

Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use

NICE guideline

Published: 18 August 2015

[nice.org.uk/guidance/ng15](https://www.nice.org.uk/guidance/ng15)

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What is this guideline about and who is it for?

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

- 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).
- 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).
- Adults, young people and children (including neonates) using antimicrobials or those caring for these groups. This includes people and organisations involved with the prescribing and management of antimicrobials in health and social care settings.
- The guideline may also be relevant to individual people and organisations delivering non-NHS healthcare services, and to other devolved administrations.

It is anticipated that health and social care providers and commissioners of services will need to work together to ensure that patients benefit from the good practice recommendations in this guideline.

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 by NHS organisations, local authorities (in England), independent organisations or independent contractors.

The guideline may also be relevant to care delivered by non-NHS healthcare services, and to other devolved administrations.

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
- hand hygiene, decolonisation and infection prevention and control measures
- medicines adherence, except where there are specific issues for health and social care practitioners 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.

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

Person-centred 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 [NHS Constitution for England](#) – all NICE guidance is written to reflect these. 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 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 or carers to be involved, they can give their own consent. Health professionals should follow the [Department of Health's advice on consent](#). If a person does not have capacity to make decisions, health and social care practitioners should follow the [code of practice that accompanies the Mental Capacity Act](#) and the supplementary [code of practice on deprivation of liberty safeguards](#).

NICE has produced guidance on the components of good patient experience in adult NHS services. All health professionals should follow the recommendations in [patient experience in adult NHS services](#). In addition, all health and social care practitioners working with people using adult NHS mental health services should follow the recommendations in [service user experience in adult mental health](#). 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 Department of Health's [Transition: getting it right for young people](#). 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

The following guidance is based on the best available evidence. The [full guideline](#) 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 [about this guideline](#) 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 commissioners (clinical commissioning groups and local authorities) and providers (hospitals, GPs, out-of-hours services, dentists and social enterprises) of health or social care 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'.

Health and social care practitioners

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

1.1 *All antimicrobials*

Recommendations for organisations (commissioners and providers)

Antimicrobial stewardship programmes

- 1.1.1 Commissioners should ensure that [antimicrobial stewardship](#) operates across all care settings as part of an antimicrobial stewardship programme.
- 1.1.2 Establish an antimicrobial stewardship programme, taking account of the resources needed to support antimicrobial stewardship across all care settings.
- 1.1.3 Consider including the following in an antimicrobial stewardship programme:
- 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 prescriber (cost centre) codes
 - 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 [health and social care practitioners](#) about antimicrobial stewardship and [antimicrobial resistance](#)
 - integrating audit into existing quality improvement programmes.
- 1.1.4 Ensure that roles, responsibilities and accountabilities are clearly defined within an antimicrobial stewardship programme.
- 1.1.5 Involve lead health and social care practitioners 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.

- 1.1.6 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.
- 1.1.7 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, *Escherichia coli* bacteraemias, mastoiditis, pyelonephritis, empyema, quinsy or brain abscess).

Antimicrobial stewardship teams

- 1.1.8 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.
- 1.1.9 Support antimicrobial stewardship teams, by developing processes that promote antimicrobial stewardship or by allocating 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
 - assist the local formulary decision-making group with recommendations about new antimicrobials
 - update local formulary and prescribing guidance

- 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
- provide feedback and advice to prescribers who prescribe antimicrobials outside of local guidelines when it is not justified.

Antimicrobial stewardship interventions

1.1.10 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 health and social care practitioners, (for example, academic detailing, clinical education or educational outreach).

1.1.11 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).

1.1.12 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.

- 1.1.13 Consider prioritising the monitoring of antimicrobial resistance, to support antimicrobial stewardship across all care settings, taking into account the resources and programmes needed.
- 1.1.14 Consider supplying antimicrobials in pack sizes that correspond to local (where available) and national guidelines on course lengths.
- 1.1.15 Consider evaluating the effectiveness of antimicrobial stewardship interventions by reviewing rates and trends of antimicrobial prescribing and resistance.

Communication

- 1.1.16 Encourage and support prescribers only to prescribe antimicrobials when this is clinically appropriate.
- 1.1.17 Encourage health and social care practitioners 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.
- 1.1.18 Consider developing local networks across all care settings to communicate information and share learning on:
 - antimicrobial prescribing
 - antimicrobial resistance
 - patient safety incidents.
- 1.1.19 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 local (where available) or national guidelines and no reason is documented.

- 1.1.20 Encourage senior health professionals to promote antimicrobial stewardship within their teams, recognising the influence that senior prescribers can have on prescribing practices of colleagues.
- 1.1.21 Raise awareness of current local guidelines on antimicrobial prescribing among all prescribers, providing updates if the guidelines change.

Laboratory testing

- 1.1.22 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 local formulary
 - the priorities of medicines management and antimicrobial stewardship teams.

Recommendations for prescribers and other health and social care practitioners

Antimicrobial guidelines

- 1.1.23 Health and social care practitioners should support the implementation of local antimicrobial guidelines and recognise their importance for antimicrobial stewardship.

Recommendations for prescribers

Antimicrobial prescribing

- 1.1.24 When prescribing antimicrobials, prescribers should follow local (where available) or national guidelines on:
- prescribing the shortest effective course
 - the most appropriate dose
 - route of administration.

- 1.1.25 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.
- 1.1.26 When prescribing any antimicrobial, undertake a clinical assessment and document the clinical diagnosis (including symptoms) in the patient's record and clinical management plan.
- 1.1.27 For patients in hospital who have suspected infections, take microbiological samples before prescribing an antimicrobial and review the prescription when the results are available.
- 1.1.28 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.
- 1.1.29 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.
- 1.1.30 Consider point-of-care testing in primary care for patients with suspected lower respiratory tract infections as described in the NICE guideline on [pneumonia](#).
- 1.1.31 Prescribers should take time to discuss with the patient and/or their family members or carers (as appropriate):
- the likely nature of the condition
 - why prescribing an antimicrobial may not be the best option
 - alternative options to prescribing an antimicrobial
 - their views on antimicrobials, taking into account their priorities or concerns for their current illness and whether they want or expect an antimicrobial
 - the benefits and harms of immediate antimicrobial prescribing
 - what they should do if their condition deteriorates (safety netting advice) or they have problems as a result of treatment

- whether they need any written information about their medicines and any possible outcomes.

1.1.32 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 member or carer (as appropriate), including the planned duration of any treatment.

1.1.33 Do not issue an immediate prescription for an antimicrobial to a patient who is likely to have a self-limiting condition.

1.1.34 If immediate antimicrobial prescribing is not the most appropriate option, discuss with the patient and/or their family 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.

1.1.35 When a decision to prescribe an antimicrobial has been made, take into account the benefits and harms for an individual patient associated with the particular antimicrobial, including:

- possible interactions with other medicines or any food and drink
- the patient's other illnesses, for example, the need for dose adjustment in a patient with renal impairment
- any drug allergies (these should be documented in the patient's record)
- the risk of selection for organisms causing healthcare-associated infections, for example, *C. difficile*.

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

- 1.1.37 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.

Prescribing intravenous antimicrobials

- 1.1.38 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.
- 1.1.39 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.

1.2 *New antimicrobials*

Recommendations for organisations (commissioners and providers)

- 1.2.1 Consider establishing processes for reviewing national horizon scanning to plan for the release of new [antimicrobials](#).
- 1.2.2 Consider using an existing local decision-making group (for example, a drug and therapeutics committee, area prescribing committee or local formulary decision-making group) to consider the introduction of new antimicrobials locally. The group should include representatives from different care settings and other local [organisations](#) to minimise the time to approval.
- 1.2.3 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.

1.2.4 Once a new antimicrobial has been approved for local use, organisations should consider ongoing monitoring by:

- conducting an antimicrobial use review (reviewing whether prescribing is appropriate and in line with the diagnosis and local [where available] and national guidelines)
- costing the use of the new antimicrobial
- reviewing the use of non-formulary antimicrobial prescribing
- evaluating local prescribing and resistance patterns
- reviewing clinical outcomes such as response to treatment, treatment rates, emerging safety issues, tolerability and length of hospital stay.

Recommendations for local decision-making groups

1.2.5 Consider co-opting members with appropriate expertise in [antimicrobial stewardship](#) when considering whether to approve the introduction of a new antimicrobial locally; this may include those involved in the antimicrobial stewardship team (see also recommendation 1.1.8).

1.2.6 Ensure that local formularies, prescribing guidelines and care pathways are updated when new antimicrobials are approved for use.

1.2.7 When evaluating a new antimicrobial for local use and for inclusion in the local formulary, 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
- local rates and trends of resistance
- 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.

1.2.8 Local decision-making groups should assess the benefits and risks of restricting access to a new antimicrobial.

1.2.9 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.

1.2.10 Ensure that there is a plan for the timely introduction, adoption and diffusion of a new antimicrobial when this has been recommended for use.

1.2.11 Discuss with commissioners early in the approval process if funding concerns for a new antimicrobial are likely to cause delay in its introduction, adoption and diffusion.

1.2.12 Indicate where prescribers can find accurate, evidence-based and up-to-date information about the new antimicrobial, such as the:

- [British National Formulary \(BNF\)](#)
- [British National Formulary for Children \(BNFC\)](#)
- [electronic Medicines Compendium \(eMC\)](#)

- [European Medicines Agency \(EMA\)](#)
- [Medicines and Healthcare products Regulatory Agency \(MHRA\)](#).

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. We identified these with the help of healthcare practitioners including GPs and pharmacists, commissioners and Guideline Development Group (GDG) members (see [section 9.4 of the manual](#)).

2.1 *The challenge: changing prescribing practice for antimicrobials*

The benefits

Reducing the use of [antimicrobials](#) where they are not indicated will^[1]:

- slow down the emergence 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.

Managers and leads of services 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.

Commissioners could support a change in prescribing practice by:

- using contracts to ensure that prescribers have the training and skills for antimicrobial stewardship
- using contracts to ensure that there are programmes for education and feedback on antimicrobial prescribing and resistance, which for secondary care could include the [Antimicrobial stewardship: Start Smart - Then Focus](#) toolkit, designed to provide an outline of evidence-based antimicrobial stewardship in the secondary care setting
- working with NHS England primary care commissioners to use the [TARGET resource for commissioners](#)
- ensuring that providers have data about rates and trends of antimicrobial prescribing (for example, from the [NHS Business Service Authority](#))
- encouraging local learning networks, possibly across clinical areas or services, linking to NHS England where required (clinical commissioning groups could lead on this).

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.

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.

Commissioners could support the use of information systems to change prescribing practice by:

- offering a central facility, which presents national and local data on 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)
- learning from services such as orthopaedic wound clinics, which make significant contributions to local surveillance and antimicrobial stewardship
- 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.

Commissioners and managers of services could support the use of information systems to change prescribing practice by:

- including the information standard 'Prescriber ID' (when available) as part of the set-up of the cost centre and registering of prescribers' codes

- 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

- [Antimicrobial prescribing and stewardship competencies](#) (Public Health England, 2013).
- For primary care, the [TARGET antibiotics toolkit](#) 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](#) 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](#) are available.
- NICE [uptake data](#) about guideline recommendations and quality standard measures are available on the NICE website.

^[1]The World Health Organization (2015) [Factsheet on antimicrobial resistance](#)

3 Research recommendations

The Guideline Development Group has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future. The Guideline Development Group's full set of research recommendations is detailed in the [full guideline](#).

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

One or more randomised controlled trials should be undertaken 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 UK setting.

3.2 *Decision-making*

What interventions, systems and processes are effective and cost effective in changing [health and social care practitioners'](#) decision-making and ensuring appropriate [antimicrobial stewardship](#)?

Recommendation

Randomised controlled trials should be undertaken 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

4.1 *Scope and how this guideline was developed*

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover.

How this guideline was developed

This guideline was developed by the Medicines and Prescribing Centre at NICE using the methods described in the integrated process statement, the [interim methods guide](#) for developing medicines practice guidelines and [Developing NICE guidelines: the manual](#) (2014). The Centre established a Guideline Development Group (see section 5), which reviewed the evidence and developed the recommendations.

4.2 *Related NICE guidance and quality standards*

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

Published

- [Medicines optimisation](#) (2015) NICE guideline NG5
- [Antibiotics for neonatal infection](#) (2014) NICE quality standard 75
- [Infection prevention and control](#) (2014) NICE quality standard 61
- [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 49
- [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

Under development

NICE is developing the following guidance and quality standards:

- [Antimicrobial stewardship: changing risk-related behaviours](#). NICE guideline. Publication expected March 2016.

5 The Guideline Development Group, NICE project team, NICE quality assurance team and declarations of interest

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5.4 *Declarations of interests*

The following members of the Guideline Development Group (GDG) made declarations of interests. All other GDG members stated that they had no interests to declare. The conflicts of interest policy (2007) was followed until September 2014, when an [updated policy](#) was published.

Member	Interest declared	Type of interest	Decision taken
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<p>Alastair Hay (Chair)</p>	<p>Member of Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection.</p> <p>Would like to be aware of evidence gaps and GDG research recommendations that could influence future research programme.</p> <p>Has an interest in the Longitude prize, no financial interests, no involvement in any new antimicrobials.</p>	<p>Personal specific non-financial</p>	<p>Project lead will monitor for any potential conflict. Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc.</p>
<p>Alastair Hay (Chair)</p>	<p>No financial conflicts of interest to declare. Lead a group at the University of Bristol conducting research into primary care infections and antimicrobial resistance.</p>	<p>Personal non-financial non-specific</p>	<p>Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc.</p>

<p>Esmita Charani</p>	<p>Published in peer reviewed journals.</p>	<p>Personal non-financial non-specific</p>	<p>Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/ groups or included within any written articles. Reminded that opinions expressed that may be relevant to the guideline may lead to a conflict of interest.</p>
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Esmita Charani	Published author on research into antimicrobial stewardship interventions and behaviour change in this field including Cochrane reviews (one ongoing at present). Has also published research on use of mobile health technology to deliver antimicrobial stewardship interventions.	Personal non-financial non-specific	Chair and Project lead will monitor for any potential conflict. Also discussed with the NICE Medicines and Prescribing Centre Programme Director. Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles.
	Salary is funded by the National Institute of Health Research on a grant investigating behaviour change in antimicrobial prescribing.	Non-personal financial non-specific	
	Honorary visiting researcher to Haukeland University in Norway where advice on the implementation of the national implementation of an antimicrobial stewardship programme.	Personal non-financial non-specific	

<p>Esmita Charani</p>	<p>Undertaking research at PhD level into antibiotic prescribing behaviours in secondary care.</p>	<p>Personal non-financial non-specific</p>	<p>Chair and Project lead will monitor for any potential conflict. Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/ groups or included within any written articles.</p>
<p>Published author in the field of antibiotic prescribing behaviours and antimicrobial stewardship.</p>			

Martin Duerden	Received personal payment (honoraria) plus reimbursement of expenses from Reckitt Benckiser (RB) to speak at 2 meetings in the last 12 months. The subject of the talks was antibiotic use in respiratory infections at each meeting but there was no promotion of products marketed by Reckitt Benckiser in the content.	Personal financial non-specific	Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles. Advised not to write for any publication until the guideline has published.
	In the last 12 months has also received payment from the publishers of Pulse, GP and Prescriber for writing various articles on prescribing and therapeutics, including antibiotic use.	Personal financial non-specific	
Martin Duerden	Clinical Adviser on Prescribing for the Royal College of General Practitioners but does not receive payment for this.	Personal non-specific non-financial	None

Martin Duerden	Member of the Global Respiratory Infection Partnership (work declared above with Reckitt Benckiser done in this capacity). Now spoken at 4 meetings in the last 12 months.	Personal non-specific non-financial	Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles. Advised not to write for any publication until the guideline has published.
	Member of the Paediatric Formulary Committee for the British National Formulary (BNF); payment not received for this.	Personal non-specific non-financial	
	On the editorial board of Prescriber (a Wiley publication) which is an unpaid position. Occasionally writes opinion-based editorials and articles for this publication. Receives payments for these.	Personal non-specific non-financial	
	In the last year was commissioned and co-wrote a report on Polypharmacy for the King's Fund and received payment for this. Also spoke at a King's Fund seminar on the topic.	Personal non-specific non-financial	
	On the Editorial Board of Drug and Therapeutics Bulletin, a BMJ Group publication, this is a paid position.	Personal financial non-specific	
	Has received small payments for articles on the Lipid Modification Clinical Guideline from Pulse and from Guidelines in Practice.	Personal financial non-specific	
	Member of the NICE Guideline Development Group on lipid modification: cardiovascular risk assessment and the modification of blood lipids for the primary and secondary prevention of cardiovascular disease.	Personal non-specific non-financial	
	On the Medicines Committee for the Royal College of Paediatrics and Child Health – payment not received for this.	Personal non-specific non-financial	
	Member of the NICE technology appraisals Committee until October 2014. This is not a paid position.	Personal non-specific non-financial	

Martin Duerden	Presented at workshops for commissioners introducing the proposed new national Antimicrobial Prescribing Quality Premium and guide commissioners towards resources and best practice – March 2015 in Leeds.	Personal non-specific financial	Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles. Chair and Project lead will monitor for any potential conflict.
	Delivered a session on sharing success and the work that has been done in Leeds. No financial payment was received for presenting.	Personal non-specific non-financial	
Heather Edmonds	Involved in a Royal College of Nursing published position statement which was sponsored by Pfizer.	Personal non-specific non-financial	None

<p>Rose Gallagher</p>	<p>Paid consultancy work on antibiotics for the pharmaceutical industry: Pfizer (linezolid), Astellas (levofloxacin), AstraZeneca (ceftaroline), Novartis (daptomycin), Gilead (AmBisome).</p>	<p>Personal non-specific non-financial</p>	<p>Chair and Project lead will monitor for any potential conflict. Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc.</p>
<p>Philip Howard</p>	<p>Paid consultancy work with Danone on antimicrobial stewardship.</p> <p>Committee member of UK Clinical Pharmacy Association – Pharmacy Infection Network.</p> <p>Council member of British Infection Association (until May 2013).</p> <p>Council member of British Society of Antimicrobial Chemotherapy.</p> <p>Represented International Pharmaceutical Federation (FIP) at WHO (World Health Organisation) Antimicrobial Resistance Strategic Technical Advisory Group (May 2014).</p> <p>Published unpaid articles related to antimicrobial stewardship.</p>	<p>Non-specific personal financial</p>	<p>Advised not to undertake any further consultancy work in this area during the development of the guideline through to publication.</p>

	Spokesman on Antimicrobials for Royal Pharmaceutical Society.		
Philip Howard	Involved in Antimicrobial Resistance Summit at the Royal Pharmaceutical Society in November 2014.	Personal non-specific non-financial	Advised not to undertake any further consultancy work in this area during the development of the guideline through to publication. Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc. Chair and Project lead will monitor for any potential conflict.

Philip Howard	<p>Sponsorship to present work at international conferences (no money received directly):</p> <ul style="list-style-type: none"> - European Association of Hospital Pharmacy (B. Braun 2013 and 2014) - European Congress of Clinical Pharmacy and Infectious Diseases (Gilead 2014). <p>Received expenses and conference paid directly to conference.</p>	Personal non-specific financial	<p>Advised that as the evidence of the NICE guideline will have been presented he will need to ensure that information he has learnt as being on the GDG is not shared. He agreed and understood.</p>
	<p>Lecture on <i>Clostridium difficile</i> multicentre local service evaluation of fidaxomicin.</p> <p>European Advisory Board on pipeline antibiotics (January 2014) funded by Sanofi.</p> <p>Lecturing/consultancy about:</p> <ul style="list-style-type: none"> - role of the pharmacist in antimicrobial stewardship - antimicrobial medicine specific topics - data warehousing - pipeline agents. <p>Carried out in September/October 2014. Fees paid into Leeds Teaching Hospitals NHS Trust Charitable Trustees. Funding from Astellas, Baxter, Pfizer and Cubist.</p>	Non-personal non-specific financial	
	<p>Paid by College of Pharmacy Practice and Education to develop Antimicrobials in Focus (Antimicrobial Stewardship for Community Pharmacists).</p>	Personal non-specific financial	
	<p>Research funding from Novartis and Astellas paid directly to an independent audit company to undertake audit. Audits not directly related to antimicrobial stewardship topic.</p>	Non-personal non-specific financial	
	<p>Committee member of European Society of Clinical Microbiology and Infectious Diseases, Antimicrobial Stewardship Group (ESGAP). Member of the Department of Health/Public Health England ESPAUR group.</p>	Personal non-specific non-financial	

Department of Health ARHAI (Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection) Start Smart then Focus guidance for hospitals group.	Personal non-specific non-financial	
PHE (Public Health England) and RCGP (Royal College of General Practitioners) TARGET AMS for primary care group. PHE (Public Health England)/Department of Health Competencies of Antimicrobial Prescribing and Antimicrobial Stewardship.	Personal non-specific non-financial	
Lead a research project on surveying antimicrobial stewardship in hospitals across the world.	Personal non-specific non-financial	
Part of a research group developing an antimicrobial guideline application with a European group "Panacea".	Personal non-specific non-financial	
Part of a joint NIHR (National Institute for Health Research) Programme grant AMR themed call on behalf of Leeds and Oxford Universities on antimicrobial allergy.	Personal non-specific non-financial	
Antimicrobial resistance round table group (unfunded) with AstraZeneca to help pharmaceutical industry discussion with Government.	Personal non-specific non-financial	
Lecture at Clinical Pharmacy Congress (2013 and 2014). Updates provided on respiratory infections in 2013. Updates provided on <i>C. difficile</i> , ESBL and drug allergy in 2014. Payment received directly.	Personal non-specific financial	

Philip Howard	Speaker for Royal Pharmaceutical Society at the Royal Colleges Summit on Antimicrobial Resistance. No payment received.	Non-specific non-personal financial	Project lead reiterated the importance that work from this group is not shared with other work that he is involved with. Chair and Project lead will monitor for any potential conflict.
	Introduction of proposed ESPAUR/NHS-England on Quality Premium to reduce antibiotic prescribing.	Specific personal non-financial	
	Secondment to NHS England as Regional Healthcare Associated Infections Project Lead from November 2014 to March 2015.	Non-specific non-personal financial	
	Speaker at British Society for Antimicrobial Chemotherapy Antimicrobial Stewardship conference in India.	Non-specific personal non-financial	
	British Society of Antimicrobial Chemotherapy (BSAC) workshop on antimicrobial stewardship in India (27–28 November 2014).	Non-specific personal non-financial	
Philip Howard	BSAC workshop on antimicrobial stewardship in Bahrain (24–26 February 2015).	Non-specific, personal non-financial	Project lead reiterated the importance that work from this group is not shared with other work involved with. Chair and Project lead will monitor for any potential conflict.
	BSAC round table talk on pharmacy's role in antimicrobial stewardship.	Personal non-specific non-financial	
	Advisory board for new pipeline product, Durata (February 2015). Fees paid into Leeds Teaching Hospitals NHS Trust Charitable Trustees.	Personal non-specific financial	

Philip Howard	Advisory boards for: - Durata (Dalbavancin) (February 2015) - Cubist (Tedezolid) (March 2015). Payment to be made to employer (Leeds Teaching Hospitals) for time.	Personal non-specific financial	Advised that the GDG discussions remain confidential although the draft guideline contents can be used now they are in the public domain.
	Attendance at European Association of Hospital Pharmacy conference. B. Braun paid for accommodation, travel paid and attendance. No direct payment received.	Personal non-specific non-financial	
	Secondment to NHS England as Regional Healthcare Associated Infections Project Lead from November 2014 to March 2015. Extended to June 2015. NHS England payment to Leeds Teaching Hospital Trust for time.	Personal non-specific non-financial	
	Speaker at 3 antimicrobial resistance study days for NHS commissioners and a single <i>C. difficile</i> day (March 2015) (NHS England role).	Personal non-specific non-financial	
	GP <i>C. difficile</i> event in Hull (NHS England role).	Personal non-specific non-financial	
	Part of a Public Health England project on tailoring antimicrobial programmes.	Personal non-specific non-financial	
	Speaker at British Society of Antimicrobial Chemotherapy Gulf Antimicrobial Stewardship conference in Bahrain.	Personal non-specific non-financial	
	National Sepsis Programme Board (March 2015 onwards).	Personal non-specific non-financial	
	POC CRP testing in Primary Care (Alere) – February 15.	Personal non-specific non-financial	

Philip Howard	Associate for the NICE Medicines and Prescribing Centre.	Non-specific personal non-financial	Advised that the GDG discussions remain confidential although the draft guideline contents can be used now they are in the public domain.
Kym Lowder	Stated no conflicts to declare. Spoken at antimicrobial resistance symposia sponsored by public bodies and one by bioMeriuex but received no payment. Leads the development of national Public Health England antibiotic and laboratory use guidance for GPs which covers the diagnosis and treatment of urinary tract infections. She has received grants from several publically funded research bodies.	Personal non-specific non-financial	Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc.

Cliona McNulty	Lead for e-Bug project across Europe.	Personal non-specific non-financial	Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc.
Cliona McNulty	Member of Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection.	Personal non-specific non-financial	Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc.

Cliona McNulty	Observer on British Society for Antimicrobial Chemotherapy Council.	Personal non-specific non-financial	Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc.
	Member of English surveillance programme for antimicrobial utilisation and resistance.		
	Lead in the development of Treat Antibiotics Responsibly, Guidance, Education, Tools (TARGET) and promotes the TARGET resources hosted by the Royal College of General Practitioners.		
Cliona McNulty	Involved in judging the Longitude prize.	Personal non-specific non-financial	Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc
Cliona McNulty	Attended advisory board meeting organised by Hayward Medical Communications on 16/05/14 to discuss procalcitonin: event organised on behalf of Thermo Fischer. Honorarium paid to University Hospital Southampton, travel expenses reimbursed.	Personal non-specific non-financial	None

Sanjay Patel	Has written a paper on antimicrobial stewardship.	Non-specific personal non-financial	Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups, etc
Sanjay Patel	Author of book chapter about antimicrobial stewardship in paediatric care. Manuscript prepared April 2015 for Oxford University Press.	Non-specific personal non-financial	None
Sanjay Patel	Has had a relevant journal article published.	Personal non-specific non-financial	None

<p>Wendy Thompson</p>	<p>Lectured to foundation dentists on antimicrobial prescribing in general dental practice. Guidance to Foundation Dentists in Health Education (North East).</p>	<p>Specific personal non-financial</p>	<p>Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles</p>
	<p>Lecturer on antimicrobial stewardship prescribing at a Local Professional Network event in Chester in in November and sponsored by Colgate.</p>		
<p>Wendy Thompson</p>	<p>Offer received from Leeds University re PhD sponsored financially by Leeds University entitled educating patients about dental treatment rather than antibiotic prescriptions for dental pain.</p>	<p>Personal non-specific financial</p>	<p>Advice given regarding ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles.</p>
	<p>Lecturing at British Dental Association Conference on prescribing standards and guidance – May 2016 – no financial gain.</p>	<p>Personal non-specific non-financial</p>	

Wendy Thompson	Represents and works for organisations that support people with faulty immune systems. Antimicrobials are life-saving medicines for these patients.	Personal non-specific non-financial	None
Susan Walsh	Primary Immunodeficiency UK (PID UK) received 2 grants from CSL Behring in the last 12 months. They were unrestricted and were unrelated to antimicrobials.	Non-personal non-specific financial	None
Susan Walsh	Restricted grant from Biotest UK Ltd to PID UK.	Non-personal non-specific financial	None
	Sponsorship from Bio Products Laboratory Ltd to attend a European Society for Immunodeficiencies conference - unrelated to antimicrobial stewardship.		
Susan Walsh	Appointment as community member of NICE Public Health Advisory Committee: guideline on 'Antimicrobial resistance: changing risk-related behaviours in the general population' (confirmed 27 January 2015).	Non-personal non-specific financial	None

About this guideline

NICE clinical guidelines are recommendations about the treatment and care of people with specific diseases and conditions.

NICE guidelines are developed in accordance with a [scope](#) that defines what the guideline will and will not cover.

This guideline was 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.

This guideline was developed using the methods described in the integrated process statement, the [interim methods guide](#) for developing medicines practice guidelines and [Developing NICE guidelines: the manual](#) (2014).

NICE produces guidance, standards and information on commissioning and providing high-quality healthcare, social care, and public health services. We have agreements to provide certain NICE services to Wales, Scotland and Northern Ireland. Decisions on how NICE guidance and other products apply in those countries are made by ministers in the Welsh government, Scottish government, and Northern Ireland Executive. NICE guidance or other products may include references to organisations or people responsible for commissioning or providing care that may be relevant only to England.

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](#)).

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.

Other versions of this guideline

The full guideline, [antimicrobial stewardship: systems and processes for effective antimicrobial medicine use](#) contains details of the methods and evidence used to develop the guideline. It is published by the Medicines and Prescribing Centre at NICE.

We have produced [information for the public](#) about this guideline.

Implementation

[Implementation tools and resources](#) to help you put the guideline into practice are also available.

Your responsibility

This guidance represents the view of NICE, 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 drugs.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity and foster good relations. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

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ISBN: 978-1-4731-1319-0

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