The 5x5 Antimicrobial Audit

AUDIT USER GUIDE

Introduction

Antimicrobial stewardship (AMS) is a key strategy in the prevention and control of healthcare associated infections[1]. Under the National Safety and Quality Health Service Standards, Australian hospitals are required to demonstrate that an antimicrobial stewardship program is in place, antimicrobial usage is monitored and action is taken to improve the effectiveness of antimicrobial stewardship[1]. Measuring the quality of antimicrobial prescribing within a health facility is an AMS activity that contributes to meeting these goals and helps to identify targets for improvement[2].

Point prevalence surveys that measure appropriateness of antimicrobial therapy (or concordance with guidelines as a surrogate measure) provide a valuable and detailed snapshot of antimicrobial prescribing[3,4]. Unfortunately these study designs are often quite time-consuming and labour-intensive to carry out[5]. Many healthcare facilities are unable to perform point prevalence surveys on a regular basis, and often undertake these surveys no more than once per year.

Founded in 2008, the Scottish Antimicrobial Prescribing Group (SAPG) is responsible for coordinating a national antimicrobial stewardship program in Scotland[6]. The SAPG have made significant improvements in the quality of antimicrobial prescribing in Scottish hospitals through the development of national antimicrobial prescribing indicators[6]. A focus on these indicators shifted the emphasis of antimicrobial prescribing surveillance towards frequent, sustainable process measures which encourage regular feedback directed to specific groups of prescribers[5]. The indicator for hospital-based empirical prescribing is divided into two components: documentation of the antimicrobial indication in the case notes, and concordance of the choice of antimicrobial agent with local antimicrobial policy[5]. The target for both components of this indicator is ≥ 95%.

Based on the lessons learned from the SAPG, the 5x5 Antimicrobial Audit has been developed as a quality measure of empirical antimicrobial prescribing that is adaptable to the needs, resources and limitations of a variety of NSW public hospitals.

Components of the 5x5 Antimicrobial Audit Resource Package

- This **Audit User Guide**, which includes:
  - Details of the audit methodology
  - Data Collection Form (*Appendix A*)
  - List of Audit Definitions (*Appendix B*)
  - Eligibility Flowchart (*Appendix C*)
  - Audit Coordinator Checklist (*Appendix D*)
- **Frequently Asked Questions**
- **Data Entry & Review System**
- **Guide to the Data Entry & Review System**
- **Community Acquired Pneumonia Cheat Sheet**
- **Challenging Cases Tutorial**
- **Clinician Engagement Tools**, including:
  - Letter to Prescribers
  - Presentation for Prescribers
  - Audit Information Flyer for Prescribers
  - Ward Posters

All components of the audit package are available for download from the CEC QUAH website:

www.cec.health.gov.au/programs/quah

Aim of the audit

The primary aim of the 5x5 Antimicrobial Audit is to introduce regular, frequent and directed measurement and reporting of antimicrobial prescribing indicators in NSW local health districts and networks, based on the work of the SAPG. While these do not provide an in-depth analysis of appropriateness, such measurements offer insight into clinician prescribing practices and are ideal process measures for AMS.

A secondary aim of the audit is to pair the auditing process with clinically appropriate interventions where indications are unclear and/or empirical antimicrobial prescribing is found to be non-concordant with local guidelines.

Suitability Assessment

The 5x5 Antimicrobial Audit has been successfully piloted in acute care hospitals across a wide range of peer groups, targeting a variety of wards and clinical specialties. Despite this, it is acknowledged that this particular audit and feedback methodology may not be suitable for all healthcare facilities. Potential users of the audit are advised that the key benefits offered by this activity are more likely to be realised if:

- The audit is used to target a specific subset of antibiotic prescribers, often distinguished by location, unit or specialty (e.g. general medical patients on wards M1 and M2, respiratory patients on acute care wards at Hospital A)
- Systemic, empirically-prescribed antimicrobial therapy is used regularly within the target location, unit or specialty, sufficient that at least 20 eligible patients will be encountered per month (see *Patient Eligibility*)
- Suitable clinical personnel are available to collect data, make interventions, perform data analysis and provide targeted feedback to prescribers on a regular and ongoing basis
- Antibiotic prescribers are able to be engaged with the audit purpose and will be open to receiving feedback regarding indicator results at consistent intervals.

Method

Audit Preparation

Successful implementation of the 5x5 Antimicrobial Audit requires an organised approach in the pre-audit preparation phase. Assessing available time and personnel resources, as well as levels of engagement with clinicians and other stakeholders, are important considerations.

Although the processes of audit preparation will vary considerably between different facilities, Audit Coordinators are encouraged to make use of the Audit Coordinator's Checklist provided in *Appendix D*.

Sampling of Patients

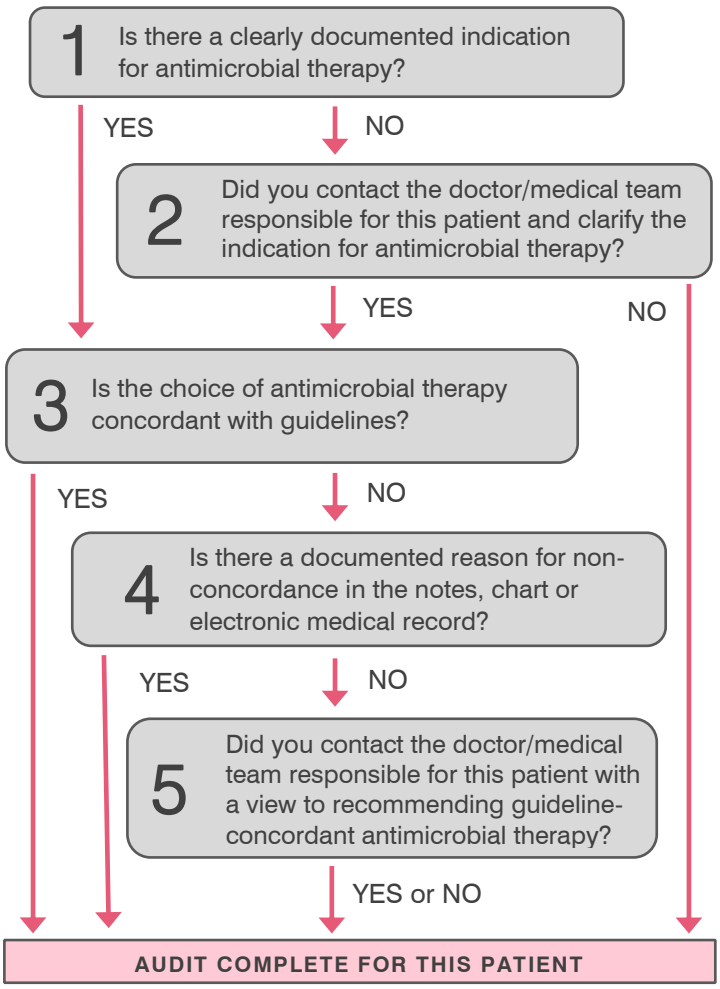
Sample Population: The target location, unit or specialty should be determined prior to commencing data collection, and must include acute care patients in whom antimicrobials are prescribed empirically.

Day of data collection: Where possible, the day of the week that data is collected should be varied, ideally between Tuesday, Wednesday, Thursday and Friday.

Target number of patients: At least 20 complete audit records are required per month* for each location, unit or specialty. This may be collected as 5 patients per week (recommended) or 20 patients in a single week.

Patient Sampling Procedures: Patients should be selected at random. This may be facilitated by counting sequences or another suitable method. All care should be taken to reduce the risk of sampling bias.

Figure 1: Flow of audit questions



*Meeting or exceeding the monthly quota for data collection is a critical target. When reviewing data collected for less than 20 patients per month, indicator results (usually expressed as a percentage) must be presented and interpreted with a small sample size in mind.

Patient Eligibility: To be eligible for inclusion in the audit, the following criteria must be fulfilled:

(i) The patient must have current orders for systemic antimicrobial therapy, AND

(ii) Therapy must have been prescribed empirically and is not a continuation of stable treatment commenced prior to this episode of hospitalisation, AND

(iii) Fewer than 5 days have elapsed between the in-hospital identification of an indication for antimicrobial therapy and the time of data collection.

Auditors are encouraged to use the Eligibility Flowchart *(Appendix C)* to assist in determining patient eligibility.

Data Points for Collection

Date Audited: The date on which the data was collected.

Other parameters: Data on the chosen analysis parameters (e.g. "hospital, location and specialty", or "ward, specialty and team") for the patient being audited.

Daily Patient Number: The sequential number of patients audited on a given date. The first patient audited on a single day has daily patient number 1, the second patient is number 2, etc.

Audit Record Number: A number assigned to each audit record, using the *Date Audited* and the *Daily Audit Number*. For example, the third patient audited on the on 7th May 2015 would be assigned audit number 07051503. Where there is more than one auditor active during a single day, care must be taken to ensure unique audit numbers are assigned when data is being collated.

Patient Identifiers: Collecting patient identifiers with each audit record is not a requirement, as long as there is a strategy in place to avoid the same patient being inadvertently audited twice. Auditors may wish to keep a record of medical record numbers and patient initials, in case further investigation is required or to assist with providing more detailed feedback to prescribers.

Audit Questions: Five closed-ended questions (see *Figure 1* and *Appendix A*), which must be answered 'Yes', 'No' or 'N/A' ('N/A' should be selected only where instructed).

Comments: The comments section is for auditors to record other details of interest, highlight audit barriers or justify their reasoning for specific audit answers.

Data Collection Procedure

Where a randomly sampled patient is found to be eligible, antimicrobial prescribing processes are reviewed in terms of indication documentation and guideline concordance. Auditors must consider information contained in the patient chart, notes and electronic medical record to inform their responses. Where information from these sources is either absent or unclear, auditors may be prompted to contact a doctor. These interventions (prompted by questions 2 and 5) are encouraged, but may not be appropriate in all scenarios and are enacted at the auditor's own discretion.

Once an indication is known, the auditor compares the choice of antimicrobial(s) with that which is recommended in guidelines for the given indication. When a clear indication is not available from either the chart, notes, electronic medical record or doctor/medical team, guideline concordance cannot be reviewed and the audit record is complete.

For the purpose of this audit, only the choice of antimicrobial must be concordant with guidelines

(Concerns regarding an antimicrobial dose, route, frequency, etc. should be acted upon according to the auditors regular duty of care, outside the scope of data collection.)

If the facility has locally endorsed therapeutic guidelines for antimicrobial prescribing, these should be used to determine concordance. If the facility does not have locally endorsed guidelines for the given indication, the current version of *Therapeutic Guidelines: Antibiotic* should be used. If neither locally endorsed guidelines nor the *Therapeutic Guidelines: Antibiotic* have recommendations, the patient is out of scope and the data is discarded.

Two interventions may be prompted during data collection:

1. **Contacting the doctor attending to the patient to confirm an unclear or undocumented indication.** This action improves communication regarding antimicrobial therapy and encourages clear documentation of antimicrobial indications.
2. **Recommending guideline-concordant antimicrobial therapy where current therapy is non-concordant.** This action encourages prescribing in concordance with guidelines (or documentation of a reason for diverging from guidelines), and may be an opportunity for prescriber education regarding locally endorsed guidelines or the *Therapeutic Guidelines: Antibiotic*.

A variety of resources have been included in the audit package to support auditors undertaking data collection. These include the *List of Definitions* (see *Appendix B*), *Frequently Asked Questions, Community Acquired Pneumonia (CAP) Cheat Sheet* and the *Challenging Cases Tutorial.*

It is important that auditors are consistent with their interpretation of data collection rules and definitions. Where more than one auditor is collecting data, regular discussion of difficult cases is strongly recommended to reduce the impact of inter-rater variability.

Data Entry & Analysis

As part of the 5x5 Antimicrobial Audit Package, a standardised database is available in the form of a Microsoft Excel workbook. This item is called the *5x5 Data Entry & Review System* and functions as a semi-automated tool for collating and analysing data based on up to four parameters (e.g. date, hospital, location and specialty). A *Guide To The Data Entry & Review System* is also available, which provides basic instruction on how to generate graphs and statistics to support the feedback process.

Results and Feedback

The key results of the 5x5 Antimicrobial Audit are for the following prescribing indicators:

Indicator 1:	An indication for antimicrobial therapy is clearly documented
Indicator 2:	Choice of antimicrobial therapy is concordant with guidelines (or there is a documented reason for non-concordance)

Provision of feedback is a critical component of the 5x5 Antimicrobial Audit as a quality improvement initiative. Research has shown that regular and targeted feedback can be a powerful strategy for modifying prescribing behaviours when measuring concordance with clinical guidelines[7]. The most effective feedback has been found to be that which is timely, non-punitive and individualised[8]. More generally, audit and feedback is most effective when feedback is provided by a respected peer or supervisor, on more than one occasion, in both verbal and written formats, and with an explicit target and action plan[9]. Audit sites are encouraged to keep these points in mind when developing a feedback plan.

Feedback for the target prescribers

At a prescriber level, providing ward, unit or specialty-specific feedback at regular intervals is of vital importance. Feedback should be delivered to the doctors/medical teams responsible for the audited patients and may combine both active and passive approaches. Presentation of results at clinician meetings is highly recommended as such a forum allows for group discussion and a review of the cases where indicators were missed. Updates of audit results may also be posted in a private area such as a doctor's room or on a staff bulletin board. Audit coordinators should work with their prescribers to develop a feedback strategy which best meets their needs.

Feedback at a Facility and/or LHD Level

At a more facility-wide or LHD level, monthly reports can be distributed to other stakeholders, such as relevant Heads of Department, Quality Managers, and the Director of Clinical Governance. Audit coordinators are also encouraged seek out forums for regular discussion of overall results, including JMO education sessions or grand rounds. Monthly results should also be shared with the relevant committee that oversees AMS, for the development of action points to address gaps in clinical practice.

Limitations

The 5x5 Antimicrobial Audit has been designed to be adaptable to a wide variety of facilities differing in size, location and resources. As a result, there are a number of limitations which need to be acknowledged.

The audit does not measure appropriateness of antimicrobial therapy. The recording of whether or not antimicrobial therapy is concordant with guidelines is considered a surrogate marker for appropriateness, however there may be legitimate reasons that the guidelines are not followed for a specific patient. Documenting a reason for non-concordance in the patient records is measured and should be considered when interpreting results.

Although auditors are expected to be trained in the data collection procedure, **a degree of inter-rater variability is expected**. Where an auditor is unsure of whether a clear indicator has been documented, or whether antimicrobial therapy is concordant with guidelines, they are encouraged to discuss the scenario with their audit coordinator and

other auditors who are familiar with the audit and its definitions. Attempts to reduce variation among auditors have been made by validating the audit tool during its development and the availability of a Frequently Asked Questions document and Challenging Cases Tutorial, which provide scenario-based guidance on data collection.

For instances where an auditor records contact with a doctor, the question parameters are strict. **The audit tool does not capture whether an auditor's intervention actually led to a change therapy or management.**

The audit focuses specifically on the processes prescribers have followed, thus **analysing the correctness of a documented indication or rationale is outside the audit scope**. If an auditor has concerns regarding the accuracy of the documented indication or the quality of the documented reason for non-concordance, they are encouraged to discuss their concerns with the doctor/medical team directly.

Acknowledgements

This audit tool has been adapted (with permission) from the work of the Scottish Antimicrobial Prescribing Group. The CEC would also like to acknowledge the guidance and support of the CEC AMS Expert Advisory Committee and the fifteen NSW facilities who piloted the audit over a 12 month period.

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5x5 Antimicrobial Audit

Data Collection Tool

Date Audited:	Daily Patient Number:	Patient Identifier:
Hospital:	Location/Unit:	Specialty/Team:

1	Is there a clearly documented indication for antimicrobial therapy?	◯ YES (Mark Q2 N/A and go to Q3) ◯ NO
2	Did you contact the doctor/medical team responsible for this patient and clarify the indication for antimicrobial therapy?	◯ YES ◯ NO (Mark Q3, Q4 and Q5 N/A) ◯ N/A
3	Is the choice of antimicrobial therapy concordant with guidelines?	◯ YES (Mark Q4 and Q5 N/A) ◯ NO ◯ N/A
4	Is there a documented reason for non-concordance in the notes, chart or electronic medical record?	◯ YES (Mark Q5 N/A) ◯ NO ◯ N/A
5	Did you contact the doctor/medical team responsible for this patient with a view to recommending guideline-concordant antimicrobial therapy?	◯ YES ◯ NO ◯ N/A

Comments:

Date Data Collated:

Audit Record Number:

Date Audited:	Daily Patient Number:	Patient Identifier:
Hospital:	Location/Unit:	Specialty/Team:

1	Is there a clearly documented indication for antimicrobial therapy?	◯ YES (Mark Q2 N/A and go to Q3) ◯ NO
2	Did you contact the doctor/medical team responsible for this patient and clarify the indication for antimicrobial therapy?	◯ YES ◯ NO (Mark Q3, Q4 and Q5 N/A) ◯ N/A
3	Is the choice of antimicrobial therapy concordant with guidelines?	◯ YES (Mark Q4 and Q5 N/A) ◯ NO ◯ N/A
4	Is there a documented reason for non-concordance in the notes, chart or electronic medical record?	◯ YES (Mark Q5 N/A) ◯ NO ◯ N/A
5	Did you contact the doctor/medical team responsible for this patient with a view to recommending guideline-concordant antimicrobial therapy?	◯ YES ◯ NO ◯ N/A

Comments:

Date Data Collated:

Audit Record Number:

5x5 Antimicrobial Audit

List of Audit Definitions

"Antimicrobial therapy"

Antimicrobials currently prescribed for systemic use (i.e. by the parenteral and oral route, including those given by supplementary routes such as through a naso-gastric, PEG or PEJ tube). As per the audit eligibility rules, this definition will exclude antimicrobial therapy which has not been prescribed empirically, or which represents a continuation of stable treatment commenced prior to the current episode of hospitalisation.

"Choice of antimicrobial therapy"

The antimicrobial agent(s) (medication) currently prescribed on the medication chart, regardless of the dose, dose form, frequency or administration times.

"Clearly documented indication"

A rationale for prescribing antimicrobial therapy, provided with enough clarity and precision in the patient's notes, medication chart or electronic medical record that it may be matched to a diagnosis or diagnostic related group in the relevant antimicrobial prescribing guidelines. If the patient is receiving antimicrobial therapy for separate and concurrent infections, all indications must be documented. The indication must have been documented by a doctor, as opposed to being written on the chart or notes by a nurse or pharmacist.

"Concordant with guidelines"

The choice of antimicrobial therapy matches what is recommended in current locally endorsed guidelines, or if these are not available, the latest version of *Therapeutic Guidelines: Antibiotic*.

"Contact with doctor/medical team"

Verbal and/or written communication between an auditor and the doctor or team of doctors currently responsible for the patient.

"Doctor/Medical Team"

The doctor or team of doctors currently responsible for the patient, regardless of the identity of the original prescriber of antimicrobial therapy.

"Documented Reason for Non-Concordance"

A rationale for diverging from guideline recommendations, provided with enough clarity and precision in the patient's notes, medication chart or electronic medical record that it may be understood by a healthcare professional to be a proposed justification for guideline non-concordance. The rationale must highlight specific patient factors and/or refer to a particular clinical context.

"Empirical therapy"

Antimicrobial therapy intended to treat an infection for which the causative organism is unknown at the time of prescribing.

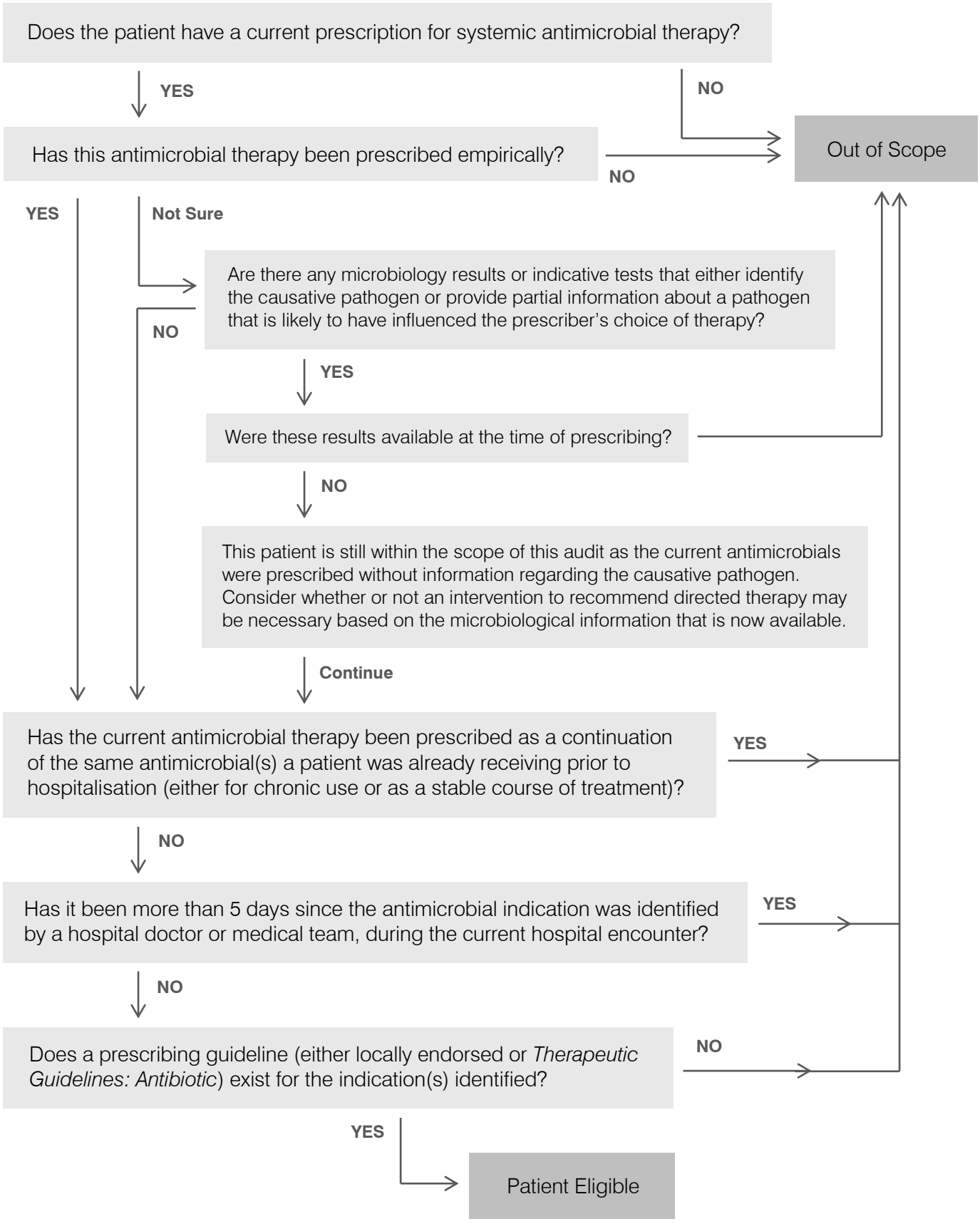
"Locally Endorsed Guidelines"

Antimicrobial prescribing guidelines which have been approved by the local committee that oversees antimicrobial use (often an Antimicrobial Stewardship Committee and/or a Drug & Therapeutics Committee).

For more detailed advice about interpreting audit terminology in specific scenarios, please see the 5x5 Antimicrobial Audit *Frequently Asked Questions*

5x5 Antimicrobial Audit

Eligibility Flowchart



5x5 Antimicrobial Audit

Audit Coordinator Checklist

General Decisions

- ◯ **An appropriate audit focus (e.g. ward or team) has been selected**
  Data collection should be as focused as possible on a particular audit population, such as a medical ward or a specific team or specialty, to be able to provide targeted prescriber feedback whilst still able to produce at least 20 audit records per month.
- ◯ **Suitable personnel have been selected as auditors**
  Ideal auditors include pharmacists, doctors and registered nurses with an interest in antimicrobial stewardship.
- ◯ **An audit launch date has been chosen (i.e. commencement of data collection)**

Communication & Engagement

- ◯ **Target prescriber group(s) have been engaged**
  All prescribers whose patients may be audited must be aware of the audit and have opportunities to ask questions or voice concerns. A range of clinician engagement tools are available to support this process.
- ◯ **Other relevant stakeholders have been engaged**
  This list should include nursing unit managers, a member of the hospital executive (e.g. Director of Medical Services), and quality managers, and may also include department heads, pharmacists and nursing staff.
- ◯ **Other channels of communication have been considered**
  Ward posters, providing auditors with 'Information for Prescribers' flyer, discussions at ward meeting, etc.

Auditor Preparation

- ◯ **All auditors have been provided with a copy of relevant documents and tools**
  Auditors should receive a copy of the Audit User Guide (including the Data Collection Tool, List of Audit Definitions and Eligibility Flowchart), the Frequently Asked Questions and the CAP Cheat Sheet, as well as a copy of antimicrobial indications for which locally endorsed guidelines exist.
- ◯ **All auditors have received appropriate training**
  Auditors must understand the purpose of the audit and should have read through and understood the various components of the audit resource package. Auditors should also perform some 'practice auditing' with the audit coordinator and complete the Challenging Cases Tutorial.
- ◯ **Auditors are aware of data collection quotas (and appropriate steps to be taken if these cannot be met)**

Data Analysis & Feedback

- ◯ **Appropriate analysis parameters have been selected to support the targeted feedback process**
  The Data Entry & Review System can stratify data based on up to 3 chosen parameters (e.g. "ward, specialty and team" or "Hospital, unit and prescriber"), providing this information is collected for each audit record.
- ◯ **Plans are in place for regular data collation and review**
  E.g. Collate data at end of each week, produce report at end of each month
- ◯ **Plans are in place for regular feedback to prescribers and other stakeholders**
  E.g. Attendance at monthly clinician meetings and AMS committee meetings to discuss latest results, circulation of monthly report via email and posting of monthly updates on bulletin board in staff room.

Contingency Planning

- ◯ **Contingency plans are in place to ensure the audit and feedback continues during periods of staff leave**