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# Antimicrobial stewardship: Systems and processes for effective antimicrobial medicine use within human health and healthcare in New Zealand

November 2017



**bpac<sup>nz</sup> guidelines**  
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**NICE** National Institute for  
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**Appendix A.** Published separately. Available from [www.bpac.org.nz/guidelines/3](http://www.bpac.org.nz/guidelines/3)

**A. The NICE Guideline Development Group & New Zealand contextualisation group**

- A.1 Guideline Development Group
- A.2 NICE project team
- A.3 NICE quality assurance team
- A.4 NZ Guideline Review and Contextualisation Group
- A.5 Declarations of interests

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An online version of this guideline is available from the [bpac<sup>nz</sup>](http://www.bpac.org.nz) website:  
[www.bpac.org.nz/guidelines/3](http://www.bpac.org.nz/guidelines/3)

## Introduction

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The UK's National Institute for health and Care Excellence (NICE) provide evidence-based guidance and advice to improve health and social care.

Clinical guidelines are recommendations by NICE on the most effective ways to diagnose, treat and care for people with specific conditions with the NHS and beyond. They are based on the best available evidence of clinical and cost effectiveness. While clinical guidelines help health professionals and others in their work, they do not replace their knowledge and skills.

Good clinical guidelines aim to improve the quality of healthcare and reduce inequalities and variation in practice. They can change the process of healthcare and improve outcomes for patients. Clinical guidelines:

- Help professionals and patients make decisions about the most appropriate treatment and care for specific clinical circumstances
- Can be used to develop standards to assess the clinical practice of individual health professionals
- Can support the education and training of health professionals and others
- Can improve communication between patients and health professionals.

The Best Practice Advocacy Centre New Zealand (bpac<sup>nz</sup>) has an agreement with NICE to contextualise recently published NICE clinical guidelines for the New Zealand health care sector. The contextualisation process is described in detail on the bpacnz website. As part of this bpac<sup>nz</sup> will convene a Guideline Review and Contextualisation Group (GRCG) for each guideline. The GRCG will carefully consider the NICE guideline recommendations, taking into account the differences between the UK and New Zealand health care systems to produce a guideline that is relevant to those delivering and managing care in New Zealand.

The development of a profusion of antimicrobial medicines since the middle of the twentieth century has been one of the greatest advances of medical science. Antibiotic therapy has reduced the mortality and morbidity of almost all serious infections. Furthermore the use of antibiotics to prevent or treat infections has dramatically reduced the risks associated with many medical and surgical procedures, such as the treatment of leukaemia, organ transplantation, and joint replacement surgery. In the absence of effective antibiotic therapy many of these procedures would have unacceptably high risks of failure or death.

Unfortunately, for decades antibiotics have been very widely prescribed for conditions in which they provide no clinical benefit – most commonly for patients with self-limiting respiratory tract infections. High levels of antibiotic use in recent decades have accelerated the evolution and spread of bacteria that are very resistant to many antibiotics. Most alarming has been the emergence of infections caused by microbes resistant to all available antibiotics. Such untreatable infections are expected to increase in the near future, and unless we can dramatically slow this process, by 2050 antimicrobial resistant infections will cause more deaths globally than currently are caused by cancer.

All nations have responded to the threat of antimicrobial resistant infections by implementing antimicrobial stewardship strategies to ensure, not only that patients with serious infections receive the most effective treatment, but also that unnecessary antimicrobial use is dramatically reduced. There is no reason to be complacent about antimicrobial use in New Zealand. We have very high levels of use and rapidly rising levels of antimicrobial resistance. Improved antimicrobial stewardship needs to be a national health priority. This guideline provides comprehensive, carefully considered, evidence based recommendations to support antimicrobial stewardship in New Zealand.

## What is this guideline about and who is it for?

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### Purpose of this guideline

The purpose of this guideline is to provide good practice recommendations on systems and processes for the effective use of antimicrobials.

### Audience for this guideline

- All healthcare providers.
- All organisations funding, providing or supporting the provision of care.
- Adults, young people and children (including neonates) using antimicrobials or those caring for these groups.
- It is anticipated that the MoH, District Health Boards (DHBs) and all healthcare providers will need to work together to ensure that patients benefit from the good practice recommendations in this guideline.

### Scope of this guideline

The bpac<sup>nz</sup> guideline covers the effective use of antimicrobials as part of all publicly and privately funded human healthcare provided throughout New Zealand.

The guideline does not cover:

- specific clinical conditions (although some evidence identified included patients with a specific infection such as community acquired pneumonia)
- named medicines
- public health awareness of antimicrobial resistance
- research into new antimicrobials
- immunisation and vaccination
- antimicrobial household cleaning products
- antimicrobial use in animals and plants, including veterinary/animal health, agricultural/aquaculture/horticultural
- hand hygiene, decolonisation and infection prevention and control measures
- medicines adherence, except where there are specific issues for all healthcare providers to address relating to antimicrobials
- access to medicines, including local decision making for medicines not included on local formularies
- medicines shortages, including supply issues and discontinued medicines
- prescription charges
- waste medicines
- Identification of antimicrobials currently being overused in human health care.
- Introduction of funding or prescribing restrictions on the use of antimicrobials.
- International treaties, rules and governance.

In the New Zealand setting, it is expected that many of these issues will be extensively discussed elsewhere (including in the New Zealand National Antimicrobial Resistance Group).

All NICE guidelines are developed in accordance with the NICE equality scheme.

### Person-centered care

This guideline offers best practice advice on the effective use of antimicrobial medicines.

Patients and health professionals have rights and responsibilities as set out in [the Code of Health and Disability Services Consumers Rights](https://www.hdc.org.nz/the-act--code/the-code-of-rights) [https://www.hdc.org.nz/the-act--code/the-code-of-rights]. Treatment and care should take into account individual needs and preferences. Patients should have the opportunity to make informed decisions about their care and treatment, in partnership with their health professionals. If the person is under 16, their family/whānau or carers should also be given information and support to help the child or young person to make decisions about their treatment. If it is clear that the child or young person fully understands the treatment and does not want their family/whānau or carers to be involved, they can give their own consent. Health professionals should follow the advice on consent provided by the Health and Disability Commissioner and Ministry of Health.

If a person does not have capacity to make decisions, all healthcare providers should follow the code of practice outlined by the [Health and Disability Commissioner](https://www.hdc.org.nz) [https://www.hdc.org.nz] and the [Ministry of Health](https://www.health.govt.nz) [https://www.health.govt.nz]. All health professionals should follow the recommendations in the [Code of Health and Disability Services Consumers' Rights](https://www.hdc.org.nz/the-act--code/the-code-of-rights) [https://www.hdc.org.nz/the-act--code/the-code-of-rights]. In addition, all healthcare providers working with people using adult mental health services should follow the recommendations in the Code of Health and Disability Services Consumers' Rights. If a young person is moving between paediatric and adult services, care should be planned and managed according to the best practice guidance described in the Code of Health and Disability Services Consumers' Rights and [Consent in Child and Youth Health: Information for Practitioners](https://www.health.govt.nz/system/files/documents/publications/consent-in-child-and-youth-health.pdf) [https://www.health.govt.nz/system/files/documents/publications/consent-in-child-and-youth-health.pdf]. Adult and paediatric healthcare teams should work jointly to provide assessment and services to young people and diagnosis and management should be reviewed throughout the transition process. There should be clarity about who is the lead clinician to ensure continuity of care.

# 1. Recommendations

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The following guidance is based on the best available evidence. [The full guideline](http://www.nice.org.uk/Guidance/NG15/Evidence) [www.nice.org.uk/Guidance/NG15/Evidence] gives details of the methods and the evidence used to develop the guidance.

The wording used in the recommendations in this guideline (for example, words such as 'offer' and 'consider') denotes the certainty with which the recommendation is made (the strength of the recommendation). See Page 29 for details.

## Terms used in this guideline

### Antimicrobial stewardship

The term 'antimicrobial stewardship' is defined as 'an organisational or healthcare system wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness'.

### Antimicrobial resistance

The term 'antimicrobial resistance' is defined as the 'loss of effectiveness of any anti infective medicine, including antiviral, antifungal, antibacterial and antiparasitic medicines'.

### Antimicrobials and antimicrobial medicines

The term 'antimicrobials' and 'antimicrobial medicines' includes all anti infective therapies, (antiviral, antifungal, antibacterial and antiparasitic medicines) and all formulations (oral, parenteral and topical agents).

### Organisations

The term 'organisations' (also known as the 'service') is used to include all funders (including MoH, District Health Boards, PHARMAC, Accident Compensation Corporation) and providers (hospitals, Primary Health Organisations, general practitioners (GPs), out of hours services, dentists and other community based providers) of healthcare services, unless specified otherwise. Occasionally, in order to make a recommendation more specific to the intended care setting, the setting is specified; for example, the recommendation will state 'hospital'.

### Healthcare Providers

The term healthcare providers is used to define the wider care team, including but not limited to, case managers, care coordinators, GPs, hospital doctors, microbiologists, midwives, pharmacists, nurses and social workers.



## 1.1 All antimicrobials

### Recommendations for organisations

#### Antimicrobial stewardship programmes

- 1.1.1 The Ministry of Health should consider establishing a New Zealand antimicrobial resistance group (NZ AMR Group) which (among other roles) will provide national leadership and take responsibility for fostering antimicrobial stewardship across all healthcare settings.
- 1.1.2 The NZ AMR Group should consider the provision of the following antimicrobial stewardship activities throughout New Zealand:
- monitoring and evaluating antimicrobial prescribing and how this relates to local resistance patterns
  - providing regular feedback to individual prescribers in all care settings about:
    - their antimicrobial prescribing, for example, by using professional regulatory numbers for prescribing as well as by relevant prescriber groups such as clinical teams (within hospitals) or practice groups (within the community)
    - patient safety incidents related to antimicrobial use, including hospital admissions for potentially avoidable life threatening infections, infections with *Clostridium difficile* or adverse drug reactions such as anaphylaxis
  - providing education and training to all healthcare providers about antimicrobial stewardship and antimicrobial resistance
  - integrating audit into existing quality improvement programmes.
- 1.1.3 The NZ AMR Group should ensure that roles, responsibilities and accountabilities are clearly defined within a national antimicrobial stewardship programme.
- 1.1.4 The NZ AMR Group should encourage lead healthcare providers to establish processes for developing, reviewing, updating and implementing national or regional antimicrobial guidelines informed by local prescribing data and resistance patterns.
- 1.1.5 The NZ AMR Group should consider developing systems and processes for providing regular updates (at least every year) to individual prescribers and prescribing leads on:
- individual prescribing benchmarked against local and national antimicrobial prescribing rates and trends
  - local and national antimicrobial resistance rates and trends
  - patient safety incidents related to antimicrobial use, including hospital admissions for potentially avoidable life threatening infections, infections with *C. difficile* or adverse drug reactions such as anaphylaxis.
- 1.1.6 The NZ AMR Group should consider developing systems and processes for identifying and reviewing whether hospital admissions are linked to previous prescribing decisions in patients with potentially avoidable infections (for example, rheumatic fever, *Escherichia coli* bacteraemias, mastoiditis, pyelonephritis, empyema, quinsy or brain abscess).

**Antimicrobial stewardship teams**

- 1.1.7 Each District Health Board (DHB), if necessary through regional collaboration, should establish an antimicrobial resistant team (DHB AMR Team) and should ensure that the team includes the relevant competencies (including where feasible, an infectious diseases physician, an antimicrobial pharmacist, a medical microbiologist, and a primary care representative) and can co-opt additional members depending on the care setting and the antimicrobial issue being considered. The areas of interest for each DHB AMR Team should encompass all antimicrobial stewardship activities in all healthcare settings within that DHB
- 1.1.8 The NZ AMR Group and the DHB AMR Teams should develop processes that promote antimicrobial stewardship and allocate resources, to:
- review prescribing and resistance data and identify ways of feeding this information back to prescribers in all care settings
  - promote education for prescribers in all care settings
  - advise decision-making by PHARMAC, advised by its Pharmacology and Therapeutics Advisory Committee and its Anti-infective Subcommittee) on antimicrobials listed on the NZ Pharmaceutical Schedule, including access criteria/restrictions for new and existing listings
  - update local formulary and [New Zealand Formulary prescribing guidance](http://nzf.org.nz/nzf_2890) [[http://nzf.org.nz/nzf\\_2890](http://nzf.org.nz/nzf_2890)]
  - help advise PHARMAC about antimicrobial use activities
  - work with prescribers to explore the reasons for very high, increasing or very low volumes of antimicrobial prescribing, or use of antimicrobials not recommended in regional (where available) or national guidelines
  - provide feedback and advice to prescribers who prescribe antimicrobials outside of relevant guidelines when it is not justified.

**Antimicrobial stewardship interventions**

- 1.1.9 The NZ AMR Group and the DHB AMR Teams should consider using the following antimicrobial stewardship interventions:
- review of prescribing by antimicrobial stewardship teams to explore the reasons for increasing, very high or very low volumes of antimicrobial prescribing, or use of antimicrobials not recommended in local (where available) or national guidelines
  - promotion of antimicrobials recommended in local (where available) or national guidelines
  - IT or decision support systems
  - education based programmes for all healthcare providers,(for example, academic detailing, clinical education or educational outreach).
- 1.1.10 The NZ AMR Group and the DHB AMR Teams should consider providing IT or decision support systems that prescribers can use to decide:
- whether to prescribe an antimicrobial or not, particularly when antimicrobials are frequently prescribed for a condition but may not be the best option
  - whether alternatives to immediate antimicrobial prescribing may be appropriate (for example, back up [delayed] prescribing or early review if concerns arise).

- 1.1.11 The NZ AMR Group and the DHB AMR Teams should consider developing systems and processes to ensure that the following information is provided when a patient's care is transferred to another care setting:
- information about current or recent antimicrobial use
  - information about when a current antimicrobial course should be reviewed
  - information about who a patient should contact, and when, if they have concerns about infection.
- 1.1.12 The NZ AMR Group and the DHB AMR Teams should consider prioritising the monitoring of antimicrobial resistance, to support antimicrobial stewardship across all care settings, taking into account the resources and programmes needed.
- 1.1.13 PHARMAC's contracts with suppliers should consider specifying the supply of antimicrobials in pack sizes that correspond to local (where available) and national guidelines on course lengths.
- 1.1.14 The NZ AMR Group and the DHB AMR Teams, with ESR, should consider evaluating the effectiveness of antimicrobial stewardship interventions by reviewing rates and trends of antimicrobial prescribing and resistance.

## Communication

- 1.1.15 The NZ AMR Group and the DHB AMR Teams, with PHARMAC should encourage and support prescribers only to prescribe antimicrobials when this is clinically appropriate.
- 1.1.16 The NZ AMR Group and the DHB AMR Teams, with PHARMAC should encourage all healthcare providers across all care settings to work together to support antimicrobial stewardship by:
- communicating and sharing consistent messages about antimicrobial use
  - sharing learning and experiences about antimicrobial resistance and stewardship
  - referring appropriately between services without raising expectations that antimicrobials will subsequently be prescribed.
- 1.1.17 The NZ AMR Group and the DHB AMR Teams should consider developing local networks across all care settings to communicate information and share learning on:
- antimicrobial prescribing
  - antimicrobial resistance
  - patient safety incidents.
- 1.1.18 The NZ AMR Group and the DHB AMR Teams should consider developing local systems and processes for peer review of prescribing. Encourage an open and transparent culture that allows health professionals to question antimicrobial prescribing practices of colleagues when these are not in line with relevant guidelines and no reason is documented.
- 1.1.19 The NZ AMR Group and the DHB AMR Teams should encourage senior health professionals to promote antimicrobial stewardship within their teams, recognising the influence that senior prescribers can have on prescribing practices of colleagues.

- 1.1.20 The NZ AMR Group and the DHB AMR Teams should raise awareness of current local guidelines on antimicrobial prescribing among all prescribers, providing updates if the guidelines change.

### Laboratory testing

- 1.1.21 The NZ AMR Group and the DHB AMR Teams, with ESR, should ensure that laboratory testing and the order in which the susceptibility of organisms to antimicrobials is reported is in line with:
- national and local treatment guidelines
  - the choice of antimicrobial in the New Zealand Pharmaceutical Schedule and the New Zealand Formulary
  - the priorities of medicines management and antimicrobial stewardship teams.

### Recommendations for prescribers and other healthcare providers

#### Antimicrobial guidelines

- 1.1.22 All healthcare providers should support the implementation of antimicrobial guidelines and recognise their importance for antimicrobial stewardship.

### Recommendations for prescribers

#### Antimicrobial prescribing

- 1.1.23 When prescribing antimicrobials, prescribers should follow regional (where available) or national guidelines on:
- selecting the most appropriate antimicrobial agent
  - prescribing the shortest effective course
  - the most appropriate dose
  - route of administration
- 1.1.24 When deciding whether or not to prescribe an antimicrobial, take into account the disease profile and particular health consequences of the infectious disease in high risk sub populations and the risk of antimicrobial resistance and other potential adverse effects for individual patients and the population as a whole.
- 1.1.25 When prescribing any antimicrobial, undertake a clinical assessment and document the clinical diagnosis in the patient's record and clinical management plan.
- 1.1.26 For patients in hospital who have suspected infections, take microbiological samples before prescribing an empiric antimicrobial and review the prescription when the results are available.
- 1.1.27 For patients in primary care who have recurrent or persistent infections, consider taking microbiological samples when prescribing an antimicrobial and review the prescription when the results are available.
- 1.1.28 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.

- 1.1.29 Consider point of care testing in primary care for patients with suspected lower respiratory tract infections as described in the NICE guideline on [pneumonia](https://www.nice.org.uk/guidance/cg191) [[www.nice.org.uk/guidance/cg191](https://www.nice.org.uk/guidance/cg191)].
- 1.1.30 Prescribers should take time to discuss with the patient and/or their family/whānau 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
  - the views of the patient and/or their family/whānau or carers 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
  - whether they need any written information about their medicines and any possible outcomes.
- 1.1.31 When an antimicrobial is a treatment option, document in the patient's records (electronically wherever possible):
- the reason for prescribing, or not prescribing, an antimicrobial
  - the plan of care as discussed with the patient, their family/whānau member or carer (as appropriate), including the planned duration of any treatment
  - the results of any relevant laboratory test.
- 1.1.32 Do not issue an immediate prescription for an antimicrobial to a patient who is likely to have a self limiting condition.
- 1.1.33 If immediate antimicrobial prescribing is not the most appropriate option, discuss with the patient and/or their family/whānau members or carers (as appropriate) other options such as:
- self care with over the counter preparations
  - back up (delayed) prescribing
  - other non pharmacological interventions, for example, draining the site of infection.
- 1.1.34 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](https://www.nice.org.uk/guidance/cg183) [[www.nice.org.uk/guidance/cg183](https://www.nice.org.uk/guidance/cg183)] (these should be documented in the patient's record)
  - the risk of selection for organisms causing healthcare associated infections, for example, *C. difficile*.

- 1.1.35 When prescribing is outside local (where available) or national guidelines, document in the patient's records the reasons for the decision.
- 1.1.36 Do not issue repeat prescriptions for antimicrobials unless needed for a particular clinical condition or indication. Generally avoid issuing repeat prescriptions for longer than 3 months without review and ensure adequate monitoring for individual patients to reduce adverse drug reactions and to check whether continuing an antimicrobial is really needed.

### Prescribing intravenous antimicrobials

- 1.1.37 Use an intravenous antimicrobial in line with regional or national guidelines for a patient who needs an empirical intravenous antimicrobial for a suspected infection but has no confirmed diagnosis.
- 1.1.38 Review 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.

## 1.2 New antimicrobials

### Recommendations for the NZ AMR Group, DHB AMR Teams, PHARMAC and Medsafe

- 1.2.1 Consider establishing processes to plan for the release of new antimicrobials.
- 1.2.2 When evaluating a new antimicrobial for inclusion in the New Zealand Pharmaceutical schedule, take into account:
- the need for the new antimicrobial
  - its clinical effectiveness
  - the population in which it will be used
  - the specific organisms or conditions for which it will be used
  - dose, dose frequency, formulation and route of administration
  - likely tolerability and adherence
  - any drug interactions, contraindications or cautions
  - rates and trends of resistance
  - the ecological impact of the antimicrobial on the host microbiome
  - whether use should be restricted and, if so, how use will be monitored
  - any additional monitoring needed
  - any urgent clinical need for the new antimicrobial
  - any plans for introducing the new antimicrobial.

These evaluation features are relevant to PHARMAC's funding and defunding decisions and complement and are directly or indirectly incorporated into, [PHARMAC's Factors for Consideration decision-making framework](https://www.pharmac.govt.nz/medicines/how-medicines-are-funded/factors-for-consideration) [7www.pharmac.govt.nz/medicines/how-medicines-are-funded/factors-for-consideration].

- 1.2.3 Decision making groups should assess the benefits and risks of restricting access to a new antimicrobial. This is part of PHARMAC's decision-making framework.

- 1.2.4 If access to a new antimicrobial is restricted:
- document the rationale for and the nature of the restriction, and ensure that this information is publicly available
  - review the restriction regularly to determine that it is still appropriate.
- 1.2.5 Ensure that formularies, prescribing guidelines and care pathways are updated when new antimicrobials are approved for use.
- 1.2.6 Ensure that there is a plan for the timely introduction, adoption and diffusion of a new antimicrobial when this has been recommended for use.
- 1.2.7 Discuss with the NZ AMR Group early in the approval process if funding concerns for a new antimicrobial are likely to cause delay in its introduction, adoption and diffusion.
- 1.2.8 Consider using multiple approaches to support the introduction of a new antimicrobial, including:
- electronic alerts to notify prescribers about the antimicrobial
  - prescribing guidance about when and where to use the antimicrobial in practice
  - issuing new or updated formulary guidelines and antimicrobial prescribing guidelines
  - peer advocacy and advice from other prescribers
  - providing education or informal teaching on ward rounds
  - shared risk management strategies for antimicrobials that are potentially useful but may be associated with patient safety incidents.
- 1.2.9 Indicate where prescribers can find accurate, evidence based and up to date information about the new antimicrobial, such as the:
- [New Zealand Formulary \(NZF\)](http://nzformulary.org) [[↗nzformulary.org](http://nzformulary.org)]
  - [New Zealand Formulary for Children \(NZFC\)](http://www.nzfchildren.org.nz) [[↗www.nzfchildren.org.nz](http://www.nzfchildren.org.nz)]
  - [Medsafe](http://www.medsafe.govt.nz) [[↗www.medsafe.govt.nz](http://www.medsafe.govt.nz)]
  - [British National Formulary \(BNF\)](http://www.evidence.nhs.uk/formulary/bnf/current) [[↗www.evidence.nhs.uk/formulary/bnf/current](http://www.evidence.nhs.uk/formulary/bnf/current)]
  - [British National Formulary for Children \(BNFC\)](http://www.evidence.nhs.uk/formulary/bnfc/current) [[↗www.evidence.nhs.uk/formulary/bnfc/current](http://www.evidence.nhs.uk/formulary/bnfc/current)]
  - [electronic Medicines Compendium \(eMC\)](http://www.medicines.org.uk/emc/) [[↗www.medicines.org.uk/emc/](http://www.medicines.org.uk/emc/)]
  - [European Medicines Agency \(EMA\)](http://www.ema.europa.eu/ema/) [[↗www.ema.europa.eu/ema/](http://www.ema.europa.eu/ema/)]
  - [Medicines and Healthcare products Regulatory Agency \(MHRA\)](http://www.gov.uk/government/organisations/medicines-and-healthcare-products-regulatory-agency). [[↗www.gov.uk/government/organisations/medicines-and-healthcare-products-regulatory-agency](http://www.gov.uk/government/organisations/medicines-and-healthcare-products-regulatory-agency)]
- 1.2.10 Once a new antimicrobial has been funded and approved for use, organisations should consider ongoing monitoring by:
- conducting an antimicrobial use review (reviewing whether prescribing is appropriate and in line with the diagnosis and national guidelines)
  - costing the use of the new antimicrobial
  - reviewing the use of non formulary antimicrobial prescribing
  - evaluating prescribing and resistance patterns
  - reviewing clinical outcomes such as response to treatment, treatment rates, emerging safety issues, tolerability and length of hospital stay.

## 2. Implementation: getting started

This section highlights interventions for changing prescribing practice (education and feedback, and information systems to support data collection and feedback), as these could have a big impact on practice and be challenging to implement. The NICE guideline development group identified these with the help of healthcare providers including GPs and pharmacists, commissioners and Guideline Development Group (GDG) members (see section 9.4 of the manual). [[www.nice.org.uk/article/pmg20/chapter/9-Developing-and-wording-recommendations-and-writing-the-guideline#highlighting-recommendations-for-implementation-support](http://www.nice.org.uk/article/pmg20/chapter/9-Developing-and-wording-recommendations-and-writing-the-guideline#highlighting-recommendations-for-implementation-support)]

### 2.1 The challenge: changing prescribing practice for antimicrobials

#### The benefits

Reducing the use of antimicrobials where they are not indicated will:<sup>1</sup>

- slow down the emergence and spread of antimicrobial resistance
- ensure that antimicrobials remain an effective treatment for infection
- improve clinical outcomes for the population as a whole
- conserve healthcare resources.

#### 2.1.1 Using education and feedback to change prescribing practice

See recommendations 1.1.3, 1.1.6, 1.1.9, 1.1.10, 1.1.17, 1.1.18, 1.1.19

Education and feedback have been recommended as a way of changing prescribers' attitudes and supporting antimicrobial stewardship. Potential barriers that may affect prescribers acting on messages about antimicrobial stewardship include:

- the possible risk of adverse outcomes from not treating
- not seeing the direct impact of their prescribing on antimicrobial resistance
- lack of critical evaluation, review and reflection on their own prescribing practice.

**DHB, PHARMAC and PHO decision makers** could support a change in prescribing practice by:

- allocating resources for education and feedback in their local area and nationally
- using governance processes such as audit so that prescribers follow antimicrobial guidelines
- creating an open and transparent culture so that prescribers can question prescribing when this doesn't follow antimicrobial guidelines
- providing regular updates across the service on individual prescribing, antimicrobial resistance and patient safety incidents
- including antimicrobial stewardship interventions in education programmes which are designed for the setting in which they are to be used

1. The World Health Organization (2015) Factsheet on antimicrobial resistance [[www.who.int/mediacentre/factsheets/fs194/en/](http://www.who.int/mediacentre/factsheets/fs194/en/)]



- encouraging prescribers to reflect on their personal practice
- including objectives for antimicrobial stewardship in prescribers' annual reviews
- signposting prescribers to relevant resources (see Further resources, Page 18 for details of resources you may wish to include)
- using the [NICE baseline assessment tool](https://www.nice.org.uk/guidance/ng15/resources) [ [www.nice.org.uk/guidance/ng15/resources](https://www.nice.org.uk/guidance/ng15/resources)] to evaluate current practice and plan changes
- ensuring that prescribers have the training and skills for antimicrobial stewardship
- ensuring that there are programmes for education and feedback on antimicrobial prescribing and resistance
- ensuring that providers have data about rates and trends of antimicrobial prescribing (for example, summary data from the ESR Surveillance Report on community antimicrobial consumption in New Zealand)
- encouraging local learning networks, possibly across clinical areas or services, linking to DHB AMR Teams and the NZ AMR Group.

**Those responsible for planning pre- and post registration training** for prescribers could support a change in prescribing practice by:

- including information about antimicrobial stewardship in training courses
- providing opportunities for prescribers to demonstrate via continuing professional development (CPD) that they are following the principles of antimicrobial stewardship.

## 2.1.2 Using information systems to change prescribing practice

See recommendations 1.1.3, 1.1.6, 1.1.10, 1.1.11, 1.1.12

Information systems can help antimicrobial stewardship by capturing data to allow feedback on:

- rates and trends of antimicrobial prescribing
- rates and trends of antimicrobial resistance
- patient use of standard and back up (delayed) prescriptions.

However the relevant data are not always captured or easily accessible.

**The NZ AMR Group and DHB AMR Teams** could support the use of information systems to change prescribing practice by:

- supporting the development of a central facility, which presents national and local data on hospital antimicrobial prescribing and resistance in a format that is easy to use
- encouraging the introduction of electronic prescribing where systems are not in place
- commissioning the planning and designing of information systems to support antimicrobial stewardship by establishing working groups (to include IT specialists) across all services; this will need coordination and subgroup working to address differences between the various primary and secondary care services.

**DHB and PHO decision makers** could support the use of information systems to change prescribing practice by:

- circulating the data they receive about rates and trends of prescribing within their organisation
- using data on rates and trends of prescribing in programmes for educating prescribers about antimicrobial stewardship.

## Further resources

### New Zealand

- Antimicrobial resistance prevalence and recent trends:
 

Williamson DA, Heffernan H. The changing landscape of antimicrobial resistance in New Zealand. [<http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-127-no-1403/6315>]

ESR. Antimicrobial resistance surveillance reports. [[https://surv.esr.cri.nz/antimicrobial/antimicrobial\\_resistance.php](https://surv.esr.cri.nz/antimicrobial/antimicrobial_resistance.php)]
- Antimicrobial consumption in the community:
 

Norris P, Horsburgh S, Keown S, *et al.* Too much and too little? Prevalence and extent of antibiotic use in a New Zealand region. *J Antimicrob Chemother* 2011;66:1921-6. [<http://jac.oxfordjournals.org/content/66/8/1921.long>]

Thomas MG, Smith AJ, Tilyard M. Rising antimicrobial resistance: a strong reason to reduce excessive antimicrobial consumption in New Zealand. *NZ Med J* 2014;127:72-84. [<http://journal.nzma.org.nz/journal/127-1394/6136/>]

Williamson DA, Roos RF, Verrall A. Antibiotic consumption in New Zealand, 2006-2014. The Institute of Environmental Science and Research Ltd. Porirua, New Zealand. 2016. [[https://surv.esr.cri.nz/PDF\\_surveillance/AntibioticConsumption/2014/Antibiotic\\_Consumption\\_Report\\_Final.pdf](https://surv.esr.cri.nz/PDF_surveillance/AntibioticConsumption/2014/Antibiotic_Consumption_Report_Final.pdf)]
- Antimicrobial consumption in hospitals:
 

Ticehurst R, Thomas M. Antimicrobial consumption at Auckland City Hospital: 2006-2009. *NZ Med J* 2011;124(1332):9-20. [<http://journal.nzma.org.nz/journal/124-1332/4602/content.pdf>]

Beardsley J, Morar B, Blackmore T. Antimicrobial consumption data from New Zealand hospitals. *NZ Med J* 2011;124:83-5. [<http://www.nzma.org.nz/journal/124-1341/4851/>]

Hopkins C J. Inpatient antibiotic consumption in a regional secondary hospital in New Zealand. *Intern Med J* 2014;44(2)::185-90. [<http://onlinelibrary.wiley.com/doi/10.1111/imj.12345/full>]

Duffy E, Gardiner S, du Plessis T, *et al.* A snapshot of antimicrobial use in New Zealand hospitals – a comparison to Australian and English data. *NZ Med J* 2015;128: 82-4. [<https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2015/vol-128-no-1421-4-september-2015/6651>]

- MoH/MPI strategy for antimicrobial resistance (most up to date version of the New Zealand National Action Plan on Antimicrobial Resistance to be added when available in New Year)

### United Kingdom

- [Antimicrobial prescribing and stewardship competencies](https://www.gov.uk/government/publications/antimicrobial-prescribing-and-stewardship-competencies) [ [www.gov.uk/government/publications/antimicrobial-prescribing-and-stewardship-competencies](https://www.gov.uk/government/publications/antimicrobial-prescribing-and-stewardship-competencies)] (Public Health England, 2013).
- For primary care, the [TARGET antibiotics toolkit](https://www.rcgp.org.uk/clinical-and-research/target-antibiotics-toolkit.aspx) [ [www.rcgp.org.uk/clinical-and-research/target-antibiotics-toolkit.aspx](https://www.rcgp.org.uk/clinical-and-research/target-antibiotics-toolkit.aspx)] designed to support CPD, audit, training and self assessment for the whole primary care team within a GP practice or out of hours setting.
- [Further resources](https://www.nice.org.uk/guidance/ng15/resources) [ [www.nice.org.uk/guidance/ng15/resources](https://www.nice.org.uk/guidance/ng15/resources)] are available from NICE to support implementation of this guideline.
- NICE produces indicators annually for use in the Quality and Outcomes Framework (QOF) for the UK. [The process for this and the NICE menu](https://www.nice.org.uk/standards-and-indicators/qofindicators) [ [www.nice.org.uk/standards-and-indicators/qofindicators](https://www.nice.org.uk/standards-and-indicators/qofindicators)] are available.
- [NICE uptake data](https://www.nice.org.uk/uptake) [ [www.nice.org.uk/uptake](https://www.nice.org.uk/uptake)] about guideline recommendations and quality standard measures are available on the NICE website.

## 3. Research recommendations

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The bpac<sup>nz</sup> Guidelines and Review committee have made these recommendations following New Zealand specific research. The NICE Guideline Development Group's full set of research recommendations is detailed in the [full guideline](http://www.nice.org.uk/Guidance/NG15/Evidence) [www.nice.org.uk/Guidance/NG15/Evidence].

### 3.1 Reducing antimicrobial resistance

What interventions, systems and processes are effective and cost effective in reducing antimicrobial resistance without causing harm to patients?

#### **Recommendation**

Consider undertaking randomised controlled trials to determine whether short versus longer courses of antimicrobials, directly administered (or observed) therapy, continuous versus intermittent therapy and inhaled antimicrobials reduce the emergence of antimicrobial resistance and maintain patient outcomes compared with usual care in the NZ setting.

### 3.2 Decision-making

What interventions, systems and processes are effective and cost effective in changing all healthcare providers' decision making and ensuring appropriate antimicrobial stewardship.

#### **Recommendation**

Consider undertaking randomised controlled trials to determine whether using point of care tests in decision making is clinically and cost effective when prescribing antimicrobials in children, young people and adults presenting with respiratory tract infections.

## 4. Other information

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### 4.1 Scope and how this guideline was developed

This bpac<sup>nz</sup> contextualised version of the NICE clinical guideline has been developed in accordance with a scope (available from [www.bpac.org.nz/guidelines/3](http://www.bpac.org.nz/guidelines/3)) The guideline covers the effective use of antimicrobials as part of all publically and privately funded human healthcare provided throughout New Zealand.

#### **How this guideline was developed**

The bpac<sup>nz</sup> contextualised versions of NICE guidelines provide recommendations about the treatment and care of people with specific diseases and conditions in New Zealand.

The guideline was originally developed by the NICE Internal Clinical Guidelines programme and then contextualised by the bpac<sup>nz</sup> Guideline Review and Contextualisation Group. The NICE team worked with a group of healthcare professionals (including consultants, GPs and nurses), patients and carers, and technical staff, who reviewed the evidence and drafted the recommendations. The NICE recommendations were finalised after public consultation within the UK. Similarly the bpac<sup>nz</sup> contextualised version of the NICE guideline were finalised after wide consultation within New Zealand.

The methods and processes for the bpac<sup>nz</sup> contextualisation of NICE clinical guidelines are described on the bpac<sup>nz</sup> guidelines website. The NICE guideline was developed using the NICE shore clinical guideline process.

## 4.2 Related NICE guidance and quality standards

Details are correct at the time of publication of the guideline (August 2015).

### Published

- Sepsis: recognitions, diagnosis and early management (2016) NICE guideline NG51
- Medicines optimisation (2015) NICE guideline NG5
- Antibiotics for neonatal infection (2014) NICE quality standard QS75
- Infection prevention and control (2014) NICE quality standard QS61
- Pneumonia (2014) NICE guideline CG191
- Drug allergy (2014) NICE guideline CG183
- Managing medicines in care homes (2014) NICE guideline SC1
- Surgical site infection (2013) NICE quality standard QS49
- Patient group directions (2013) NICE guideline MPG2
- Infection (2012) NICE guideline CG139
- Patient experience in adult NHS services (2012) NICE guideline CG138
- Developing and updating local formularies (2012) NICE guideline MPG1
- Service user experience in adult mental health (2011) NICE guideline CG136
- Prevention and control of healthcare-associated infections (2011) NICE guideline PH36.
- Medicines adherence (2009) NICE guideline CG76
- Surgical site infection (2008) NICE guideline CG74
- Respiratory tract infections – antibiotic prescribing (2008) NICE guideline CG69
- Antimicrobial stewardship: changing risk-related behaviours (2017) NICE guideline NG63

## 5. About this Guideline

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### 5.1 About this guideline

This bpac<sup>nz</sup> contextualised version of a NICE clinical guideline provides recommendations about the treatment and care of people with specific diseases and conditions in New Zealand.

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover. The bpac<sup>nz</sup> scope (available from [www.bpac.or.nz/guidelines/3](http://www.bpac.or.nz/guidelines/3)) outlines what the contextualised guideline will and will not cover.

The guideline was originally developed by the Medicines and Prescribing Centre at NICE. The Centre worked with a Guideline Development Group, comprising healthcare professionals (including consultants, GPs and nurses), patients and carers, and technical staff, which reviewed the evidence and drafted the recommendations. The recommendations were finalised after public consultation within the UK.

The methods and processes for the bpac<sup>nz</sup> contextualisation of NICE clinical guidelines are described on the bpac<sup>nz</sup> website. The NICE guideline was developed using the process described in “Developing NICE guidelines: the manual”. See [www.nice.org.uk/article/pmg20](http://www.nice.org.uk/article/pmg20).

Further information about the The Guideline Development Group, NICE project team, NICE quality assurance team, New Zealand contextualisation group, and declarations of interest are presented as Appendix A, available from [www.bpac.or.nz/guidelines/3](http://www.bpac.or.nz/guidelines/3)

The guideline bpac<sup>nz</sup> have contextualised was published August 2015.

## 5.2 Rationale for contextual changes – Antimicrobial Stewardship (NG15)

Original wording from Antimicrobial Stewardship – (NG15)	Recommendation following contextualisation for this guideline	Rationale for contextualisation
Audience for this guideline: Health and social care practitioners (a term used to define the wider care team of hospital staff [including microbiologists and infection control staff], community matrons and case managers, GPs, dentists, podiatrists, pharmacists and community nurses [including those staff working in out of hours services], domiciliary care workers and care home staff [registered nurses and social care practitioners working in care homes], social workers and case managers).	All healthcare providers (a term used to define the wider care team of hospital staff [including microbiologists and infection control staff], nurses, midwives, GPs, dentists, podiatrists, pharmacists, community nurses & case managers [including those staff working in out-of-hours services], domiciliary care workers and care home staff [registered nurses and carers working in care homes], social workers and case managers).	<i>The GRCG removed reference to social care practitioners &amp; community matrons as this terminology and titles pertained to the UK only and in not recognised in New Zealand.</i>  <i>The CRCG included nurses &amp; midwives to the audience for this guideline as both are important to be included in the contextualisation</i>
Organisations commissioning (for example, clinical commissioning groups or local authorities), providing or supporting the provision of care (for example, national or professional bodies, directors of public health, health and wellbeing boards, healthcare trusts and locum agencies).	Organisations funding, providing or supporting the provision of care (for example, national or professional bodies, the Ministry of Health, PHARMAC, Statutory Medical Officer of Health, District Health Boards, Primary Health Organisations, Rest Homes, Midwives, Pharmacists, Private health Insurance Companies, Private Hospital Groups).	<i>The CRCG deleted clinical commissioning groups, local authorities, national or professional bodies, director of public health, health and wellbeing boards, healthcare trusts and locum agencies and included Ministry of Health, PHARMAC, Statutory Medical Officer of Health, District Health Boards, Primary Health Organisations, Rest Homes, Midwives, Pharmacists, Private health Insurance Companies, Private Hospital Groups to align with the New Zealand healthcare environment.</i>
Scope of this guideline. The guideline covers the effective use of antimicrobials as part of all publicly funded health and social care commissioned or provided NHS organisations, local authorities (in England), independent organisations or independent contractors.	Scope of this guideline. The guideline covers the effective use of antimicrobials as part of all publicly and privately funded human health care throughout New Zealand.	<i>The CRCG included privately funded healthcare as it was agreed all funded healthcare should be covered, both private and public.</i>
The guideline does not cover: <ul style="list-style-type: none"> <li>Antimicrobial use in animals</li> </ul>	The guideline does not cover: <ul style="list-style-type: none"> <li>Antimicrobial use in animals and plants, including veterinary/animal health, agricultural/aquaculture/horticultural.</li> </ul>	<i>For clarity the point was extended</i>
1.1.1 The Ministry of Health and PHARMAC should establish a New Zealand antimicrobial stewardship committee (NZAMSC) which will provide national leadership and take responsibility for fostering, antimicrobial stewardship across all healthcare settings.	1.1.1 The Ministry of Health should consider establishing a New Zealand antimicrobial resistance group (NZ AMR Group) which will (among other roles) provide national leadership and take responsibility for fostering antimicrobial stewardship across all healthcare settings.	<i>Ministry of Health should have responsibility for the establishment of a national group that will consider antimicrobial costs as only one aspect of their brief. Acknowledgement of PHARMAC's inclusion within the membership of the established group would be reasonable.</i>
1.1.2 The NZAMSC should facilitate the provision of the following antimicrobial stewardship activities throughout New Zealand: <ul style="list-style-type: none"> <li>monitoring and evaluating antimicrobial prescribing and how this relates to local resistance patterns</li> <li>providing regular feedback to individual prescribers in all care settings about: <ul style="list-style-type: none"> <li>their antimicrobial prescribing, for example, by using professional regulatory numbers for prescribing as well as prescriber (cost centre) codes</li> <li>patient safety incidents related to antimicrobial use, including hospital admissions for potentially avoidable life threatening infections, infections with <i>Clostridium difficile</i> or adverse drug reactions such as anaphylaxis</li> </ul> </li> </ul>	1.1.2 The NZ AMR Group should consider the provision of the following antimicrobial stewardship activities throughout New Zealand: <ul style="list-style-type: none"> <li>monitoring and evaluating antimicrobial prescribing and how this relates to local resistance patterns</li> <li>providing regular feedback to individual prescribers in all care settings about: <ul style="list-style-type: none"> <li>their antimicrobial prescribing, for example, by using professional regulatory numbers for prescribing as well as by relevant prescriber groups such as clinical teams (within hospitals) or practice groups (within the community)</li> <li>patient safety incidents related to antimicrobial use, including hospital admissions for potentially avoidable life threatening infections, infections with <i>Clostridium difficile</i> or adverse drug reactions such as anaphylaxis</li> </ul> </li> </ul>	<i>The recommendation has been revised acknowledging the Ministry of Health is establishing a group with responsibilities that include promoting antimicrobial stewardship throughout New Zealand.</i>

<ul style="list-style-type: none"> <li>• providing education and training to all healthcare providers about antimicrobial stewardship and antimicrobial resistance</li> <li>• integrating audit into existing quality improvement programmes.</li> </ul>	<ul style="list-style-type: none"> <li>• providing education and training to all healthcare providers about antimicrobial stewardship and antimicrobial resistance</li> <li>• integrating audit into existing quality improvement programmes.</li> </ul>	
<p>1.1.4 On the advice of the NZAMSC, the Ministry of Health should involve lead healthcare providers in establishing processes for developing, reviewing, updating and implementing local antimicrobial guidelines in line with national guidance and informed by local prescribing data and resistance patterns</p>	<p>1.1.4 The NZ AMR Group should encourage lead healthcare providers to establish processes for developing, reviewing, updating and implementing national or regional antimicrobial guidelines informed by local prescribing data and resistance patterns.</p>	<p><i>The wording has been amended to reflect that there is no national guideline for both hospital and community settings should be developed and promoted. IT was also noted regional rather than local guidelines were also considered more appropriate.</i></p>
<p>1.1.7 Organisations establishing antimicrobial stewardship teams should ensure that the team has core members (including an antimicrobial pharmacist and a medical microbiologist) and can co-opt additional members depending on the care setting and the antimicrobial issue being considered</p>	<p>1.1.7 Each District Health Board (DHB) if necessary through regional collaboration, should establish antimicrobial stewardship teams (DHB AMR Team) and should ensure that the team included the relevant competencies, (including where feasible an infectious diseases physician, an antimicrobial pharmacist a medical microbiologist and primary care representative) and can co-opt additional members depending on the care setting and antimicrobial issue being considered. The areas of interest for each DHB AMR Team should encompass all antimicrobial stewardship activities in all healthcare settings within that DHB.</p>	<p><i>The wording was changed to reflect the New Zealand health environment</i></p>
<p>1.1.8 The NZAMSC and the DHBAMSTs should develop processes that promote antimicrobial stewardship and allocate resources to:</p> <ul style="list-style-type: none"> <li>• review prescribing and resistance data and identify ways of feeding this information back to prescribers in all care settings</li> <li>• promote education for prescribers in all care settings</li> <li>• assist the local formulary decision making group with recommendations about new antimicrobials</li> <li>• update local formulary and prescribing guidance</li> <li>• work with prescribers to explore the reasons for very high, increasing or very low volumes of antimicrobial prescribing, or use of antimicrobials not recommended in local (where available) or national guidelines</li> <li>• provide feedback and advice to prescribers who prescribe antimicrobials outside of local guidelines when it is not justified.</li> </ul>	<p>1.1.8 The NZ AMR Group and the DHB AMR Teams should develop processes that promote antimicrobial stewardship and allocate resources to:</p> <ul style="list-style-type: none"> <li>• review prescribing and resistance data and identify ways of feeding this information back to prescribers in all care settings</li> <li>• promote education for prescribers in all care settings</li> <li>• advise decision-making by PHARMAC, advised by its Pharmacology and Therapeutics Advisory Committee and its Anti-infective Subcommittee) on antimicrobials listed on the NZ Pharmaceutical Schedule, including access criteria/restrictions for new and existing listings</li> <li>• update local formulary and New Zealand Formulary <a href="http://nzf.org.nz/nzf_2890">http://nzf.org.nz/nzf_2890</a> prescribing guidance</li> <li>• help advise PHARMAC about antimicrobial use activities</li> <li>• work with prescribers to explore the reasons for very high, increasing or very low volumes of antimicrobial prescribing, or use of antimicrobials not recommended in regional (where available) or national guidelines</li> <li>• provide feedback and advice to prescribers who prescribe antimicrobials outside of relevant guidelines when it is not justified.</li> </ul>	<p><i>The use of local review and amended where required to the national formulary.</i></p>



1.1.13 Consider supplying antimicrobials in pack sizes that correspond to local (where available) and national guidelines on course lengths.	1.1.13 PHARMAC's contracts with suppliers should consider specifying the supply of antimicrobials in pack sizes that correspond to local (where available) and national guidelines on course lengths.	<i>The wording was changed to reflect the New Zealand health environment</i>
1.1.14 The NZAMSC and the DHBAMSTs, with PHARMAC and the Health Quality & Safety Commission (HQSC), should encourage and support prescribers only to prescribe antimicrobials when this is clinically appropriate.	1.1.14 The NZ AMR Group and the DHB AMR Teams, with PHARMAC, should encourage and support prescribers only to prescribe antimicrobials when this is clinically appropriate.	<i>Wording amended to reflect the view that HQSC should not be engaged in this process</i>
1.1.16 The NZAMSC and the DHBAMSTs, with PHARMAC and the Health Quality & Safety Commission (HQSC), should encourage all healthcare providers across all care settings to work together to support antimicrobial stewardship by: <ul style="list-style-type: none"> <li>• communicating and sharing consistent messages about antimicrobial use</li> <li>• sharing learning and experiences about antimicrobial resistance and stewardship</li> <li>• referring appropriately between services without raising expectations that antimicrobials will subsequently be prescribed.</li> </ul>	1.1.16 The NZ AMR Group and the DHB AMR Teams, with PHARMAC, should encourage all healthcare providers across all care settings to work together to support antimicrobial stewardship by: <ul style="list-style-type: none"> <li>• communicating and sharing consistent messages about antimicrobial use</li> <li>• sharing learning and experiences about antimicrobial resistance and stewardship</li> <li>• referring appropriately between services without raising expectations that antimicrobials will subsequently be prescribed.</li> </ul>	<i>As above 1.1.14</i>
1.1.21 The NZAMSC and the DHBAMSTs, with ESR, should ensure that laboratory testing and the order in which the susceptibility of organisms to antimicrobials is reported is in line with: <ul style="list-style-type: none"> <li>• national and local treatment guidelines</li> <li>• the choice of antimicrobial in the local formulary</li> <li>• the priorities of medicines management and antimicrobial stewardship teams.</li> </ul>	1.1.21 The NZ AMR Group and the DHB AMR Teams, with ESR, should ensure that laboratory testing and the order in which the susceptibility of organisms to antimicrobials is reported is in line with: <ul style="list-style-type: none"> <li>• national and local treatment guidelines</li> <li>• the choice of antimicrobial in the New Zealand Pharmaceutical Schedule and the New Zealand Formulary</li> <li>• the priorities of medicines management and antimicrobial stewardship teams.</li> </ul>	<i>Local formulary not correct terminology and has been changed throughout the document</i>
1.1.24 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.	1.1.24 When deciding whether or not to prescribe an antimicrobial, take into account the disease profile and particular health consequences of infectious diseases in high risk sub populations and the risk of antimicrobial resistance and other potential adverse effects for individual patients and the population as a whole.	<i>Stakeholder feedback considers the guideline should emphasise taking into account subpopulations in New Zealand and financial, cultural, socioeconomic, and other factors</i>
1.1.25 When prescribing any antimicrobial, undertake a clinical assessment and document the clinical diagnosis (including symptoms) in the patient's record and clinical management plan.	1.1.25 When prescribing any antimicrobial, undertake a clinical assessment and document the clinical diagnosis in the patient's record and clinical management plan.	<i>It was deemed rare for a medicine to be prescribed without documentation of the history, exam an diagnosis so removed for simplicity of document</i>
1.1.26 For patients in hospital who have suspected infections, take microbiological samples before prescribing an antimicrobial and review the prescription when the results are available.	1.1.26 For patients in hospital who have suspected infections, take microbiological samples before prescribing an empiric antimicrobial and review the prescription when the results are available.	<i>This statement implies prescribing an empiric antimicrobial and reviewing its appropriateness once results are available, wording amended for clarification</i>
1.1.27 For patients in primary care who have recurrent or persistent infections, consider taking microbiological samples when prescribing an antimicrobial and review the prescription when the results are available	1.1.27 For patients in primary care who have recurrent or persistent infections, consider taking microbiological samples when prescribing an antimicrobial and review the prescription when the results are available.	<i>Microbiological samples in primary care would not necessarily only be taken with recurrent or persistent infections - it would be wrong and potentially unsafe to imply this. Wording amended for clarity.</i>

<p>1.1.30 Prescribers should take time to discuss with the patient and/or their family/whānau members or carers (as appropriate):</p> <ul style="list-style-type: none"> <li>• the likely nature of the condition</li> <li>• why prescribing an antimicrobial may not be the best option</li> <li>• alternative options to prescribing an antimicrobial</li> <li>• their views on antimicrobials, taking into account their priorities or concerns for their current illness and whether they want or expect an antimicrobial</li> <li>• the benefits and harms of immediate antimicrobial prescribing</li> <li>• what they should do if their condition deteriorates (safety netting advice) or they have problems as a result of treatment</li> <li>• whether they need any written information about their medicines and any possible outcomes.</li> </ul>	<p>1.1.30 Prescribers should take time to discuss with the patient and/or their family/whānau members or carers (as appropriate):</p> <ul style="list-style-type: none"> <li>• the likely nature of the condition</li> <li>• why prescribing an antimicrobial may not be the best option</li> <li>• alternative options to prescribing an antimicrobial</li> <li>• the views of the patient and/or their family/ whānau members or carers on antimicrobials, taking into account their priorities or concerns for their current illness and whether they want or expect an antimicrobial</li> <li>• the benefits and harms of immediate antimicrobial prescribing</li> <li>• what they should do if their condition deteriorates (safety netting advice) or they have problems as a result of treatment</li> <li>• whether they need any written information about their medicines and any possible outcomes.</li> </ul>	<p><i>The guideline states that prescribers should take time to discuss the patient's condition and proposed treatment. Doctors have an obligation on providing information and obtaining consent.</i></p> <p><i>In giving information to patients, a shared dialogue between the health care professional and patient should be responsive to the patient's needs, wishes and expressed concerns.</i></p>
<p>1.1.31 When an antimicrobial is a treatment option, document in the patient's records (electronically wherever possible):</p> <ul style="list-style-type: none"> <li>• the reason for prescribing, or not prescribing, an antimicrobial</li> <li>• the plan of care as discussed with the patient, their family/whānau member or carer (as appropriate), including the planned duration of any treatment.</li> </ul>	<p>1.1.31 When an antimicrobial is a treatment option, document in the patient's records (electronically wherever possible):</p> <ul style="list-style-type: none"> <li>• the reason for prescribing, or not prescribing, an antimicrobial</li> <li>• the plan of care as discussed with the patient, their family/whānau member or carer (as appropriate), including the planned duration of any treatment.</li> <li>• The results of any relevant laboratory test</li> </ul>	<p><i>Wording amended to include relevant test results</i></p>
<p>1.3.36 Do not issue repeat prescriptions for antimicrobials unless needed for a particular clinical condition or indication. Avoid issuing repeat prescriptions for longer than 6 months without review and ensure adequate monitoring for individual patients to reduce adverse drug reactions and to check whether continuing an antimicrobial is really needed.</p>	<p>1.3.36 Do not issue repeat prescriptions for antimicrobials unless needed for a particular clinical condition or indication. Generally avoid issuing repeat prescriptions for longer than 3 months without review and ensure adequate monitoring for individual patients to reduce adverse drug reactions and to check whether continuing an antimicrobial is really needed.</p>	<p><i>The wording changed to reflect the New Zealand environment</i></p>
<p>1.3.37 Use an intravenous antimicrobial from the agreed local formulary and 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.</p>	<p>1.3.37 Use an intravenous antimicrobial in line with regional or national guidelines for a patient who needs an empirical intravenous antimicrobial for a suspected infection but has no confirmed diagnosis</p>	<p><i>As previously noted, reference to local guideline amended</i></p>
<p>1.3.38 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.</p>	<p>1.3.38 Review 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.</p>	<p><i>Removed 'consider' - this should be a standard of practice, with the possible exception of outpatient home IV service?</i></p>
<p>1.2.1 Consider establishing processes for reviewing national horizon scanning to plan for the release of new antimicrobials.</p>	<p>1.2.1 Consider establishing processes to plan for the release of new antimicrobials.</p>	<p><i>'National horizon scanning' is confusing and as such has been removed.</i></p>

<p>1.2.2 When evaluating a new antimicrobial for inclusion in the formulary, take into account:</p> <ul style="list-style-type: none"> <li>• the need for the new antimicrobial</li> <li>• its clinical effectiveness</li> <li>• the population in which it will be used</li> <li>• the specific organisms or conditions for which it will be used</li> <li>• dose, dose frequency, formulation and route of administration</li> <li>• likely tolerability and adherence</li> <li>• any drug interactions, contraindications or cautions</li> <li>• rates and trends of resistance</li> <li>• whether use should be restricted and, if so, how use will be monitored</li> <li>• any additional monitoring needed</li> <li>• any urgent clinical need for the new antimicrobial</li> <li>• any plans for introducing the new antimicrobial.</li> </ul> <p>These evaluation features are relevant to PHARMAC's funding and defunding decisions and complement and are directly or indirectly incorporated into, PHARMAC's Factors for Consideration decision-making framework <a href="https://www.pharmac.govt.nz/medicines/how-medicines-are-funded/factors-for-consideration">https://www.pharmac.govt.nz/medicines/how-medicines-are-funded/factors-for-consideration</a>.</p>	<p>1.2.2 When evaluating a new antimicrobial for inclusion in the New Zealand Pharmaceutical schedule, take into account:</p> <ul style="list-style-type: none"> <li>• the need for the new antimicrobial</li> <li>• its clinical effectiveness</li> <li>• the population in which it will be used</li> <li>• the specific organisms or conditions for which it will be used</li> <li>• dose, dose frequency, formulation and route of administration</li> <li>• likely tolerability and adherence</li> <li>• any drug interactions, contraindications or cautions</li> <li>• rates and trends of resistance</li> <li>• the ecological impact of the antimicrobial on the host microbiome</li> <li>• whether use should be restricted and, if so, how use will be monitored</li> <li>• any additional monitoring needed</li> <li>• any urgent clinical need for the new antimicrobial</li> <li>• any plans for introducing the new antimicrobial.</li> </ul> <p>These evaluation features are relevant to PHARMAC's funding and defunding decisions and complement and are directly or indirectly incorporated into, PHARMAC's Factors for Consideration decision-making framework <a href="https://www.pharmac.govt.nz/medicines/how-medicines-are-funded/factors-for-consideration">https://www.pharmac.govt.nz/medicines/how-medicines-are-funded/factors-for-consideration</a>.</p>	<p><i>Included 'ecological impact to the list of factors that are identified. Some antibiotics seem to have a greater ecological impact than others with a similar spectrum of activity</i></p>
<p>2.1 The challenge: changing prescribing practice for antimicrobials</p> <p>The benefits</p> <p>Reducing the use of antimicrobials where they are not indicated will:</p> <ul style="list-style-type: none"> <li>• slow down the emergence of antimicrobial resistance</li> <li>• ensure that antimicrobials remain an effective treatment for infection</li> <li>• improve clinical outcomes for the population as a whole</li> <li>• conserve healthcare resources.</li> </ul>	<p>2.1 The challenge: changing prescribing practice for antimicrobials</p> <p>The benefits</p> <p>Reducing the use of antimicrobials where they are not indicated will:</p> <ul style="list-style-type: none"> <li>• slow down the emergence and spread of antimicrobial resistance</li> <li>• ensure that antimicrobials remain an effective treatment for infection</li> <li>• improve clinical outcomes for the population as a whole</li> <li>• conserve healthcare resources.</li> </ul>	<p><i>The wording has been amended to reflect the challenge is not just the emergence of antimicrobial resistance but the rate of increase also.</i></p>
<p>2.1.1 Using education and feedback to change prescribing practice</p> <p>See recommendations 1.1.3, 1.1.6, 1.1.9, 1.1.10, 1.1.17, 1.1.18, 1.1.19</p> <p>Education and feedback have been recommended as a way of changing prescribers' attitudes and supporting antimicrobial stewardship. Potential barriers that may affect prescribers acting on messages about antimicrobial stewardship include:</p> <ul style="list-style-type: none"> <li>• the possible risk of adverse outcomes from not treating</li> <li>• not seeing the direct impact of their prescribing on antimicrobial resistance</li> <li>• lack of critical evaluation, review and reflection on their own prescribing practice.</li> </ul>	<p>2.1.1 Using education and feedback to change prescribing practice</p> <p>See recommendations 1.1.3, 1.1.6, 1.1.9, 1.1.10, 1.1.17, 1.1.18, 1.1.19</p> <p>Education and feedback have been recommended as a way of changing prescribers' attitudes and supporting antimicrobial stewardship. Potential barriers that may affect prescribers acting on messages about antimicrobial stewardship include:</p> <ul style="list-style-type: none"> <li>• the possible risk of adverse outcomes from not treating</li> <li>• not seeing the direct impact of their prescribing on antimicrobial resistance</li> <li>• lack of critical evaluation, review and reflection on their own prescribing practice.</li> </ul>	<p><i>The wording has been amended to reflect the NZ environment</i></p>

**DHB, PHARMAC and PHO decision makers** could support a change in prescribing practice by:

- allocating resources for education and feedback in their local area
- using governance processes such as audit so that prescribers follow antimicrobial guidelines
- creating an open and transparent culture so that prescribers can question prescribing when this doesn't follow antimicrobial guidelines
- providing regular updates across the service on individual prescribing, antimicrobial resistance and patient safety incidents
- including antimicrobial stewardship interventions in education programmes which are designed for the setting in which they are to be used
- encouraging prescribers to reflect on their personal practice
- including objectives for antimicrobial stewardship in prescribers' annual reviews
- signposting prescribers to relevant resources (see further resources for details of resources you may wish to include)
- using the NICE baseline assessment tool to evaluate current practice and plan changes
- ensure that prescribers have the training and skills for antimicrobial stewardship
- ensure that there are programmes for education and feedback on antimicrobial prescribing and resistance
- ensuring that providers have data about rates and trends of antimicrobial prescribing (for example, summary data from the ESR Surveillance Report on community antimicrobial consumption in New Zealand)
- encouraging local learning networks, possibly across clinical areas or services, linking to DHB AMR Teams and the NZ AMR Group.

Those responsible for planning pre-and post registration training for prescribers could support a change in prescribing practice by:

- including information about antimicrobial stewardship in training courses
- providing opportunities for prescribers to demonstrate via continuing professional development (CPD)/revalidation that they are following the principles of antimicrobial stewardship.

**DHB, PHARMAC and PHO decision makers** could support a change in prescribing practice by:

- allocating resources for education and feedback in their local area and nationally
- using governance processes such as audit so that prescribers follow antimicrobial guidelines
- creating an open and transparent culture so that prescribers can question prescribing when this doesn't follow antimicrobial guidelines
- providing regular updates across the service on individual prescribing, antimicrobial resistance and patient safety incidents
- including antimicrobial stewardship interventions in education programmes which are designed for the setting in which they are to be used
- encouraging prescribers to reflect on their personal practice
- including objectives for antimicrobial stewardship in prescribers' annual reviews
- signposting prescribers to relevant resources (see further resources for details of resources you may wish to include)
- using the NICE baseline assessment tool to evaluate current practice and plan changes
- ensuring that prescribers have the training and skills for antimicrobial stewardship
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Those responsible for planning pre- and post registration training for prescribers could support a change in prescribing practice by:

- including information about antimicrobial stewardship in training courses
- providing opportunities for prescribers to demonstrate via continuing professional development (CPD) that they are following the principles of antimicrobial stewardship.

### 2.1.2 Using information systems to change prescribing practice

See recommendations 1.1.3, 1.1.6, 1.1.10, 1.1.11, 1.1.12

Information systems can help antimicrobial stewardship by capturing data to allow feedback on:

- rates and trends of antimicrobial prescribing
- rates and trends of antimicrobial resistance
- patient use of standard and back up (delayed) prescriptions.

However the relevant data are not always captured or easily accessible.

**The NZ AMR Group and DHB AMR Teams** could support the use of information systems to change prescribing practice by:

- supporting the development of a central facility, which presents national and local data on hospital antimicrobial prescribing and resistance in a format that is easy to use
- encouraging the introduction of electronic prescribing where systems are not in place (if a phased approach is needed, this could start with electronic prescribing for antimicrobials)
- commissioning the planning and designing of information systems to support antimicrobial stewardship by establishing working groups (to include IT specialists) across all services; this will need coordination and subgroup working to address differences between the various primary and secondary care services.

**DHB and PHO decision makers** could support the use of information systems to change prescribing practice by:

- circulating the data they receive about rates and trends of prescribing within their organisation
- using data on rates and trends of prescribing in programmes for educating prescribers about antimicrobial stewardship.

### 2.1.2 Using information systems to change prescribing practice

See recommendations 1.1.3, 1.1.6, 1.1.10, 1.1.11, 1.1.12

Information systems can help antimicrobial stewardship by capturing data to allow feedback on:

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However the relevant data are not always captured or easily accessible.

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- commissioning the planning and designing of information systems to support antimicrobial stewardship by establishing working groups (to include IT specialists) across all services; this will need coordination and subgroup working to address differences between the various primary and secondary care services.

**DHB and PHO decision makers** could support the use of information systems to change prescribing practice by:

- circulating the data they receive about rates and trends of prescribing within their organisation
- using data on rates and trends of prescribing in programmes for educating prescribers about antimicrobial stewardship.

*Starting electronic prescribing just for antimicrobials doesn't make sense. Infrastructure requirements and implementation is the same regardless of whether you prescribe one class of drugs or all of them.*

## 5.3 Strength of recommendations

Some recommendations can be made with more certainty than others, depending on the quality of the underpinning evidence. The Guideline Development Group (GDG) makes a recommendation based on the trade off between the benefits and harms of an intervention, taking into account the quality of the underpinning evidence. The wording used in the recommendations in this guideline denotes the certainty with which the recommendation is made (the strength of the recommendation).

For all recommendations, NICE expects that there is discussion with the person about the risks and benefits of the interventions, and their values and preferences. This discussion aims to help them to reach a fully informed decision (see also Person-centred care, Page 7).

### Interventions that must (or must not) be used

We usually use 'must' or 'must not' only if there is a legal duty to apply the recommendation.

Occasionally we use 'must' (or 'must not') if the consequences of not following the recommendation could be extremely serious or potentially life threatening.

### **Interventions that should (or should not) be used – a 'strong' recommendation**

We use 'offer' (and similar words such as 'refer' or 'advise') when we are confident that, for the majority of people, an intervention will do more good than harm, and be cost effective. We use similar forms of words (for example, 'Do not offer...') when we are confident that an intervention will not be of benefit for most people.

### **Interventions that could be used**

We use 'consider' when we are confident that an intervention will do more good than harm for most people, and be cost effective, but other options may be similarly cost effective. The choice of intervention, and whether or not to have the intervention at all, is more likely to depend on the patient's values and preferences than for a strong recommendation, and so the health professionals should spend more time considering and discussing the options with the person.

### **UK versions of this guideline**

The full guideline, [antimicrobial stewardship: systems and processes for effective antimicrobial medicine use](https://www.nice.org.uk/guidance/ng15/evidence) [a href="https://www.nice.org.uk/guidance/ng15/evidence">www.nice.org.uk/guidance/ng15/evidence] contains details of the methods and evidence used to develop the guideline. It is published by the Medicines and Prescribing Centre at NICE.

Also available is [information for the public](https://www.nice.org.uk/Guidance/NG15/InformationforPublic) [a href="https://www.nice.org.uk/Guidance/NG15/InformationforPublic">www.nice.org.uk/Guidance/NG15/InformationforPublic] about this guideline and [Implementation tools and resources](https://www.nice.org.uk/Guidance/NG15/resources) [a href="https://www.nice.org.uk/Guidance/NG15/resources">www.nice.org.uk/Guidance/NG15/resources] to help you put the guideline into practice.

### **Your responsibility**

This guideline represents the view of bpac<sup>nz</sup> in contextualising the [NICE clinical guideline Antimicrobial Stewardship: systems and processes for effective antimicrobial medicine use \(NG15\)](https://www.nice.org.uk/Guidance/NG15) [a href="https://www.nice.org.uk/Guidance/NG15">www.nice.org.uk/Guidance/NG15], which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summaries of product characteristics of any medicines.

## **5.4 Copyright**

This guideline is an adaption of Antimicrobial Stewardship: systems and processes for effective antimicrobial medicine use (NG15) ©National Institute for Health and Clinical Excellence 2015. All rights reserved.

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An online version of this guideline is available from the bpac<sup>nz</sup> website:  
[www.bpac.org.nz/guidelines/3](http://www.bpac.org.nz/guidelines/3)

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