Antimicrobial Treatment Systems

ZOONEX SYSTEMS

TRAD2 CONSULTANCY SERVICES

The Question

How do we reduce the frequency of people acquiring HAIs?

The Problem

HAI: Healthcare associated infections.

These are infections patients acquire while receiving medical treatment, care, or during stays in hospitals, clinics, or nursing homes. They are caused by bacteria, viruses, or fungi. *

HAIs, many of which are caused by multidrug-resistant organisms, harm patients, visitors and health workers and are a significant burden to health systems, including the associated increased costs.

HAIs represent one of the **most frequent** adverse events during health care delivery.**

*(*Patient Safety Solutions: Infection Prevention and Control. WHO 2012)*

*(**Global Report on Infection Prevention and Control, World Health Organisation. 2024.* ISBN 978-92-4-010398-6 (electronic version))

The Problem

-Prolonged stay in hospital

-Suffering of the patient, families and their community

-Long-term complications

The consequences of HAIs can be diverse and very serious

-Health-worker illness

-Social and psychological repercussions

-Disability

-Burden on health system → -Pressure on resources

-Increased costs

*(*Patient Safety Solutions: Infection Prevention and Control. WHO 2012)*

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The Global Burden of HAIs

- In EU/EEA countries, 7.4% of patients staying in an ICU for more than two days presented with at least one HAI (61).
- Among hospital-treated sepsis cases worldwide, approximately one in four cases (23.6%) were health care-associated (62).
- In adult ICUs, almost half of all cases (48.7%) of sepsis with organ dysfunction treated in ICUs were hospital-acquired (62, 63).
- Patients living in lower income countries acquire HAIs more and suffer worse outcomes.
- WHO estimated that nearly 3.5 million people globally may lose their lives every year up to 2050 due to HAIs

(Numbered references are to the numbered references within the Global Report on Infection Prevention and Control, World Health Organisation. 2024. ISBN 978-92-4-010398-6 (electronic version)*)*

The Global Burden of HAIs

- In EU/EEA countries 4.5 million episodes of HAIs occurred in patients admitted to acute care hospitals in 2017 (a total of 8.9 million when also accounting for long-term care facilities) (40).
- There are an estimated 93,305 patients with at least one HAI on any given day in acute care hospitals in EU/EEA countries and an estimated 91,310 attributable deaths to have occurred in acute care hospitals (41).
- The CDC (US) estimated that one in 31 hospital patients and one in 43 nursing home residents on any given day has a HAI (48).
- 11 out of 100 general surgical patients are likely to develop an infection 30 days after surgery (53).

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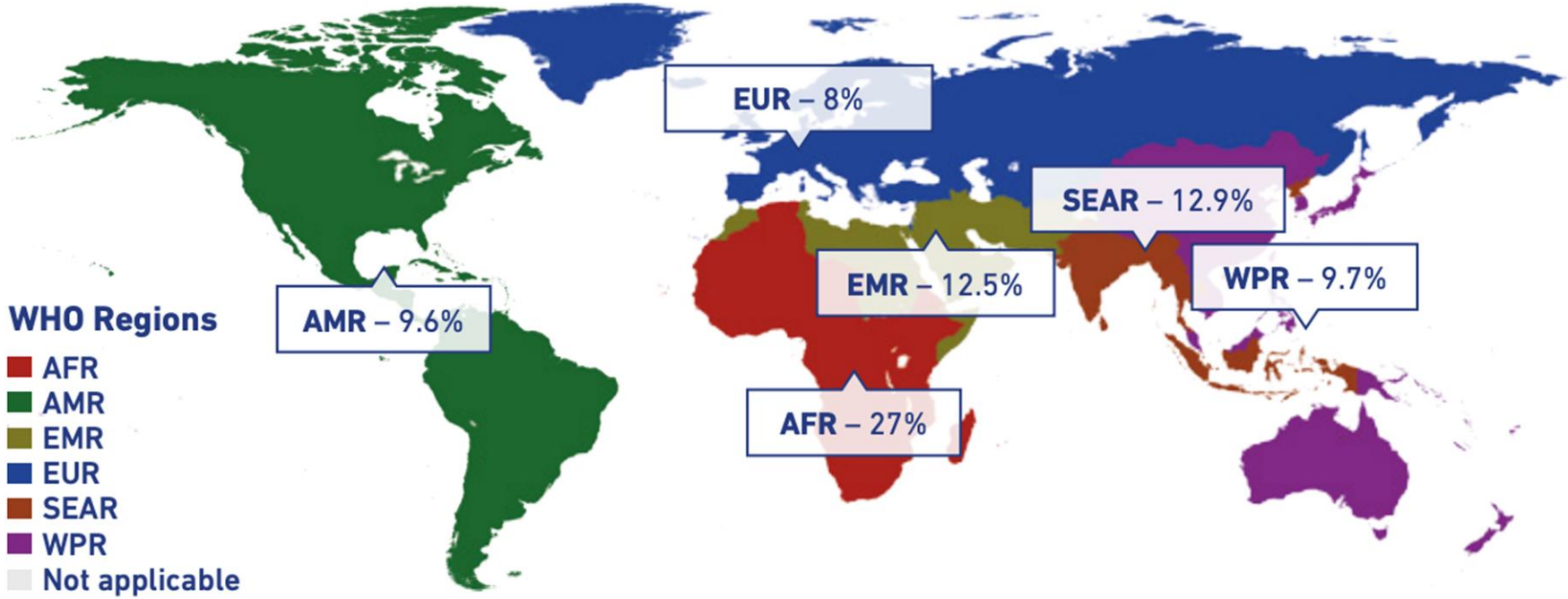
The Global Burden of HAIs

Fig. 2.1. Frequency of HAIs reported in different WHO regions



Abbreviations and (year of publication): AFR, African Region (2023); AMR, Region for the Americas (2023); EMR, Eastern Mediterranean Region (2023); EUR, European Region (2024); SEAR, South-East Asia Region (2023); WPR, Western Pacific Region (2023).
Source: *(37, 39)*.

Infection prevention and control depend on resources.
Lower-income countries experience a higher frequency of HAIs.

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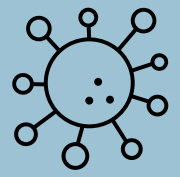
The Causes (Simplified)

Endogenous Flora

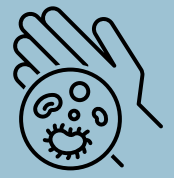
(the microorganisms (bacteria, fungi) that normally live on and within a human body)



Transmission Mechanisms

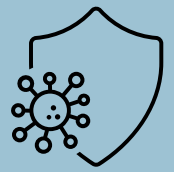
Modifiable

- Direct/indirect contact with contaminated transmission surfaces
- Droplet transmission
- Aerosolised transmission



Compromised Immune system

(less able to fight off infection)



Invasive Procedures

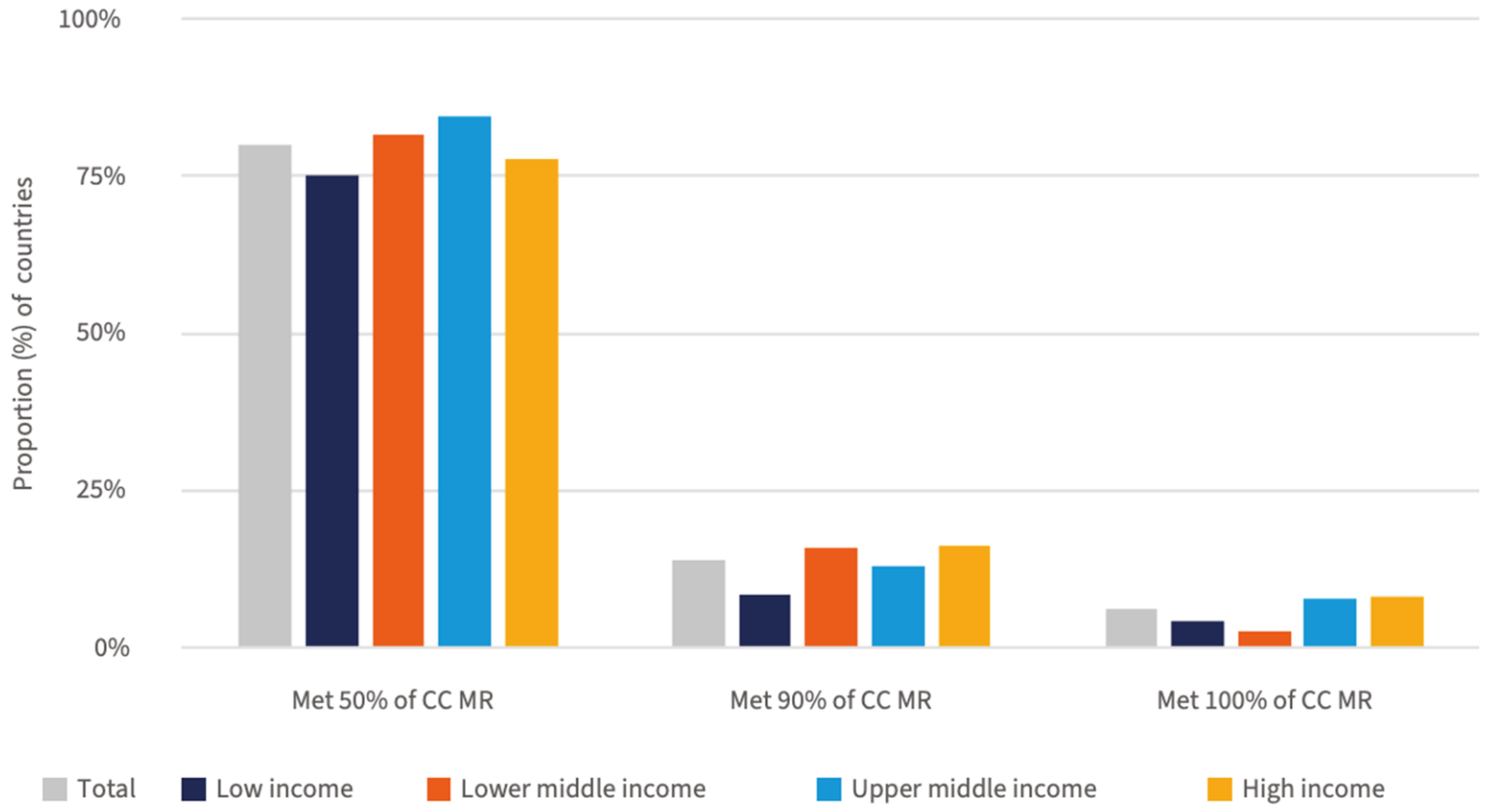
Healthcare Personnel Practice/Failure of Infection Control

Modifiable

(Nosocomial Infections.2025 Ellis H. Tobin; Farah Zahra. PMID: 32644738)

Current Practice

Fig. 4. Proportion of countries meeting IPC minimum requirements by World Bank income level, 2023–2024



Abbreviations: CC MR: core components' minimum requirements.
Source: WHO global survey on IPC minimum requirements at the national level, 2023–2024 (WHO, unpublished data).

Majority of countries met only 50% of the WHO's minimum requirements for infection prevention and control

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Where We Stand

- In European healthcare settings, significant progress was achieved in infection prevention and control during the COVID-19 pandemic, whereas a stagnation has now been observed.
- Ongoing disparity in infection prevention and control effectiveness and resource availability between different country income levels.
- Despite the surge in response to the COVID-19 pandemic, not all essential infection prevention and control resources, supplies and products are available (22-25).

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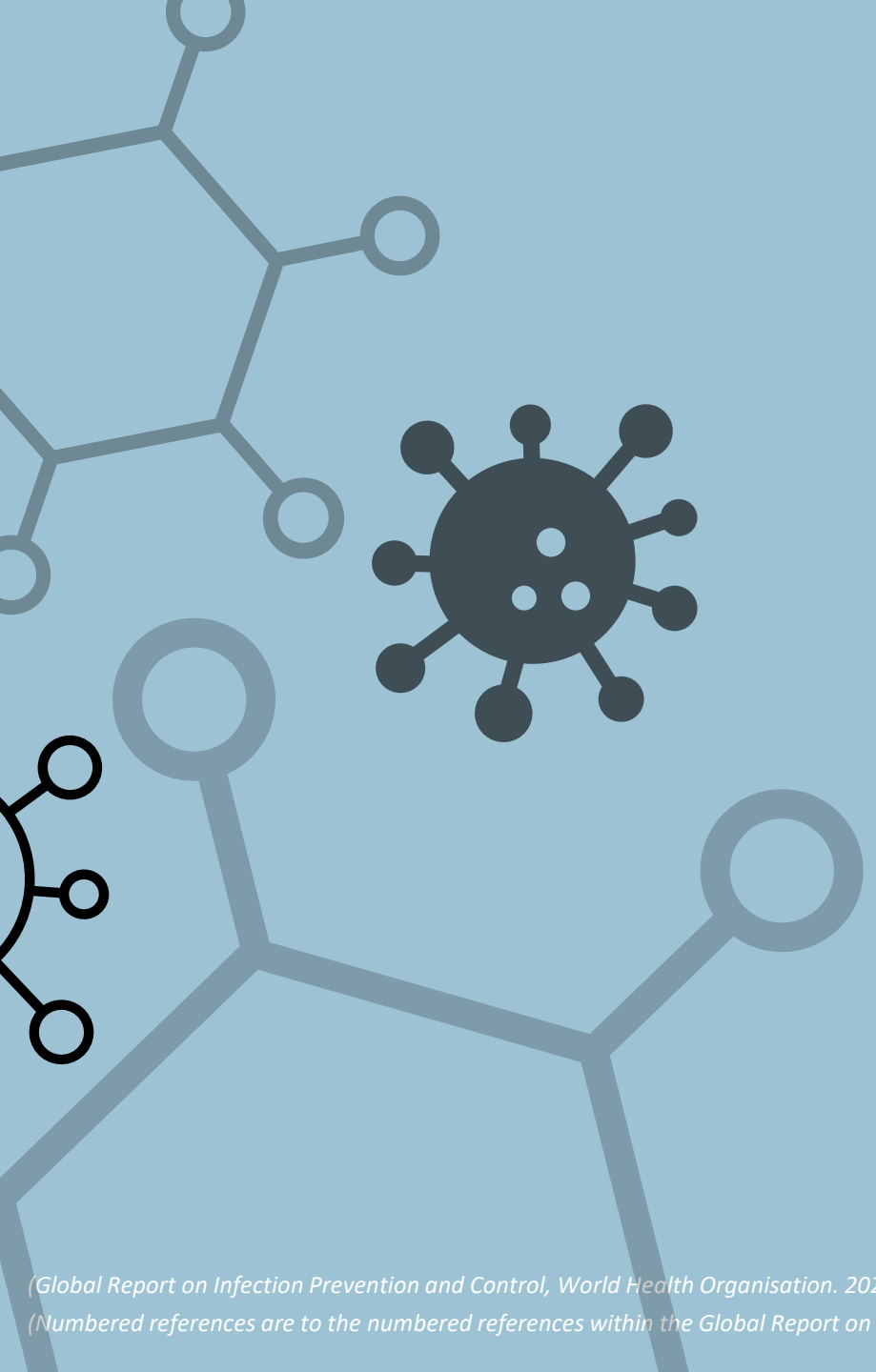

Where We Stand

- Despite significant acceleration in the adoption of infection prevention and control measures, significant gaps and challenges remain, especially regarding elements that require investments and sustainability over the long term.
- Some significant gaps in ensuring operational IPC programmes at national and facility levels:
  - evaluation of training effectiveness,
  - The use of results for targeted improvements in IPC,
  - Improving HAI surveillance and monitoring systems.
- Available evidence showed that compliance with hand hygiene recommendations during health care delivery remains **suboptimal around the world**, with an average of 59.6% compliance levels in ICUs up to 2018 and extreme differences between HICs and LICs (64.5% versus 9.1%, respectively) (160).

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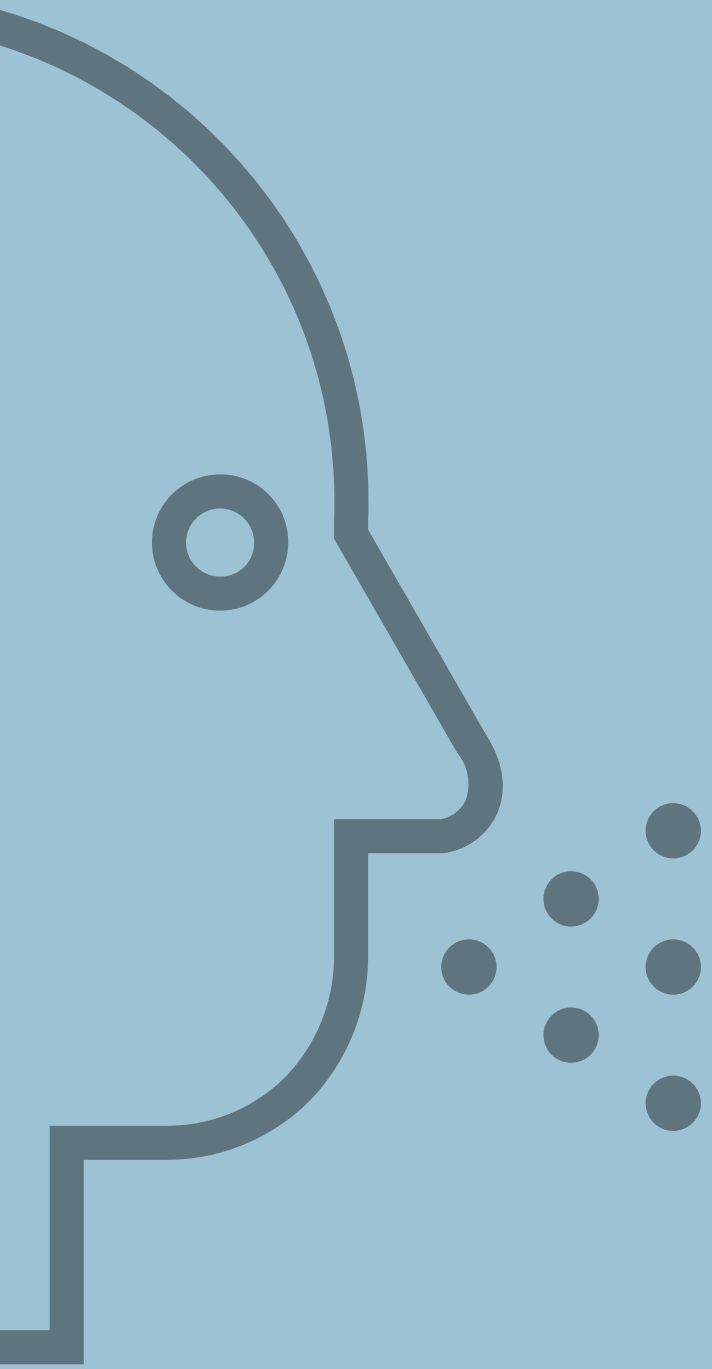
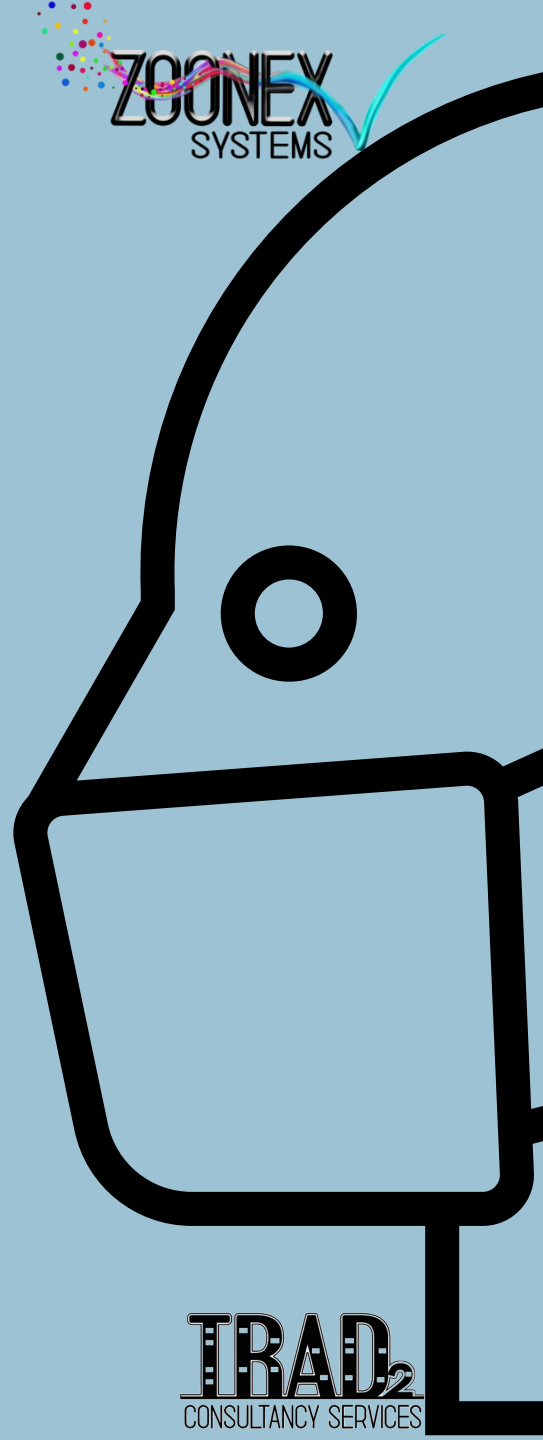
Where We Stand

- So even with the highest level of manual cleaning, surfaces are at **continual risk of contamination** and the transference of microbes to multiply and grow.

Where We Stand

Mechanical ventilation systems, as an unseen area in all working environments, can provide ideal conditions for microbial growth, bringing already compromised, unclean air into public spaces, wards, patient triage and treatment rooms.





What We Do

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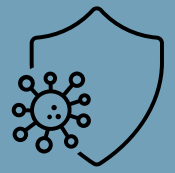
Our Aims

Improve infection prevention and control within healthcare settings

Help to reduce Healthcare Associated Infections (HCAI's)



Form part of the alignment of practice, education, monitoring, quality improvement, and scrutiny of Infection Prevention and Control

Improve the well-being and outcomes of all hospital stakeholders through simple, effective, antimicrobial treatment systems throughout its buildings/ assets.

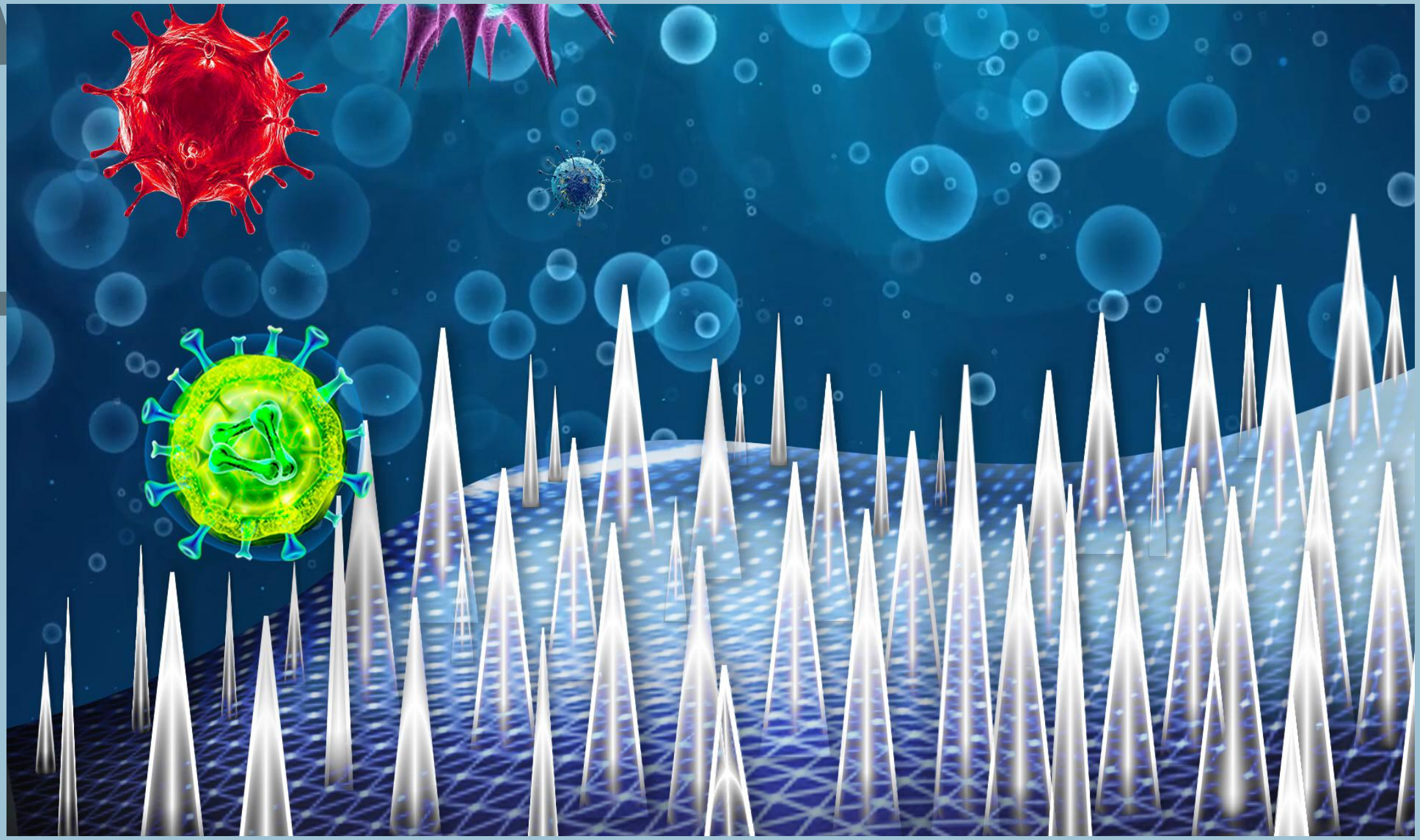
Mechanism of Distribution and Action:

ZoonEx uses ultrasonic dispersal to move an antimicrobial liquid into the ductwork of air conditioning systems engaging the existing systems air intake path as the mode of transport.

The ultrasonic dispersal changes the liquid to a state of less than 100 microns in size. As it moves through the system it comes into contact with the interior of the ductwork, where the molecules adhere, thus forming a covalent bond with the surface.

As it dries it forms into a bed of miniature spikes, all of which contain a nitrogen molecule. The nitrogen positively charges the spike. Most germs are negatively charged, so like strong magnets, pathogens are attracted to any surfaces that are treated.

Mechanism of Distribution and Action:



Mechanism of Distribution and Action:

ZOONEX SYSTEMS

BONDS TO THE SURFACE OF THE DUCTWORK

The liquid leaves a mono molecular layer that binds to the surface of the ductwork

WORKS WHEN DRY

The liquid is an active sanitiser; it provides an initial kill and then continues working when dry for extended periods.

PIERCES PATHOGENS

The bonded molecules resemble antibacterial pins that pierce pathogens, causing cell degradation and death.

KILLS GERMS MECHANICALLY

The liquid remains on the surface mechanically destroying pathogens via lysis.

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Zoono Z-71 Microbe Shield and **Zoono GermFree24 Hand Sanitiser** have both been tested successfully against Vaccinia- often referred to as the 'mothership' of enveloped viruses, and frequently used as a surrogate for testing against other enveloped viruses.

As such, the following viruses are effectively inactivated

Effective Against

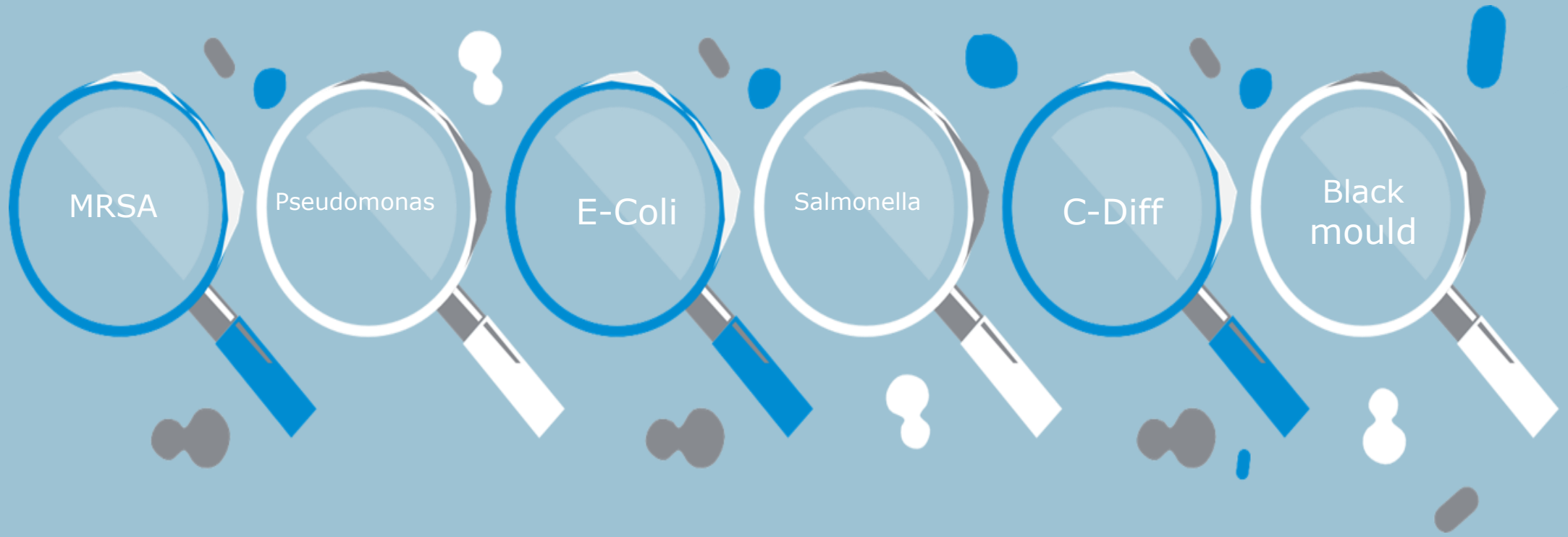
- All component parts of the system are CE marked and readily available.
- The system has passed the EN17272(UK Standard) for mechanical disinfection.

- Viruses causing travel-associated or vector borne infections: bunya virus (sandfly fever virus), dengue virus, ebola virus, tick-borne encephalitis, Hantaan virus, crimean-congo haemorrhagic fever virus, Lassa virus, Marburg virus, rabies virus, West nile virus, Yellow fever virus, Zika virus

The European tiered approach for virucidal efficacy testing – rationale for rapidly selecting disinfectants against emerging and re-emerging viral diseases. Euro Surveill. 2021;26(3):pii=2000708. https://doi.org/10.2807/1560-7917.ES.2021.26.3.2000708

Zoono products are also effective against the following pathogens*:

Effective Against



*Full list available upon request

Real Life Test- Proof of Concept

Area

-A&E waiting area

This will enable real-world data collection for both pre- and post-treatment regimens.

The Proposed Test

-Split A&E into 3 areas:

Area 1- Standard cleaning
Area 2- Enhanced cleaning
Area 3- Zoonex treatment

Sample Collection

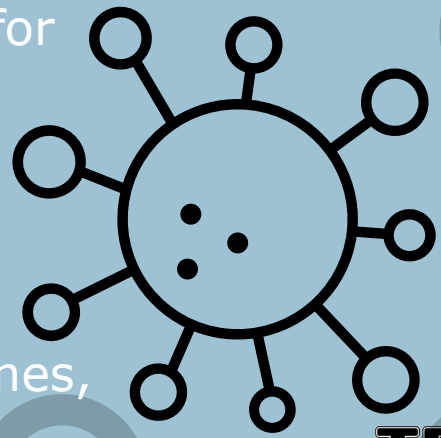
-Minimum 4 samples to be taken by each stakeholder with Zoonex using ATP sampling methodology (rapid detection of microbial contamination in minutes by quantifying ATP from viable cells)

Time Frame

-Testing pre-treatment
-Immediate, 12 hours, 24 hours, and 294 hours (7days)

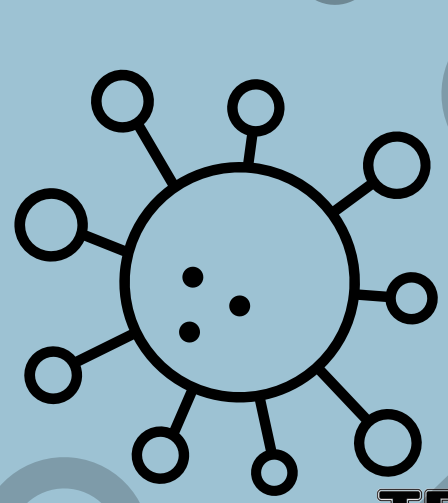
To Conclude

- HAIs continue to be a global burden, causing long-lasting negative effects on people, families, communities, healthcare providers, and global health.
- There are infection prevention and control measures in place across the world, but they are imperfect and require improvement in the long-term effectiveness, with continuity and reliability of services.
- We want to reduce adverse outcomes for patients, and the costs associated with managing them both for the person, and for the system providing the care
- We can make integrated, meaningful and long-term improvements in the existing infection prevention and control programmes, without impeding on existing protocols



References

- A full list of references can be made in excess of what is included on the slides
- Many of the references are from ‘Global report on infection prevention and control 2024’ conducted by the WHO, which analysed infection prevention and control measures globally, and is widely accessible
- We have quantitative evaluation data performed in labs on the efficacy of Zoono products in the medical area to support our claims



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