

This fact sheet does not take into consideration changes that have occurred due to COVID-19. This will be undergoing a full update. In the meantime, please head to the **COVID-19 gateway page and hub**.

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Definition

As defined by NICE, 'healthcare-associated infections (HCAIs) can develop either as a direct result of healthcare interventions such as medical or surgical treatment, or from being in contact with a healthcare setting.

The term HCAI covers a wide range of infections. The most well-known include those caused by *meticillin-resistant Staphylococcus aureus (MRSA)*, *meticillin-sensitive Staphylococcus aureus (MSSA)*, *Clostridioides difficile* (formerly known as *Clostridium difficile* and often called *C. difficile* or *C. Diff*) and *Escherichia coli (E. coli)*. HCAIs cover any infection contracted:

- as a direct result of treatment in, or contact with, a health or social care setting
- as a result of healthcare delivered in the community
- outside a healthcare setting (for example, in the community) and brought in by patients, staff or visitors and transmitted to others (for example, norovirus).¹

Additionally, gram-negative bacteria such as *E. coli*, *Klebsiella species (spp.)* and *Pseudomonas aeruginosa* are the leading causes of healthcare-associated bloodstream infections.²

The following video from Covenant Health provides a simple introduction to HCAIs.

Healthcare-associated infections



HCAIs are closely linked to the rise in **antimicrobial resistance**.

CPPE's **Antimicrobial resistance** gateway page contains learning on antimicrobial resistance.

e-Learning for Healthcare offers a **Reducing Antimicrobial Resistance: An Introduction** programme. This is supported by the following video, *A GP guide to antimicrobial resistance*, which can be found on e-Learning for Healthcare's **About the Antimicrobial Resistance and Infections programme** page.

A GP guide to antimicrobial resistance



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Prevalence and incidence

It is estimated that 300,000 people in England acquire a HCAI each year as a result of care within the NHS. The prevalence of healthcare-associated infections in hospitals in England in 2011 was 6.4 percent. The most common sites for HCAI are respiratory tract (including *pneumonia* and lower respiratory tract infections), urinary tract and surgical sites.³

Public Health England (PHE) manages the surveillance of methicillin-resistant *Staphylococcus aureus* (MRSA) and methicillin-susceptible *Staphylococcus aureus* (MSSA) bacteraemia in England. This has been mandatory since 2001. PHE's **Annual epidemiological commentary: Gram-negative, MRSA and MSSA bacteraemia and *C. difficile* infection data, up to and including financial year April 2018 to March 2019** reports on MRSA bacteraemia, *C. difficile* infections, MSSA bacteraemia, *E. coli* bacteraemia, *Klebsiella* spp. bacteraemia and *P. aeruginosa* bacteraemia. It also explores the differences in rates of hospital-onset and community-onset infections.

The healthcare-associated infections in long-term care facilities (HALT) project aimed to quantify the magnitude of HCAI in long-term care facilities at a European level. The results of these surveys are reported via the **European Centre for Disease Prevention and Control**. A study by Tracey Thornley et al. also identified and quantified antibiotic prescribing in elderly residents in UK long-term health facilities. The paper is titled, *Antibiotic prescribing for residents in long-term-care facilities across the UK*.¹⁴

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Causes/risk factors

HCAIs are caused by a range of microorganisms. These microorganisms are often carried by those affected by a HCAI as transient skin flora (microorganisms that reside on the skin). These microorganisms may be acquired and spread through direct person-to-person contact or by contact with environmental surfaces. Healthcare practitioners are increasingly working across both acute and community care settings, as well as performing invasive procedures in outpatient clinics, nursing home and home settings.^{4,5,15}

HCAIs often occur when the causative microorganisms have taken advantage of a susceptible site, provided by an invasive device or procedure, and therefore found a route into the body. These routes can

be surgical wounds, intravascular cannulation sites, enteral feeding systems or catheter drainage systems.^{4,5}

*Part 2: How infections are spread of **Prevention and control of infection in care homes – an information resource** covers the chain of infection in terms reservoirs of microorganisms, points of entry and exit for microorganisms, method of transmission and host susceptibility.*

Rather than because of an invasive procedure, *C. difficile* is most commonly caused by the disruption of the bowel flora due to a course of antibiotics.⁶ In the following NHS Stockport CCG video, Anne Faulkner talks about how she contracted *C. difficile* after taking a course of antibiotics.

A Patient's Story – Dealing with C.diff



Long-term care and old age as risk factors

Long-term care environments, eg, care homes, are uniquely suited to the development and transmission of multi-drug resistant organisms. In addition to extensive histories of healthcare exposure, those in long-term care often have feeding tubes or urinary catheters. The majority of those who are in care are also older in age, which has been identified as a risk factor for colonisation with multi-drug resistant organisms.⁷

Biofilms

Biofilms are robust collections of microorganisms that have attached to a surface and formed a film made up of cells, surrounded by a matrix of polymers. Biofilms play a pivotal role in HCAs as they can form on medical devices such as intravascular catheters, urinary catheters and orthopaedic implants.

More information on this is available in the article ***Prevention and control of biofilm-based medical-device-related infections.***⁸

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Prognosis and complications

HCAs can have a large impact on the individual, their family and the healthcare system. The World Health Organization states that *'according to the available evidence, the impact of HCAI implies prolonged hospital stay, long-term disability, increased resistance of microorganisms to antimicrobials, massive additional financial burden for health systems, high costs for patients and their family, and unnecessary deaths.'*⁹

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Prevention

There is an international and national drive to prevent healthcare associated-infection. In 2005, the World Health Organization (WHO) launched the first **Global Patient Safety Challenge: Clean Care is Safer Care**. The key elements of this campaign were raising global awareness of the impact of HCAI on patient safety and promoting preventive strategies.¹⁰ The five elements to this challenge are:

- blood safety, including injection practice and immunisation
- water, including basic sanitation and waste management
- clinical procedures
- safety
- hand hygiene.¹¹

Nationally, the NICE public health guideline **Healthcare-associated infections: prevention and control [PH36]** outlines key areas of practice that underpin infection prevention and control such as hand hygiene, antimicrobial stewardship and environmental cleanliness.¹²

The Department of Health and Social Care and Public Health England guidance **Care homes: infection prevention and control, Part 3: Basic infection prevention and control practices**, is a key document for those working in care homes. It outlines recommendations on:

- standard infection control precautions (including hand hygiene, personal protective equipment, disposal of sharps, aseptic technique, use of invasive devices, urinary catheter care and enteral feeding)
- the prevention, management and control of infections (including immunisation, antibiotics, isolation and management of specific infections)
- environmental aspects of infection prevention and control (including cleaning, managing spillage of bodily fluids and decontamination).

The **Prevention and control of infection in care homes: summary for staff** summary document is also available.

NHS Improvement has developed a resource to support health and social care reduce the number of Gram-negative blood stream infections **Preventing healthcare associated Gram-negative bloodstream infections (GNBSI)**.

These other key documents focus on the prevention of HCAs:

- The NICE accredited **National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England**¹³
- NICE clinical guideline **Healthcare-associated infections: prevention and control in primary and community care [CG139]**

In the following Bristol Community Health video, we meet several people who have been affected by HCAs, highlighting the importance of infection control.

When infection control goes wrong – patient stories



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Management

As discussed, the most common sites of HCAI are the respiratory tract (including pneumonia), urinary tract and surgical site. The management offered to someone who develops a HCAI depends on the site of infection and causative microorganism. If a drug-resistant microorganism is identified, then microbiology advice may need to be sought.

Primary care and the community

If treatment is offered in primary care and the community, then the NICE clinical knowledge summaries (CKS) below outline the appropriate management:

- **Diarrhoea – antibiotic associated** (includes *C. difficile* infection)
- **MRSA in primary care**
- **Urinary tract infection (lower) – men** (includes catheter-associated infection)
- **Urinary tract infection (lower) – women** (includes catheter-associated infection).

Secondary care

If treatment is offered in secondary care, local guidance should be followed along with microbiology advice.

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Patient support

MRSA Action UK is a registered charity that supports people who have been affected by healthcare-associated infections.

The **Peggy Lillis Foundation** is building a nationwide *clostridium difficile* awareness movement by educating the public, empowering advocates, and shaping policy.

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External websites

CPPE is not responsible for the content of any non-CPPE websites mentioned on this page or for the accuracy of any information to be found there. All web links were accessed on 21 April 2020.

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Last review: May 2021

Next review due: May 2022