# Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use

## Short guideline

## Draft for consultation, February 2015

If you wish to comment on this version of the guideline, please be aware that all the supporting information and evidence is contained in the full version.

# Contents

# 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, 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.

## 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. Some recommendations can be made with more certainty than others. 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’).

### Recommendations using ‘should’ (or ‘should not’) – ‘strong’ recommendations

For recommendations using ‘should’ (or ‘should not’) the GDG was confident to recommend the course of action.

### Recommendations using ‘should consider’

For recommendations using ‘should consider’ the GDG was less confident to recommend the course of action than for a recommendation using ‘should’ or ‘should not’.

# 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.

## *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' 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.

The terms secondary care and primary care are used to distinguish hospital care from care provided in the community.

### 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.

When a recommendation is for a particular professional group, this is specified in the recommendation.

## *1.1 All antimicrobials*

**Recommendations for organisations (commissioners and providers)**

*Antimicrobial stewardship programmes*

1.1.1 Organisations should establish an antimicrobial stewardship programme, taking account of the resources needed to support antimicrobial stewardship across all care settings.

1.1.2 Organisation should 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 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 antimicrobials, including hospital admissions for rare or serious infections or associated complications
- providing education and training to health and social care practitioners about antimicrobial stewardship and antimicrobial resistance.

1.1.3 Organisations should clearly define roles, responsibility and accountability within an antimicrobial stewardship programme.

1.1.4 Organisations should consider developing systems and processes for providing regular updates (at least every year) to individual prescribers and prescribing leads on:

- national and local antimicrobial prescribing patterns
- local antimicrobial resistance patterns
- patient safety incident patterns relating to antimicrobial use.

1.1.5 Organisations should consider developing systems and processes for identifying and reviewing previous and current antimicrobial prescribing for patients who are admitted to hospital with severe infections.

*Antimicrobial stewardship interventions*

1.1.6 Organisations should consider using the following antimicrobial stewardship interventions:

- review of prescribing by antimicrobial stewardship teams and promotion of appropriate antimicrobial use
- IT or decision support systems
- education programmes for health and social care practitioners, (for example, academic detailing, clinical education or educational outreach).

1.1.7 Organisations 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 (such as delayed prescribing or early review if concerns arise) may be appropriate.

1.1.8 Organisations, when developing care pathways, should consider including:

- information about antimicrobial use
- advice about who a patient should contact if they have concerns about infection after discharge from secondary care.

1.1.9 Organisations should consider prioritising the monitoring of antimicrobial resistance, to support antimicrobial stewardship across all care settings, taking into account the resources and programmes needed.

1.1.10 Organisations should stock antimicrobials in pack sizes that correspond to local guidelines on course lengths.

1.1.11 Organisations should consider evaluating the effectiveness of antimicrobial stewardship interventions by reviewing antimicrobial prescribing and resistance patterns.

1.1.12 Organisations should provide feedback to prescribers on their antimicrobial prescribing.

*Antimicrobial stewardship teams*

1.1.13 Organisations should establish an antimicrobial stewardship team that operates across all care settings as part of the antimicrobial stewardship programme. The team should have core members and may co-opt additional members depending on the setting and antimicrobial issue being considered.

1.1.14 Organisations should support the antimicrobial stewardship team to:

- review prescribing and resistance data and identify ways of feeding this information back to prescribers in all care settings
- provide education to 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 investigate the reasons for very high, increasing or very low volumes of antimicrobial prescribing, or inappropriate antimicrobial use

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

*Communication*

1.1.15 Organisations should encourage and support prescribers only to prescribe antimicrobials when this is clinically appropriate.

1.1.16 Organisations should 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.

1.1.17 Organisations should consider developing local networks across all care settings to communicate information and share learning on:

- antimicrobial prescribing
- antimicrobial resistance
- patient safety incident patterns.

1.1.18 Organisations should consider developing local systems and processes for peer review of prescribing. They should encourage an open and transparent culture that allows questioning of antimicrobial prescribing practices when these are not in line with local and national guidelines and no reason is documented.

1.1.19 Organisations 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.

*Antimicrobial guidelines*

1.1.20 Organisations should 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 supported by local prescribing data and resistance patterns.

1.1.21 Organisations should raise awareness of current local guidelines on antimicrobial prescribing among all prescribers, providing updates if the guidelines change.

*Laboratory testing*

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

## Recommendations for prescribers

*Antimicrobial stewardship*

1.1.23 Prescribers should take into account the likely impact on antimicrobial resistance when deciding whether or not to prescribe an antimicrobial.

*Antimicrobial guidelines*

1.1.24 Health and social care practitioners should support the implementation of local antimicrobial guidelines and understand the

rationale for having these in line with effective antimicrobial stewardship practice.

1.1.25 Prescribers should follow local guidelines when prescribing antimicrobials and consider prescribing the shortest effective course at the most appropriate dose for the individual patient.

*Antimicrobial prescribing*

1.1.26 Prescribers should undertake a clinical assessment and document the clinical diagnosis (including symptoms) in the patient's record and clinical management plan when prescribing any antimicrobial.

1.1.27 Prescribers should consider obtaining microbiological cultures before deciding whether to prescribe an antimicrobial for a non-severe infection, providing it is safe to withhold treatment until the results are available.

1.1.28 Prescribers should consider point of care testing in primary care as described in the NICE guideline on pneumonia.

1.1.29 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), including providing any written information about this as appropriate.

1.1.30 Prescribers should document in the patient's records (electronically wherever possible):

- when an antimicrobial is prescribed
- 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).

1.1.31 Prescribers should not issue an immediate prescription for an antimicrobial to a patient who is likely to have a self-limiting condition.

1.1.32 If immediate antimicrobial prescribing is not the most appropriate option, prescribers should discuss with the patient and/or their family members or carers (as appropriate) other options such as:

- self-care with over-the-counter preparations
- delayed prescribing
- other non-pharmacological interventions, for example, draining the site of infection.

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

- the risk of antimicrobial resistance
- possible interactions with other medicines
- 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*.

1.1.34 When prescribing is outside national and local guidelines, prescribers should document in the patient's records the reasons for the decision.

1.1.35 Prescribers should not issue repeat prescriptions for antimicrobials for longer than 6 months. A more frequent review may be needed for individual patients.

*Prescribing intravenous antimicrobials*

1.1.36 Prescribers should use an intravenous antibiotic from the agreed local formulary and in line with local guidelines for a patient who needs an empirical intravenous antimicrobial for a suspected infection but has no confirmed diagnosis.

1.1.37 Prescribers should consider reviewing intravenous antimicrobial prescriptions at 48–72 hours in all care settings (including community services) to determine if the antimicrobial needs to be continued, and if so whether the intravenous antimicrobial can be switched to an oral antimicrobial.

## *1.2 New antimicrobials*

**Recommendations for organisations (commissioners and providers)**

1.2.1 Organisations should consider establishing processes for reviewing national horizon scanning to allow planning for the release of new antimicrobials.

1.2.2 Organisations should 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 Organisations should 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 and national guidelines)
- costing the use of the new antimicrobial
- reviewing the use of non-formulary antimicrobial prescribing
- evaluating local prescribing and resistance patterns.

**Recommendations for local decision-making groups**

1.2.5 Local decision-making groups should 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.

1.2.6 Local decision-making groups should ensure that local formularies, prescribing guidelines and care pathways are updated when new antimicrobials are approved for use.

1.2.7 When considering a new antimicrobial for local use and for inclusion in the local formulary, local decision-making groups should take into account:

- the need for the new antimicrobial
- 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 patterns 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 consider assessing the benefits and risks of restricting access to a new antimicrobial.

1.2.9 Local-decision-making groups should:

- document the rationale for restricting access to a new antimicrobial and the nature of restriction, and ensure that this information is publicly available
- review the restriction regularly to determine that it is still appropriate.

1.2.10 Local decision-making groups should 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 Local decision-making groups should have discussions 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 Local decision-making groups should indicate where prescribers can find accurate, evidence–based and up–to–date information about the new antimicrobial such as:

- the electronic medicines compendium
- the British National Formulary (BNF)
- the British National Formulary for Children (BNFC)
- the Medicines and Healthcare products Regulatory Agency (MHRA).

# 2 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.

## *2.1 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.

## *2.2 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 use of point of care to aid decision-making is clinically and cost effective when prescribing antimicrobials in children, young people and adults presenting with respiratory tract infections?

# 3 Other information

## *3.1 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.

## *3.2 Related NICE guidance and quality standards*

Details are correct at the time of consultation on the guideline (February 2015).

**Published**

- Pneumonia. NICE guideline CG191 (2014).
- Drug allergy. NICE guideline CG183 (2014).
- Managing medicines in care homes. NICE guideline SC1 (2014).
- Patient group directions. NICE guideline MPG2 (2013).
- Infection control NICE guideline CG139 (2012).
- Patient experience in adult NHS services. NICE guideline CG138 (2012).
- Developing and updating local formularies. NICE guideline MPG1 (2012).
- Service user experience in adult mental health. NICE guideline CG136 (2011).
- Prevention and control of healthcare-associated infections NICE guideline PH36 (2011).
- Medicines adherence. NICE guideline CG76 (2009).

- Surgical site infection. NICE guideline CG74 (2008).
- Respiratory tract infections (RTI) – antibiotic prescribing NICE guideline CG69 (2008).

**Under development**

NICE is developing the following guidance and quality standards:

- Medicines optimisation. NICE guideline. Publication expected March 2015.
- Antimicrobial resistance: changing risk-related behaviours. NICE guideline. Publication expected March 2016.

# 4 The Guideline Development Group and NICE project team

## *4.1 Guideline Development Group*

**Chris Cefai**

Consultant in Clinical Microbiology and Infection Control, Betsi Cadwaladwr University Health Board, North Wales

**Esmita Charani (until 27 November 2014)**

Academic Research Pharmacist, the National Centre for Infection Prevention and Management, Imperial College London and Honorary Clinical Pharmacist, Imperial College Healthcare NHS Trust

**Lynne Craven**

Lay member

**Martin Duerden**

Sessional/Locum GP, North Wales and Clinical Senior Lecturer, Centre for Health Economics and Medicines Evaluation, Bangor University

**Heather Edmonds**

Lead Medicines Optimisation and Antimicrobial Pharmacist, Leeds North Clinical Commissioning Group

**Alastair Hay (Chair)**

Professor of Primary Care and NIHR Research Professor, Centre for Academic Primary Care, School of Social and Community Medicine, University of Bristol; and GP, Concord Medical Centre, Bristol

**Philip Howard**

Consultant Antimicrobial Pharmacist, Leeds Teaching Hospitals NHS Trust

**Sanjay Kalra**

Consultant in Trauma and Orthopaedics and Clinical Lead for Infection Control, Royal Liverpool University Hospitals NHS Trust

**Tessa Lewis (Vice Chair)**

GP and Medical Advisor to All Wales Therapeutics and Toxicology Centre

**Kym Lowder**

Head of Medicines Management, Integrated Care 24 Limited, Kent

**Cliodna McNulty**

Head of Primary Care Unit, Public Health England

**John Morris**

Lay member

**Sanjay Patel**

Consultant in Paediatric Infectious Diseases and Immunology, University Hospital Southampton NHS Foundation Trust

**Wendy Thompson**

Associate Dentist, Sedbergh Dental Practice, Clinical Supervisor, Blackpool Teaching Hospitals NHS Foundation Trust, Lecturer in Antimicrobial Prescribing, Health Education NE

**Susan Walsh**

Lay member

## *4.2 NICE project team*

**Leighton Coombs**

Data Analyst, Health Technology Intelligence, NICE

**Johanna Hulme**

Project Lead and Associate Director, Medicines and Prescribing Centre, NICE

**Debra Hunter**

Assistant Project Manager, Medicines and Prescribing Centre, NICE (from 29 September 2014)

**Dominick Moran**

Data Analyst, Costing and Commissioning Implementation, NICE

**Greg Moran**

Senior Adviser, Medicines and Prescribing Centre, NICE

**Roberta Richey**

Senior Adviser, Medicines and Prescribing Centre, NICE (from 1 August 2014)

**Rebekah Robinson**

Assistant Project Manager, Medicines and Prescribing Centre, NICE (until 26 September 2014)

**Emma Aaron**

Administrator, Medicines and Prescribing Centre, NICE

# 5 Declarations of interest

The following members of the Guideline Development Group made declarations of interests. All other members of the Group stated that they had no interests to declare.

**Alastair Hay (Chair)**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | None | None |
| First GDG meeting (3 June 2014) | Member of Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection.<br><br>Would like to be aware of evidence gaps and GDG research recommendations that could influence future research programme. | Project lead will monitor for any potential conflict.<br><br>Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc. |
| Second GDG meeting (8 September 2014) | Has an interest in the longitude prize, no financial interests, no involvement in any new antimicrobials. | None |
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | No financial conflicts of interest to declare. Lead a group at the University of Bristol conducting research into primary care infections and antimicrobial resistance. | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc. |

**Tessa Lewis (Vice-chair)**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | None | None |
| First GDG meeting (3 June 2014) | No changes to record | None |
| Second GDG meeting (8 | No changes to record | None |

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| September 2014) | | |
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | No changes to record | None |

**Esmita Charani (until 27 November 2014)**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | None | None |
| First GDG meeting (3 June 2014). | Published in peer reviewed journals. | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles.<br><br>Reminded that opinions expressed that may be relevant to the guideline may lead to a conflict of interest. |
| Emailed 31 July 2014 | 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.<br><br>Salary is funded by the National Institute of Health Research on a grant investigating behaviour change in antimicrobial prescribing.<br><br>Honorary visiting researcher to Haukeland University in Norway where advice on the implementation of the national implementation of an antimicrobial stewardship programme. | Chair and Project lead will monitor for any potential conflict. Also discussed with the Nice Medicines and prescribing centre Programme Director.<br>Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles. |
| Second GDG meeting (8 September 2014) | No changes to record | None |

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | Undertaking research at PhD level into antibiotic prescribing behaviours in secondary care.<br><br>Published author in the field of antibiotic prescribing behaviours and antimicrobial stewardship. | Chair and Project lead will monitor for any potential conflict.<br>Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles. |

**Martin Duerden**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | 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 RB in the content.<br><br>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. | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles.<br><br>Advised not to write for any publication until the guideline has published. |
| First GDG meeting (3 June 2014) | Clinical Adviser on Prescribing for the Royal College of General Practitioners but does not receive payment for this. | None |
| Emailed 26 August 2014 | Member of the Global Respiratory Infection Partnership (work declared above with RB done in this capacity). Now spoken at 4 meetings in the last 12 months.<br><br>On the Editorial Board of Drug and Therapeutics Bulletin, a BMJ Group publication, this is a paid position.<br><br>On the editorial board of Prescriber (a Wiley publication) which is an unpaid position. Occasionally writes opinion | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles.<br><br>Advised not to write for any publication until the guideline has published. |

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| | based editorials and articles for this publication. Receives payments for these.<br><br>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.<br><br>I am a member of the Paediatric Formulary Committee for the British National Formulary (BNF) payment not received for this. | |
| Second GDG meeting (8 September 2014) | No changes to record | None |
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | Recently has received small payments for articles on the Lipid Modification Clinical Guideline from Pulse and from Guidelines in Practice.<br><br>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.<br><br>On the Medicines Committee for the Royal College of Paediatrics and Child Health - payment not received for this.<br><br>Member of the NICE technology appraisals Committee until October 2014. This is not a paid position. | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles.<br>Chair and Project lead will monitor for any potential conflict. |
| Fifth GDG meeting (16 March 2015) | | |

**Rose Gallagher**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | None | None |
| Second GDG meeting (8 September 2014) | Involved in a Royal College of Nursing published position statement which was sponsored by Pfizer. | Chair and Project lead will monitor for any potential conflict<br><br>Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc. |
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | No changes to record | None |

**Philip Howard**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | Paid consultancy work on antibiotics for the pharmaceutical industry i.e. Pfizer (Linezolid), Astellas (Levofloxacin), AstraZeneca (Ceftaroline), Novartis (Daptomycin), Gilead (Ambisome). | Advised not to undertake any further consultancy work in this area during the development of the guideline through to publication. |
| First GDG meeting (3 June 2014) | Paid consultancy work with Danone on antimicrobial stewardship.<br><br>Committee member of UK Clinical Pharmacy Association - Pharmacy Infection Network.<br><br>Council member of British Infection Association (until May 2013).<br><br>Council member of British Society of Antimicrobial Chemotherapy.<br><br>Represented International Pharmaceutical Federation (FIP) at WHO (World Health Organisation) Antimicrobial Resistance Strategic Technical Advisory Group (May | Advised not to undertake any further consultancy work in this area during the development of the guideline through to publication.<br><br>Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc.<br><br>Chair and Project lead will monitor for any potential conflict |

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| | 2014).<br><br>Published unpaid articles related to AMS.<br><br>Spokesman on Antimicrobials for Royal Pharmaceutical Society. | |
| 12 August 2014 | Involved in Antimicrobial Resistance Summit at the Royal Pharmaceutical Society in November 2014. | Advised that as the evidence of the NICE MPG 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. |
| Second GDG meeting (8 September 2014). Interests emailed 7 September 2014. | Sponsorship to present work at international conferences (no money received directly):<br><br>European Advisory Board on pipeline antibiotics (January 2014) funded by Sanofi. Lecture on *Clostridium difficile* multicentre local service evaluation of fidaxomycin<br><br>Lecturing/consultancy about:<br>• role of the pharmacist in antimicrobial stewardship<br>• antimicrobial medicine specific topics<br>• data warehousing<br>• pipeline agents<br>Carried out in September/October 2014.<br><br>Fees paid into Leeds Teaching Hospitals NHS Trust Charitable Trustees funding from Astellas, Baxter, Pfizer and Cubist.<br><br>Sponsorship to present work at international conferences (no money received directly):<br>• European Association of Hospital Pharmacy (B. Braun 2013 and 2014)<br>• European Congress of Clinical Pharmacy and Infectious Diseases (Gilead 2014). | Project lead reiterated the importance that work from this group is not shared with other work that he is involved with.<br><br>Chair and Project lead will monitor for any potential conflict. |

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| | Received expenses and conference paid directly to conference.<br><br>Paid by College of Pharmacy Practice and Education to develop Antimicrobials in Focus (Antimicrobial Stewardship for Community Pharmacists).<br><br>Research funding from Novartis and Astellas paid directly to an independent audit company to undertake audit. Audits not directly related to antimicrobial stewardship topic.<br><br>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.<br><br>Department of Health ARHAI (Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection) Start Smart then Focus guidance for hospitals group.<br><br>PHE (Public Health England) & 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.<br><br>Lead a research project on surveying Antimicrobial Stewardship in hospitals across the world.<br><br>Part of a research group developing an Antimicrobial guideline application with a European group “Panacea”.<br><br>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. | |

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| | Antimicrobial Resistance round table group (unfunded) with AstraZeneca to help pharmaceutical industry discussion with Government.<br><br>Lecture at Clinical Pharmacy Congress (2013 and 2014). Updates provided on respiratory infections in 2013. Updates provided on *C. difficile*, ESBL and drug allergy in 2014. Payment received directly. | |
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | Speaker for Royal Pharmaceutical Society at the Royal Colleges Summit on Antimicrobial Resistance. No payment received.<br><br>Introduction of proposed ESPAUR / NHS-England on Quality Premium to reduce antibiotic prescribing.<br><br>Secondment to NHS England as Regional Healthcare Associated Infections Project Lead from November 2014 to March 2015.<br><br>Speaker at British Society for Antimicrobial Chemotherapy Antimicrobial Stewardship conference in India.<br><br>British Society of Antimicrobial Chemotherapy (BSAC) workshop on antimicrobial stewardship in India (27-28 November 2014). | Project lead reiterated the importance that work from this group is not shared with other work involved with.<br><br>Chair and Project lead will monitor for any potential conflict. |
| Interests emailed 12 February 2015 | BSAC workshop on antimicrobial stewardship in Bahrain (24-26 February 2015)<br><br>BSAC round table talk on Pharmacy's role in antimicrobial stewardship<br><br>Advisory board for new pipeline product, Durata (February 2015). Fees paid into Leeds Teaching | |

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| | Hospitals NHS Trust Charitable Trustees. | |

**Kym Lowder**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | None | None |
| First GDG meeting (3 June 2014) | Associate for the NICE Medicines & Prescribing Centre | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc. |
| Second GDG meeting (8 September 2014) | No changes to record | None |
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | No changes to record | None |

**Cliodna McNulty**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | Stated no conflicts to declare, Spoken at antimicrobial resistance symposiums sponsored by public bodies and one by bioMeriuex but receives no payment. Leads the development of national Public Health England antibiotic and lab use guidance for GP's which covers the diagnosis and treatment of *Urinary tract infections.* She has received grants from several publically funded research bodies. | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc. . |
| First GDG meeting (3 June 2014) | Member of Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc. |
| 6 August 2014 | Observer on British Society for Antimicrobial | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other |

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| | Chemotherapy Council<br>Member of English surveillance programme for antimicrobial utilisation and resistance<br>Lead in the development of<br>Treat Antibiotics Responsibly, Guidance, Education, Tool s (TARGET) and promotes the TARGET resources hosted by the Royal College of General Practitioners | committees/groups etc. |
| Second GDG meeting (8 September 2014) | Involved in judging the longitude prize. | None |
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | No changes to record | None |

**Sanjay Patel**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | None | None |
| 4 August 2014 | 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. | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups etc. |
| Second GDG meeting (8 September 2014) | Has written a paper on AMS. | |
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | No changes to record | None |

**Wendy Thompson**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | None | None |
| First GDG meeting (3 June 2014) | No changes to record | None |
| Second GDG meeting (8 September 2014) | Has had a relevant journal article published. | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles. |
| Third GDG meeting (30 September 2014) | Lectured to foundation dentists on antimicrobial prescribing in general dental practice guidance to Foundation Dentists in Health Education (North East) Lecturer on AMS prescribing at a Local Professional Network event in Chester in in November and sponsored by Colgate. | Advice given regards ensuring that information learnt as part of the NICE guideline process is not shared with other committees/groups or included within any written articles. |
| Fourth GDG meeting (14 November 2014) | No changes to record | None |

**Susan Walsh**

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| Recruitment | Represents and works for organisations that support people with faulty immune systems. Antimicrobials are life-saving medicines for these patients. | None |
| First GDG meeting (3 June 2014) | Primary Immunodeficiency UK (PID UK) received two grants from CSL Behring in the last 12 months. They were unrestricted and were unrelated to antimicrobials. | None |
| Second GDG meeting (8 September 2014) | No changes to record | None |
| Third GDG meeting (30 September 2014) | No changes to record | None |
| Fourth GDG meeting (14 November 2014) | Restricted grant from Biotest UK Ltd to PID UK. Sponsorship from Bio Products Laboratory Ltd to attend | None |

| GDG meeting | Declaration of interest | Action taken |
|---|---|---|
| | European Society for an Immunodeficiencies conference – unrelated to antimicrobial stewardship. | |