Mandatory Training Workbook 2015

Infection Prevention and Control & Sepsis

Medical Staff
Level 2

Infection Prevention & Control – Level 2

Definition of Levels:

Level 1 – Non clinical Staff
Level 2 – Clinical Staff

Checklist

- **Read through this section of the workbook.**
- **Complete the on-line assessment on My PACT**
- **If further information is required please contact the Infection Prevention Team on 1326/1057**

Learning Outcomes – mapped against Core Skills Framework

All Clinical Staff should be able to:

- Define Healthcare Associated Infections and develop and understanding of why this is important
- Describe the three levels of decontamination including being able to provide examples of equipment that needs to be decontaminated at those levels
- Describe who is responsible for cleaning items used in patient care and how and when is this done
- Identify single use items
- Describe local and national policy and statutory requirements relating to:
    - Theory and practice of hand hygiene
    - Correct use of PPE
    - Safe use and disposal of sharps and management of accidental splash or sharps injuries
    - Management of blood and body fluid spillages
    - Safe disposal of waste and used linen (if applicable)
- Describe the need for surveillance of alert conditions, eg diarrhoea and vomiting
- Describe how to safely manage patients with specific alert organisms, eg MRSA, C. diff
- Where applicable, identify the procedure for microbiological investigation such as specimen collection for screening and investigation and the role of antibiotic use.

Background

The management of infection prevention and control is now a statutory requirement. (Health and Social Care Act 2008). The introduction of this Act resulted in the development of a Code of practice that details standards that the Trust is required to meet or exceed.
The Code specifies that effective prevention and control of infection must be a part of everyday practice and must be applied consistently by everyone.
To demonstrate compliance the Trust is required to submit a self assessment each year. Compliance is also be assessed by external scrutiny from bodies such as the Care Quality Commission.

What is a healthcare Associated Infection?

Health Care Associated infections (HCAI) are those caused by any infectious agent acquired as a consequence of a person's treatment in a healthcare institution or acquired by a health care worker in the course of their duties. Although not all HCAI can be avoided many can be, by adherence to good infection prevention & control practices.

HCAI can significantly increase patient morbidity and mortality and affects a significant number of patients each year. A national prevalence study performed in 2006 found that 8.2 % of inpatients in England had a HCAI i.e. one that was not present or incubating on admission.

The prevention and control of HCAI is important to:

- Ensure patients receive safe and effective care
- Ensure the health and safety of staff
- Reduce financial burdens in terms of additional costs associated with the treatment of HCAI and avoidance of financial penalties associated with breaching targets.
- Preserve or enhance the reputation of the Trust

Standard Precautions

Standard precautions should be practiced at all times for all patients within the hospital setting.

• Effective hand Hygiene
• Use of Personal Protective Equipment (PPE)
• Safe use and disposal of sharps
• Management of sharps injuries
• Safe disposal of clinical waste
• Safe management of laundry
• Cleaning and decontamination of re-usable equipment
• Maintenance of a clean clinical environment
• Safe management of body fluid spillages
• Respiratory hygiene

Hand hygiene

There is a substantial body of evidence that hand hygiene reduces the transmission of health care-associated pathogens and the incidence of HCAI. (WHO 2009). Therefore this is an important part of any infection prevention and control strategy.

Routine hand decontamination can be performed using an alcohol rub or with soap and water.

Alcohol Rub

Alcohol rubs are more convenient to use than washing with soap and water at a sink, and for the majority of staff who have to perform frequent hand decontamination, are less prone to cause skin irritation.

Alcohol hand rubs will destroy micro-organisms but will not remove physical soiling or dirt and should be used when hands are socially clean.
When caring for patients with Clostridium difficile and in some outbreak situations e.g. norovirus alcohol will not be effective and hands should be washed with soap and water.

Application

- Apply 1 dose of alcohol rub to hands
- Rub into skin, ensuring all surfaces are covered, including fingertips, thumbs and the area between fingers until the solution has evaporated and hands are dry

Soap and Water Hand wash

Hand washing at a sink with liquid soap and water is the preferred method for hand decontamination if the hands are visibly soiled or potentially contaminated with dirt, body fluids or other material:

- Wet the hands with tepid running water before applying soap
- Ensure all surfaces of the hands and fingers are covered paying particular attention to the tips of fingers, the thumbs and the areas between fingers (for 10-15 seconds) before rinsing the hands thoroughly under tepid running water;
- DRY the hands thoroughly by blotting/gentle rubbing with a disposable paper towel, paying particular attention to the skin between the fingers.

Skin care

- Cover all cuts or broken skin on hands or forearms with a waterproof dressing

- Use a high quality hand cream as frequently as is necessary to maintain the skin in good condition (available on the wards)

The World Health Organisation has recommended 5 moments for hand hygiene in the healthcare environment.

1. Before patient contact	When? Clean your hands before touching a patient when approaching him, or her Why? To protect the patient against harmful germs carried on your hands
2. Before aseptic task	When? Clean your hands immediately before any aseptic task Why? To protect the patient against harmful germs, including the patient's own germs, entering his or her body
3. After body fluid exposure risk	When? Clean your hands immediately after an exposure risk to body fluids (and after glove removal) Why? To protect yourself and the health-care environment from harmful patient germs
4. After patient contact	When? Clean your hands after touching patient and his/her immediate surroundings when leaving Why? To protect yourself and the health-care environment from harmful patient germs
5. After contact with patient surroundings	When? Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even without touching the patient Why? To protect yourself and the healthcare environment from harmful patient germs

Barriers to effective hand hygiene

The Trust Hand Hygiene policy reflects the recommendations and guidelines from the DOH, WHO (2009) and NICE (2012) that healthcare workers carrying out direct patient care should be "bare below the elbows" in order to prevent contamination and allow effective hand hygiene to be performed.

Therefore for direct patient care the following should be avoided

- Hand and wrist jewellery
- Long sleeves
- False/acrylic nails
- Nail polish

Personal Protective Equipment (PPE)

Appropriate personal protective equipment should be available in all clinical areas.

Gloves

Gloves must be worn for invasive procedures, contact with sterile sites, contact with non intact skin and mucous membranes and for all activities that have been assessed as carrying a risk of exposure to blood or bodily fluids.
Gloves must be worn when carrying out an episode of care for patients nursed in source isolation. Gloves must be worn as a single use item and must be changed between caring for different patients or between different care activities or treatments.

Hands must always be decontaminated following removal of gloves.

Aprons/Gowns
Plastic aprons must be worn when there is a risk that clothing may become contaminated with pathogenic micro-organisms, blood or bodily fluids. Aprons must be worn when carrying out an episode of care for a patient in source isolation. Full body fluid repellent gowns must be worn where there is a risk of extensive splashing of body fluids or blood onto the skin or clothing of healthcare workers. Aprons and gowns must be worn as single use items for one procedure or episode of care and then removed and disposed of.

Face/eye protection
Face and eye protection must be worn when there is a risk of blood or bodily fluids splashing into the eyes or face.

Management of Sharps

The term' sharp' is the general term used to describe anything with the potential to cause penetrating injury to somebody and includes disposable and non-disposable sharps.

- All disposable sharps must be disposed of immediately after use by placing them into a correctly assembled container that conforms to the British Safety Standard
- The person using the sharp is responsible for it's safe disposal
- Sharps containers should be kept in a safe location, at an appropriate height and the temporary closure mechanism used when not in use
- The container should not be over-filled. It should be locked when the fill line has been reached and labelled with appropriate ward/area
- Used needles should not be re-sheathed by hand, bent or broken prior to disposal

Inoculation Incidents

An inoculation incident is defined as an exposure to blood and body fluids. Significant occupational exposures carry a possible risk of infection with blood borne viruses.

A **significant** occupational exposure is defined as:

- Penetrating injury from a sharp object or instrument which is contaminated with blood/body fluids
- Exposure of mucous membranes (eyes, mouth etc) to blood/body fluids from an individual.
- Exposure of non-intact skin (cuts, abrasions, eczema etc) to blood/body fluids from an individual.
- A human bite that breaks the skin

Non significant exposure is defined as:

- Contamination of intact skin
- Exposure to urine or saliva which is not blood stained
- Injury from a sterile or uncontaminated sharp object

All significant exposures must be managed and reported as below.

Management and reporting of a Sharps or Inoculation Incident

If you sustain an injury from a sharp or splash of blood/body fluid to the eyes, you must:

1. Encourage bleeding of the affected area.
2. Wash the affected area with soap and water
3. In the event of an eye-splash with blood or body fluids, remove contact lenses and irrigate the eye immediately with water or eyewash
4. Inform the person in charge of that area
5. Report to the Occupational Health Department at Aintree University Hospital if the incident occurs between 8.30 and 16.30 (phone number 0151 529 3803). Outside of these hours you must attend the A&E department at Aintree
6. Complete a Trust Incident form

The occupational health department will arrange for blood to be taken for storage.

A risk assessment form should be completed stating whether sharp was from a known or unknown patient and whether the patient was known to have or be at high risk of having a Hepatitis B, Hepatitis C or HIV infection.

Consent

To aid the effective management of the healthcare worker who has had the inoculation injury blood should be tested from the donor patient for testing for blood borne viruses.
However informed consent must be obtained prior to any tests being performed and this must be documented in the casenotes. The person receiving the injury should not be the person requesting consent.

National guidelines on testing for HIV state that all doctors, nurses and midwives should be able to take consent for HIV testing in the same way as they currently do for other medical investigations and that extensive pre-test counselling is not required.

Information to enable informed consent would be:

(1) the reason for testing
(2) how the results will be conveyed to the patient (this should be by the clinical team).

If results are positive the patient would be referred into the relevant specialist service for treatment e.g. at the RLUBHT.

Waste disposal

All waste should be segregated and disposed of correctly in colour coded bags or containers.

- Household waste e.g. paper, packaging etc should be disposed of in a black plastic bag.
- Clinical waste e.g. anything that has been in contact with blood or body fluid or is potentially infectious should be disposed of in an orange plastic bag.
- Sharps should be placed directly into a designated sharps box/container.
- All bags should never be overfilled, should be securely tied and labelled prior to placing in a designated area/container prior to disposal

Linen Handling

Clean linen must be stored in a clean designated cupboard/room. Used linen must be placed directly into a white bag.
Soiled linen or linen from an isolation room must be placed directly into a red alginate bag and then into a red plastic bag. See isolation policy for further details.
Bags must not be over filled and when full must be tied and stored in a designated area to await collection.

Decontamination

All equipment must be decontaminated between patients
Consideration must be given to decontamination methods when purchasing new equipment.

The three decontamination processes are cleaning, disinfection and sterilisation and the process used is dependant on the type of equipment and its use:

Process	Risk	Examples
Cleaning Removal of accumulated deposits by washing thereby removing dirt, grease, organic matter and reducing the number of organisms	**Low Risk** Items in contact with intact skin	Commodes Stethoscopes Monitoring equipment Bed Patient chair
Disinfection Partial removal or destruction of organisms, may not destroy spores	**Medium risk** Items in contact with mucous membranes or non intact skin Low risk items contaminated with virulent organisms or contaminated with blood	Endoscopes Equipment in isolation rooms
Sterilisation Removal and destruction of micro-organisms including spores	**High risk** Items introduced into sterile body cavities	Theatre instruments

Cleaning must always be performed prior to disinfection or sterilisation

Single use items
Any item which is described as disposable or for single use must not be re-used or re-processed.

Environmental Hygiene

Shared equipment used in the clinical environment must be decontaminated appropriately after use. The hospital must be visibly clean and free from dust or soilage.

Spillages
Wear suitable protective clothing e.g. aprons and gloves and wash hands after removal

(1) Blood Spillages

- Cover the blood spill with hypochlorite granules
- Leave for 2 minutes, to allow granules to absorb spillage
- Clear up granules with a disposable cloth and discard into a clinical waste bag
- Clean area with detergent plus disinfectant (e.g. actichor plus)

Do not use above method on urine spillages as chlorine in the granules may react with urine

(2) Body Fluid Spillages

- Soak up the spillage and remove any gross contamination with disposable paper towels or pad
- Discard into a clinical waste bag
- Clean area with detergent and water then wipe area with detergent plus disinfectant solution

Respiratory Hygiene

The measures include:

- Covering nose and mouth with disposable single use tissues when sneezing, coughing, wiping and blowing noses
- Disposing of used tissues into a waste bin
- Washing hands with soap and water after coughing, sneezing, using tissues, or after contact with respiratory secretions or objects contaminated by these secretions
- Keeping contaminated hands away from the mucous membranes of the eyes and nose

Diarrhoea and Vomiting

Diarrhoea and vomiting can be caused by a number of micro-organisms. Viruses, especially Norovirus, are the most common cause of outbreaks in hospitals in the UK.
Surveillance and prompt action are necessary to prevent spread as Norovirus is highly infectious. Contact the infection prevention team (or hospital co-ordinators out of hours) if there are 2 or more staff or patients in an area with diarrhoea and/or vomiting. An outbreak of viral gastroenteritis will be suspected dependant upon the number of patients and staff with symptoms, the duration of illness and the incubation period.

Laboratory tests can confirm the presence of Norovirus by sending separate samples to the virology department.

Clostridium difficile

Clostridium difficile infection (CDI) causes serious illness and outbreaks among hospital inpatients
All cases of CDI are reportable to the strategic health authority and to the health protection agency via the mandatory reporting system.
The Trust has an annual target to reduce the numbers of CDI.

Clinicians should apply the following mnemonic when managing potentially infectious diarrhoea.

S	Suspect a case may be infective if there is no clear alternative cause for diarrhoea e.g. medication, laxatives
I	Isolate the patient and consult with infection prevention team while determining the cause
G	Gloves and aprons used for contact with the patient and their environment
H	Hand washing should be carried out before and after contact
T	Test by sending a stool specimen when indicated i.e. no other attributable cause for diarrhoea. Fill the container so it is 1/3 full

1) Definitions and diagnosis

Standard definitions of infections and outbreak are applied. A patient is classified as having CDI if they have diarrhoea with no other probable cause and the sample tests positive for C difficile toxin.

2) Surveillance

A robust surveillance and reporting system is in place within the Trust to ensure that any issues are detected and addressed quickly

3) Management and treatment

CDI should be managed as a diagnosis in its own right.

The severity of infection should be assessed daily as follows:

Mild	Not associated with raised WCC. Typically <3 loose stools per day
Moderate	Raised WCC <15. Typically 3-5 stools per day
Severe	WCC>15 or acute rising serum creatinine or temperature >38.5 or evidence of severe colitis
Life threatening	Includes hypotension, partial or complete ileus or toxic megacolon

Treatment should be tailored to the severity of the patient's condition.
Anti-motility drugs are contra- indicated for acute CDI.

4) Antibiotic prescribing

Restrictive antibiotic guidelines should be in place.

Antibiotics should only be prescribed when there is clinical evidence of bacterial infection. The evidence should be clearly documented in the clinical record. Consultants should be responsible for reviewing antibiotic prescriptions on their ward rounds and stopping unnecessary prescriptions or changing those that do not meet guidelines.

5) Isolation

Suspected and confirmed cases of infective diarrhoea should be isolated.
Gloves and aprons should be used when in contact with the patient or the environment.
A stool chart should be used to monitor diarrhoea.
Isolation is discontinued 48 hours after the last episode of diarrhoea and a formed stool has been achieved. Negative samples are not required.

6) Cleaning and disinfection

All clinical areas should be regularly assessed for cleanliness and all equipment should be cleaned before and after each patient use.
Environmental cleaning of rooms and bed spaces of patients with CDI should be carried out with appropriate solutions e.g. 1000 ppm available chlorine (Actichlor plus)

7) Hand hygiene

Staff should wash their hands with soap and water before and after contact with the patient or their environment for cases of suspected or confirmed CDI.

*** Click to view C difficile figures for this Trust

Methicillin resistant Staphylococcus aureus (MRSA)

MRSA has been strongly implicated as a significant HCAI resulting in increased morbidity and mortality. Recommendations for control are similar to those detailed above for CDI as they include an active surveillance programme, good antibiotic stewardship, isolation precautions as necessary and a robust cleaning and decontamination programme.

Additional recommendations are:

1) To have a screening programme to identify MRSA positive inpatients
2) To use decolonisation treatments to suppress or eradicate MRSA carriage in relevant patients.

Trust policy is that elective and emergency patients will be screened for MRSA. However day case patients do not require screening for MRSA unless they have been positive in the past or are they are having specific procedures i.e. insertion of a pacemaker or implantable cardioverter defibrillator .
Patients on the intensive care unit are screened weekly and other patients will be screened if they are designated as significant contacts of other MRSA positive patients.

The decolonisation regime for all MRSA positive patients is 5 days of hibiscrub washes and nasal bactroban with the addition of chlorhexidine mouthwashes for throat carriage.
Systemic antibiotics are used for clinical infections and surgical prophylaxis must be altered from the standard prophylaxis to ensure adequate cover is provided if the patient is known to be colonised/infected with MRSA.

Patients who have MRSA will be isolated while they are in the Trust; these patients will be identified on the patient information system with a # after their name and address so when their admission is planned they can be allocated to an appropriate area. The MRSA status of the patient will also be noted on the EPR system

It is not uncommon for patients to become MRSA positive even after decolonisation treatment and a subsequent negative screen. Therefore a minimum of 3 negative screens taken at least 1 week apart, after the discontinuation of decolonisation treatment is necessary before precautions are stopped.

** Click to see MRSA figures for this Trust

Urinary Tract Infection

Urinary tract infection (UTI) is one of the most common infections acquired as a result of healthcare
Catheter insertion significantly increases the risk of infection by allowing micro-organisms bypassing natural host mechanisms.
This will be by extraluminal or intraluminal contamination. Extraluminal contamination may occur during catheter insertion, from the patient's own perineal flora or from the hands of health care workers. Intraluminal contamination occurs through reflux of micro-organisms via a contaminated drainage system or bag.
There is a strong association between the duration of catheterisation and the risk of infection. In acute care facilities the risk of developing bacteria in the urine increases by approximately 5% for each day of catheterisation and a quarter of these bacteriuric patients will go on to develop a UTI.
Evidence based guidelines for the prevention of catheter associated urinary tract infections include:

- Only use a urethral catheter when clinically indicated
- Assess and record the need for catheter daily and remove as soon as no longer indicated
- Select appropriate catheters, in terms of length, material and gauge
- Ensure insertion is an aseptic procedure performed by healthcare workers competent in the procedure
- Use a sterile closed system with sampling post and do not break the connection unless clinically indicated
- Position the drainage bag below the level of the bladder on a stand that prevents contact with the floor
- Do not allow the bag to fill beyond three quarters full
- Do not add antiseptic solutions to the drainage system

Surgical site Infection (SSI)

The national prevalence study carried out in 2006 estimated 5% of patients undergoing a surgical procedure developed a SSI. Although this was recognised as likely to be an underestimate as a significant number of patients develop the symptoms of SSI after discharge.

High impact interventions to prevent surgical site infections include:

- Screening for MRSA and decolonising prior to surgery
- Removal of hair with clippers not shavers

- Prepping the site with alcoholic chlorhexidine (povidone-iodine if patient has sensitivity)
- Giving prophylactic antibiotics (when necessary) within the 60 minutes prior to incision
- Maintaining body temperature above 36 C in the peri-operative period
- Maintaining tight glucose control in diabetic patients (< 11mmol/l)
- Covering the wound with a dressing at the end of surgery. Keeping the wound undisturbed for 48 hours after surgery unless there is leakage and a dressing change is required. Using an aseptic non touch technique to redress the wound
- Ensuring correct hand hygiene performed

Carbapenemase Producing Enterobacteriaceae (CPE)

Enterobacteriaceae are a large family of bacteria that usually live harmlessly in the gut of all humans and animals. However, these organisms are also some of the most common causes of opportunistic urinary tract infections, intra-abdominal and bloodstream infections. They include species such as *Escherichia coli*, *Klebsiella* spp. and *Enterobacter* spp. Carbapenems are a valuable family of antibiotics normally reserved for serious infections caused by drug-resistant Gram-negative bacteria (including Enterobacteriaceae). They include meropenem, ertapenem, imipenem and doripenem. Carbapenemases are enzymes that destroy carbapenem antibiotics, conferring resistance. They are made by a small but growing number of Enterobacteriaceae strains. There are different types of carbapenemases, of which KPC, OXA-48, NDM and VIM enzymes are currently the most common.

The spread of carbapenem- resistant bacteria has great potential to pose a threat to public health in the future.

In some countries these bacteria have become widespread in healthcare institutions. This has not yet happened in the UK but over the last five years there has been a rapid increase in the incidence of infection and colonisation by multi-drug resistant carbapenemase-producing organisms. A number of clusters and outbreaks have been reported in England, some of which have been contained, providing evidence that, when the appropriate control measures are implemented, these clusters and outbreaks can be managed effectively

New guidelines have been written by Public Health England in order to provide expert advice on the management and control of these organisms. These focus on:

- <u>Early recognition and detection of individuals who may be colonised or infected</u>

  Patients should be assessed on admission and screened for CPE when they meet certain criteria

<u>Current LHCH policy is to screen:</u>

Patients transferred from abroad
Patients who have had a hospital admission abroad in the previous 12 months
Patients transferred from another hospital
Patients who are known to be positive for CPE in the past
Patients who are contacts of someone with CPE

- Early isolation of suspected/confirmed cases

  Current LHCH policy is that patients should be isolated if they are positive or have been positive in the past, or have been transferred from an area with an outbreak/high incidence.

- Treatment

  Decolonisation is not advised
  If patient is diagnosed with an infection the treatment options would need to be discussed with a microbiologist

- Cleaning and decontamination
  Adherence to high standards should be promoted and audited

- Communication
  Patients should be informed of their status

Good communication should be ensured within the healthcare environment and to any receiving organisations, GPs

References

Department of Health (2010). *The Health and Social Care Act 2008: Code of Practice on the prevention and control of infections and related guidance*. DOH

World Health Organisation (2009) *WHO Guidelines on hand hygiene in Health Care*. WHO

Department of Health (2010). *Care bundle to prevent surgical site infection*. DOH

Department of Health (2009) *Clostridium difficile infection: How to deal with the problem. DOH*

Joint working party on MRSA *(2006) Guidelines for the control and prevention of methicillin in healthcare facilities.* Journal of hospital Infection 63 (supplement)
British HIV Association.(2008)
*UK National Guidelines for HIV Testing.*BHIVA

Public Health England (December 2013)
Acute trust toolkit for the early detection, management and control of carbapenemase-producing Enterobacteriaceae.

Sepsis

Sepsis is associated with significant patient morbidity and mortality and there is some evidence that it can be poorly recognised and treated. In order to improve patient outcomes staff should be able to recognise the signs of sepsis and ensure the rapid initiation of appropriate monitoring and therapies.

Early recognition

Sepsis arises when the body's response to infection causes systemic effects that manifest as two or more of the Systemic Response Syndrome (SIRS).

SIRS in the presence of infection is sepsis. Suspicion of an infective cause is all that is required, ward staff do not require positive cultures or swabs or the results of any investigations. The most common causes will be respiratory, urinary, abdominal or surgical site infections but there may be other causes
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Recognising Sepsis

Definite or probable infection

+

2 or more of the following SIRS criteria:

- Temperature greater than 38° C or less than 36° C
- Heart Rate greater than 90 /minute
- Respiratory rate greater than 20/minute
- White cell count greater than 12 or less than 4.0 x10 ^{9}/L
- Acutely altered mental state
- Glucose level greater than 7.7 mmol/L (without diabetes)

Sepsis can be classified according to its severity as uncomplicated sepsis, severe sepsis (sepsis with organ dysfunction) or septic shock (sepsis with hypoperfusion resistant to fluid therapy).

Severity of Sepsis Classification

Severity	Definition	Group Mortality
Uncomplicated Sepsis	Definite or probable infection +SIRS	10%
Severe Sepsis	Sepsis + one or more organ dysfunction criteria as below ❖ Bilateral Lung infiltrates + new need for	35%

	oxygen to maintain saturations >90% ❖ Bilateral lung infiltrates with $Pa0_2$/ FiO_2 ratio <300 (mmHg) or 39.9. (kPa) ❖ Lactate > 2.0 mmol/L ❖ Serum creatinine > 176.8µmol/L or urine output< 0.5mL/kg/hr for 2 successive hours ❖ INR >1.5 or APTT >60s ❖ Platelet count< 100x 10^9/L ❖ Bilirubin > 34.2 µmol/L	
Septic Shock	Sepsis + shock Shock criteria: ❖ Lactate >4mmol/L at any time point ❖ Hypotension persisting after 30ml/kg intravenous fluid, defined as systolic BP <90mmHg, mean BP <65mmHg or a fall of >40mmHg from patient's usual systolic BP.	50%

Interventions and Treatment

The key immediate interventions that increase survival are described in a bundle called the Sepsis Six (see box below). This bundle has been shown to be associated with significant reduction in mortality when applied within the first hour. Nursing and medical staff should work together to ensure this bundle is initiated as soon as possible following diagnosis.

The Sepsis Six

1. Administer high flow oxygen therapy using a facemask with a flow rate of 15 l/minute

2. Take blood cultures prior to the administration of antibiotics (2 separate samples separated by time and location)

3. Give intravenous antibiotics within 1 hour

4. Give intravenous fluid challenges (30ml/kg of crystalloid). Small boluses of 250mls of fluid challenge can be administered if there were concerns regarding heart failure

5. Perform an arterial or venous blood gas to measure serum lactate and haemoglobin levels.

6. Measure hourly urine output, aiming for 0.5 ml/kg/hour

Antibiotic treatment

The first doses of antibiotics can be found in the sepsis boxes on each ward. The boxes will also contain blood culture bottles, giving sets and blood gas syringes.
There are 2 boxes available for first and second line treatment options:

(1)First line = Red Box
Piperacillin/Tazobactam 4.5g tds for 72 hours and Gentamicin 5mg/kg once only

(2)Second line treatment (e.g. if patient has penicillin allergy) = Green Box
Teicoplanin 800mg daily (if patient's weight less than 70kg) and 1200mg daily (if patient's weight greater than 70kg),and Ciprofloxacin 400mg bd for 72 hours.

In special circumstances e.g. the patient has severe sepsis or septic shock the antibiotic therapy can be changed to Teicoplanin 800mg daily (if patient's weight less than 70kg) and 1200mg daily (if patient's weight greater than 70kg) and Meropenem 1g 8 hourly, as advised in the Antimicrobial Policy.

These antibiotics should be prescribed using the sepsis care bundle in the electronic patient record. Add enter order and then use "sepsis" in the search box to identify the order set.

The addition of an antifungal should be considered in patients with prior exposure to antibiotics, gastrointestinal surgery/inflammatory processes, femoral central lines, especially if known to be colonized by yeasts, and to be unresponsive to antibiotics.

Once the sepsis box has been opened it should be returned back to pharmacy directly so that it can be refilled and re-checked.

References and further reading.

http://sepsistrust.org/
http://survivesepsis.org/

ACTIVITY: Infection Prevention and Control & Sepsis

- **Do not forget** to complete the on-line assessment of knowledge on My PACT

For additional advice and information please contact the Infection Prevention Team on Ext: 1326/1057

You can also access the health & safety web site on the intranet or alternatively you can access www.hse.gov.uk Health and Safety Executive web-site.