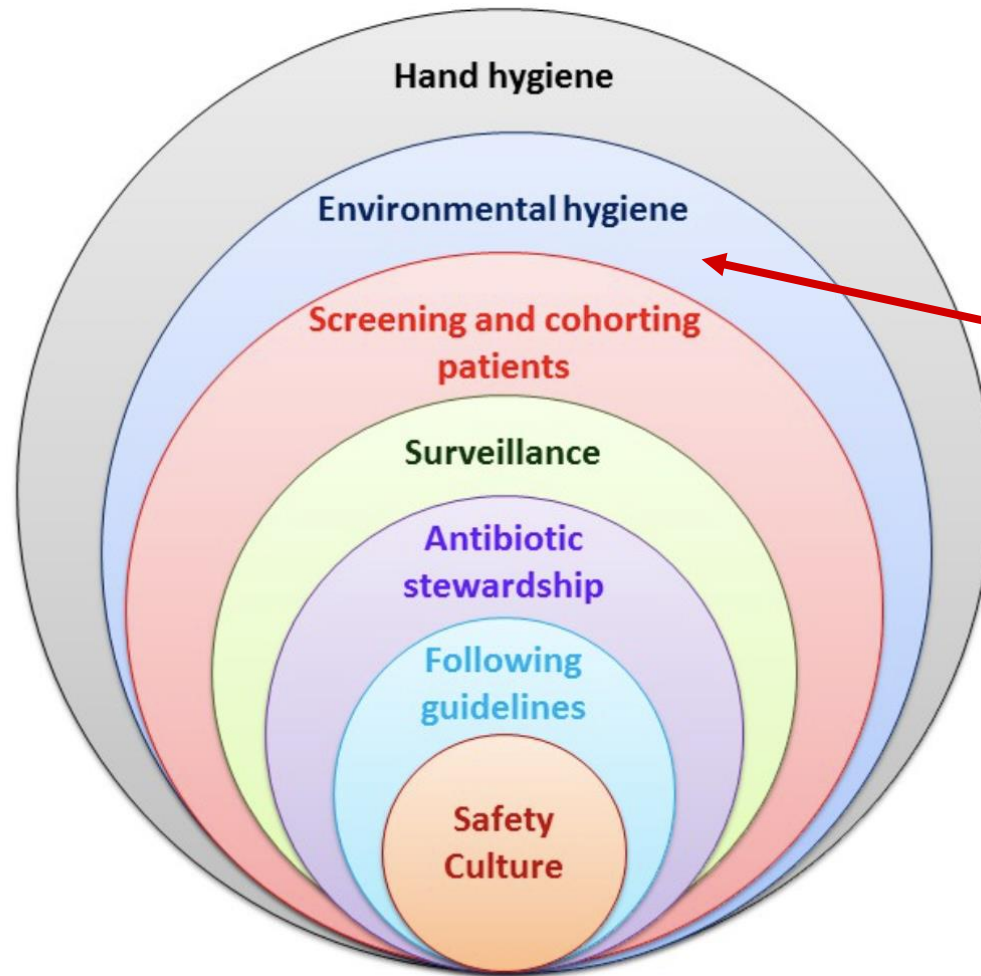
Scientific Lead for Clean Hospitals  
Geneva, Switzerland



# Why Environmental hygiene?



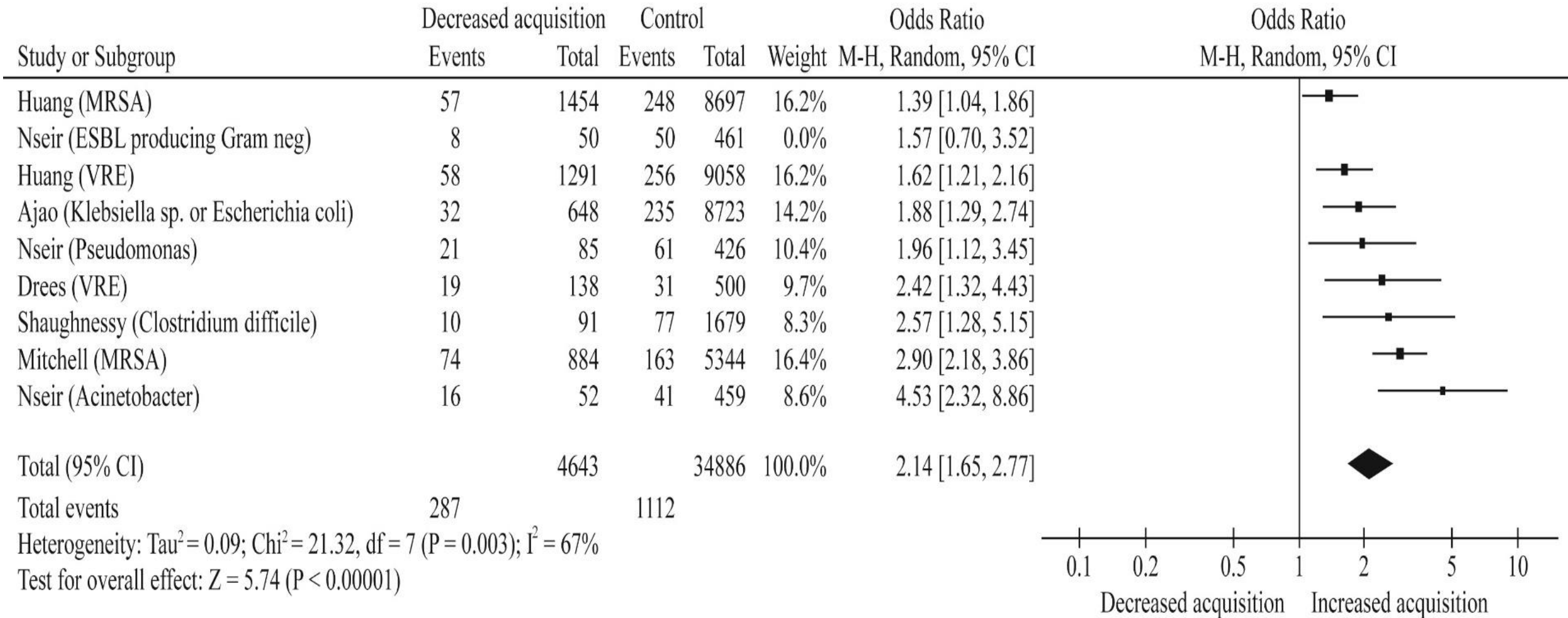
# Strategies for reducing HAI



Very important but understudied and usually underfunded

<https://infectionsinsurgery.org/7-strategies-to-prevent-healthcare-associated-infections-2/>

# Risk of acquisition from prior room occupants by organism



REVIEW

Open Access



# Impact of environmental hygiene interventions on healthcare-associated infections and patient colonization: a systematic review

Alexandra Peters<sup>1,2</sup>, Marie N. Schmid<sup>2</sup>, Pierre Parneix<sup>3</sup>, Dan Lebowitz<sup>1</sup>, Marlieke de Kraker<sup>1</sup>, Julien Sauser<sup>1</sup>, Walter Zingg<sup>4</sup> and Didier Pittet<sup>1\*</sup>

## Abstract

**Background:** Healthcare-associated infections (HAI) are one of the gravest threats to patient safety worldwide. The importance of the hospital environment has recently been revalued in infection prevention and control. Though the literature is evolving rapidly, many institutions still do not consider healthcare environmental hygiene (HEH) very important for patient safety. The evidence for interventions in the healthcare environment on patient colonization and HAI with multidrug-resistant microorganisms (MDROs) or other epidemiologically relevant pathogens was reviewed.

# Main Conclusions

- The healthcare environment is important for patient safety
- There are numerous HEH interventions that can reduce HAI
- We need more and better studies designed to measure colonization/HAI



# The role of the healthcare environment in disease transmission

- Depends on the setting and the microbe
- But the 3 main sources of HAIs are:
  - Contamination by a patients' own endogenous bacteria (sometimes through fomites in the environment or their own hands)
  - Healthcare workers' contaminated hands
  - The healthcare environment

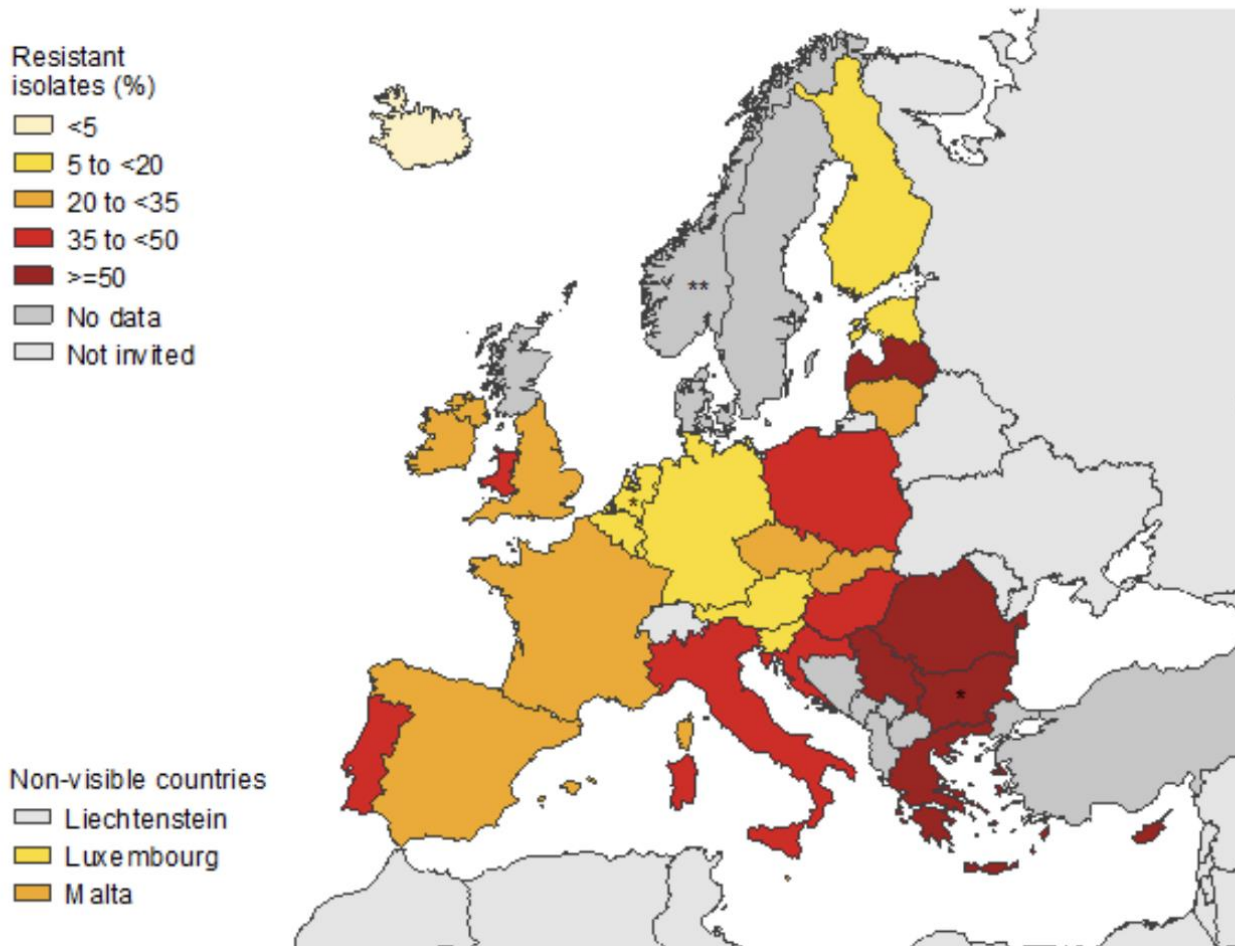


# Effect on antimicrobial resistance

- The best solution to combat resistance is preventing the infections in the first place; making IPC central to the fight against AMR
- Antibiotics are overused and misused, and there are few new ones in the pipeline
- In the environment, some disinfectants may also encourage resistance, it is important to know what to use, when to use it and how to apply it



# Composite index\* of antimicrobial resistance (AMR) in healthcare-associated infections from acute care hospitals, EU/EEA countries and Serbia, 2016-2017



- \*Percentage of isolates resistant to first-level antimicrobial resistance markers in healthcare-associated infections, i.e.:
- *Staphylococcus aureus* resistant to methicillin (MRSA),
  - *Enterococcus faecium* and *Enterococcus faecalis* resistant to vancomycin,
  - Enterobacteriaceae resistant to third-generation cephalosporins,
  - *Pseudomonas aeruginosa* and *Acinetobacter baumannii* resistant to carbapenems.

From: <https://healthfirsteurope.eu/wp-content/uploads/2020/09/Patient-safety-ECDC-Dr.-Monnet.pdf>

\* Bulgaria and the Netherlands: poor national representativeness of acute care hospital sample;

\*\* Norway: national protocol;

Norway and UK-Scotland did not collect microbiological data.

Adapted from: Suetens C, et al. Eurosurveillance 15 November 2018.

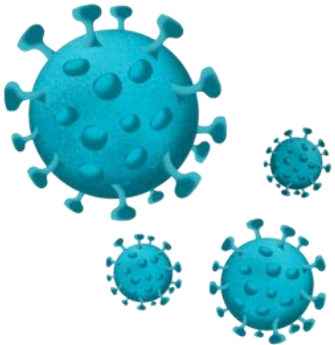
# Bridging the gap

- The healthcare environment remains a major gap in IPC
- We need to:
  - Address silos and fragmentation in the field
  - Change how healthcare facilities view HEH
  - Increase the body of high-quality academic research to identify the specific routes of transmission, pathogens of interest and most effective interventions



# Healthcare-associated infections in Europe

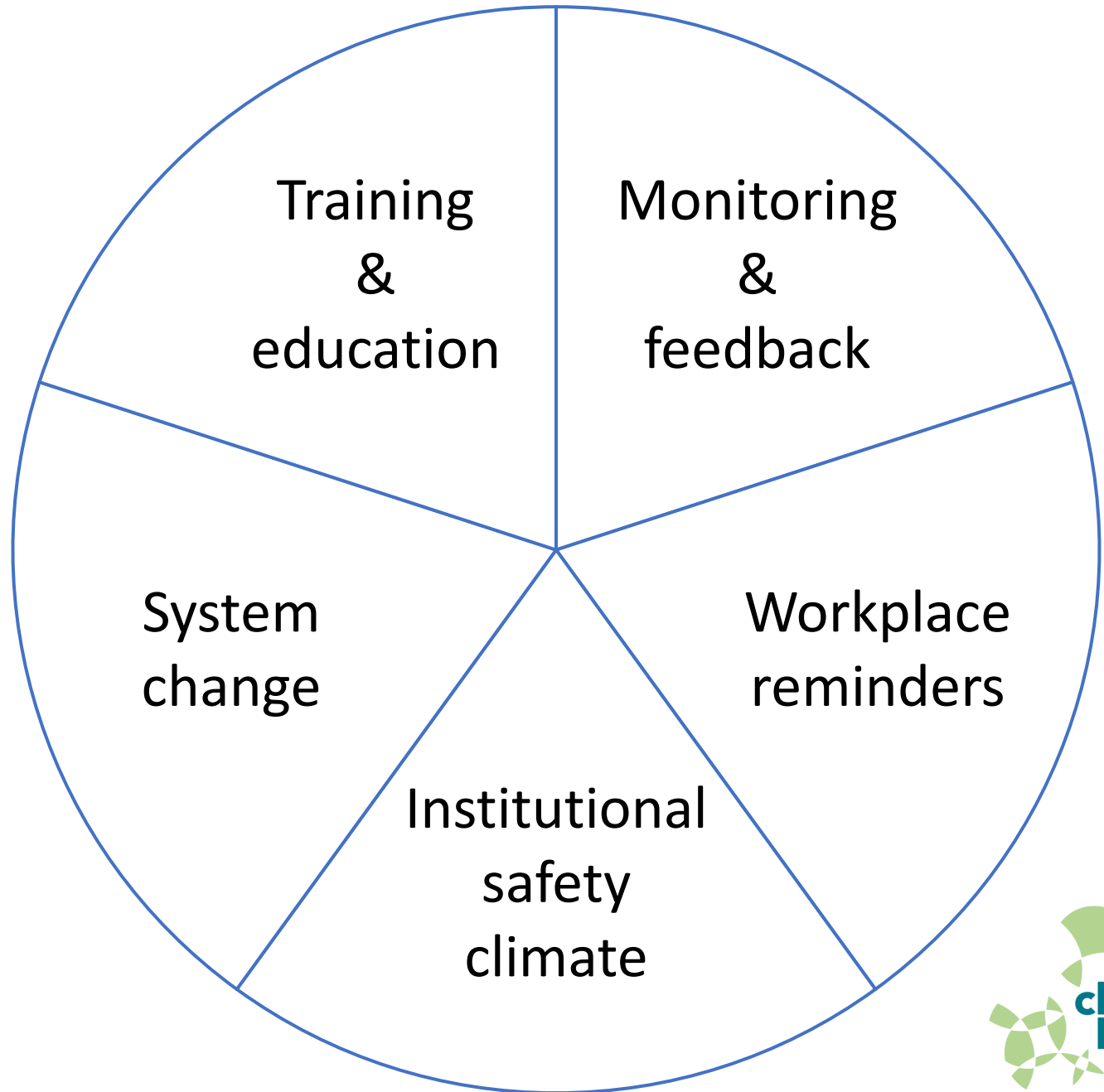
- Currently, 1 out of every 15 patients will get an HAI during their hospital stay\*
- If we are able to reduce 20% through improved HEH that means 1/19 will get an HAI
- If we are able to reduce 40% through improved HEH that means 1/25 patients will get an HAI



# Logistics of hospital cleaning



# The Multimodal Strategy for Healthcare Environmental Hygiene



# System Change

Availability of tools, supplies and machines to:

- Cleaning and disinfecting surfaces
- To treat air when needed
- To sterilize and reprocess medical devices
- Water treatment
- Waste treatment
- Laundry



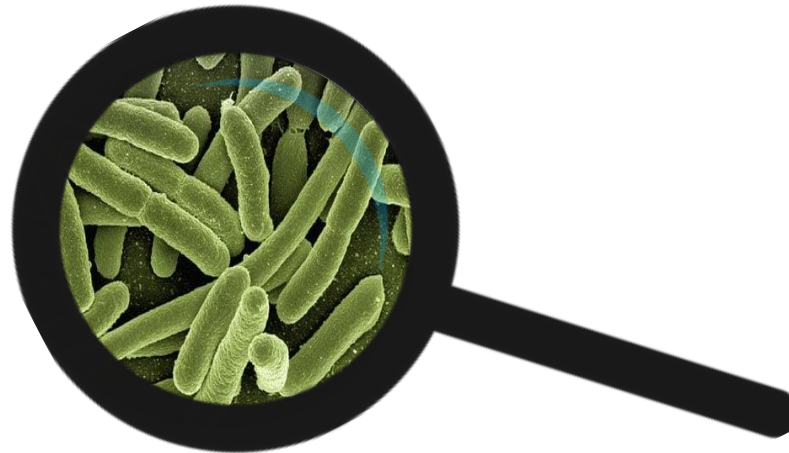
# Training & Education

- Training EVS staff for cleaning and disinfection, how to operate equipment, or do specialized tasks
- Can be through classroom, manuals training, job training or E-learning



# Monitoring & Feedback

- Monitoring EVS staff through visual monitoring, ATP measurements, fluorescent marking or, rarely, with microbiological sampling
- Feedback can be given in a constructive or punitive way, and either individual, the team, or institutional level (or a combination)





# Workplace Reminders

Workplace reminders help EVS staff in their tasks

Required safety posters, individual reminders, additional activities and events for raising awareness



improving environmental hygiene practices

## RISK ZONES

When risk increases frequency of cleaning must rise

The diagram is a pyramid with five horizontal levels, numbered 1 to 5 from top to bottom. Each level is a different color: level 1 is yellow, level 2 is green, level 3 is orange, level 4 is red-orange, and level 5 is red. On each level, there are icons representing cleaning tools (mops) and viruses. The number of mop icons increases from 1 on level 1 to 5 on level 5. The number of virus icons also increases from 1 on level 1 to 5 on level 5. Two arrows point downwards from the top of the pyramid. The left arrow is labeled "Increase cleaning frequency" and the right arrow is labeled "Increase of risk".

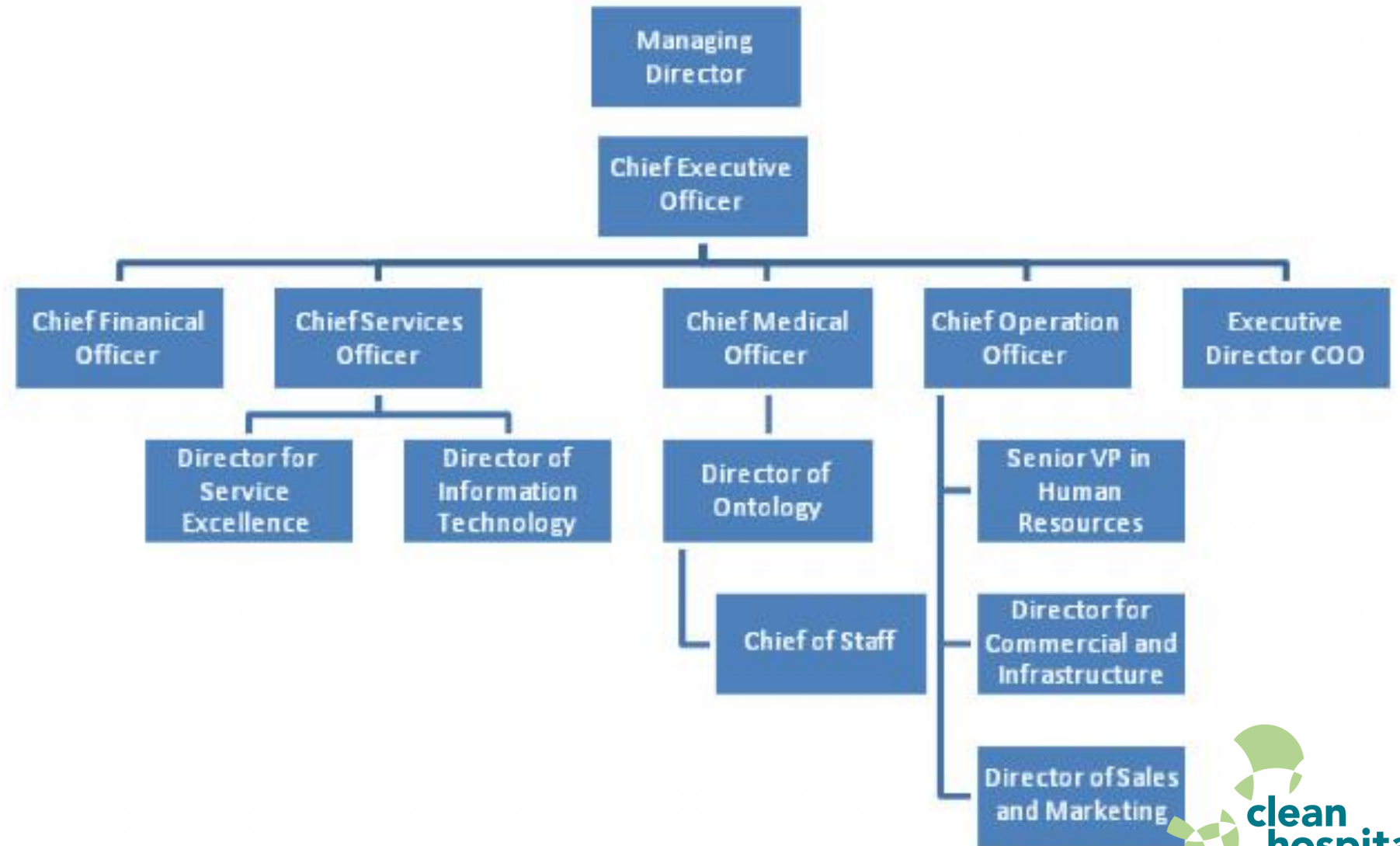
For more information please visit:  
[www.cleanhospitals.com](http://www.cleanhospitals.com)

© 2021 Clean Hospitals. Designed by www.AirdropCreative.com

The logo for Clean Hospitals, featuring a stylized green and blue circular graphic to the left of the text "clean hospitals" in a sans-serif font.

# Institutional Safety Climate

All other efforts will be insufficient without the support from the institution



# Optimising HEH



- Optimal HEH is as much about the products as it is about institutions and people
- 4 out of the 5 elements of the multimodal strategy have to do with people, specifically, the people who clean
- People is the most important element in HEH, which makes it challenging to implement
- It is essential that performing HEH is a professionalized and recognized field
- All elements need to work harmoniously for improvement

# Who cleans what?

- Everyone needs to fully understand their function
- Everyone is crucial to the outcome



- If a task is not clearly defined and attributed, it probably won't be performed

# Multimodal Studies in HEH



- An increasing number of interventions in HEH are multimodal in nature
- Many bundle some of the 5 components of the multimodal improvement strategy into a single complex intervention

# What is Clean Hospitals?

A coalition of international stakeholders who work explicitly to promote and support healthcare environmental hygiene

- research
- publications
- participation in conferences and events
- education and training
- specialized working groups



# What do we aim to do?

Bring together academia and industry to:

- Champion best practices and evidence-based solutions
- Drive and support academic research
- Create a network where project members can exchange and collaborate
- Create a platform from which to bring healthcare environmental hygiene into the spotlight



# Clean Hospitals internal activities



Journal Clubs

Clean  
Hospitals  
Live  
Workshops

Clean  
Hospitals  
Think Tanks

Clean  
Hospitals  
Events



# Clean Hospitals Day: October 20th

- 2020 was specifically focused on COVID-19
- 2021 focused on cleaners
- Teleclasses and webinars
- Company involvement
- Social media and videos
- 2022 was the first year of the CH Day conference



# Clean Hospitals Day: 20<sup>th</sup> of October, 2022

**clean hospitals**

Better Patient Safety Through Improved  
Healthcare Environmental Hygiene

Scan The QR Code Below To Apply To Join Our Network  
And Take Your Innovation To The Next Level



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celtec  
SMART TEXTILES

airinspace

Diversey

**SARAYA**

gama  
HEALTHCARE

MetalSkin

natéosanté

**ECOLAB**

**Our Stakeholders:**



20 October 2022

**3<sup>rd</sup> clean hospitals<sup>®</sup> Day**

## Clean Hospitals Day International Conference

Crowne Plaza Hotel 08:00-20:30 20 October, 2022  
Av. Louis-Casaï 75/77, 1216 Genève, Switzerland

2022

- 08:00 Welcome Coffee & Visit of the Exhibition
- 08:45 **Session 1: Environmental Control**
- 10:35 Coffee & Visit of the Exhibition
- 11:05 **Session 2: Healthcare Environmental Hygiene Self-Assessment Framework (HEHSAF)**
- 12:25 – 13:40 Lunch & Visit of the Exhibition
- 12:30 – 13:30 Company Symposium 1, 2 & 3
- 13:40 **Session 3: Medical Devices Reprocessing**
- 15:30 Coffee & Visit of the Exhibition
- 16:00 **Session 4: Air and Water Control**
- 17:20 Closing remarks
- 17:45 Clean Hospitals Day Apéro
- 19:30 **Clean Hospitals Day Webber Teleclass**

Scan The QR Code  
To Learn More  
About The 3<sup>rd</sup> Clean  
Hospitals Day 2022  
International  
Conference



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info@cleanhospitals.com  
www.cleanhospitals.com



More information on <https://cleanhospitals.com/2022-conference/>

# Publications in the last 2 years:



- Vaux S, Fonteneau L, Venier AG, Gautier A, Soing Altrach S, Parneix P, Lévy-Bruhl D. Influenza vaccination coverage of professionals working in nursing homes in France and related determinants, 2018-2019 season: a cross-sectional survey. *BMC Public Health*. 2022 May 25;22(1)
- Peters A, Schmid MN, Kraker MEA, Parneix P, Pittet D. Results of an international pilot survey on healthcare environmental hygiene at the facility level. *Am J Infect Control*. 2022 Mar 6:S0196-6553(22)00133-X.
- Peters, A., Schmid, M., Parneix, P. et al. Impact of environmental hygiene interventions on healthcare-associated infections and patient colonization: a systematic review. *Antimicrob Resist Infect Control* 11:38 (2022).
- Peters, A., Carry, J., Cave, C. et al. Acceptability of an alcohol-based handrub gel with superfatting agents among healthcare workers: a randomized crossover-controlled study. *Antimicrob Resist Infect Control* 11, 97 (2022).
- Peters, A., Cave, C., Carry, J. et al. Tolerability and acceptability of three alcohol-based handrub gel formulations: a randomized crossover study. *J Hosp Infect*. 2022 Feb 3:S0195-6701(22)00034-2.
- Peters A, Lotfinejad N, Palomo, R et al. Decontaminating N95/FFP2 masks for reuse during the COVID-19 epidemic: a systematic review. *Antimicrob Resist Infect Control* Oct 11;10(1):144 (2021).
- Peters, A., Palomo, R., Ney, H. et al. “The COVID-19 pandemic and N95 masks: reusability and decontamination methods”. *Antimicrob Resist Infect Control* 10, 83 (2021)
- Peters, A. Guitart C., Pittet D. “Addressing the global challenge of access to supplies during COVID-19: Mask reuse and local production of alcohol-based handrub” *Environmental and Health Management of Novel Coronavirus Disease (COVID-19)*. Elsevier. Dehghani et al. Ed. 2021.

# Publications in the last 2 years (2):



- Peters A, Frat E, Iten A, Sauser J, Schibler M, Pittet D. “Alcohol-based hand rub and influenza A: the danger of publishing a flawed study with no clinical relevance”. *J Hosp Infect.* 104:1, p120-122, Jan 2020.
- Peters A, Vetter P, Guitart C, Lotfinejad N, Pittet D. “Understanding the emerging coronavirus: what it means for health security and infection prevention”. *J Hosp Infect.* 104:4, p440-448, March 2020. Peters A, Parneix P, Otter J, Pittet D.
- Putting some context to the aerosolization debate around SARS-CoV-2. *J Hosp Infect.* 2020;105(2):381-382.
- Peters A, Buetti N, Harbarth S., Pittet D. Der schadhliche Effekt von Falschinformationen. Swissnoso. Swiss Federal Office for Public Health (OFSP/ BAG). Nov. 2020.
- Peters, A and Pittet, D. “COVID-19 and health care environmental hygiene”. *MJA Insight.* 27 July 2020.
- Otter, J. Exploring SARS-CoV-2 hospital surface and air contamination in London. *Reflections in IPC.* July 8, 2020. <https://reflectionsipc.com/2020/07/08/exploring-sars-cov-2-hospital-surface-and-air-contamination-in-london/>
- Peters, A and Pittet, D. “Clean Hospitals answers to a widely shared piece of fake news about alcohol-based handrub”. Press Release. *Clean Hospitals.* Sept 2020. Peters, A.
- “The Impact of misinformation and fake news on public health during COVID-19”. Policy Brief. *Clean Hospitals.* Sept 2020.
- Hajjar, J., Parneix P. Nonmedical fabric face masks: Why? When? And how? Health& Co. Oct, 2020.
- Bervas, C., Parneix P. “Dossier : Communication & formation – Infox : le défi des médias sociaux et du web. Health& Co. Dec, 2020.

# Clean Hospitals academic projects

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# International HEH evaluation

*According to decision makers, how do hospitals implement HEH programs?*

- Based on quantitative email surveys
- Aim is to understand how HEH works around the world and in different resource and cultural contexts
- Goals were to find universal themes and categories to support and improve, and develop the HEHSAF





ELSEVIER

Contents lists available at [ScienceDirect](#)

# American Journal of Infection Control

journal homepage: [www.ajicjournal.org](http://www.ajicjournal.org)

AJIC  
American Journal of  
Infection Control

## Major Article

# Results of an international pilot survey on health care environmental hygiene at the facility level

Alexandra Peters MA<sup>a,b</sup>, Marie N. Schmid BS<sup>b</sup>, Marlieke E.A. de Kraker PhD<sup>a</sup>, Pierre Parneix MD<sup>c</sup>,  
Didier Pittet MD, MS, CBE<sup>a,\*</sup>

<sup>a</sup> *Infection Control Programme and WHO Collaborating Center on Patient Safety, University of Geneva Hospitals and Faculty of Medicine, Geneva, Switzerland*

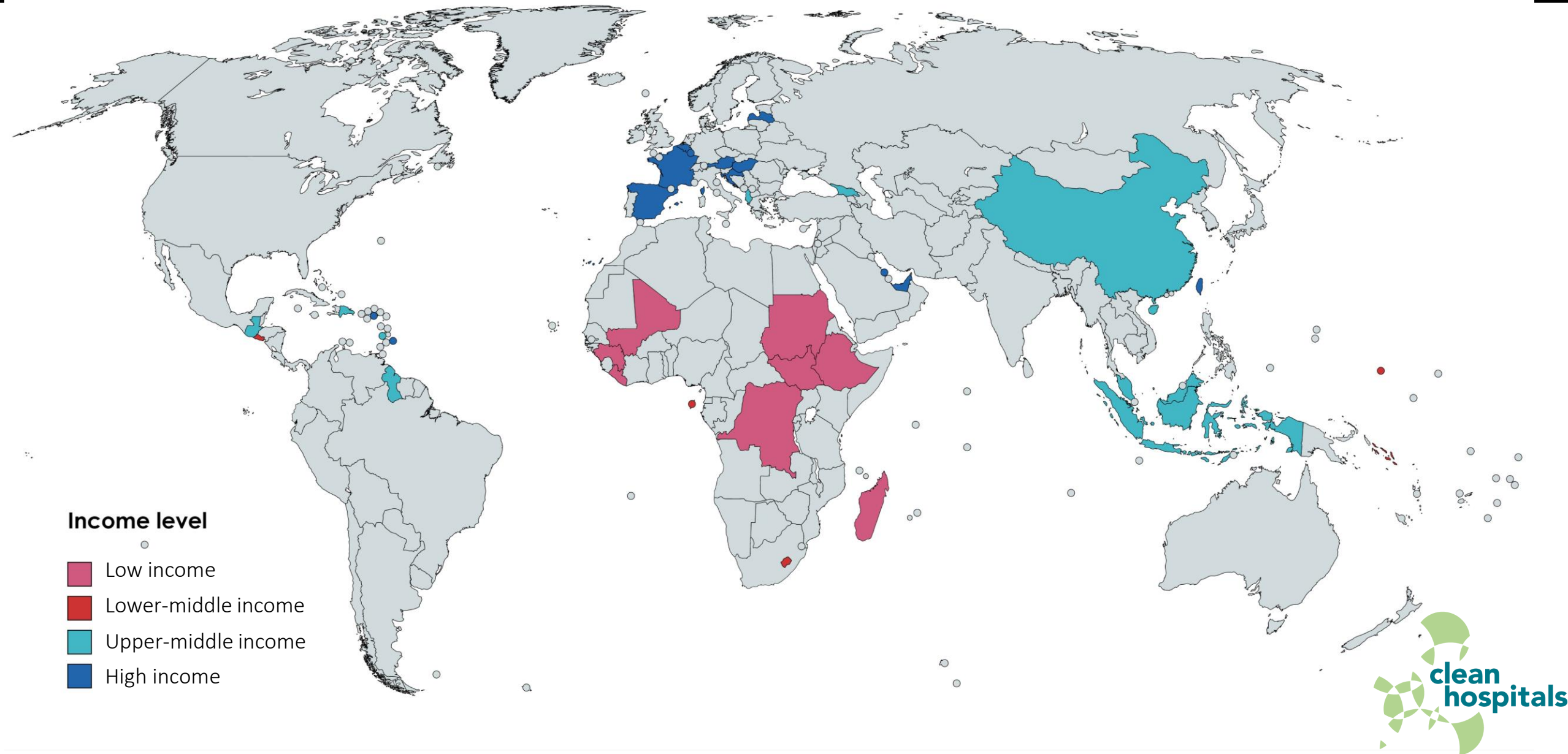
<sup>b</sup> *University of Geneva, Geneva, Switzerland*

<sup>c</sup> *Nouvelle Aquitaine Health Care-Associated Infection Control Centre, Bordeaux University Hospital, Bordeaux, France*

Peters A, Schmid MN, Kraker MEA, Parneix P, Pittet D. Results of an international pilot survey on healthcare environmental hygiene at the facility level. *Am J Infect Control*. 2022 Mar 6:S0196-6553(22)00133-X. doi: 10.1016/j.ajic.2022.02.029. Epub ahead of print. PMID: 35644296.



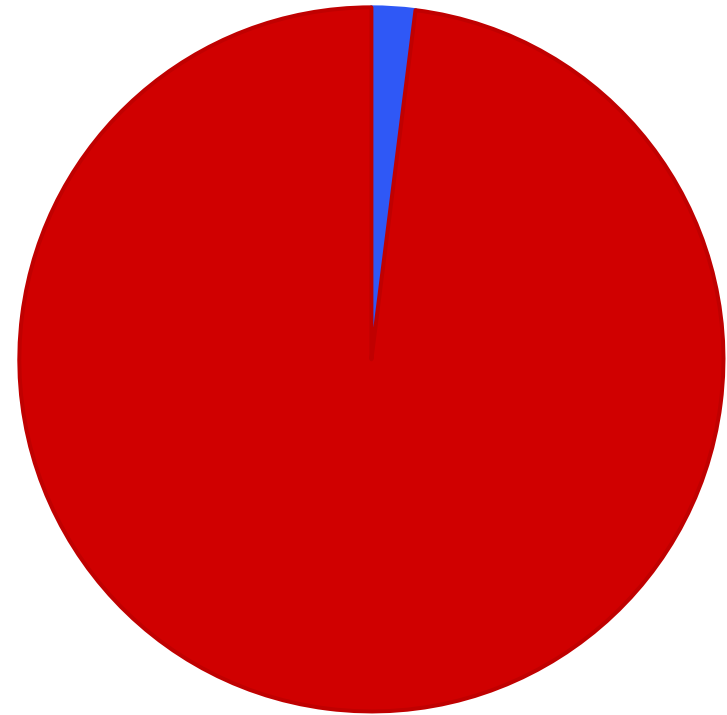
# Outcome: 51 hospitals from 35 Countries completed the survey





# Pilot survey results: HEH programs insufficient across resource levels

98% (50/51) of HCFs were  
majorly lacking in at least one of  
the components of the  
multimodal strategy

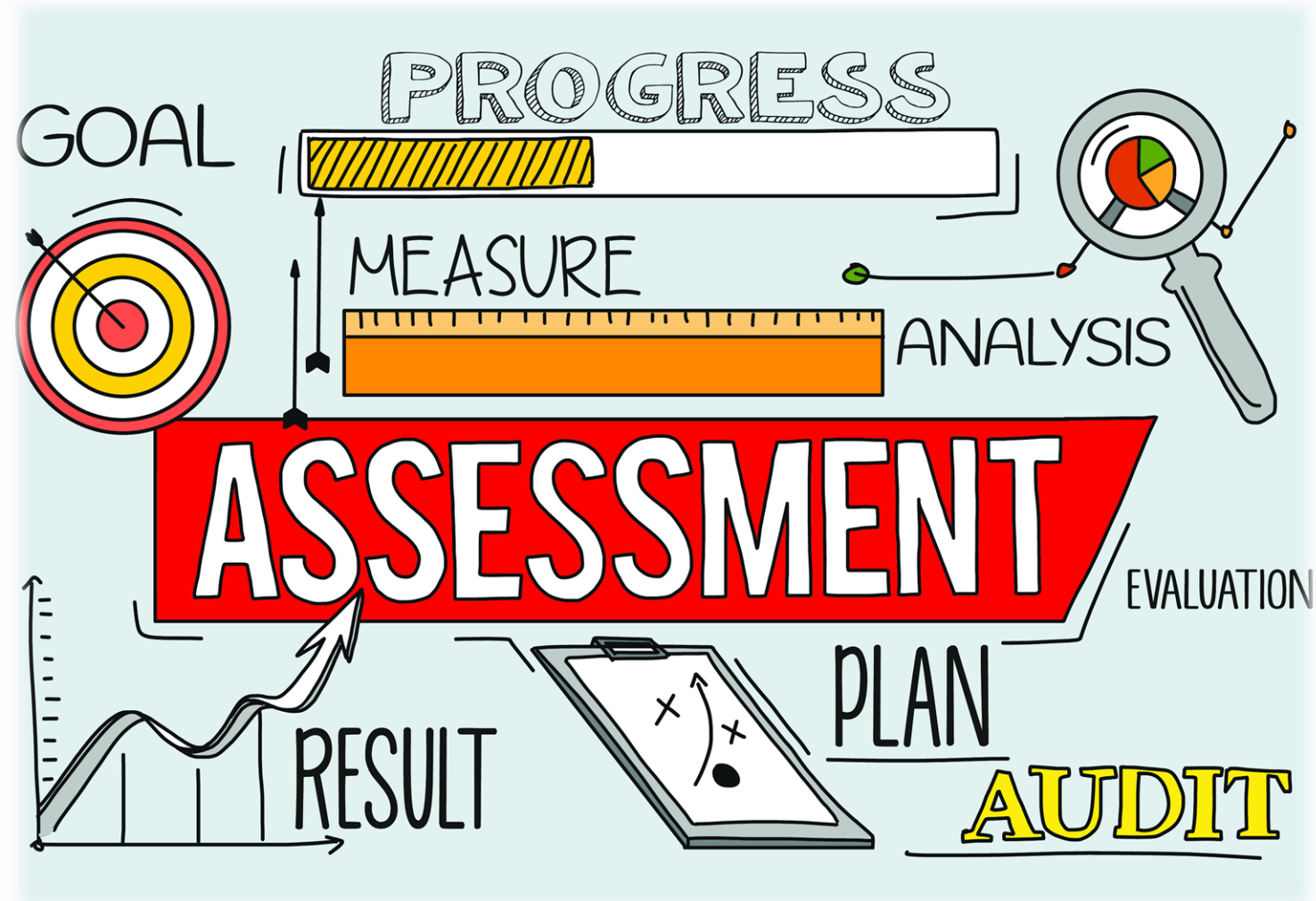


# Key results of the pilot study

- Mops and buckets for cleaning floors were still used in most HCFs; only 4% (2/50) reported exclusively using bucket-less mopping systems
- 88% (44/50) of HCFs separated normal waste from medical or hazardous waste.
- 22% (11/50) of HCFs reported having an open dump site nearby
- Only 30% (7/23) of HCFs in higher-income countries and 7% (1/14) in lower-income countries indicated that EVS staff received comprehensive formal training
- 49% (23/47) of HCFs had EVS managers on-site less than once per week or not at all 18% (9/49) did not use any workplace reminders, including the minimum required safety posters or instructions
- Concerning communication on the work floor, 16% (8/50) of respondents reported that EVS staff and nursing staff did not speak the same language
- Upward communication with direct superiors was possible in only 25% (12/48) of HCFs



# Development of the Healthcare Environmental Hygiene Self- Assessment Framework (HEHSAF)



# What is the HEHSAF?

- A tool for healthcare facilities (HCFs) to analyze and assess their healthcare environmental hygiene (HEH) programs
- Can be used as a benchmark for improvement over time
- The first time a global snapshot for HEH is being attempted



# Aims of the HEHSAF

- In order to increase patient safety by reducing healthcare-associated infections (HAIs) through improved HEH we have to change how HEH is being done around the world.
- In order to make that change, we need to understand how it is being done currently and give HCFs a tool through which they can assess their HEH programs



# The HEHSAF: designed to support facility improvement (not to meet a pre-defined level)



World Health Organization

Patient Safety

A World Alliance for Safer Health Care

SAVE LIVES

Clean Your Hands

## Hand Hygiene Self-Assessment Framework 2010

Introduction and user instructions

Total Score (range)	Hand Hygiene Level
0 - 125	Inadequate
126 - 250	Basic
251 - 375	Intermediate (or Consolidation)
376 - 500	Advanced (or Embedding)



Healthcare  
Environmental Hygiene  
Self-Assessment  
Framework  
(HEHSAF)

# HEHSAF Development

- With the Academic Taskforce and CH stakeholder working group
- PDF and online tool using REDCap
- Materials for secondary testing phase should be available spring 2023

3.1	Surfaces in the healthcare facility are smooth, intact and able to be cleaned	All of them
		Most of them
		Many surfaces are rough or damaged
3.2	Does your healthcare facility have sufficient cleaning and disinfection products and supplies available?	Cleaning/ disinfection products and supplies are not or only rarely available
		Products and supplies are sometimes available
		Products and supplies are always available
		Don't know
3.3	Are the available products and supplies appropriate for their intended task?	Cleaning/ disinfection products and supplies are not or only rarely appropriate
		Products and supplies are sometimes appropriate
		Products and supplies are always appropriate
		Don't know
3.4	Are HIGH-TOUCH surfaces cleaned with a detergent and disinfected?	Yes, always
		Cleaning and disinfection are performed at the same time with a combined detergent/disinfectant product
		Sometimes
		No

# The Transposable Model for HEH

- The working group is beginning to map a flexible system for implementation and HEH program improvement using the information gathered from:
  - Our hospital (the University of Geneva Hospitals, Switzerland)
  - Other reference hospitals
  - Hospital visits around the world
  - The pilot study
  - future results of the HEHSAF

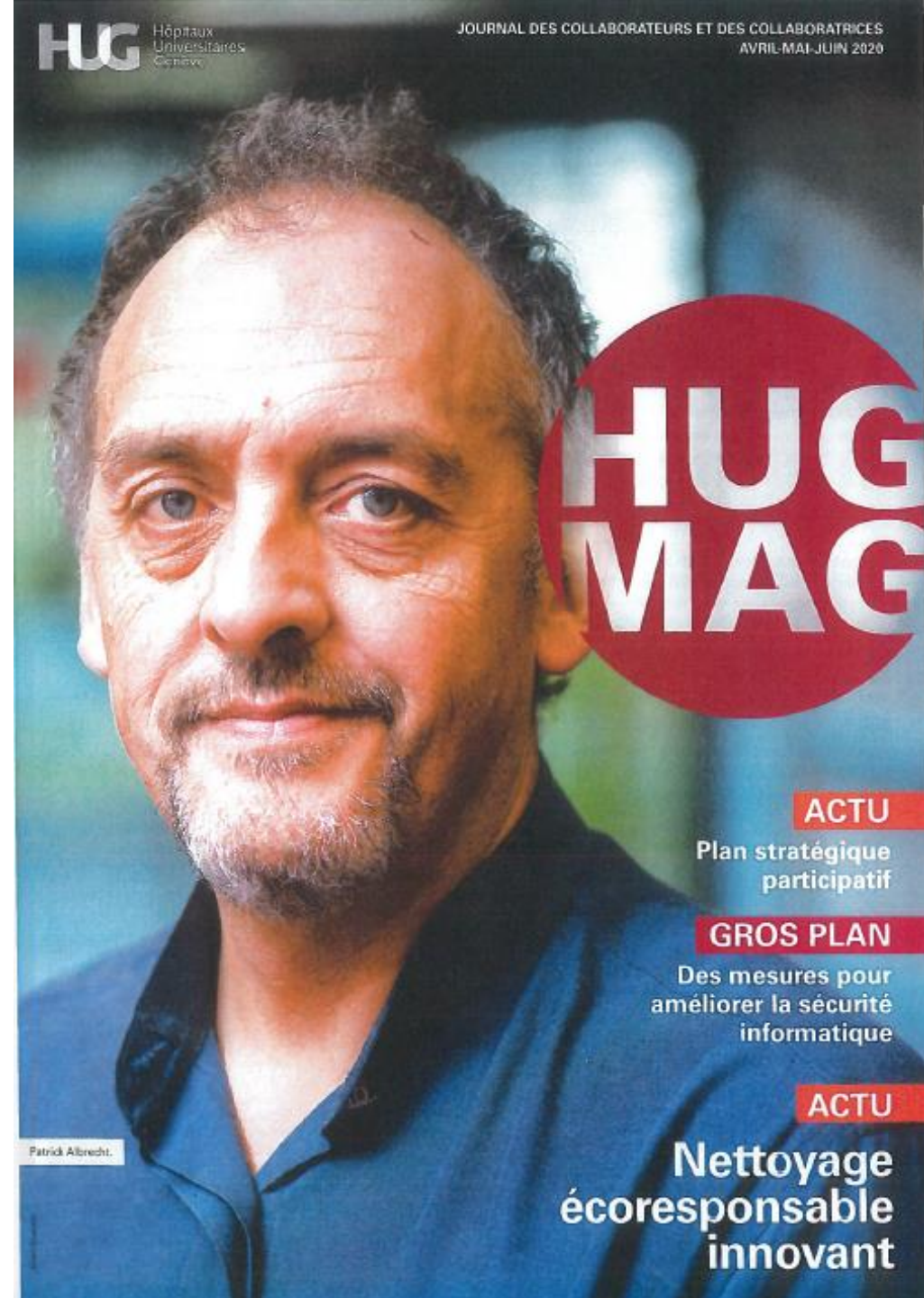


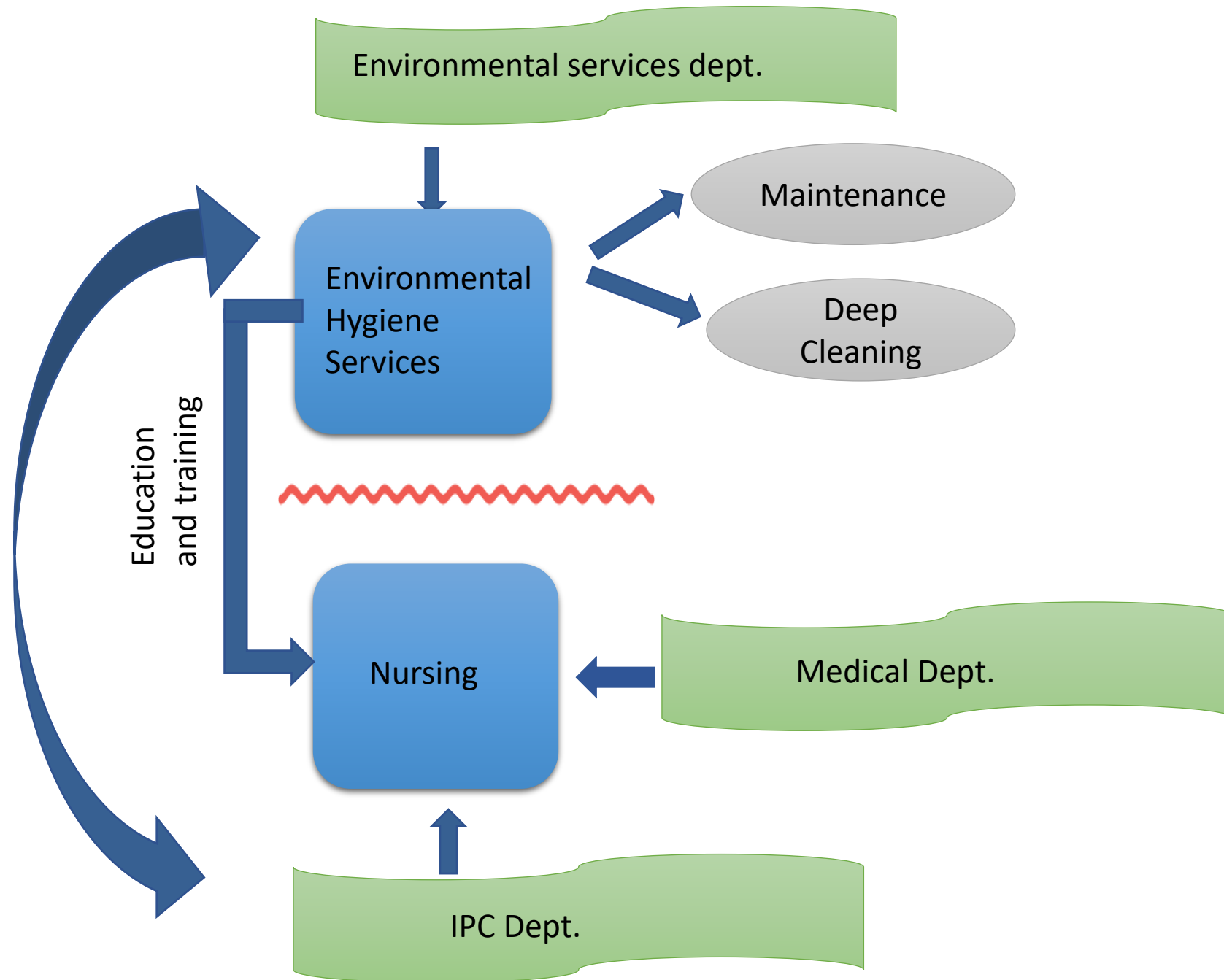
# Some details about what we do at HUG



# HUG environmental services (EVS) department

- Infection prevention and control (IPC) department created in 1992
- EVS department was created in 1994
- EVS department consist of a highly qualified team of over 500 collaborators
- Close collaboration with IPC department





# Department services and staff

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## Services

## Staff

### Cleaning

- ~ 390 full-time equivalents from the environmental hygiene service department
- 21 full time equivalents dedicated to bed cleaning
- ~100 collaborators from external companies

- Surface of 538'982 m<sup>2</sup>
- >70'000 beds
- Surface of 163'293 m<sup>2</sup>

### Waste management

- 19 full-time equivalents

>5000 tons of waste (recycling of 45% of general waste)

### Outdoor management

- 17 full-time equivalents



# Management

- ISO 9001 certification since 2003
- The management system relies on 5 axes :
  - Services
  - Collaborators
  - Collaboration
  - Improvement loop
  - Ecology
- Provides a framework for reaching department the objectives
- In-line with the legal and institutional requirements

# Quality control

- Random inspection of each collaborator twice a year by a manager
  - Process control
  - Visual inspection
  - ATP control
- Immediate feed-back + redo clean + ATP
- Immediate Education and training

# The future of HEH...

- Must be flexible, agile, and based on best practices
- Needs to include all types of healthcare facilities, not just hospitals
- Must take into account logistics, production, quality control, communication
- Needs international standards for products and procedures
- Needs to include having plans in place for emergency situations, from the international level to the facility level



# How can you get involved?

- Conduct studies in HEH in your hospitals (and publish your results!)
- Celebrate Clean Hospitals Day in your healthcare facilities
- Work for better conditions for cleaning staff
- Keep the momentum post-pandemic





# Clean Hospitals Partners



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