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- Infection Prevention and Control -

Infection Prevention and Control

Aims of this course:

- To understand Standard Infection Control Precautions (SICP)
- Recognise common Health Care Associated Infections (HCAIs) such as MRSA and clostridium difficile
- Know where to find your organisation's infection prevention and control policies and procedures
- Understand basic microbiology and how micro-organisms spread
- Know how to conduct a risk assessment
- Discuss and demonstrate standard infection prevention and control measures for your role

Infection Prevention and Control policies are essential for good clinical management and may vary between Trusts and private settings. Primary care settings like general practices, dental clinics, and community care settings like nursing homes, schools, and prisons are discussed. Healthcare-associated infections (HCAIs) can develop from healthcare interventions or contact with a healthcare setting, covering a broad range of infections. HCAIs pose a severe risk to patients, staff, and visitors, and can incur significant costs for the NHS, leading to significant morbidity.

Understanding Healthcare associated infections (HCAI)

HCAIs are infections that occur following or during a healthcare intervention in a hospital/clinical setting or in the community, caused by different microorganisms like bacteria, viruses, and fungi. The gastrointestinal, respiratory, and urinary tract are the most commonly affected parts of the body. The most common causes of patients acquiring HCAIs are healthcare staff who do not clean their hands, medical equipment that is not cleaned correctly or is used inappropriately, and healthcare staff who do not follow infection prevention policies. Some microorganisms are resistant to antibiotic treatment, limiting treatment options for patients. Examples include MRSA, C-Diff, VRE, MDR-TB, and CPE.

Basic Microbiology

Approximately 1,800 known pathogenic microorganisms exist, most of which cannot be seen by the naked eye. To cause disease, micro-organisms must enter the body. Bacteria reproduce by splitting in two, while viruses replicate themselves within infected host cells. Many bacterial infections can be treated with antibiotics, but these are not effective against viral infections. There are seven main groups of micro-organisms and parasites, including bacteria, fungi, viruses, and protozoa.

Viruses

Hepatitis B and C, and HIV are viral infections that attack the liver or the body's natural defence mechanisms and are present in blood and body fluids. Healthcare activities carry the risk of exposure to bloodborne viruses through percutaneous injury, exposure of broken skin, and mucous membranes. Risk reduction strategies include the safe handling of sharps and wearing face protection if at risk of splashing.

Standard Infection Control Precautions

Standard Infection Control Precautions (SICP) aim to prevent cross-contamination from sources of infection, including body fluids and contaminated items. SICPs should be used consistently by all staff, students, and temporary/agency workers in all care settings, at all times. Assessment of risks from tasks, level of interaction, and exposure to body fluids determine the application of SICPs during care delivery. Ongoing monitoring is necessary to ensure compliance with safe practices and commitment to patient, staff, and visitor safety. The education and training of all care providers is crucial in infection prevention and control – e.g training in hand decontamination, personal protective equipment use, and safe disposal of sharps.

There are ten key SICP elements that must be followed to ensure everyone is protected to the best ability. They are as follows:

- Patient placement/assessment for infection risk
- Hand hygiene
- Respiratory and cough hygiene
- Safe use and disposal of sharps
- Personal protective equipment (PPE)
- Safe management of care equipment
- Safe management of the care environment
- Safe management of linen
- Safe management of blood and body fluids
- Safe disposal of waste (including sharps)

National guidance on SICPS in England is provided by the 'National Hand Hygiene and Personal Protective Equipment Policy', whereas in Scotland it's provided by the 'National Infection Prevention and Control Manual'. Similarly, in Northern Ireland it's provided for by the 'Regional Infection Prevention and Control Manual', and in Wales by the 'National Infection Prevention & Control Manual' (NIPCM).

MRSA Risk Groups and Transmission

At-risk groups for MRSA infection include neo-natal/premature babies, immune-compromised patients, elderly, those with invasive devices, diabetics, those with chronic wounds, residents in nursing/residential homes, and individuals undergoing surgery. MRSA can be transmitted through:

- Direct contact with patients and the environment
- Skin shedding conditions
- Inadequately disinfected hospital equipment
- Airborne transmission through sputum

Direct contact with patients and the environment is thought to be the primary transmission source of MRSA crossinfection. An In-patient diagnosed with MRSA will be contacted by either a microbiology doctor or an infection prevention and control nurse (IPCN). The ward's clinical site manager will inform the nurse in charge of the appropriate wards/clinical areas of the new MRSA positive results and the isolation plans. All staff must inform the patient and provide them with an information leaflet. Hands must be washed or decontaminated before and after every patient contact, including between patients in MRSA cohorts. Personal protective equipment (PPE) clothing must be worn by all staff for each patient episode as per isolation precautions protocol.

Clostridium Difficile Overview

Clostridium Difficile is a spore-forming bacterium that causes diarrhoea primarily in patients over 65 years of age in hospitals, care, or residential homes. The infection is often associated with antibiotic use and can lead to outbreaks and ward closures. Symptoms range from mild to severe, potentially fatal pseudomembranous colitis, with frequent episodes of watery, foul-smelling diarrhoea, abdominal cramps, fever, and blood in the stools. Infections can be treated with antibiotics like Metronidazole and Fidaxomicin. The infection spreads through the fecal-oral route and spores can contaminate the patient's skin, hands, and the surrounding environment.

Diseases caused by C. difficile:

Pseudomembranous colitis

- "C. diff colitis"
- Antecedent antibiotic use, especially clindamycin and FQs. PPI use
- Sx: Crampy abdominal pain, foul – smelling diarrhoea
- Dx: Stool C. diff toxin assay; elevated WBCs, positive stool guaiac, lactoferrin
- Tx: D/C antibiotic; PO vancomycin or PO metronidazole or PO fidaxomicin
- Infection control measures: **Soap** and water
- Complications: Toxic megacolon, colonic perforation, peritonitis, shock. If suspected initiate systemic ABX, get CT, surgery consult

Management of C.D.

Suspect patients should be investigated with stool samples and kept in isolation in a single room. All pre-existing antibiotic therapy should be stopped, and further review is necessary to determine the appropriate treatment. Provide a commode for the patient, clean it after each use with neutral detergent and water, and disinfect it with a chlorine-based agent. Promote thorough hand washing techniques for the patient, staff, and visitors. Wear protective clothing, including single-use gloves and aprons when in direct contact with the infected patient. Decontaminate all patient care equipment before transferring it to another patient. Thoroughly clean the vacated bed space and surrounding soft furnishings according to local policies.

Viral Gastroenteritis - Symptoms and Spread

Viral gastroenteritis is caused by viruses such as Norovirus and Rotavirus and can cause symptoms including watery diarrhoea, nausea, vomiting, stomach cramps, headache, fever, and malaise. The viruses can be spread through contact with infected individuals, contaminated food, and raw or uncooked food such as meat and fish. The viruses are highly contagious and can easily spread within hospitals, mental health units, schools, nurseries, nursing homes, and other institutional settings. Gastroenteritis typically clears up within two to four days, but infected individuals should not return to work until 48 hours after their last episode of diarrhoea and/or vomiting.

Immunisation and Hygiene

The 'Health and Safety at Work' Act imposes a legal duty of care on all healthcare workers. Healthcare workers should be vaccinated against vaccine-preventable infections to reduce the risk of transmitting communicable diseases. Access to the Department of the Green Book provides guidance on immunisation. Healthcare workers who are not up to date with their immunisations should seek review with their Occupational Health Department or Primary Healthcare provider.

Hand hygiene is important to prevent infection in healthcare - there are two types of organisms on our hands: transient and resident. Healthcare workers should:

- Keep nails short, clean and nail polish free
- Avoid wearing watches, jewellery and rings with ridges or stones
- Cover cuts and abrasions
- Wear short sleeves or roll up sleeves (bare below the elbow)
- Report any skin conditions affecting hands to the Nurse in Charge or the Client Relations Team

There are two ways to decontaminate hands: Liquid Soap and Water (Handwashing) or Alcohol-based Hand rub. The 11-step process for effective hand hygiene includes:



Using an alcohol-based hand rub *is* useful when hand-washing facilities are not available, or when hands are contaminated but not visibly soiled. Alcohol-based hand rub *is not* effective if hands are visibly soiled, nor is it effective against spore-forming organisms and norovirus. The steps required for using an alcohol-based hand rub are the same as the ones for hand-washing and should take 15-30 seconds.

PPE and sharps disposal

Personal Protective Equipment (PPE) protects users from health and safety risks at work. Employers, including the NHS, must identify and control hazards under the 'Health and Safety at Work' Act (1974) and 'Control of Substances Hazardous to Health' (COSHH) regulations.

Healthcare staff must wear PPE based on the risk of transmission of microorganisms to the patient and/or the healthcare worker. Standard plastic aprons are the most common single-use type of apron, and they are suitable for most clinical and non-clinical activities. Full-body fluid-repellent gowns should be worn if there is a risk of significant splashing of blood, body fluids, secretions, or excretions. In high-risk situations where splashing may occur, in addition to gloves and an apron, masks and eye protection are necessary.

Clinical staff must ensure the proper disposal of sharps in the bins mentioned, in order to protect the nonclinical staff who remove these sharps bins. Small sharps bins can be taken to the point-of-use and **should not** be overfilled. Sharps containers must have a secure fitting lid and should be kept out of public reach. Sharps containers **should not** be disposed of in clinical waste bags.

The use of aseptic techniques (techniques which ensure sterility) is fundamental for procedures that involve either contact with the body, or with invasive devices, so that we can prevent infection risk. The 'aseptic non-touch technique' (ANTT) is a method which helps with the avoidance of contamination. This can be carried out by not touching key elements such as needles, intravenous connectors, or sterile dressings.

Overall, staff should always adhere to the local hand-hygiene policies, and should also ensure that the equipment that they are about to use on a patient is sterile.



Potential Exposure

In healthcare settings, you are commonly exposed to both blood, and body-fluid spillages. Exposure to this, if you are not careful, can lead to its penetration into your body. Examples of how this can occur can be seen through:

- The direct contact with used sharps
- Contamination of exposed abrasions/cuts/grazes and broken skin with bodily fluids
- Splashes of bodily fluids/aerosols entering the eyes/mouth or nose

In case of exposure:

- Encourage the wound to bleed under running water, and then wash using soap and warm running water
- Do not use disinfectants or alcohol
- Cover the area using a waterproof dressing
- Rinse eyes or mouth with copious amounts of water
- Do not swallow the water used for mouth rinsing

Healthcare staff must always wear the appropriate PPE; what this consists of, depends directly on the **risk**-of-transmission of the microorganisms to the patient, and/or to the healthcare worker.

Gloves should be worn for low-risk situations, such as: invasive procedures/contact with sterile sites, non-intact skin or mucous membranes/and all activities that carry a risk of exposure to blood, body fluids, secretions, and excretions.

Aprons are the most common type of PPE used in healthcare settings. Plastic aprons are sufficient for most clinical and non-clinical activities, but a full-body fluid-repellent gown should be worn in case of significant splashing of blood, body fluids, secretions, or excretions.

The 3 Levels:

There are three levels to the safe decontamination of medical devices. Three levels which ensure that they can later be used safely on patients. These are cleaning, disinfection, and sterilisation.

These 'Infection prevention and control' practices can substantially reduce healthcare-associated infections. Every year over 300,000 people contract healthcare-associated infections. Effective 'infection prevention and control' measures should be a part of everyday practice, and should be consistently applied by everyone. All staff play an important role in the control of infection, and they should read, as well as apply, the principles and practices given in medical guidance to demonstrate their commitment to high-quality care and patient safety.

Reporting & Treatment

Certain exposures to blood-borne pathogens **must** be reported to the Health-and-Safety Executive under the 'Reporting of Injuries, Diseases, and Dangerous Occurrences Regulations' 2013 (RIDDOR).

In case of a needlestick injury: clean the wound, report the incident, and seek treatment.

Any blood or bodily-fluid spillage must be dealt with immediately, and appropriate PPE must be worn.

For laundry and waste, ensure all soiled or stained laundry is appropriately bagged. Then, handle, collect, store, transport, and dispose of all waste safely in line with regulations.