

# Recommendations for Implementation of Key Performance Indicators for Antimicrobial Stewardship in Acute Hospitals in Ireland

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*A discussion document by the Hospital Antimicrobial Stewardship Working Group, a subgroup of the RCPI Clinical Advisory Group on Healthcare Associated Infection and Antimicrobial Resistance*

## Background

Antimicrobial stewardship (AMS) is a systematic approach to optimising antimicrobial therapy, through a variety of structures and interventions. AMS includes not only limiting inappropriate use but also optimising antimicrobial selection, dosing, route, and duration of therapy to maximise clinical cure or prevention of infection, while limiting the unintended consequences, such as the emergence of resistance, adverse drug events, and cost. AMS programmes have been shown to reduce inappropriate antimicrobial use, with resulting reductions in antimicrobial resistance, and also lead to more appropriate antimicrobial therapy for infections where therapy is required, with improved clinical outcomes for patients. AMS programmes are highly cost effective, and are capable of saving hospitals many multiples of the cost required to staff and run the programme.

Measurement of the effectiveness of AMS activities is a key component of ongoing quality improvement. In AMS programs, this usually includes measuring antimicrobial use, auditing the quality of prescribing and monitoring process and outcome indicators via a set of key performance indicators (KPIs).<sup>1</sup> For example, the Scottish Antimicrobial Prescribing Group developed antimicrobial prescribing indicators which successfully aimed to reduce the incidence of *Clostridium difficile* infection and antimicrobial resistance (outcome indicators) via two process indicators in relation to prescribing of antimicrobials in hospitals, namely indication for treatment recorded in the patient's healthcare record and antimicrobial choice compliant with local prescribing policy.<sup>2</sup>

It should be noted that KPI results and targets will vary from hospital to hospital (and even within individual hospital departments) depending on case-mix, specialities, etc. and should not be evaluated as pass or fail, but rather a quantitative measurement of ongoing development or a prompt for action.

## Quantity measures of antimicrobial usage

Measuring the volume of antimicrobials used over a set time offers valuable insight into overall consumption and helps to identify relevant changes or trends in usage. This is best done within hospitals by measuring the defined daily dose (DDD) per 100 bed-days used (BDU). However, direct

comparison between hospitals should be undertaken with caution due to differences in case mix and limitations of the DDD system.

The Health Protection Surveillance Centre (HPSC) currently produces six monthly reports of overall and individual hospitals antimicrobial consumption. This report quantifies DDD/100 BDU and for individual hospitals includes additional information on overall antimicrobial rate, comparison to similar hospital types and national median, consumption and decile scores for specific antimicrobial agents.

The Health Service Executive (HSE) has set targets for antimicrobial usage within Irish hospitals. For 2016, the HSE target for antimicrobial use is <80 DDD/100 BDU. These targets are currently in place and will continue to be part of HSE performance management reports.

## **Process indicators of AMS programs**

A number of AMS process indicators can be used as AMS program KPIs. These process indicators can be framed around aspects of the national antibiotic care bundle (Appendix 1). Suggested process indicators include:

- Compliance of choice of antimicrobial agent(s) with hospitals antimicrobial guidelines
- Compliance with IV-PO switch policy for IV antimicrobials
- Proportion of restricted antimicrobial use that is in accordance with hospital prescribing guidelines/local antimicrobial restricted use policy
- Documentation of indication for antimicrobial use
- Compliance with appropriate time to first dose of antimicrobials
- Compliance with de-escalation from empiric to directed antimicrobial treatment when microbiological culture results are available and/or stopping antimicrobials when infection has been ruled out
- Compliance with recommendations from Clinical Microbiologist/infectious Disease physician to de-escalate or stop therapy
- Compliance with prescribing guidelines for community-acquired lower respiratory tract infections (accurate documentation, calculation of CURB-65 score (where appropriate), and compliance with choice of agent(s))
- Compliance with guidelines for surgical prophylaxis (choice of agent(s), and duration of agent(s))
- Compliance with antimicrobial app (where applicable) uptake and usage by prescribers

An example of an AMS process indicator report template is included in Appendix 2.

## **Recommendations of Hospital Antimicrobial Stewardship Working Group**

The HSE management teams currently review hospital antimicrobial consumption (DDD/100 BDU) as part of performance management reports. The Hospital Antimicrobial Stewardship Working Group recommends that such data be stratified as per hospital type (tertiary centre, general hospital, specialist centre, etc.) and used as a quantitative measurement of ongoing development or a prompt for action for individual hospitals. Work is ongoing on a methodology for national monitoring of restricted use antimicrobials such as carbapenems.

Process indicators (or KPIs) represent a means for individual hospitals to monitor their AMS program. Hospitals should pick a number of process indicators relevant to their particular hospital and AMS program, with targets based on local, regional and national data (e.g. based on national point prevalence surveys). These indicators should provide the basis of 3-6 monthly point prevalence audits of particular wards/departments and involve a pre-defined number of patients. Results from KPIs should be fed back to prescribers, wards, directorates and relevant committees within each hospital and form the basis of education and quality improvement initiatives.

Antimicrobial consumption and KPIs should then be reviewed in conjunction with outcome indicators such as incidence of *Clostridium difficile* infection and antimicrobial resistance.

## References

1. Duguid M, Cruickshank M (Eds). Antimicrobial Stewardship in Australian Hospitals. In: Care. Sydney: Australian Commission on Safety and Quality in Health Care, 2011 (<http://www.safetyandquality.gov.au/wp-content/uploads/2011/01/Antimicrobial-stewardship-in-Australian-Hospitals-2011.pdf>).
2. Nathwani D, et al. Antimicrobial stewardship in Scotland: impact of a national programme. Antimicrobial Resistance and Infection Control 2012, 1:7

## Appendix 1: Antibiotic Care Bundle

### Start Smart, Then Focus An Antibiotic Care Bundle for Hospitals



#### Day 1: Start Smart...

1. Start antibiotics only if there is clinical evidence of bacterial infection
  - If there is evidence of bacterial infection, prescribe in accordance with your local antibiotic guidelines and appropriately for the individual patient (see notes below)
2. Obtain appropriate cultures before starting antibiotics
3. Document in both the drug chart and medical notes:
  - Treatment indication
  - Drug name, dose, frequency and route
  - Treatment duration (or review date)
4. Ensure antibiotics are given within four hours of prescription
  - Within 1 hour for severe sepsis or neutropenic sepsis

When deciding on the most appropriate antibiotic(s) to prescribe, consider the following factors:

- History of drug allergy (document allergy type: minor (rash only) or major (anaphylaxis, angioedema))
- Recent culture results (e.g. is patient colonised with a multiple-resistant bacteria?)
- Recent antibiotic treatment
- Potential drug interactions
- Potential adverse effects (e.g. *C. difficile* infection is more likely with broad spectrum antibiotics)
- Some antibiotics are considered unsafe in pregnancy or young children
- Dose adjustment may be required for renal or hepatic failure

Consider removal of any foreign body/indwelling device, drainage of pus, or other surgical intervention

For advice on appropriate investigation and management of infections, consult your local infection specialist(s) (microbiologist, infectious disease physician and/or antimicrobial pharmacist)

#### ...then Focus (Day 2 onwards)

At 24-48 hours after starting antibiotics, make an **Antimicrobial Prescribing Decision**

- Review the clinical diagnosis
- Review laboratory/radiology results
- Choose one of the five options below
- Document this decision

#### Options

1. Stop antibiotic(s)
  - no evidence of bacterial infection, or infection resolved
2. Switch from intravenous to oral antibiotic(s)
  - if patient meets criteria for oral switch
3. Change antibiotic(s)
  - narrower spectrum, if possible;
  - broader spectrum, if indicated
4. Continue current antibiotic(s)
  - review again after further 24 hours
5. Outpatient parenteral antibiotic therapy
  - consult with local OPAT team

Developed by the RCPI Hospital Antimicrobial Stewardship Working Group (2012)  
Adapted, with permission, from the UK Department of Health "Start Smart, Then Focus"  
hospital antimicrobial stewardship programme

## Appendix 2: Example of AMS process indicator results template (25 patients/quarter)

		<b>Prescribing indicators/KPIs;</b>					
		<b>Target</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Year end</b>
			%	%	%	%	%(n)
<b>Compliance of choice of agent with local policy</b>		<b>≥90%</b>					
	<i>n</i>						
<b>Compliance of duration of agent with local policy</b>		<b>≥90%</b>					
	<i>n</i>						
<b>Patient on IV therapy but eligible for PO switch</b>		<b>≤10%</b>					
	<i>n</i>						
<b>% of restricted antimicrobial agents compliant with restricted use guidelines</b>		<b>≥95%</b>					
	<i>n</i>						
<b>Documentation of indication</b>		<b>≥95%</b>					
	<i>n</i>						
<b>Compliance with CA-LRTI</b>	<b>Documentation</b>	<b>≥80%</b>					
	<b>CURB-65 calculated</b>	<b>≥80%</b>					
	<b>Compliance</b>	<b>≥80%</b>					
<b>Surgical prophylaxis</b>	<b>Choice</b>	<b>≥90%</b>					
	<b>Duration</b>	<b>≥80%</b>					

### Key;

	Red	Has not achieved target
	Amber	Close to achieving target (within 10%)
	Green	Has achieved/exceeded target