**ANTIMICROBIAL STEWARDSHIP**

**START SMART – THEN FOCUS**

Guidance for Antimicrobial Stewardship for SHSCT

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<th>CLINICAL GUIDELINES ID TAG</th>
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<tr>
<td><strong>Title:</strong> Antimicrobial Stewardship Guideline</td>
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1. Introduction

1.1 The development of antimicrobials has been among one of the most important public health interventions in the last century giving humanity a significant advantage in the struggle against infections. However it is important to appreciate that micro-organisms have the capacity to evolve and become resistant to antimicrobials at a faster pace than the ability of humans to develop newer antimicrobials.

1.2 Current evidence clearly demonstrates that the inappropriate use of broad-spectrum antimicrobials is the main driver of selection of antimicrobial resistance. This includes extended spectrum beta-lactamases (ESBL) producing Gram negative bacteria, MRSA, Carbapenemase producing enterobacteriaceae and the induction of Clostridium difficile infection (CDI) as a result of gut dysbiosis caused by long lasting harmful changes to the body’s protective microbial flora.

1.3 Antimicrobial stewardship is an important element of the both the UK Five Year Antimicrobial Resistance Strategy and the 2011 CMO report. The aims of such stewardship initiatives are to improve the safety and quality of patient care and to contribute significantly to reductions in the emergence and spread of AMR.

1.4 These aims are ultimately achieved by improving antimicrobial prescribing through an organised antimicrobial stewardship program. Current published evidence recommends an antimicrobial stewardship programme should include the following.

- An assessment of the Trust’s antimicrobial stewardship activities
- An antimicrobial stewardship management team/committee
- A ward-focused antimicrobial team
- Evidence-based antimicrobial prescribing guidelines
- Quality assurance measures/audits and feedback
- Education and training
2. Aim of Guidance

2.1 The antibiotic stewardship guidance has the following aims:

a) To set out a framework for best practice on antibiotic prescribing in order to optimise therapy for individual patients
b) To Prevent overuse and misuse of antibiotics in order to preserve the existing antibiotics
c) To Minimise development of resistance at patient and community level
d) To Promote Clinical Leadership of Antibiotic management among members of all multidisciplinary teams

3. Scope of the Guidance

The Guideline covers efficient use of antimicrobials in all areas commissioned by the SHSCT.

4. Guideline Summary

A Start Smart - then Focus approach is recommended for all antibiotic prescriptions.
## “Start Smart – then Focus”
All Clinicians should ideally within one hour (or as soon as possible)

### 4.1 START SMART

**a) Antibiotic Therapy:**

| a) | Initiate prompt effective antibiotic treatment within one hour (or as soon as possible) in patients with life-threatening infections/ suspected neutropaenic sepsis |
| b) | Avoid inappropriate use of broad-spectrum antibiotics |
| c) | Comply with local antimicrobial prescribing guidance |
| d) | Do not start antimicrobial therapy unless there is clear evidence of infection |

**b) Document in the Clinical Notes and the Drug Chart:**

| a) | Indication |
| b) | Duration/ Review date |
| c) | Disease severity if Appropriate (CURB/ SIRS) |
| d) | Route, dose and drug allergies and nature of allergy |

Antibiotics in hospitals are often continued unnecessarily because clinicians caring for the patient do not have information indicating why the antibiotics were initially commenced and how long they were planned to be continued.

This challenge is compounded where primary responsibility for patient care is frequently transferred from one clinician to another. Ensuring that all antibiotic prescriptions are always accompanied by an indication, the correct dose and a clear duration will help clinicians change or stop therapy when appropriate.

**c) Obtain Cultures First**

| a) | Obtain cultures prior to commencing therapy where possible but not delay therapy in life threatening infections. |
| b) | Knowing the susceptibility of an infecting organism can lead to narrowing of broad spectrum therapy, changing therapy to effectively treat resistant pathogens and stopping antibiotics when cultures suggest an infection is unlikely. |

**d) Antibiotic Prophylaxis:**

| a) | Single dose for surgical prophylaxis where antibiotics have been shown to be effective |
| b) | Single dose is administered up to 60 minutes prior to surgical incision to enable peak blood levels to be present at the start of the surgical procedure |
| c) | A repeat dose of antibiotic prophylaxis is required when the operation is longer than the half-life of the antibiotic given |
| d) | Antibiotic treatment (in addition to prophylaxis) should be given to patients having surgery on a dirty or infected wound |
### 4.2 THEN FOCUS

a) Review the clinical diagnosis and the continuing need for antibiotics *by* 48 hours

b) and make a clear plan of action - the “Antimicrobial Stewardship Decision”

c) Antibiotics are generally started before a patient's full clinical picture is known. By 48 hours, when additional information is available, including microbiology, radiographic and clinical information, it is important for clinicians to re-evaluate why the therapy was initiated in the first place and to gather evidence on whether there should be changes to the therapy

d) It is essential that the review and subsequent decision is clearly documented in the medical notes.

<table>
<thead>
<tr>
<th>The five ‘Antibiotic Stewardship Decision’ options are Stop, Switch, Change, Continue and OPAT:</th>
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<tbody>
<tr>
<td>1. Stop antibiotics if there is no evidence of infection</td>
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<tr>
<td>2. Switch antibiotics from intravenous to oral</td>
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<tr>
<td>3. Change antibiotics – ideally to a narrower spectrum – or broader if required</td>
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<tr>
<td>4. Continue and review again at 72 hours</td>
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<tr>
<td>5. Outpatient Parenteral Antibiotic Therapy (OPAT)</td>
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Figure 1: Antimicrobial Stewardship (AMS) – Treatment algorithm

ANTIMICROBIAL STEWARDSHIP
Treatment algorithm

Start Smart

DO NOT START ANTIBIOTICS IN
THE ABSENCE OF CLINICAL
EVIDENCE OF BACTERIAL
INFECTION

1. Take thorough drug allergy history
2. Initiate prompt effective, antibiotic treatment
   within one hour of diagnosis (or as soon as
   possible) in patients with severe sepsis or
   life-threatening infections\(^a\)
3. Comply with local antimicrobial prescribing
   guidance
4. Document clinical indication (and disease
   severity if appropriate), dose\(^b\) and route\(^b\)
   on drug chart and in clinical notes
5. Include review/stop date or duration
6. Obtain cultures prior to commencing
   therapy where possible (but do not delay
   therapy)

Then Focus

CLINICAL REVIEW & DECISION
AT 48-72 HOURS

Clinical review, check microbiology and make
a clear plan. Document this decision

1. STOP
2. IV to oral switch
3. Change antibiotic
4. Continue
5. OPAT*  \(^\ddagger\)

Document Decision & Next Review Date or
Stop Date

DOCUMENT ALL DECISIONS

\(^a\) In accordance with surviving sepsis patient safety alert
\(^b\) According to weight\(\times\)age in children refer to local formulary or BNFs
\(^\ddagger\) Use appropriate route in line with severity/patient factors
*Outpatient Parenteral Antibiotic Therapy

Advocating patient safety and auditing of antimicrobial stewardship in hospitals should be based around the principles stated in this AMS algorithm. Examples of audit tools are shared in Appendix 1
Advocating patient safety and auditing of antimicrobial stewardship in hospitals should be based around the principles stated in this AMS algorithm. Examples of audit tools are shared in Appendix 1. Deviations from the NiCE guideline should be evidence based, with prolonged prophylaxis needing evidence of benefit.
5. **Roles, Responsibilities and Recommendations:**

5.1 **Chief Executive**

The Chief Executive has the overall responsibility for ensuring that the antimicrobial stewardship is an integral part of the Trust governance and patient safety agenda.

5.2 **Medical Director**

- The Medical Director has Trust wide responsibility for infection prevention and control and antimicrobial stewardship programme.
- Medical Director should raise and maintain a high clinical and managerial profile of Antimicrobial Stewardship in the hospital.
- Review reports of Antimicrobial Stewardship audits, Antibiotic consumption data; identify repeated non compliances and guide and support the AMT to address these non compliances.
- Ensure that audit components of quality assurance measures on Antimicrobial Stewardship is reported to the Board.

5.3 **Senior Managers & Clinical Managers**

Senior managers should

- Allocate resources for stewardship activities, education and feedback
- Ensure that all staff are aware of and comply with the current stewardship policy
- Ensure that all staff attend relevant training of antimicrobial stewardship
- Use governance processes such as audit so that prescribers follow antimicrobial guidelines
- Create an open and transparent culture so that prescribers can question prescribing when this doesn't follow antimicrobial guidelines
- Demonstrate that there has been an assessment of the organisation's antimicrobial stewardship activities against the Start Smart Then Focus AMS toolkit
- Develop an action plan in order to provide an assurance to the Trust Board of safe, effective and appropriate antimicrobial prescribing.
- As a minimum following should be regularly monitored in all clinical areas:
- Evidence of documenting indication and duration (or review date) on the drug chart
- Evidence of antimicrobial stewardship review of antibiotics at 48-72 hours after initiation and documentation of the antimicrobial prescribing decision (one of five options) on the drug chart (or in the clinical notes – see Figure 1)
- The time between the onset of sepsis related hypotension and administration of appropriate antibiotics – this may be part of ‘Surviving Sepsis’ related audits within the Trust
- Adherence with local guidance on the choice of antibiotic therapy (or documented reason for non-compliance)
- Antimicrobial resistance and consumption trends

5.4 Antimicrobial Management Team
- The suggested core membership should include a Consultant Microbiologist, an Antimicrobial pharmacist, Acute Care Physician, a surgeon, a senior member of the Pharmacy Management team, an Anaesthetist, an Emergency Department Consultant, a Paediatrician, a Senior nurse and Primary Care representation. The aim is to ensure a multidisciplinary approach and improve engagement across the organisation. In order to promote multi-professional engagement we recommend Stewardship leads for each directorate to act as the directorate champions for antimicrobial stewardship and form representation in the AMT
- Implement the organisation’s Antimicrobial Stewardship Programme for all adults and children admitted to hospital.
- The Committee should report to the organisation’s Medical Director and the Drugs and Therapeutic Committee.

Key Roles:
- **Antimicrobial Guidelines**
  Ensure that evidence-based local antimicrobial guidelines are in place and reviewed regularly or when new evidence is published
- **Audits and Feedback**
  Ensure regular auditing stewardship practice and quality assurance measures
- **Antibiotic Consumption Data**
  Report a regular formal review of the organisation’s retrospective antibiotic Consumption data (especially highlighting the use of broad-spectrum antibiotics such
as cephalosporins, co-amoxiclav, piperacillin-tazobactam, fluoroquinolones and carbapenems)

The consumption data should be reviewed by the AMT and the medical director. Also benchmark against local and National antimicrobial prescribing trends.

- **Address Non Compliance**
  Identify actions to address non-compliance with local guidelines, general antimicrobial stewardship issues and other prescribing issues

- **Monitor for patient safety incidents/ unintended consequences of stewardship**
  It is important to monitor patient outcomes to ensure that qualitative or quantitative alterations (changing, reducing, restricting) to antimicrobial prescribing do not have unintended detrimental effects for example increased time to clinical cure, increased mortality or increased readmission rate.

5.5 Ward Focused Antimicrobial Team:

This should include the Antimicrobial Pharmacist, Consultant Microbiologist, Acute Care Physician/ Medical SAS.

**Key Roles**
- Undertake multidisciplinary antimicrobial stewardship ward rounds
- Review prescriptions at ward level as part of the multidisciplinary antimicrobial stewardship ward round
- Feedback/ communicate to relevant clinical teams of recommendations
- Collect data on compliance, quality assurance measures, antibiotic consumption and feedback to relevant clinical teams and directorates through M&M
- Report to AMT

5.6 Antimicrobial Stewardship Leads

Identified clinical leads in each directorate/division to lead on antibiotic stewardship, recruited via an expression of interest process.

**Key Roles**
- Member of the Antimicrobial Management Team
• Review and implement directorate specific antimicrobial guidelines, ensuring they are fit for purpose.
• Communicate feedback on stewardship audits and feedback to directorate specific governance fora.

5.7 All Medical Staff

• Improving antimicrobial prescribing and stewardship is dependent on strong clinical leadership. Within local Trusts, Medical and Surgical teams, in particular consultants should take a leadership role for antimicrobial quality improvement in their specialist areas.
• This should be done in collaboration with a Consultant Microbiologist and the antimicrobial pharmacist.
• Such initiatives should also seek to engage with junior doctors in order to develop a wider understanding of antimicrobial stewardship throughout the organisation.
• Consultants / SAS doctors / Infection control leads should act as role models in the execution of best practice with regards to antibiotic stewardship.
• All Consultants will be responsible for ensuring that junior medical staff within their team follow best practice recommendations as follows.

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<thead>
<tr>
<th>Recommendations for prescribers</th>
<th>Antimicrobial prescribing</th>
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<tbody>
<tr>
<td>1. When prescribing antimicrobials, prescribers should follow local (where available) or national guidelines on:</td>
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<tr>
<td>• prescribing the shortest effective course</td>
<td></td>
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<tr>
<td>• the most appropriate dose and route o</td>
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<tr>
<td>2. When deciding whether or not to prescribe an antimicrobial, take into account the risk of antimicrobial resistance for individual patients and the population as a whole.</td>
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<tr>
<td>3. When prescribing any antimicrobial, undertake a clinical assessment and document the clinical diagnosis (including symptoms) in the patient's record and clinical management plan.</td>
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<tr>
<td>4. For patients in hospital who have suspected infections, take microbiological samples before prescribing an antimicrobial and review the prescription when the results are available.</td>
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5. For patients who have non-severe infections, consider taking microbiological samples before making a decision about prescribing an antimicrobial, providing it is safe to withhold treatment until the results are available.

6. Prescribers should take time to discuss with the patient and/or their family members or carers (as appropriate):
   • the likely nature of the condition
   • why prescribing an antimicrobial may not be the best option
   • alternative options to prescribing an antimicrobial
   • their views on antimicrobials, taking into account their priorities or concerns for their current illness and whether they want or expect an antimicrobial
   • the benefits and harms of immediate antimicrobial prescribing
   • what they should do if their condition deteriorates (safety netting advice) or they have problems as a result of treatment

7. When an antimicrobial is a treatment option, document in the patient’s records:
   • the reason for prescribing, or not prescribing,
   • an antimicrobial the plan of, including the planned duration of any treatment.

8. When a decision to prescribe an antimicrobial has been made, take into account the benefits and harms for an individual patient associated with the particular antimicrobial, including:
   possible interactions with other medicines or any food and drink the patient's other illnesses, for example, the need for dose adjustment in a patient with renal impairment, any drug allergies (these should be documented in the patient's record), the risk of selection for organisms causing healthcare-associated infections, for example, C. difficile.

9. When prescribing is outside local (where available) or national guidelines, document in the patient's records the reasons for the decision.

10. Prescribing intravenous antimicrobials
    • Use an intravenous antimicrobial from the agreed local formulary in
line with local (where available) or national guidelines for a patient who needs an empirical intravenous antimicrobial for a suspected infection but has no confirmed diagnosis.

- Consider reviewing intravenous antimicrobial prescriptions at 48–72 hours in all health and care settings (including community and outpatient services).
- Include response to treatment and microbiological results in any review, to determine if the antimicrobial needs to be continued and, if so, whether it can be switched to an oral antimicrobial.

### 5.9 Nursing Staff

Nursing staff play a significant role in antimicrobial Stewardship and prevention of HCAI.

Nursing staff should ensure:

- Antibiotics are used appropriately as per guidance and prompt clinicians to document indication/ stop/ review dates for antibiotics at ward rounds as indicated in the Drug Kardex.
- Administer antibiotics in accordance with the treatment plan and any variation is acted promptly. i.e avoid missed/ omitted doses/ prescription beyond documented duration
- Ensure appropriate microbiological testing is carried out. i.e. therapeutic drug monitoring, clinical sampling.

### 5.10 Ward Pharmacist:

Ward Pharmacist play a vital role in promoting the appropriate use of antibiotics by acting as knowledge brokers and exercising discretionary behaviour to influence positive prescribing decisions. i.e.

- Dose adjustments in organ dysfunction/ dose optimisation.
- Time sensitive stop orders/ pre-authorisation request for high risk/ high cost/ low stock/ antibiotics non-compliant with guidance e.g. Meropenam, Quinolones, linezolid, Cephalosporins
- Alert where situations in which therapy might be unnecessarily duplicated.
5.11 Laboratory

- Microbiology laboratories should ensure timely communication of critical results to allow appropriate management of acutely ill patients
- Should ensure appropriate turnaround time of results for review of patients to guide prescribing decision (stop/ targeted therapy/ PO switch/ Therapeutic drug monitoring)
- Ensure that laboratory testing and the order in which the susceptibility of organisms to antimicrobials is reported is in line with:
  1. national and local treatment guidelines
  2. the choice of antimicrobial in the local formulary
  3. the priorities of medicines management and antimicrobial stewardship teams

6. Antimicrobial Prescribing Guidelines

Antimicrobial prescribing guidelines should be guided by evidence and local susceptibility.

Key Roles:

- Minimise unnecessary prescribing of antimicrobials by providing clear clinical case definitions and associated evidence of infection
- Emphasise the need for infection prevention and control precautions where appropriate. For severe or life-threatening infection, emphasise the urgent need to start treatment with broad-spectrum antibiotic agents (particularly where the source of infection is uncertain)
- For less severe infection, offer antibiotic agent(s) with an adequate spectrum to cover only the expected pathogens
- Remind prescribers to consider the risk of resistant pathogens such as MRSA or ESBL-producing organisms, and offer alternative treatment regimens accordingly, or encourage prescribers to seek expert advice
- Highlight the importance of checking allergy status and offer alternative treatment choices for patients intolerant of recommended antibiotic agents
- Require prescribers to take appropriate specimens for microbiological investigation before starting antibiotic treatment wherever possible, but not to delay starting treatment in patients who are severely ill
- Recommend intravenous administration only to patients who are severely ill or unable to tolerate oral treatment
• Recommend antibiotic doses, and remind prescribers to adjust dosing in renal or hepatic impairment
• Require prescribers to review microbiology results daily, and de-escalate to pathogen-directed narrow-spectrum treatment promptly
• Require prescribers to review the need for intravenous treatment daily, and switch to the oral route of administration promptly according to local IV-to-oral switch guidance
• Offer oral switch choices for intravenous antibiotics
• Provide advice regarding monitoring, follow-up, recommendations for non antimicrobial treatment i.e. surgical drainage and contingency advice for treatment failure
• Suggest typical treatment course length for intravenous and oral agents
• Require single dose surgical prophylaxis regimens as appropriate

7. Components of Best Practice for Antimicrobial Prescribing. (Quality Assurance Measures/Audits and Feedback)

• Procedures should be in place to ensure prudent antibiotic prescribing and antimicrobial stewardship. This will necessitate an ongoing programme of audit, revision and update and should be monitored by the AMS management team/committee.
• Several components of best practice should be audited integrated into existing audit programmes established locally and as part of the Trust-wide six-monthly or annual point prevalence studies (PPS)
• Regular feedback of adherence to audits should be provided to the Trust Board (as part of the annual infection control committee report), prescribers, lead clinicians, microbiologists, nurses, pharmacists and the Medical Director
• Action should be taken to investigate non-adherence to local protocols for antibiotic prescribing (based on best practice) or unexpected trends in prescribing. It is recommended that these should be documented and reported, for example in minutes of the Antimicrobial Stewardship Committee/Team meetings
• Organisations should consider the formal investigation, via an existing clinical governance framework, of cases of repeated non-compliance (without clinical justification) or inappropriate prescribing, particularly when these result in an
adverse patient outcome (eg development of an HCAI, prolonged length of stay, etc.).

- The Medical Director or Director of Infection Prevention and Control should challenge individuals whose prescribing practice is found to be repeatedly inappropriate.
- As part of the ongoing stewardship programme in the Trust we will be auditing the following:

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<thead>
<tr>
<th>Criteria</th>
<th>Description of Audit</th>
<th>Rationale for Audit</th>
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<tbody>
<tr>
<td>1. Communication of the decision to prescribe antimicrobials.</td>
<td>Audit the documentation of the decision to start antimicrobial therapy 1. Indication/ provisional diagnosis 2. This should include the clear identification of the prescriber and their contact details 3. Review/ stop date</td>
<td>Communication between healthcare teams is vital to ensure safe and effective patient care. This is mandated by the Royal Colleges. The requirement to document prescribing decisions will discourage antimicrobial prescribing where evidence of infection is lacking</td>
</tr>
<tr>
<td>2. Microbiology culture and sensitivities (MC&amp;S)</td>
<td>Audit the appropriateness of specimens (for specific infections) obtained for MC&amp;S. This should conform to local guidelines</td>
<td>The availability of appropriate cultures and sensitivities will facilitate the prompt de-escalation of broad- spectrum agents or the tailoring of therapy in cases of treatment failure</td>
</tr>
<tr>
<td>4. Antimicrobial consumption</td>
<td>Audit the consumption of antimicrobial agents (or de-escalation audit)</td>
<td>The unnecessary continuation of antimicrobials is associated with HCAIs and contributes to the development of AMR</td>
</tr>
<tr>
<td>5. Choice of antimicrobial agent(s)</td>
<td>Audit the choice of antimicrobial therapy. 1. Compliance with local policy in terms of choice/ route/ dose 2. Reason for deviation from policy.</td>
<td>Inappropriate antimicrobial therapy is associated with HCAIs, the development of AMR and the associated risks of unnecessary drug exposure</td>
</tr>
<tr>
<td>6. Review date for prescribed antimicrobials</td>
<td>Audit the review of antimicrobials at 48-72 hours after initiation. 1. Review of diagnosis 2. Documentation of Prescribing decision, this should capture the documentation of the decision to continue, step down/ escalate/ iv-po switch subsequent specified review or stop date</td>
<td>An expected duration or review date should be documented on antimicrobial prescriptions. This practice will discourage open-ended prescriptions</td>
</tr>
<tr>
<td>7. Duration of IV antimicrobial therapy</td>
<td>Where IV antimicrobials are continued at 48-72 hours after initiation, audit the documentation for continuing</td>
<td>Treatment with IV antimicrobials should not continue beyond 48-72 hours unless recommended by local guideline or consultant</td>
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8. IV-to-oral antimicrobial switch

- Audit compliance with local IV to oral switch
- OR
- Audit the relative consumption of IV and oral antimicrobials

Treatment with IV antimicrobials should be switched to oral therapy within 24 hours of meeting local switch criteria.

Unnecessary continuation of IV treatment increases the risk of line infection.

8. Total duration of antimicrobial therapy

Audit antimicrobial consumption
1. Total duration
2. Consumption trends

Treatment with antimicrobials should not continue beyond 7 days (IV plus oral) unless recommended by a local guideline or consultant microbiologist/infectious diseases specialist.

Prolonged antibiotic therapy is associated with HCAIs, the development of AMR and other consequences of prolonged drug exposure.

8. Education and Training

- There should be mandatory core training in prudent antibiotic use for doctors, pharmacists and nurses in addition to an introductory session on each induction programme.
- Post-registration, this training should be repeated by all such staff every three years and should specifically cover those antibiotics that are linked to CDI.
- Independent prescribers should use the antimicrobial prescribing and stewardship competencies (developed by the Department of Health advisory committee on antimicrobial resistance and healthcare associated infections (ARHAI)) to help develop their practice in relation to prescribing antimicrobials.
- Nurses have a significant role to play in limiting the threat posed by AMR.
- They should be educated on the importance of avoiding missed and/or omitted doses (to maintain therapeutic levels) and ensuring that all diagnostic tests are carried out promptly.
• A targeted education strategy may facilitate the role that nurses also play in questioning and highlighting the duration of therapies and prescription of medications where these do not meet with established organisational guidelines.
9. References:

1. Start Smart then Focus Antimicrobial Stewardship Toolkit for English Hospitals Updated March 2015


8. NICE guidelines August 2015; Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use