

Health care-associated infections FACT SHEET

Key facts

- Health care-associated infections, or infections acquired in health-care settings are the most frequent adverse event in health-care delivery worldwide.
- Hundreds of millions of patients are affected by health care-associated infections worldwide each year, leading to significant mortality and financial losses for health systems.
- Of every 100 hospitalized patients at any given time, 7 in developed and 10 in developing countries will acquire at least one health care-associated infection.
- The endemic burden of health care-associated infection is also significantly higher in low- and middle-income than in high-income countries, in particular in patients admitted to intensive care units and in neonates.
- While urinary tract infection is the most frequent health care-associated infection in high-income countries, surgical site infection is the leading infection in settings with limited resources, affecting up to one-third of operated patients; this is up to nine times higher than in developed countries.
- In high-income countries, approximately 30% of patients in intensive care units (ICU) are affected by at least one health care-associated infection.
- In low- and middle-income countries the frequency of ICU-acquired infection is at least 2–3 fold higher than in high-income countries; device-associated infection densities are up to 13 times higher than in the USA.
- Newborns are at higher risk of acquiring health care-associated infection in developing countries, with infection rates three to 20 times higher than in high-income countries.

What are health care-associated infections?

Health care-associated infections, or “nosocomial” and “hospital” infections, affect patients in a hospital or other health-care facility, and are not present or incubating at the time of admission. They also include infections acquired by patients in the hospital or facility but appearing after discharge, and occupational infections among staff.

Most countries lack surveillance systems for health care-associated infections. Those that do have systems often struggle with the complexity and lack of standardized criteria for diagnosing the infections. While this makes it difficult to gather reliable global information on health care-associated infections, results from studies clearly indicate that each year, hundreds of millions of patients are affected by health care-associated infections around the world.

Health care-associated infections only usually receive public attention when there are epidemics. Although often hidden from public attention, the very real endemic, on-going problem is one that no institution or country can claim to have solved, despite many efforts.

Health care-associated infections in high-income countries



At any given time, the prevalence of health care-associated infection in developed countries varies between 3.5% and 12%.

The European Centre for Disease Prevention and Control reports an average prevalence of 7.1% in European countries. The Centre estimates that 4 131 000 patients are affected by approximately 4 544 100 episodes of health care-associated infection every year in Europe.

The estimated incidence rate in the United States of America (USA) was 4.5% in 2002, corresponding to 9.3 infections per 1 000 patient-days and 1.7 million affected patients.

According to a recent European multicentre study, the proportion of infected patients in intensive care units can be as high as 51%; most of these are health care-associated. Approximately 30% of patients in ICUs are affected by at least one episode of health care-associated infection. The longer patients stay in an ICU, the more at risk they become of acquiring an infection. On average, the cumulative incidence of infection in adult high-risk patients is 17.0 episodes per 1000 patient-days. High frequency of infection is associated with the use of invasive devices, in particular central lines, urinary catheters, and ventilators.

Health care-associated infections in low- and middle-income countries

Limited data, often of low quality, are available from low- and middle-income countries. However, recent analysis by WHO found that health care-associated infections are more frequent in resource-limited settings than in developed countries.

At any given time, the prevalence of health care-associated infection varies between 5.7% and 19.1% in low- and middle-income countries. Average prevalence is significantly higher in high- than in low-quality studies (15.5% vs 8.5%, respectively).

The proportion of patients with ICU-acquired infection ranged from 4.4% to 88.9% with a frequency of overall infections as high as 42.7 episodes per 1000 patient-days. This is almost three times higher than in high-income countries. Furthermore, in some developing countries, the frequency of infections associated with the use of central lines and ventilators and other invasive devices can be up to 19 times higher than those reported from Germany and the USA.

Newborns are also at higher risk, with infection rates in developing countries 3-20 times higher than in high-income countries. Among hospital-born babies in developing countries, health care-associated infections are responsible for 4% to 56% of all causes of death in the neonatal period, and 75% in South-East Asia and Sub-Saharan Africa.

Surgical site infection is the leading infection in the general patient population in countries with limited resources, affecting up to two third of operated patients and with a frequency up to nine times higher than in developed countries.

What factors put patients at risk of infection in health-care settings?

Several factors can cause health care-associated infections. Some of these factors are present regardless of the resources available:

- prolonged and inappropriate use of invasive devices and antibiotics;
- high-risk and sophisticated procedures;



- immuno-suppression and other severe underlying patient conditions;
- insufficient application of standard and isolation precautions.

Some determinants are more specific to settings with limited resources:

- inadequate environmental hygienic conditions and waste disposal;
- poor infrastructure;
- insufficient equipment;
- understaffing;
- overcrowding;
- poor knowledge and application of basic infection control measures;
- lack of procedure;
- lack of knowledge of injection and blood transfusion safety;
- absence of local and national guidelines and policies.

What is the impact of health care-associated infections?

As is the case for many other patient safety issues, health care-associated infections create additional suffering and come at a high cost for patients and their families. Infections prolong hospital stays, create long-term disability, increase resistance to antimicrobials, represent a massive additional financial burden for health systems, generate high costs for patients and their family, and cause unnecessary deaths. Such infections annually account for 37 000 attributable deaths in Europe and potentially many more that could be related, and they account for 99 000 deaths in the USA.

Annual financial losses due to health care-associated infections are also significant: they are estimated at approximately €7 billion in Europe, including direct costs only and reflecting 16 million extra days of hospital stay, and at about US\$ 6.5 billion in the USA.

Financial costs attributable to health care-associated infections are poorly and variably reported in low- and middle-income countries. For instance, the economic burden of health care-associated infections in Belo Horizonte, Brazil, was estimated to be equal to US\$ 18 million in 1992. In Mexican ICUs, the overall cost of one single health care-associated infection episode was US\$ 12 155. In several ICUs in Argentina, the overall extra-cost estimates for catheter-related bloodstream infection and health care-associated pneumonia averaged US\$ 4 888 and US\$ 2 255 per case, respectively.

What are the solutions to this problem?

Many infection prevention and control measures, such as appropriate hand hygiene and the correct application of basic precautions during invasive procedures, are simple and low-cost, but require staff accountability and behavioural change.

The main solutions and perspectives for improvement are:

- identifying local determinants of the HCAI burden;
- improving reporting and surveillance systems at the national level;



- ensuring minimum requirements in terms of facilities and dedicated resources available for HCAI surveillance at the institutional level, including microbiology laboratories' capacity;
- ensuring that core components for infection control are in place at the national and health-care setting levels;
- implementing standard precautions, particularly best hand hygiene practices at the bedside;
- improving staff education and accountability;
- conducting research to adapt and validate surveillance protocols based on the reality of developing countries;
- conducting research on the potential involvement of patients and their families in HCAI reporting and control.

WHO's response

WHO Patient Safety is actively working towards establishing effective ways of improving global health care and save lives lost to health care-associated infections. Within WHO Patient Safety, the Clean Care is Safer Care programme is aimed at reducing health care-associated infections globally and has placed improving hand hygiene practices at the core of achieving this. WHO Patient Safety works in collaboration with other WHO programmes, including regional and country offices supporting Member States, to reduce HCAI by assisting with the assessment, planning, and implementation of infection prevention and control policies, and timely actions at national and institutional levels.

Related links

WHO, *Clean Care is Safer Care* www.who.int/gpsc

WHO, Infection Control

http://www.who.int/csr/bioriskreduction/infection_control/en/index.htm/

European Centre for Disease Prevention and Control (ECDC)

<http://www.ecdc.europa.eu/en/Pages/home.aspx>

Centre for Disease Prevention and Control (CDC) and National Healthcare Safety Network (NHSN) <http://www.cdc.gov/nhsn/>

International Nosocomial Infection Control Consortium

<http://www.inicc.org/english/index.php>