ANTIMICROBIAL STEWARDSHIP:

“START SMART - THEN FOCUS”

Guidance for Antimicrobial Stewardship for Hospitals in Wales
Antimicrobial Stewardship: “Start Smart - then Focus”

Right Drug, Right Dose, Right Time, Right Duration - Every time.

Current evidence clearly demonstrates that the inappropriate use of broad-spectrum antibiotics is associated with the selection of antibiotic resistant bacteria such as Extended-Spectrum Beta-Lactamase (ESBL)-producing Gram-negative bacteria as well as the specific acquisition of MRSA and the induction of Clostridium difficile infection (CDI). In particular, it has been recommended that the use of broad spectrum antibiotics such as cephalosporins, quinolones and broad-spectrum penicillins (including co-amoxiclav) and clindamycin should be avoided unless there are clear clinical indications for their use.

Data published by the Welsh Antimicrobial Resistance Programme shows that resistance in E. coli and other coliforms is increasing [link to data]. The data also shows significant variability in antibiotic use across Wales with stable use in some Health Boards, and increasing use in others. Control of Antibiotic use can control the spread of resistance, support reductions in CDI, and reduce unnecessary expense.

An Antimicrobial Stewardship programme is seen as a key component in the reduction of HCAI infections in a healthcare setting.

The elements of an Antimicrobial Stewardship Programme should include the following:

- **An Antimicrobial Stewardship Committee or Management Team**: A multidisciplinary committee should be set up to develop and implement the Health Board’s antimicrobial stewardship programme for all adults and children admitted to hospital. The committee/team should report to the organisation’s Director of Infection Prevention and Control/Infection Control Committee and the Drugs and Therapeutic Committee (or equivalent). The key roles of the Antimicrobial Stewardship committee should be to:
  - Ensure that evidenced based local antimicrobial guidelines are in place and reviewed annually.
  - Ensure regular auditing of the guidelines, antimicrobial stewardship practice and quality improvement measures.
  - Formally report a regular review of the organisation’s retrospective antibiotic consumption data.
  - Identify actions to address non-compliance to local guidelines, antimicrobial stewardship guidelines and prescribing issues highlighted.

In addition to the committee/management team, it is suggested that organisations develop an Antimicrobial Stewardship Ward Focused Team (Antimicrobial pharmacist and/or consultant microobiologist) that report to the Committee/Management Team and are available to review prescriptions at ward level if required.

- **Evidence based antimicrobial prescribing guidelines**: It is recommended that evidence based local guidelines for the diagnosis and treatment of common infections and for prophylaxis of infection should be drawn up by each organisation based on national guidance. Prescribers should to adhere to guidelines and adherence should be monitored and supported by senior clinicians and pharmacists. Goals of local prescribing guidelines should be to:
  - 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 and follow-up and contingency advice for treatment failure.
Suggest typical treatment course length for intravenous and oral agents.
Require single dose surgical prophylaxis regimens as appropriate.

Quality Improvement Measures/Audits: Procedures should be in place to ensure prudent antibiotic prescribing and antimicrobial stewardship. There should be an ongoing programme of audit, revision and update monitored by the antimicrobial management team.

- A multi-disciplinary quality improvement/audit programme for antimicrobial stewardship should be developed and sustained in each Health Board. Regular (at least annual) feedback of adherence to prescribing standards should be provided to the Trust Board (as part of the annual infection control committee (or equivalent) report), prescribers, lead clinicians and microologists, nurses, pharmacists and the DIPC.
- The Antimicrobial Stewardship Committee/Management Team should review antibiotic consumption trends regularly (at least annually).
- Action should be taken to investigate and address non-adherence to best practice for antibiotic prescribing or unexpected trends in prescribing.

Quality improvement measures and audits should include:

- Monitoring total antibiotic consumption (at least annually).
- Regular monitoring/audit of compliance to components of the Antimicrobial stewardship algorithms and best practice for antibiotic prescribing. Examples include:
  - % of antibiotic prescriptions that follow local antibiotic policy/guidelines.
  - % of patients with evidence of clinical review and decision at 48 hours.
  - Use of the five options after clinical review as auditing interventions e.g. % of IV to oral switch, % of OPAT, % changed to narrow spectrum antibiotic, % of ward based interventions.

ANTIMICROBIAL STEWARDSHIP: “Start Smart – then Focus”

All Clinicians should ideally within one hour (or as soon as possible) -

START SMART:

- Initiate prompt effective antibiotic treatment within one hour (or as soon as possible) in patients with life-threatening infections

  - Document on drug chart and in medical notes: Route, Indication, Dose, Duration (RIDD)
    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.

  - Obtain Cultures First
    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.

  - Prescribe: Single dose for surgical prophylaxis where antibiotics have been shown to be effective
    Critical to this advice is that the 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. A repeat dose of antibiotic prophylaxis is required when the operation is longer than the half-life of the antibiotic given. Antibiotic treatment (in addition to prophylaxis) should be given to patients having surgery on a dirty or infected wound (Surgical Prophylaxis Algorithm – figure 2)

THEN FOCUS

- Review the clinical diagnosis and the continuing need for antibiotics by 48 hours and make a clear plan of action - the “Antimicrobial Stewardship Decision”
  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.

- The five Antibiotic Stewardship Decision options are Stop, Switch, Change, Continue and OPAT:
1. **Stop** antibiotics if there is no evidence of infection
2. **Switch** antibiotics from intravenous to oral
3. **Change** antibiotics – ideally to a narrower spectrum – or broader if required
4. **Continue** and review again at 72 hours
5. **Outpatient Parenteral Antibiotic Therapy (OPAT).**

It is essential that the review and subsequent decision is clearly documented in the medical notes.
Advocating patient safety and auditing of antimicrobial stewardship in hospitals should be based around the principles stated in this ASP algorithm. Examples of audit tools are shared in Appendix 2.

**Figure 1: Antimicrobial Stewardship – Antibiotic Treatment Algorithm**

- **START SMART**
  - Take history of relevant allergies
  - Comply with local prescribing guidance
  - Document clinical indication and dose on drug chart and in clinical notes
  - Include review/stop date or duration
  - Ensure relevant microbiological specimens taken

- **THEN FOCUS**
  - **CLINICAL REVIEW & ASP DECISION AT 48 HOURS**
    - Clinical review, check microbiology, make and document ASP decision
      - **1. STOP**
      - **2. IV/oral switch**
      - **3. Change: to narrow spectrum agent**
      - **4. Continue and review again at 72 hours**
      - **5. OPAT**

- **DOCUMENT DECISION**
  - *Outpatient Parenteral Therapy*
Antimicrobial stewardship

Right Drug, Right Dose, Right Time, Right Duration...
...... Every time.

SINGLE DOSE SURGICAL PROPHYLAXIS*1

Surgical prophylaxis
ONE DOSE

Within 60 minutes of knife to skin?

- Clean surgery involving placement of a prosthesis or implant
- Clean contaminated surgery
- Contaminated surgery

* A repeat dose of prophylaxis is required when the operation is longer than the half life given. Antibiotic treatment should be given (in addition to prophylaxis) to patients having surgery on a dirty or infected wound

References:
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<thead>
<tr>
<th>Description</th>
<th>Rationale</th>
<th>Audit(s) and frequency</th>
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<tbody>
<tr>
<td>1. Urgent treatment of infection emergencies</td>
<td>For severe or life-threatening infection, start prompt treatment with broad-spectrum antibiotic agents urgently (within one hour of diagnosis).</td>
<td>Delay to starting adequate antibiotic therapy in severe infection is associated with increased morbidity and mortality</td>
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<td>2. Communication of decision to prescribe antibiotics</td>
<td>Document the decision to start antibiotic therapy along with the indication or provisional diagnosis in medical records and on medication charts (must include clear identification of prescriber and contact details)</td>
<td>Communication between healthcare teams is vital to safe and effective patient care and mandated by the Royal Colleges. Requirement to document prescribing will discourage antibiotic prescribing where evidence of infection is lacking.</td>
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<td>3. Microbiological investigation</td>
<td>Appropriate specimens should be obtained for MC&amp;S according to local guidelines.</td>
<td>Allows for prompt de-escalation of broad-spectrum agents or tailoring therapy in cases of treatment failure.</td>
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<td>4. De-escalation</td>
<td>Review of MC&amp;S results should be documented within 24 hours of reporting and broad-spectrum therapy de-escalated or a rationale documented for continuing.</td>
<td>Unnecessary continuation of broad spectrum antibiotics is associated with healthcare-associated infection</td>
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<td>5. Guideline choice of agent(s)</td>
<td>Select antibiotic therapy according to local guidelines where available. Document rationale for deviation from local guidelines.</td>
<td>Communication mandated by Royal Colleges. Will discourage off-guideline prescribing whilst allowing for exceptional cases. May opt to include dose and route of administration in audit.</td>
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<tr>
<td>Components of Best Practice for Antibiotic Prescribing (Treatment)</td>
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<td><strong>6. Review date</strong></td>
<td><strong>Description</strong></td>
<td><strong>Rationale</strong></td>
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<tr>
<td></td>
<td>An expected duration or review date should be documented on the prescription when antibiotics are prescribed.</td>
<td>Communication mandated by Royal Colleges. Will discourage open-ended prescriptions.</td>
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<tr>
<td><strong>7. IV duration</strong></td>
<td>Treatment with IV antibiotics should not continue <strong>beyond 48-72 hours</strong> unless recommended by local guideline or microbiologist. <strong>Rationale for continuing IV should be clearly documented.</strong></td>
<td>Unnecessary continuation of IV treatment increases the risk of line infection.</td>
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<tr>
<td><strong>8. IV-to-oral switch (IVOS)</strong></td>
<td>Treatment with IV antibiotics should be switched to oral therapy within 24 hours of <strong>meeting local switch criteria.</strong></td>
<td>Unnecessary continuation of IV treatment increases the risk of line infection.</td>
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<td><strong>9. Total duration</strong></td>
<td>Treatment with antibiotics should not continue <strong>beyond 7 days (IV and oral)</strong> unless recommended by a local guideline or microbiologist. <strong>Rationale for continuing should be clearly documented.</strong></td>
<td>Prolonged treatment with antibiotics for uncomplicated infection is not associated with improved outcome.</td>
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**Components of Best Practice for Antibiotic Prescribing (Peri-operative prophylaxis)**

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<td>1. Need for prophylaxis</td>
<td>Indication should comply with NICE 74: Prevention and treatment of surgical site infection or other evidence based recommendations i.e. prophylaxis ‘recommended’ or ‘should be considered’ for a procedure Antibiotic prophylaxis is usually only recommended for clean-contaminated, contaminated or dirty procedures, in accordance with local guidelines.</td>
<td>For certain clean procedures, evidence suggests a lack of benefit of antibiotics.</td>
<td>Integrate into current Saving Lives or WHO Safer Surgery Checklist* audits for surgery</td>
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<td>2. Guideline choice of agents</td>
<td>Prescribe prophylaxis with appropriate agents according to local guidelines. Use narrow spectrum agent(s) when possible. Avoid cephalosporins, clindamycin, quinolones and co-amoxiclav whenever possible. Use appropriate alternatives for patients with penicillin/ beta-lactam allergy</td>
<td>Ensure adequate coverage of expected pathogens according to surgical site.</td>
<td>Integrate into current Saving Lives or WHO Safer Surgery Checklist* audits for surgery</td>
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<tr>
<td>3. Timing</td>
<td>Administer antibiotics within 60-minutes prior to incision (or tourniquet) or according to local guidelines(^\text{18}).</td>
<td>Lowest surgical site infection rates associated with pre-incision administration.</td>
<td>Integrate into current Saving Lives or WHO Safer Surgery Checklist* audits for surgery</td>
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* [http://www.who.int/patientsafety/safesurgery/toolsresources/SSSLChecklistfinalJun08.pdf](http://www.who.int/patientsafety/safesurgery/toolsresources/SSSLChecklistfinalJun08.pdf) [Accessed 08 August 2011]
Components of Best Practice for Antibiotic Prescribing (Peri-operative prophylaxis)

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| 4. Duration/Repeat doses | Single dose is indicated for the majority of procedures. Reason for antibiotic administration beyond one dose should be documented  
- Significant intra-operative blood loss - >1.5 litre (re-dose following fluid replacement).  
- Prolonged procedure (> 4 hours) depending on half-life of the antibiotic given for example additional dose not required for teicoplanin or vancomycin)  
- Primary arthroplasty (Single dose is preferable but up to 24 hours prophylaxis acceptable). | Antibiotics often short half-life or haemodilution effect with replacement fluid or blood products. |  |
| 5. MRSA positive patients | Decolonisation therapy is recommended prior to surgery and antibiotic prophylaxis should include cover for MRSA. Glycopeptides or co-trimoxazole are suitable agents. Gentamicin may also be considered if local resistance rates are low | Integrate into current Saving Lives audits for surgery or MRSA decolonisation audits |  |