# The case for investment and action in infection prevention and control



World Health Organization

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# Key messages

- Infections acquired in health care settings, including those antimicrobial resistant, cause tremendous suffering to patients, families and health workers and pose a high burden on health systems *(1)*.
- Most of these infections are preventable with appropriate infection prevention and control (IPC) programmes and practices and basic water, sanitation and hygiene (WASH) services. Improving IPC and WASH saves lives and yields high economic gains *(2)*.
- At the 77th World Health Assembly, all countries adopted the WHO global action plan and monitoring framework 2024–2030 *(3)*.
- This document provides the evidence on the expected return in investment in and guidance for implementing and monitoring the WHO global action plan on IPC at the country level *(3)*.
- Improving IPC and WASH through the fulfilment of at least the WHO minimum requirements for IPC *(4)* should be an urgent priority for all countries in order to provide minimum protection and safety to patients, health workers, as well as families and visitors to facilities, and achieve targets for health care-associated infections' (HAIs) and AMR reduction *(3, 5)*.
- Action and investment in IPC and WASH by international key players, donors and non-governmental organizations, can make a huge difference both at the global level and in support to countries and facilities, in particular where resources and expertise are limited. WHO is in the position of leading and coordinating these efforts and will strongly support country efforts directly.



Doctors and nurses during a trachoma operation at a hospital in Kakuma, Kenya. © WHO / NOOR / Sebastian Liste

# 1. The harm and burden caused by infections acquired in health care

Every year, around the world hundreds of millions of patients and health workers are harmed by preventable infections acquired during health care delivery, including those resistant to antimicrobials. - Family members and visitors to health care facilities can also be affected. These infections, known as HAIs, can be acquired during health care delivery at any point in time and spread through outbreaks in health care settings *(1)*.

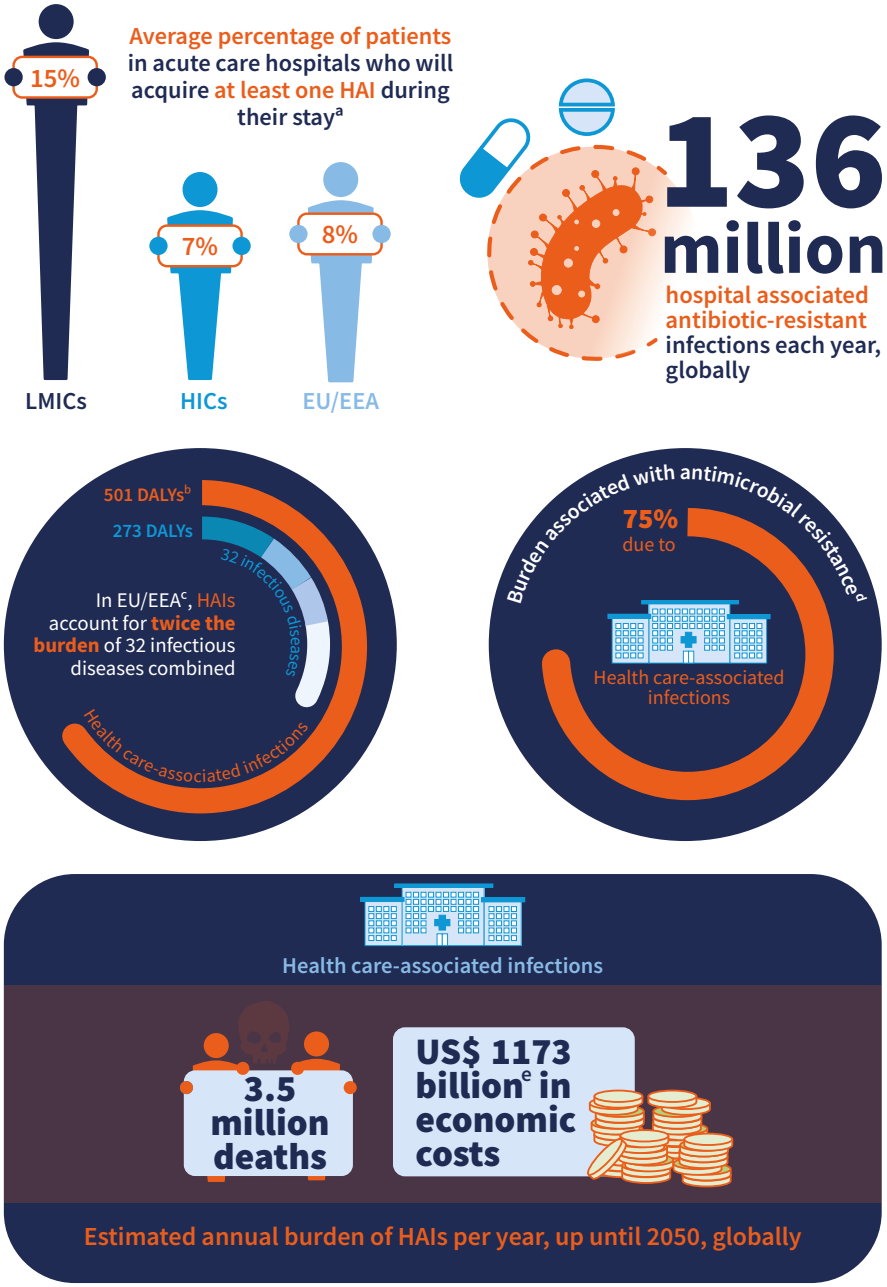
HAIs cause preventable suffering, prolong the duration of hospital stay, cause complications such as sepsis and other conditions which can lead to disabilities and premature death, and force health workers to stay off work *(1)*.

HAIs also pose a high organizational and economic burden for health systems *(2)*.

According to a key review published in 2005, low- and middle-income countries (LMICs) have an HAI frequency that can be two to 20 times higher than in high-income countries (HICs) and bear a heavier mortality burden due to HAIs than HICs *(1)*.

Fig. 1 provides an overview of relevant data on the harm and burden caused by infections and AMR acquired in health care. A comprehensive review and further details on this issue are presented in the 2024 WHO global report on IPC *(1)*.

## Fig. 1. The harm and burden caused by infections acquired in health care




*Abbreviations*: DALYs, disability-adjusted life years; EU/EEA, European Union/European Economic Area; HAIs, health care-associated infections; HICs, high-income countries; LMICs, low- and middle-income countries

[a] Global estimates based on key review and WHO report published in 2011; EU/EEA estimates based on 2012–2023 data from the European Centre for Disease Prevention and Control point prevalence survey.

[b] One DALY represents the loss of the equivalent of one year of full health. DALYs for a disease or health condition are the sum of the years of life lost due to premature mortality (YLLs) and the years lived with a disability (YLDs) due to prevalent cases of the disease or health condition in a population.

[c] Based on 2011–2012 data from the European Centre for Disease Prevention and Control point prevalence survey.

[d] Based on 2015 data from the European Antimicrobial Resistance Surveillance Network (EARS-Net).

[e] Adjusted for purchasing power parity.

Sources: *(1, 6-11)*; WHO/OECD, unpublished data (for these calculations a modified version of the OECD Strategic Public Health Planning for infectious diseases model was used. Based on: OECD; 2023 (http://oecdpublichealthexplorer.org/amr-doc/)).



# 2. IPC as an effective solution

## Reasons for investing in IPC

1. **IPC ensures patient and health workers' safety and quality of care**
2. **IPC directly improves health outcomes and saves lives**
3. **IPC reduces health care costs and generates economic gains**

## 1 IPC ensures patient and health workers' safety and quality of care

IPC is a practical, evidence-based set of measures which prevents patients, health workers, and visitors to health care facilities from being harmed by avoidable HAIs.

Examples of key IPC measures are hand hygiene, standard precautions, personal protective equipment, environmental hygiene, disinfection and sterilization, injection safety, aseptic practices for handling invasive devices. To enable IPC practices, it is crucial to ensure that adequate infrastructure (such as ventilation systems); WASH; and waste management services are in place and considered a core component of IPC programmes.

IPC occupies a unique position in the field of patient and health workers' safety, as it is universally relevant to every health worker and patient, at every health care interaction. Therefore, it significantly contributes to achieving high-quality care for all.

## 2 IPC directly improves health outcomes and saves lives

It is proven that a large proportion of HAIs, including those caused by antimicrobial-resistant and epidemic-prone pathogens, can be prevented with improved IPC practices and basic WASH services *(12-14)* (Fig. 2.1).

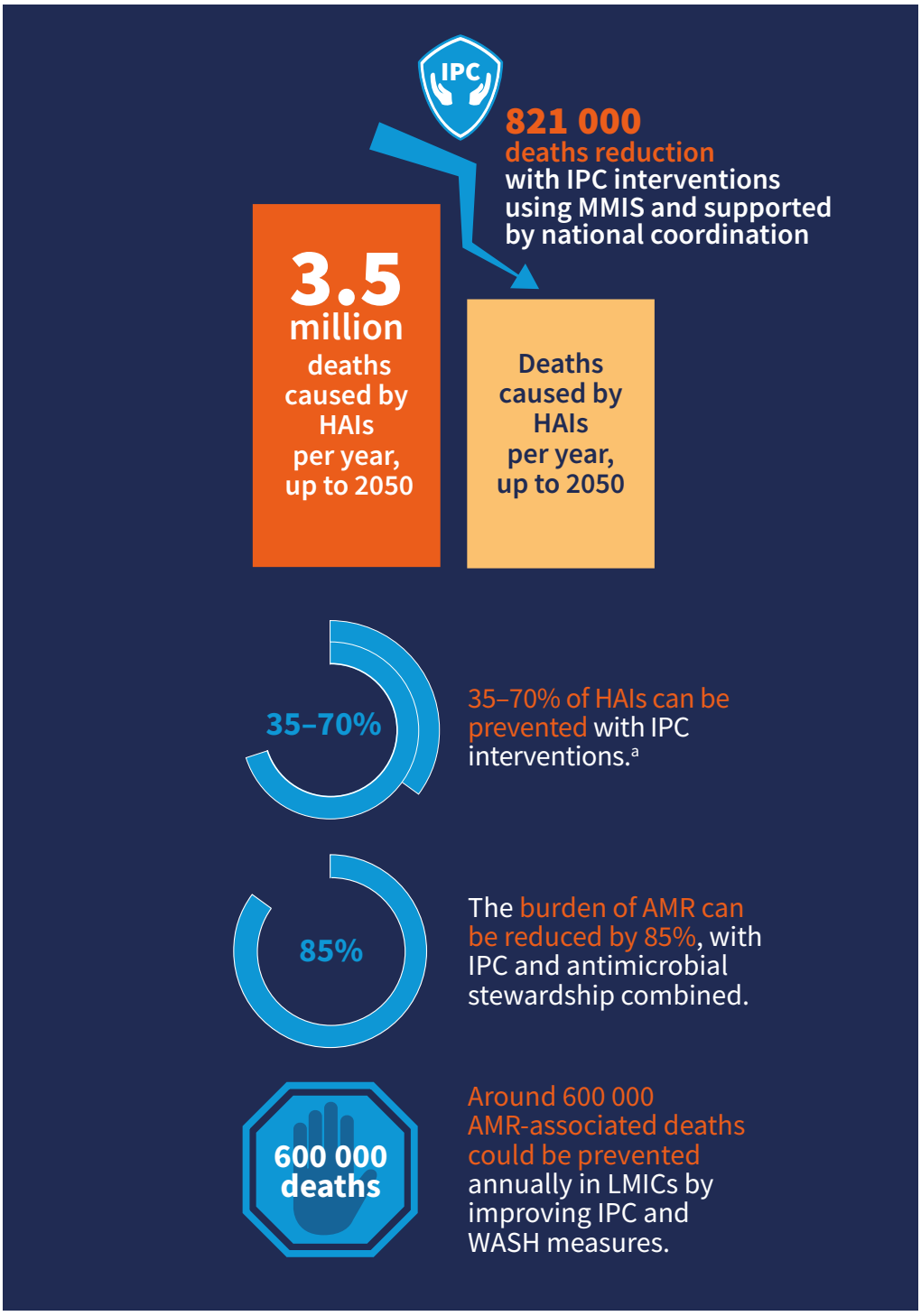
The most effective approach to reduce specific HAIs at the point of care, is to use multimodal improvement strategies (MMIS)[1]; success is usually higher when the intervention is supported by a national or subnational coordination mechanism (by the Ministry of Health or a specific network) *(15-17)* (see Box 1 in section 5).

IPC improves health outcomes in critical priority areas. For example, good IPC practice creates the conditions for clean and safe maternal and neonatal care, preventing maternal and neonatal sepsis and associated deaths *(18)*. It supports efforts to address priority global health challenges, such as preventing the transmission of the pathogens that cause tuberculosis and hepatitis in health care settings *(19, 20)*. It also prevents deadly antimicrobial resistant infections in fragile and immunocompromised patients such as those affected by AIDS and cancer *(20, 21)*.

Having in place specific IPC standards such as IPC nurses with dedicated time, alcohol-based handrub dispensers at point of care, single rooms, and implementing IPC MMIS correlate with lower prevalence of antibiotic-resistant bacteria in health care facilities in EU/EEA *(8)*.

[1] The WHO multimodal improvement strategy is a core component of IPC programmes and comprises the following five elements: system change; training and education; monitoring and feedback; reminders and communications; and a safety climate/culture change. In other words, the strategy involves building the right system, teaching the right things, checking the right things, selling the right messages, and ultimately "living" IPC throughout the entire health system.

## Fig. 2.1. Effects of IPC interventions in health care facilities




*Abbreviations*: AMR, antimicrobial resistance; HAI, health care-associated infection; IPC, infection prevention and control; LMICs, low- and middle-income countries; MMIS, multimodal improvement strategies; WASH, water, sanitation and hygiene

[a]Based on systematic reviews including studies conducted from 2005–2016.

Sources: *(12-14, 22)*; WHO/OECD, unpublished data (for these calculations a modified version of the OECD Strategic Public Health Planning for infectious diseases model was used. Based on: OECD; 2023 (http://oecdpublichealthexplorer.org/amr-doc/)).

3

## IPC reduces health care costs and generates economic gains

Landmark institutional reports by OECD, World Bank and WHO demonstrated the potential high societal return on investment from appropriate IPC implementation and enforcement (Fig. 2.2). In particular, according to the OECD analysis of 34 OECD and EU/EEA countries, enhancing environmental hygiene and hand hygiene in health care facilities generates the highest health and economic gains among 11 policy interventions against AMR *(2)*. Productivity gains are likely to be made in all settings, and health service cost savings are substantial in high and upper-middle income countries.

Scientific evidence has demonstrated cost-effectiveness for hand hygiene, environmental hygiene, multimodal strategies to implement IPC interventions, including screening of high-risk individuals for colonization with resistant bacteria and using local treatments for eliminating them. However, there is scarcity of evidence from lower middle- and low-income countries *(23)*.

Economic evaluation of interventions to prevent the spread of specific high-impact diseases such as tuberculosis, in health care facilities also showed high cost-effectiveness, with a low implementation investment *(24)*.

Rapidly increasing access to personal protective equipment, combined with IPC training and education, during the first six months of the COVID-19 pandemic, would have led to a significant reduction of infections among health workers and the associated costs for treatments and loss of productivity *(25)*.

According to the World Bank, investing in infection prevention worldwide would require only a fraction of the costs considered necessary to minimize and contain AMR (Fig. 2.2). The cost of inaction would be dramatic, leading to losses 30 times the amount considered in the (annual) investment to contain AMR *(26)*.

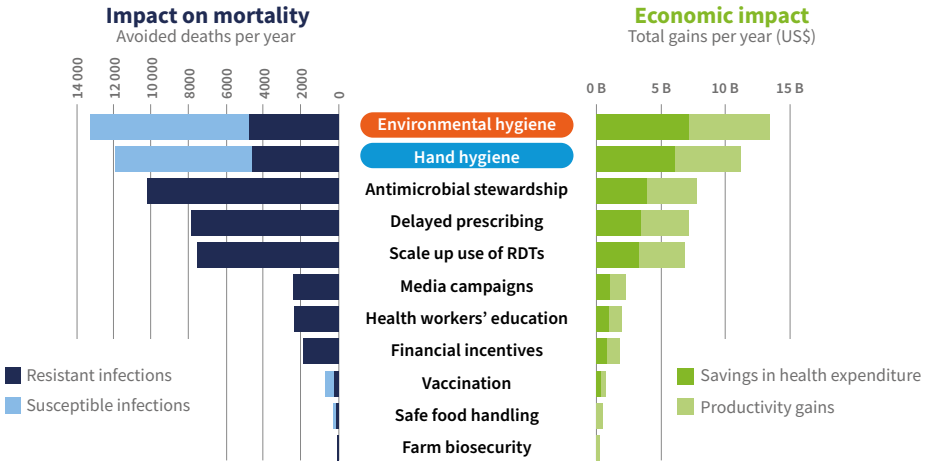
### Fig. 2.2. IPC return on investment – part 1

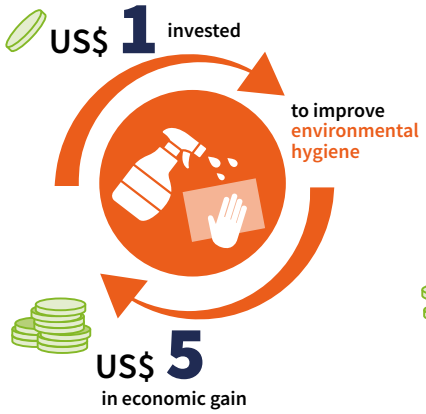


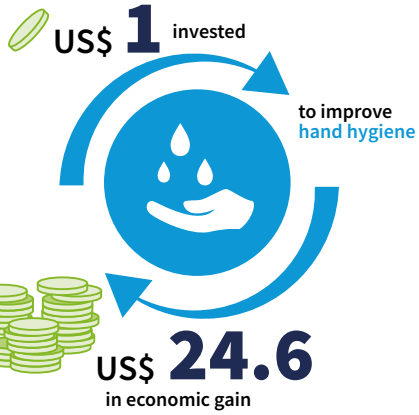

*Abbreviations*: AMR, antimicrobial resistance; IPC, infection prevention and control.
Source: *(25)*.

## Fig. 2.2. IPC return on investment – part 2[a]

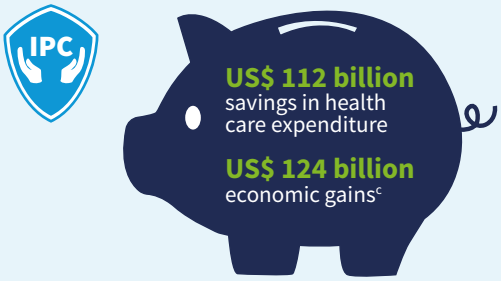
**Within a package of 11 "One Health" interventions, hand hygiene and environmental hygiene in health care facilities are the most effective and cost-saving investment to reduce AMR, based on model for 34 OECD members and EU/EEA countries[b].**




**Globally, IPC interventions implementation in health care facilities, using MMIS and national coordination mechanisms could yield annually:**




*Abbreviations*: EU/EEA, European Union/European Economic Area; IPC, infection prevention and control; MMIS, multimodal improvement strategies; OECD, Organisation for Economic Co-operation and Development; RDTs, rapid diagnostic tests.

[a] In all instances "US$" is mentioned, it refers to 2020 United States dollar, adjusted for purchasing power parity.

[b] Estimates for the return on investment are the result of the total annual savings in healthcare expenditure and productivity gains in the 34 countries produced by the policy divided by the total cost of implementing the policy between 2023 and 2050.

[c] Due to greater participation in the workforce and enhanced economic productivity.

Sources: *(2)*; WHO/OECD, unpublished data (for these calculations a modified version of the OECD Strategic Public Health Planning for infectious diseases model was used. Based on: OECD; 2023 (http://oecdpublichealthexplorer.org/amr-doc/)).

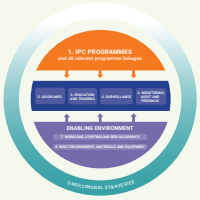



A nurse is washing her hands before surgery in a hospital in Moscow, Russia. © WHO / Sergey Volkov

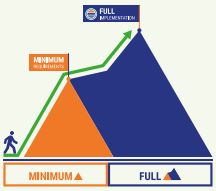
# 3. WHO's leading role in the field of IPC

In the last decade, WHO has taken a leading role in providing strategic and technical guidance, developing standards and practical tools, monitoring implementation of IPC programmes, supporting countries, and coordinating international action in the field of IPC, including WASH (Fig. 3.1). A number of international partners have exceptionally contributed to these efforts and have taken powerful action *(27)*.

## Fig. 3.1. Milestones of this work in support to country efforts



**Core components for IPC programmes:** evidence- and expert consensus-based guidelines for developing effective IPC programmes, including six core components recommended at the national and facility levels and two additional core components specific to the facility level, including WASH *(28)*.



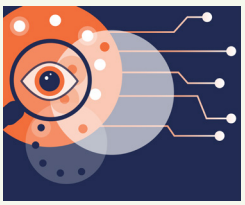

**Minimum requirements for IPC programmes:** standards that should be in place in all countries and all health care facilities, based on the IPC core components *(4)*.



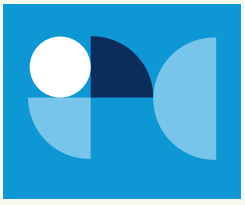
**WASH FIT:** a risk-based, quality improvement tool for health care facilities, covering standards and indicators of WASH and health care waste management services, and selected aspects of energy, building and facility management *(29)*.




**Framework and toolkit for IPC in outbreak preparedness, readiness and response:** a practical framework of actions and a toolkit to assist in the development of local contingency or action plans for strengthening IPC outbreak preparation, readiness and response at the national and facility level *(30, 31)*.



**Surveillance of HAI:** comprehensive guidance to design and implement effective surveillance systems to measure the burden of HAI and take action for its prevention. It also includes WHO HAI surveillance case definitions for use in low-resource settings *(32)*.



**WHO Global IPC Portal:** a WHO resource that supports countries to make situation analysis, track progress and make improvements to IPC programmes and/or activities at the national and facility levels, in accordance with WHO standards and associated implementation materials *(33)*.



Portrait of a family nurse at a district primary health care centre in Rudaki, Tajikistan. © WHO / Lindsay Mackenzie

# 4. Actions we can take in countries and health care facilities

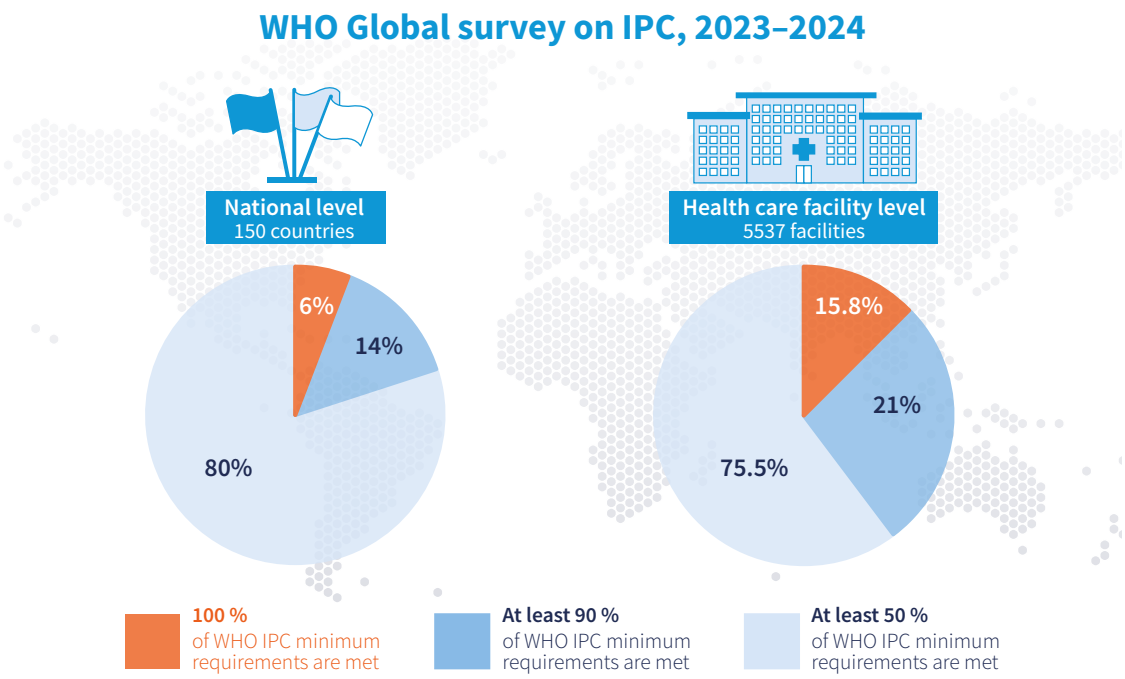
## Why action is urgent

Many countries implemented the WHO and other recommendations and implementation approaches *(1, 34, 35),* showing that nations which treat IPC and WASH as critical health priorities, can make progress and protect their patients and health workforce, while saving money.

However, many gaps and challenges still exist in IPC implementation *(1)*.

In 2023, 9% of countries did not have an IPC programme or plan yet, and only 39% of countries had IPC programmes fully implemented nationwide, with some of them being monitored for their effectiveness *(36)*. Fewer than one half (44%) of countries had a dedicated IPC budget for implementing the national programme and plan *(1)*. Furthermore, as of 2024, only 6% of countries met all the WHO minimum requirements for IPC programmes at the national level and in a sample of 5537 health care facilities from 92 countries, 15.8% met all WHO IPC minimum requirements *(1)* (Fig. 4.1). A comprehensive situation analysis of IPC at the national and health care facility level as well as by region and income level is available in 2024 WHO global report on IPC *(1)*.

## Fig. 4.1. Percentage of the WHO minimum requirements for IPC, met at the national and facility level, worldwide



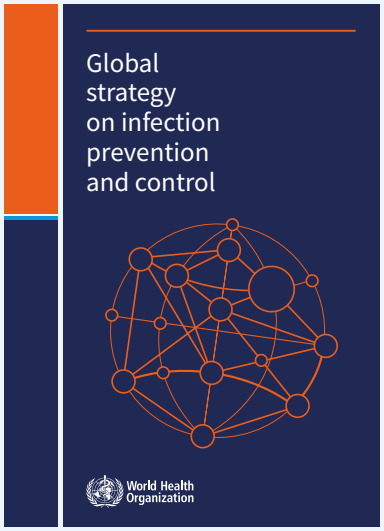

*Abbreviations*: IPC, infection prevention and control; WHO, World Health Organization.
Source: *(1)*.

The documented harm caused to patients and health workers by weak or inappropriate IPC policies and practices calls for urgent and sustained action. It is essential that health workers have the services and equipment to safely carry out the best IPC practices. This includes appropriate WASH and waste services, as a fundamental part of the so called "built environment" (core component 8) *(28)*.

In 2022, two out of five (43%) health care facilities worldwide lacked hand hygiene services at the point of care or in toilets, covering 3.4 billion people in need of using them *(37)*.

# Actionable strategies and plans

Building upon the lessons learned from the COVID-19 pandemic and other outbreaks and higher awareness about HAIs and AMR, WHO, international partners and Member States have recently accelerated efforts to highlight the importance of IPC in the global and national health agenda and committed to stronger action.




Member States proposed and adopted a **resolution on IPC** at the 75th World Health Assembly *(38)* in 2022, aimed at strengthening IPC programmes across the health system at the national, subnational and/or facility levels, and requesting the development of a global strategy, action plan and monitoring framework on IPC.

One year later, the first ever **WHO global strategy** *(39)* was approved by all Member States, and served as the backbone of the **2024–2030 WHO global action plan and monitoring framework** *(3)* which was adopted by all countries at the 77th World Health Assembly *(40)* in May 2024.

The WHO global strategy *(39)* on IPC indicates **eight strategic directions** as being critical to achieve improvement in IPC (Fig. 4.2). The global action plan and monitoring framework on IPC describe actions, indicators and targets to achieve effective implementation of each of these strategic directions and track and report progress between 2024 and 2030, at the global, national, sub-national and facility level *(3)*.

# IPC integration and coordination

Among all strategic directions, IPC integration and coordination is paramount for the success of IPC programmes. While IPC is a specialized area of work that requires specific expertise and dedicated human and financial resources, it is a cross-cutting area that contributes substantially to the achievement of other programmes' objectives and it benefits from active synergies with them.

Therefore, the collaboration, alignment and mutual support with other programmes[2] are critical to avoid duplications and amplify achievements. For example, the WHO/UNICEF Global Framework for Action on Universal WASH, Waste and Electricity Services in all Health Care Facilities to Achieve Quality Care 2024–2030 *(41)*, aligns directly with the IPC global action plan and can accelerate IPC efforts.

[2] Including – but not limited to – AMR, quality of care, patient safety, WASH, occupational health and health emergencies, as well as HIV, TB, hepatitis, maternal/child health and surgical care, and other programmes.

## Fig. 4.2. Strategic directions as the overall guiding framework of the WHO global strategy on IPC




*Abbreviations*: IPC, infection prevention and control.
Source: *(39)*.



Committee A meeting for the fourteenth time during the seventy-seventh World Health Assembly in Geneva, Switzerland. © WHO / Pierre Albouy

# 5. What we can achieve between now and 2030

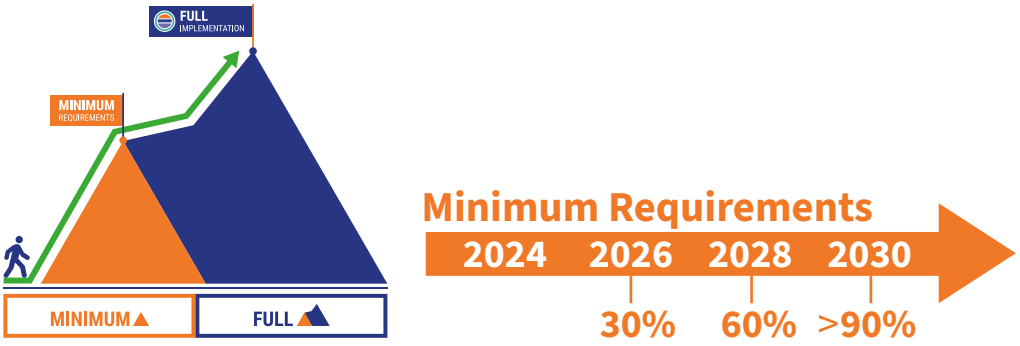
The WHO global strategy *(39)* and action plan on IPC *(3)* are driven by an inspirational and ambitious vision:

> By 2030, everyone accessing or providing health care is safe from associated infections.

The WHO 2024–2030 global action plan and monitoring framework outline clear pathways to achieve and demonstrate this vision *(3)*.

Member States agreed upon a number of indicators to be monitored to track progress towards attaining core targets by 2030 (Fig. 5.1 and Table 5.1).

**Fig. 5.1. WHO GAP/MF core target as proportion of countries meeting all WHO IPC minimum requirements for IPC programmes at the national level**




*Abbreviations*: GAP/MF, global action plan and monitoring framework; IPC, infection prevention and control.
Source: *(3, 4)*.

Within the WHO monitoring framework *(3)*, eight core targets have been prioritized to be achieved at the national level and four at the facility level (Table 5.1).

These targets can mostly be monitored using existing monitoring systems and the WHO global report 2024 provides baseline data for most of them *(1)*.

**Table 5.1.** Core targets of the IPC MF at the global and national level.

| |
|---|
| **Eight core targets at global[a] level** |
| **1.** Increase of proportion of countries with a costed and approved national action plan and monitoring framework on IPC (> 80% by 2030) |
| **2.** Increase of proportion of countries with legislation /regulation to address IPC (> 80% by 2030) |
| **3.** Increase of proportion of countries having an identified protected and dedicated budget allocated to the national IPC programme and action plan (> 90% by 2030) |
| **4.** Increase of proportion of countries meeting all WHO IPC Minimum Requirements for IPC programmes at national level (through WHO IPC portal) (> 90% by 2030) |
| **5.** Increase of proportion of countries with national IPC programmes at Level 4 or 5 per SPAR 9.1 and Level D and E in TrACSS (> 90% by 2030) |
| **6.** Increase of the proportion of countries with basic water (1), sanitation (2), hygiene (3), and waste services (4) in all health care facilities (100% by 2030) |
| **7.** Increase of proportion of countries that have achieved their national targets on reducing HAIs (> 80% by 2030) |
| **8.** Increase of proportion of countries with a national HAI surveillance system (> 90% by 2030) |
| **Four core targets at national[b] level** |
| **1.** Increase of proportion of facilities meeting all WHO IPC Minimum Requirements for IPC programmes (> 90% by 2030) |
| **2.** Increase in the proportion of facilities with a dedicated and sufficient funding for WASH services and activities (100% by 2030) |
| **3.** Increase of proportion of facilities providing training to all frontline clinical and cleaning staff upon employment and annually and to managers upon employment (> 90% by 2030) |
| **4.** Increase of proportion of tertiary/secondary health care facilities having an HAI and related AMR surveillance system (> 80% by 2030) |

*Abbreviations*: HAI, health care-associated infections; IPC, infection prevention and control; MF, monitoring framework; TrACSS, Tracking AMR Country Self- Assessment Survey.
[a] Reflecting progress at national level.
[b] Reflecting progress at facility level.
Source: *(3)*.

Significant investments are required by all countries to achieve these targets; therefore, resource mobilization is urgently needed for countries' and stakeholders' support. However, compelling data demonstrate that a high return can derive from investments in IPC, both in terms of lives saved and economic gains.

Available data show remarkable differences in IPC capacity and progress between low- and lower-middle-income countries and the other income levels *(1)*. Therefore, the efforts to be made by these countries are greater and more urgent.

## Action by WHO

With its teams at the global, regional and country levels, WHO is at the forefront to support all countries in this endeavor and based on country gaps and demand, has prioritized capacity building on IPC in 85 countries[3] across all regions, with special focus on countries with limited resources.

- In particular, WHO is committed to support countries in the development of their national action plan on IPC, based upon the local situation analysis and in line with the WHO global action plan *(3)*.
- WHO supports implementation of actions related to capacity building in health care facilities in priority areas, such as implementation of IPC and WASH interventions using MMIS at the point of care *(15)*, IPC education and training, and HAI surveillance.
- Support also includes identification of targets for action plan monitoring and for HAI reduction, and data collection to feed into the global monitoring framework for IPC to demonstrate progress at the global, national and facility level.

Many country examples exist demonstrating excellence in advancing IPC programmes and interventions, and are described by WHO *(1, 33, 34)*. In particular, Box 5.1 illustrates successful examples of practices improvement and HAI reduction following the implementation of MMIS, that can inspire others to adopt and adapt these IPC interventions.

### Box 5.1. Country examples in implementing IPC interventions at the point of care using MMIS




National IPC initiative on reducing CLABSI in Saudi Arabia: ICU staff in participating hospital in Riyadh, celebrates the successful implementation of the initiative, after more than one year without CLABSI. © King Salman Hospital, Riyadh, Saudi Arabia.

MMIS *(15)* are the modern and smartest way to implement IPC interventions to achieve the system change, climate and behaviour that support IPC progress and, ultimately, the measurable impact that benefits patients and health workers. MMIS are usually utilized to improve specific practices (for example hand hygiene) and often include bundles (for example a bundle of measures to reduce infections associated with vascular catheters) and checklists. Several successful examples of implementing MMIS in real life are available for example to improve hand hygiene practices *(42)*, and to reduce surgical site infections *(43)*, CLABSI *(16, 17)*, and hospital-acquired pneumonia *(44, 45)*.

*Abbreviations*: CLABSI: central line-associated bloodstream infections; ICU: intensive care unit; IPC, infection prevention and control; MMIS: multimodal improvement strategies.

[3] Country distribution by region: African Region, 11 countries; Region of the Americas, 21 countries; South-east Asia Region, 11 countries; Eastern Mediterranean Region, 12 countries; European Region, 22 countries; Western Pacific Region, 7 countries.

## Action by international/ national stakeholders and donors

Action and investment by international and non-governmental organizations, and donors as well as by higher-income and more advanced countries in the field of IPC, can make a huge difference both at the global level and for countries and facilities, in particular where resources and expertise are limited.

International/national stakeholders and donors can:

- provide strategic support for the identification of country priorities for IPC and WASH and the development of national action plans;
- provide financial and technical support to implement the IPC national action plans, with special attention to address real local needs, and avoiding duplication of efforts;
- maximize collaboration and coordination;
- contribute to data collection on IPC and HAIs and their use for action;
- support research on IPC, including on low-cost solutions.

## Conclusions

These efforts not only will benefit the people and health systems of all countries protecting them from avoidable infections but will also strongly contribute to the achievement of the health-related Sustainable Development Goals *(46)*.

They will also contribute towards the effective implementation of other major global health priorities, including global health security and the International Health Regulations (IHR) *(47)*, AMR action plans and targets *(48)*, patient and health worker safety *(49, 50)*, and quality health services delivery *(51)*. Furthermore, the overarching focus on quality essential health services as part of a primary health care-driven approach to universal health coverage is well-served by having strong IPC implementation at all levels of the health service.

# References


1. Global report on infection prevention and control 2024. Geneva: World Health Organization; 2024 (https://iris.who.int/handle/10665/379632).
2. Embracing a One Health framework to fight antimicrobial resistance. Paris: Organisation for Economic Co-operation and Development; 2023 (https://doi.org/10.1787/ce44c755-en).
3. Global action plan and monitoring framework on infection prevention and control (IPC), 2024–2030. Geneva: World Health Organization; 2024 (https://www.who.int/teams/integrated-health-services/infection-prevention-control/draft-global-action-plan-and-monitoring-framework-on-ipc).
4. Minimum requirements for infection prevention and control programmes. Geneva: World Health Organization; 2019 (https://iris.who.int/handle/10665/330080).
5. Declaration A(79)L5. Political declaration of the high-level meeting on antimicrobial resistance. Seventy-ninth United Nations General Assembly, September 2024. New York: United Nations; 2024 (https://documents.un.org/doc/undoc/ltd/n24/278/35/pdf/n2427835.pdf).
6. Allegranzi B, Bagheri Nejad S, Combescure C, Graafmans W, Attar H, Donaldson L, Pittet D. Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. Lancet. 2011;377:228-41. doi: 10.1016/s0140-6736(10)61458-4.
7. Report on the burden of endemic health care-associated infection worldwide. Geneva: World Health Organization; 2011 (https://apps.who.int/iris/handle/10665/80135).
8. Point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care hospitals. Stockholm: European Centre for Disease Prevention and Control; 2024 (https://www.ecdc.europa.eu/en/publications-data/PPS-HAI-AMR-acute-care-europe-2022-2023).
9. Balasubramanian R, Van Boeckel TP, Carmeli Y, Cosgrove S, Laxminarayan R. Global incidence in hospital-associated infections resistant to antibiotics: An analysis of point prevalence surveys from 99 countries. PLoS Med. 2023;20:e1004178. doi: 10.1371/journal.pmed.1004178.
10. Cassini A, Plachouras D, Eckmanns T, Abu Sin M, Blank HP, Ducomble T et al. Burden of six healthcare-associated Infections on European Population Health: Estimating Incidence-Based Disability-Adjusted Life Years through a population prevalence-based modelling study. PLoS Med. 2016;13:e1002150. doi: 10.1371/journal.pmed.1002150.
11. Cassini A, Högberg LD, Plachouras D, Quattrocchi A, Hoxha A, Simonsen GS et al. Attributable deaths and disability-adjusted life-years caused by infections with antibiotic-resistant bacteria in the EU and the European Economic Area in 2015: a population-level modelling analysis. Lancet Infect Dis. 2019;19:56-66. doi: 10.1016/s1473-3099(18)30605-4.
12. Lewnard JA, Charani E, Gleason A, Hsu LY, Khan WA, Karkey A et al. Burden of bacterial antimicrobial resistance in low-income and middle-income countries avertible by existing interventions: an evidence review and modelling analysis. Lancet. 2024;403:2439-54. doi: 10.1016/s0140-6736(24)00862-6.
13. Schreiber PW, Sax H, Wolfensberger A, Clack L, Kuster SP. The preventable proportion of healthcare-associated infections 2005-2016: Systematic review and meta-analysis. Infect Control Hosp Epidemiol. 2018;39:1277-95. doi: 10.1017/ice.2018.183.
14. Umscheid CA, Mitchell MD, Doshi JA, Agarwal R, Williams K, Brennan PJ. Estimating the proportion of healthcare-associated infections that are reasonably preventable and the related mortality and costs. Infect Control Hosp Epidemiol. 2011;32:101-14. doi: 10.1086/657912.
15. WHO multimodal improvement strategy. Geneva: World Health Organization; 2021 (https://cdn.who.int/media/docs/default-source/integrated-health-services-(ihs)/infection-prevention-and-control/core-components/ipc-cc-mis.pdf?sfvrsn=5e06c3d5_10&download=true).
16. van der Kooi T, Sax H, Pittet D, van Dissel J, van Benthem B, Walder B et al. Prevention of hospital infections by intervention and training (PROHIBIT): results of a pan-European cluster-randomized

multicentre study to reduce central venous catheter-related bloodstream infections. Intensive Care Med. 2018;44:48-60. doi: 10.1007/s00134-017-5007-6.

17. Infection, prevention and control excellence in the Kingdom of Saudi Arabia: reducing central line-associated bloodstream infections. Country stories. Geneva: World Health Organization; 2024 (https://www.who.int/news-room/feature-stories/detail/infection--prevention-and-control-excellence-in-the-kingdom-of-saudi-arabia--reducing-central-line-associated-bloodstream-infections).
18. Global report on the epidemiology and burden of sepsis: current evidence, identifying gaps and future directions. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/handle/10665/334216).
19. WHO guidelines on tuberculosis infection prevention and control: 2019 update. Geneva: World Health Organization; 2019 (https://iris.who.int/handle/10665/311259)
20. Consolidated guidelines on HIV, viral hepatitis and STI prevention, diagnosis, treatment and care for key populations. Geneva: World Health Organization; 2022 (https://iris.who.int/handle/10665/360601).
21. Preventing Infections in Cancer Patients [website]. United States Centers for Disease Control and Prevention; 2024 (https://www.cdc.gov/cancer-preventing-infections/index.html)
22. Antimicrobial resistance. Tackling the burden in the European Union. Paris: Organisation for Economic Co-operation and Development; 2019 (https://www.oecd.org/en/publications/antimicrobial-resistance-tackling-the-burden-in-the-european-union_33cbfc1c-en.html).
23. Rice S, Carr K, Sobiesuo P, Shabaninejad H, Orozco-Leal G, Kontogiannis V, et al. Economic evaluations of interventions to prevent and control health-care-associated infections: a systematic review. Lancet Infect Dis. 2023;23:E228-E39. doi: 10.1016/S1473-3099(22)00877-5.
24. Bozzani FM, McCreesh N, Diaconu K, Govender I, White RG, Kielmann K, et al. Cost-effectiveness of tuberculosis infection prevention and control interventions in South African clinics: a model-based economic evaluation informed by complexity science methods. BMJ Glob Health. 2023;8(2). doi: 10.1136/bmjgh-2022-010306.
25. Özçelik E, Lerouge A, Cecchini M, Cassini A, Allegranzi B. Estimating the return on investment of selected infection prevention and control interventions in healthcare settings for preparing against novel respiratory viruses: modelling the experience from SARS-CoV-2 among health workers. EClinicalMedicine. 2024;68:102388. doi: 10.1016/j.eclinm.2023.102388.
26. Jonas OB, Irwin A, Berthe FCJ, Le Gall FG, Marquez PV. Drug-resistant infections: a threat to our economic future (Vol. 2): final report. Washington, DC: World Bank Group; 2017 (http://documents.worldbank.org/curated/en/323311493396993758/final-report).
27. Global infection prevention and control network [website]. Geneva: World Health Organization; 2024 (https://www.who.int/groups/global-infection-prevention-and-control-network/about-us).
28. Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/handle/10665/251730).
29. Water and Sanitation for Health Facility Improvement Tool (WASH FIT): a practical guide for improving quality of care through water, sanitation and hygiene in health care facilities, second edition. Geneva: World Health Organization; 2022 (https://www.who.int/publications/i/item/9789240043237).
30. Framework and toolkit for infection prevention and control in outbreak preparedness, readiness and response at the health care facility level. Geneva: World Health Organization; 2022 (https://apps.who.int/iris/handle/10665/361522).
31. Framework and toolkit for infection prevention and control in outbreak preparedness, readiness and response at the national level. Geneva: World Health Organization; 2021 (https://iris.who.int/handle/10665/345251).
32. Surveillance of health care-associated infections at national and facility levels: practical handbook. Geneva: World Health Organization; 2024 (https://iris.who.int/handle/10665/379248).
33. WHO global IPC portal. Geneva: World Health Organization; 2024 (https://ipcportal.who.int).
34. Global report on infection prevention and control. Geneva: World Health Organization; 2022 (https://iris.who.int/handle/10665/354489).

35. Country stories on infection prevention and control. Geneva: World Health Organization; 2024 (https://www.who.int/teams/integrated-health-services/infection-prevention-control/country-stories).
36. Food and Agriculture Organization (FAO), United Nations Environment Programme (UNEP), World Health Organization (WHO), World Organisation for Animal Health (WOAH). Global Database for the Tracking Antimicrobial Resistance (AMR) Country Self-assessment Survey (TrACSS). Geneva: World Health Organization; 2024 (http://amrcountryprogress.org).
37. WASH in health care facilities 2023 data update: special focus on primary health care. Geneva: World Health Organization and UNICEF; 2024 (https://washdata.org/reports/jmp-2024-wash-hcf).
38. Resolution WHA75.13. Global strategy on infection prevention and control. In: Seventy-fifth World Health Assembly, Geneva, 22–28 May 2022. Resolutions and decisions, annexes. Geneva: World Health Organization; 2022 (https://apps.who.int/gb/ebwha/pdf_files/WHA75/A75_ACONF5-en.pdf).
39. Global strategy on infection prevention and control. Geneva: World Health Organization; 2023 (https://iris.who.int/handle/10665/354489).
40. Decision WHA77(9). Global action plan and monitoring framework on infection prevention and control. Seventy-seventh World Health Assembly, 27 May–1 June 2024. Geneva: World Health Organization; 2024 (https://apps.who.int/gb/ebwha/pdf_files/WHA77/A77_(9)-en.pdf).
41. Universal water, sanitation, hygiene, waste and electricity services in all health care facilities to achieve quality health care services: global framework for action 2024–2030. Geneva: World Health Organization and United Nations Children's Fund (UNICEF); 2024 (https://iris.who.int/handle/10665/377776).
42. Allegranzi B, Gayet-Ageron A, Damani N, Bengaly L, McLaws M-L, Moro M-L et al. Global implementation of WHO's multimodal strategy for improvement of hand hygiene: a quasi-experimental study. Lancet Infect Dis. 2013;13:843-51. doi: 10.1016/S1473-3099(13)70163-4.
43. Allegranzi B, Aiken AM, Zeynep Kubilay N, Nthumba P, Barasa J, Okumu G et al. A multimodal infection control and patient safety intervention to reduce surgical site infections in Africa: a multicentre, before-after, cohort study. Lancet Infect Dis. 2018;18:507–15. doi: 10.1016/s1473-3099(18)30107-5.
44. Wolfensberger A, Clack L, von Felten S, Faes Hesse M, Saleschus D, Meier MT, et al. Prevention of non-ventilator-associated hospital-acquired pneumonia in Switzerland: a type 2 hybrid effectiveness-implementation trial. Lancet Infect Dis. 2023 Jul;23(7):836-846. doi: 10.1016/S1473-3099(22)00812-X.
45. Landelle C, Nocquet Boyer V, Abbas M, Genevois E, Abidi N, Naimo S, et al. Impact of a multifaceted prevention program on ventilator-associated pneumonia including selective oropharyngeal decontamination. Intensive Care Med. 2018 Nov;44(11):1777-1786. doi: 10.1007/s00134-018-5227-4.
46. Transforming our World: The 2030 Agenda for Sustainable Development [website]. New York: United Nations; 2015 (https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981).
47. International Health Regulations (2005) – Third edition. Geneva: World Health Organization; 2005 (https://iris.who.int/handle/10665/246107).
48. Political Declaration of the High-Level Meeting on Antimicrobial Resistance. United Nations General Assembly (A/RES/79/2); 2024 (https://documents.un.org/doc/undoc/gen/n24/292/73/pdf/n2429273.pdf).
49. Global patient safety action plan 2021-2030. Geneva: World Health Organization; 2021 (https://iris.who.int/handle/10665/343477).
50. Occupational safety and health in public health emergencies: a manual for protecting health workers and responders. Geneva: World Health Organization and International Labour Organization; 2018 (https://iris.who.int/handle/10665/275385).
51. Delivering quality health services: a global imperative for universal health coverage. Geneva: World Health Organization; 2019 (https://iris.who.int/handle/10665/272465).

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