

antimicrobial stewardship programmes in primary care

2020 PROGRESS REPORT



Contents

Patients Association Members Briefing: Antimicrobial Stewardship Programmes in Primary Care	3
Executive Summary	5
Introduction	8
About the report	11
The policy context for Antimicrobial Stewardship	11
Current guidance and practice	16
Research and data on AMR and AMS	20
What do CCGs tell us about implementing AMS programmes?	26
Conclusions and recommendations	34
References	35

Association Members Briefing: Antimicrobial Stewardship Programmes in Primary Care

What's the issue?

Antibiotics are key to modern medicine and treatment. Many procedures and treatments developed over recent years, such as chemotherapy, organ transplants and other major surgery, rely on antibiotics to prevent infections. They are also crucial in treating some forms of pneumonia and other illnesses.

However, an increasing number of common infections are becoming resistant to the drugs designed to treat them. This is called antimicrobial resistance (AMR). Antimicrobial stewardship (AMS) is part of the fight against AMR. The purpose of AMS is to ensure 'the right antibiotic for the right patient, at the right time, with the right dose, and the right route, causing the least harm to the patient and future patients'.⁽¹⁾ AMS programmes might include improving prescribing of antibiotics, promoting data collection and raising public awareness of AMR.

Why is it important?

AMR is a significant, and growing, threat to public health in the UK and around the world. Antimicrobial-resistant infections are estimated to cause 700,000 deaths each year globally. That figure is predicted to rise to 10 million, with a cumulative cost of \$100 trillion, by 2050 if no action is taken. Estimates predict a three-fold rise in global antibiotic consumption by 2030, but no new class of antibiotics has been discovered and made available since the 1980s.⁽²⁾ The COVID-19 global pandemic also brings AMR into sharper focus. While COVID-19 is a virus, and so antibiotics are not effective against it, people may develop secondary bacterial infections requiring antibiotics, or may find it harder to get drugs as global supplies are disrupted.

What were we trying to find out?

The Patients Association wanted to find out how well local clinical commissioning groups (CCGs) were implementing government policy and guidance on AMS, and how much progress they had made in recent years.

How did we do it?

We sent freedom of information requests to all CCGs in England with a range of questions on AMS programmes. We had done this previously in 2016, so we had some information with which we could judge progress. We also reviewed current UK policy and research to understand the context for AMS and current thinking on AMR.

What did we find?

We found some progress, and some areas for improvement. Key findings include:

- More CCGs had had an AMS programme for longer in 2019 compared to 2016. However, around 10% reported having no AMS programme at all – about the same as in 2016
- In 2016, one third of respondents reported having no named individual responsible for the implementation of their AMS programme. Results from 2019 show considerable improvement, with only 17% reporting the same
- Only 5% of CCGs that responded (a total of 95) told us they had a ringfenced budget for AMS programmes
- 64% of respondents said they were currently achieving their antibiotics reduction target. 9% said they did not have a target
- Only 15% reported having a policy to promote the use of point of care tests to determine whether antibiotics were necessary for certain conditions.
- More than double the respondents – just over half - reported implementing the full TARGET toolkit for AMS programmes in primary care in 2019 compared to 2016. 9% of respondents overall had not implemented any of the toolkit.
- 73% of respondents to the question ‘do you believe that your CCG could practically do more to achieve the aims of its AMS programme?’ replied yes.

What's next?

We think there are some steps different organisations can take to improve AMS even further, including:

- Conducting further research with the 17 new CCGs created in 2020 to monitor and evaluate how they develop high quality integrated AMS programmes
- Researching why some CCGs do not appear to have AMS programmes
- Researching why some areas of England are better than others at reducing antibiotic prescribing, and if this relates to ethnicity, poverty or other factors
- Encouraging CCGs and Health and Wellbeing Boards to include measures of AMR in their local Joint Strategic Needs Assessments
- Establishing dedicated local funds to help GPs and others raise awareness of AMR and AMS among professionals and the general public
- Establishing a local AMR innovation fund, to pilot and purchase new technology
- Developing a better understanding of the barriers and solutions to introducing point of care testing for certain bacterial infections in primary care in England
- Establishing evidence-based national guidance on use and monitoring of diagnostic tests to help prescribing.

Where can I find out more?

- The Patients Association's [previous report on AMS](#) (2016)
- World Health Organisation [antimicrobial resistance fact sheet](#) (2018)
- NHS [information page on antibiotic resistance](#) (2019)
- Become a Public Health England [Antibiotic Guardian](#) (2019).

Executive Summary

This report sets out to explore how antimicrobial stewardship (AMS) programmes are working to tackle antimicrobial resistance (AMR), by asking Clinical Commissioning Groups (CCGs) about their practice and experience of local stewardship. It is a follow-up to the Patients Association's 2016 report on the same subject, and highlights some progress and areas for improvement in key areas.

Using Freedom of Information Requests (FOIs), CCGs in England were asked a range of questions about their AMS programmes, relating to national guidance, toolkits and practice. The national policy and practice landscape puts AMS programmes at the heart of fighting AMR, and securing long-term quality healthcare for patients as a result. Primary care professionals are key to making these successful.

Combatting antimicrobial resistance

Antimicrobial resistance (AMR) is a significant, and growing, threat to public health in the UK and around the world. Antimicrobial-resistant infections are estimated to cause 700,000 deaths each year globally. That figure is predicted to rise to 10 million, with a cumulative cost of \$100 trillion, by 2050 if no action is taken. Estimates predict a three-fold rise in global antibiotic consumption by 2030, which will likely lead to an increase in infections resistant to current antibiotic treatments. However, no new class of antibiotics has been discovered and made routinely available since the 1980s.²

This is where AMS comes in. The purpose of AMS is to ensure 'the right antibiotic for the right patient, at the right time, with the right dose, and the right route, causing the least harm to the patient and future patients'.¹ People need effective and appropriate treatment when they fall ill today, but they also need treatments to work if they fall ill in the future. Effective AMS can ensure that is the case for longer, by making sure antibiotics are only used when needed, extending the useful lifetime of treatments.

The global COVID-19 pandemic has had a profound impact on public health and healthcare systems in the short term, and is expected to have long term consequences too. This includes bringing AMR into sharper focus.³ There is potential, however, in new collaborative and open access drug development programmes for COVID-19, to 'solve the antibiotic R&D crisis by allowing alternative approaches to emerge and be tested'.⁴

A policy priority

AMS can involve interventions to improve appropriate prescribing of antibiotics, reducing antibiotic use in agriculture, promoting data collection and monitoring and raising public awareness of AMR.

The UK government published its first Five Year Antimicrobial Resistance Strategy and Action Plan in 2000, making it one of the first countries to do so. In 2019 it published both a 20-year vision for antimicrobial resistance and a new five year national action plan for tackling antimicrobial resistance from 2019-24.² This includes a commitment to strengthening

stewardship programmes, as part of optimising use of antimicrobials. Therapeutic and diagnostic stewardship, with commitment from leaders, accountability, education, training and communications, and robust auditing and feedback are cited as important factors in successful programmes.

A priority for practice

NICE guideline NG15 Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use, was published in 2015. It outlines ways in which commissioners and providers, prescribers, laboratories, local decision making groups and others can ensure effective healthcare-system-wide AMS programmes and interventions.⁵ The guideline asks all commissioners to ensure AMS works across all health and care settings, by establishing an AMS programme with adequate resources, clearly defined roles and responsibilities, local guidelines informed by prescribing data, and systems for providing regular updates. NICE also recommends further research to determine 'whether using point-of-care tests [to identify certain bacterial infections] in decision-making is clinically and cost effective when prescribing antimicrobials in children, young people and adults presenting with respiratory tract infections.'⁵

How are CCGs implementing AMR policy and practice guidelines?

FOI requests were sent out to 191 CCGs in March 2020. However, this was done so at a time of transition for CCGs, with 74 CCGs merging into 18 new bodies, leaving 135 in total. Taking into account new and merged CCGs, there were 107 responses, out of 191 Clinical Commissioning Groups (CCGs), a response rate of 56%. Their responses showed some good progress from our 2016 report, with a few areas for improvement. Key findings include:

- Around 10% reported having no antimicrobial stewardship (AMS) programme, roughly in line with results from 2016. However, 79% reported having an AMS programme for over a year, an increase of 19% on the previous freedom of information request (FOI).
- In 2016, one third of respondents reported having no named individual responsible for the implementation of their AMS programme. Results from 2019 show considerable improvement, having almost halved, with only 17% reporting the same
- 93% reported that their CCG was part of a local wider partnership group addressing antimicrobial resistance (AMR). 90% stated they collaborate with other CCGs around AMR, or have plans to
- Only 5% of CCGs that responded (a total of 95) told us they had a ringfenced budget for AMS programmes
- 64% of respondents said they were currently achieving their antibiotics reduction target. 9% said they did not have a target
- Only 15% reported having a policy to promote the use of point of care C-reactive protein tests in primary care settings. 63% also reported that no GP practices in their CCG area offered point of care C-reactive protein tests for patients with an uncertain diagnosis of pneumonia, as recommended by NICE Clinical Guideline 191. Just two CCGs said that all GP practices in their area did this
- Local AMS programmes commonly featured key features recommended by the NICE Guideline 15 on AMS programmes, including monitoring and evaluating antimicrobial prescribing, co-opting additional members and integrating audits into existing quality improvement plans. CCGs less commonly involved lead health and social care

practitioners, antimicrobial pharmacists and medical microbiologists in their core teams, or provided regular feedback to individual prescribers.

- More than double the respondents – just over half - reported implementing the full TARGET toolkit for AMS programmes in primary care in 2019 compared to 2016. Of those remaining, 81% had implemented at least one element. 9% of respondents overall had not implemented any of the TARGET toolkit.
- 73% of respondents to the question ‘do you believe that your CCG could practically do more to achieve the aims of its AMS programme?’ replied yes.

always While good progress has been made, more needs to be done. The areas above where there could be some improvement are, on the whole, issues that require significant investments of time, funding and expertise. The recommendations below suggest some areas for further work by different stakeholders to take forward the fight against antimicrobial resistance.

Recommendations

- Further research should be conducted with the 17 new CCGs created by mergers in 2020 to monitor and evaluate how they develop high quality integrated AMS programmes across their new territories
- Research into why some CCGs do not appear to have established AMS programmes, targets or other interventions should identify barriers and solutions to this small volume of lack of engagement
- There should be further research into geographical disparities in prescribing rates, particularly qualitative comparative research into different practices and attitudes in different areas. This should be supplemented by additional data on prescribing rates that reflect demographics including ethnicity, rates of poverty or other factors, alongside existing measures of age and sex
- CCGs and Health and Wellbeing Boards should include measures of AMR in system targets and monitoring mechanisms in order to embed antimicrobial monitoring and evaluation practice across the whole health and care system. There should also be clarity over the role of integrated care systems, as they continue to develop, in relation to AMS across health economies.
- Government, commissioners, health and wellbeing boards and other relevant stakeholders should establish dedicated core local funds, outside of payment-by-results funding, to help primary care practitioners raise awareness of AMR and AMS among professionals and the general public. This should include high quality information for patients on appropriate use of antibiotics.
- Government should establish a local AMR innovation fund, to pilot and purchase new diagnostic technologies, including point-of-care (POC) testing kits to enable clinicians to determine appropriate use of antibiotics, and e-prescribing systems
- Research should develop a better understanding of the barriers to introducing POC diagnostic testing in primary care in England, whether these can be overcome, and what are the results and success factors where CCGs are already making use of diagnostics
- Government should establish evidence-based national guidance on use and monitoring of diagnostic tests to aid prescribing, in order to aid CCGs in decision-making and to meet its commitment to report on the percentage of prescriptions supported by a diagnostic test or decision support tool by 2024.

Introduction

Antibiotics are key to modern medicine and treatment. They have a central role in treating infections and making procedures safe. However, an increasing number of common infections are becoming resistant to the drugs designed to treat them.

Antimicrobial resistance (AMR) is a significant, and growing, threat to public health in the UK and around the world. Antimicrobial-resistant infections are estimated to cause 700,000 deaths each year globally. That figure is predicted to rise to 10 million, with a cumulative cost of \$100 trillion, by 2050 if no action is taken. Estimates predict a three-fold rise in global antibiotic consumption by 2030, but no new class of antibiotics has been discovered and made routinely available since the 1980s. If this situation continues, people in the UK are likely to experience longer periods of infectious illnesses, which are more difficult to treat, which carry a greater risk of mortality, with serious social and economic implications.²

A recent report by the World Health Organisation (WHO), providing an update on its Global Antimicrobial Resistance and Use Surveillance System (GLASS), found that while more countries than ever are now monitoring and reporting on AMR, a concerning number of bacterial infections are increasingly resistant to available medicines. This is compounded by declining investment and lack of innovation in developing new drugs and diagnostic tools.⁶

According to the National Institute for Health and Care Excellence (NICE), the benefits of reducing the use of antimicrobials include:

- Slowing down the emergence of AMR
- Ensuring that antimicrobials remain an effective treatment for infection
- Improving clinical outcomes for the population as a whole
- And conserving healthcare resources.⁵



This is where the role of antimicrobial stewardship (AMS) comes in. AMS can involve interventions to improve appropriate prescribing of antibiotics, reducing antibiotic use in agriculture, promoting data collection and monitoring and raising public awareness of AMR. For clinicians, the British Society for Antimicrobial Chemotherapy (BSAC) defines the purpose of AMS as ensuring ‘the right antibiotic for the right patient, at the right time, with the right dose, and the right route, causing the least harm to the patient and future patients’.¹ People need effective and appropriate treatment when they fall ill today, but they also need treatments to work if they fall ill in the future. Effective AMS can ensure that is the case for longer.

Around three quarters of all antibiotic prescribing happens in primary care. It is therefore important that AMS programmes work well in general practice settings, as well as across the rest of the health and care system. Through initiatives and strategies over recent years, prescribing of antibiotics in primary care reduced by about 11% between 2013 and 2017, from 170 antibiotic items prescribed per 1,000 people to 151 per 1,000 people, and with 1 million fewer antibiotics dispensed in 2017/18 than in the previous year. By the beginning of 2018, more than 80% of CCGs had reduced their antibiotic prescribing levels to below the 2013 England average, in response to a new focus on improving appropriate antibiotic prescribing in NHS England’s Quality Premium – a set of financially-incentivised targets. However, tackling AMR is not just about reducing prescribing; antibiotics remain effective treatment for a wide range of infections. Policy and practice guidelines also encourage appropriate or ‘rational’ prescribing of the right type of broad-spectrum (for treatment of a range of bacteria causing serious illness) or narrow-spectrum (for more specific, targeted treatment) antibiotics, at the right dose, with a timely review.⁷

However, there remains significant variation between clinical commissioning groups (CCGs), responsible for general practices in local areas. The highest result from a CCG for number of antibiotic items prescribed per 1,000 people in 2017 was 221, compared to an England average of 156, and a lowest result of 82.⁷

This report sets out to explore variation in AMS programmes in more detail, by asking CCGs about their practice and experience of local stewardship. It is a follow-up to the Patients Association’s 2016 report on the same subject, and will look for progress in key areas. It will put this in a context of AMR policy in the UK, and recent research, including early indicators of the impact of the global COVID-19 pandemic. It makes some recommendations for future developments, for different stakeholders to take forward. These include:

- Further research should be conducted with the 17 new CCGs created by mergers in 2020 to monitor and evaluate how they develop high quality integrated AMS programmes across their new territories
- Research into why some CCGs do not appear to have established AMS programmes, targets or other interventions should identify barriers and solutions to this small volume of lack of engagement
- There should be further research into geographical disparities in prescribing rates, particularly qualitative comparative research into different practices and attitudes in different areas. This should be supplemented by additional data on prescribing rates that reflect demographics including ethnicity, rates of poverty or other factors, alongside existing measures of age and sex

- CCGs and Health and Wellbeing Boards should include measures of AMR in system targets and monitoring mechanisms in order to embed antimicrobial monitoring and evaluation practice across the whole health and care system. There should also be clarity over the role of integrated care systems and relevant partnership organisations, as they continue to develop, in relation to AMS across health economies.
- Government, commissioners, health and wellbeing boards and other relevant stakeholders should establish dedicated core local funds, outside of payment-by-results funding, to help primary care practitioners raise awareness of AMR and AMS among professionals and the general public. This should include high quality information for patients on appropriate use of antibiotics.
- Government should establish a local AMR innovation fund, to pilot and purchase new diagnostic technologies, including point-of-care (POC) testing kits to enable clinicians to determine appropriate use of antibiotics, and e-prescribing systems
- Research should develop a better understanding of the barriers to introducing POC diagnostic testing in primary care in England, whether these can be overcome, and what are the results and success factors where CCGs are already making use of diagnostics
- Government should establish evidence-based national guidance on use and monitoring of diagnostic tests to aid prescribing, in order to aid CCGs in decision-making and to meet its commitment to report on the percentage of prescriptions supported by a diagnostic test or decision support tool by 2024.



About the report

This report repeats research conducted by the Patients Association in 2016.⁸ Using Freedom of Information Requests (FOIs), CCGs in England were asked a range of questions about their AMS programmes, relating to national guidance, toolkits and practice.

FOIs were sent in March 2020 and asked questions about AMS programmes in 2019. An updated list of questions was sent to all 191 CCGs operational at the time of sending, after review by key stakeholders including a small number of CCGs and other partners. Updates included bringing questions in line with developments in policy and guidance, and reflecting key priorities for AMS and AMR. Where possible, questions for 2019 duplicated those in 2016 in order to provide an indication of progress. The FOIs were sent during a period of transition for CCGs, with 74 of the previous list merging into 18 new bodies, leaving 135 in total. Most responses were from pre-merger CCGs, including those within 11 of these new CCG footprints. Discussion of the results in this report takes this into account. In total, 107 CCGs responded to the FOI request, or 56% of CCGs in England.

The report places the results in the context of changing government policy, clinical guidance and academic research. It begins with a summary of the policy context, followed by current guidance and practice. Relevant articles identified through a small-scale review of academic journals are briefly discussed, with a focus on evaluating AMS programmes and interventions. Analysis of FOI results is followed by a short set of recommendations.

The policy context for Antimicrobial Resistance

Previous policy initiatives

The UK government published its first Five Year Antimicrobial Resistance Strategy and Action Plan in 2000, making it one of the first countries to do so. Early efforts, focused on hospitals, resulted in a 75% decline in healthcare-associated drug resistant MRSA and C-Difficile infections across England, Wales, Scotland and Northern Ireland.⁽⁹⁾ Its second five year AMR strategy, published in 2013, was a cross-government effort between the Department of Health and the Department for Environment, Food and Rural Affairs (DEFRA), recognising the joint efforts needed between the human health sector and food and farming. This is referred to as a 'One Health' approach, designed to bring different sectors together, such as health, education and food and agriculture, to achieve better public health outcomes.⁽¹⁰⁾ The strategy had three key strategic aims:

- improving knowledge and understanding of resistance
- protecting effectiveness of existing treatments
- and developing new treatments and diagnostics.

Actions supporting these strategic aims included conserving and stewarding the effectiveness of existing treatments and promoting better use of rapid diagnostics. This also included improving professional education training, including continuing professional development competences for effective antibiotic stewardship, and public engagement to promote wider understanding of the need for sustainable antibiotic use. It set out an intention to develop and implement effective antimicrobial stewardship quality measures and a quality standard on antimicrobial stewardship, as well as bringing learning from hospital-based AMS schemes to primary care settings.¹¹

The Policy Innovation Research Unit (PIRU) conducted an evaluation of the 2013-18 Five Year Strategy.⁹ It found evidence of good collaborative working and a commitment to cross-government initiatives for effective implementation of the strategy. There were some challenges with implementing diagnostic tests in primary care, designed to support more appropriate prescribing of antibiotics, and establishing how these should be paid for, particularly if diagnostic technology increased the cost of healthcare without obvious benefits for patient care. Financial incentives for reducing antibiotic prescribing in primary care had mixed success, with practices constrained by lack of scale to access specialist expertise, lack of funding for 'invest to save' strategies, and a 'ceiling effect' whereby already high performing practices struggled to demonstrate improvement. It noted opportunities with emerging NHS Integrated Care Systems and Sustainability and Transformation Partnerships to support smaller providers with high cost schemes such as e-prescribing systems, and to help better coordinate AMR initiatives. However, local efforts in England were often ad hoc, and reliant on self-appointed local 'champions' to drive them forward. Some GPs also reported concerns about how to have conversations with patients about alternative treatments.

In 2014, government commissioned economist Jim O'Neill to conduct a Review on Antimicrobial Resistance. This took place over 19 months, engaging with international stakeholders, and proposing a range of solutions and targets for tackling AMR. The final report was published in 2016, with ten recommendations for global and local action. It highlighted the enormous and growing scale of the problem and the importance of tackling it, citing it as 'core to the long-term economic development of countries and our wellbeing'. It identified supply and demand issues, prescribing practice, diagnostic innovation, vaccine and drug development, infection control, global surveillance, workforce issues and public awareness as key elements of the necessary response.⁽¹²⁾ Government responded in the same year, with a range of commitments to tackling the issues raised. Targets set included:

- Reducing healthcare associated drug resistant ('Gram-negative') bloodstream infections in England by 50% by 2020
- Reducing inappropriate antibiotic prescribing by 50%, with the aim of being a world leader in reducing prescribing by 2020
- Running a targeted pilot campaign to test effective ways to raise awareness of AMR and drive behaviour change.

The 2016 review has continued to shape UK government policy on AMR. However, a 2019 progress review concluded that too little action had been taken globally, and that progress was 'flagging in crucial areas', including in reform of the marketplace for antibiotics, incentives for drug innovation and development of effective point-of-care (POC) diagnostic tests.¹³

Government has not yet reported on its own progress against commitments made in response to the original report; any review will likely be postponed due to the global COVID-19 pandemic, and will need to take into account the implications of that crisis for tackling AMR.

Current policy

AMS today exists in the context of a range of global and national policy initiatives. While the international Sustainable Development Goals (SDGs) for 2030 do not currently include a target for combatting AMR,¹⁴ analysis by the World Bank found that goals such as ending poverty, ending hunger, ensuring healthy lives, reducing inequality and revitalizing global development partnerships are less likely to be achieved if no action is taken. The report finds that low-income countries will be most affected by increasing AMR, further widening gaps in global inequality, and stresses that all countries will benefit from better stewardship and AMR containment.¹⁵

The World Health Assembly approved a Global Action Plan on AMR in 2015, with five strategic objectives:

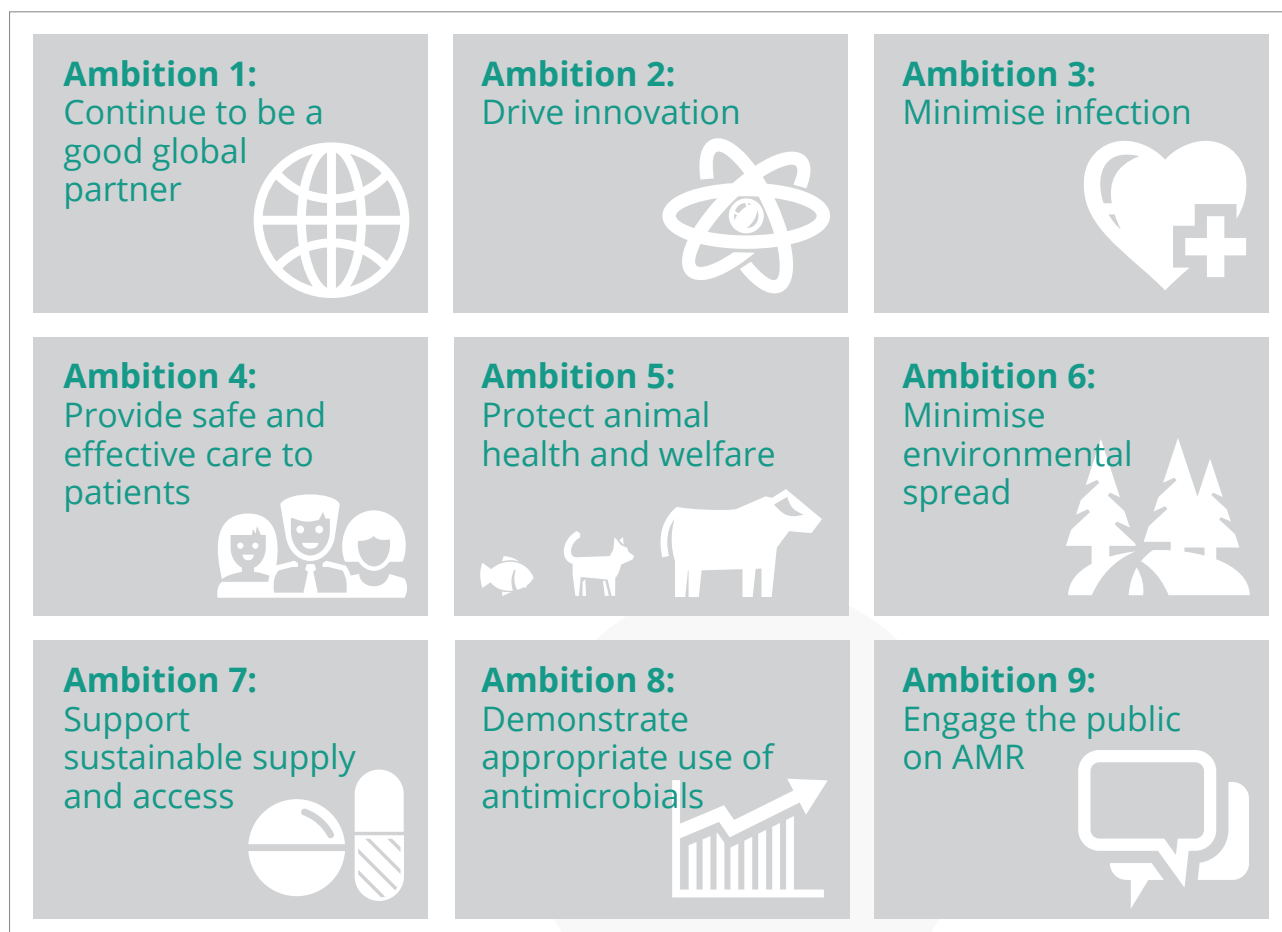
- To improve awareness and understanding of antimicrobial resistance
- To strengthen knowledge through surveillance and research
- To reduce the incidence of infection
- To optimize the use of antimicrobial agents
- To develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions.

Indicators include provision of stewardship programmes that monitor and promote good antimicrobial use and aid prescribing, as well as supporting research into effective AMS programmes. This plan provides a framework for national AMR strategies, including the UK's.¹⁶ The UK Government published a 20-year vision for antimicrobial resistance in 2019, with a vision of 'a world in which antimicrobial resistance is effectively contained, controlled and mitigated'.¹⁷ There are three central strands to the vision:

- Having a lower burden of infection, better treatment and minimised transmission
- Optimal use of antimicrobials and good stewardship across all sectors
- The development of new diagnostics, therapies, vaccines and interventions.
- These are framed in turn by nine ambitions for change, within a 'One Health' approach, which include providing safe and effective care, engaging the public and demonstrating appropriate use of antimicrobials.



Figure 1: The UK's nine ambitions for change on AMR(17)



These ambitions include commitments to fostering strong antimicrobial stewardship, promoting clinical decision support tools and effective data use, and using effective communication channels to encourage the public to take ownership of the issue and its solutions.

At the same time, government published a new five year national action plan for tackling antimicrobial resistance from 2019-24.² This focuses on the same three key aims as the 20 year 'One Health' strategy: reducing the burden of infection, optimising the use of antimicrobials, and investing in innovation, supply and access. The Microbiology Society suggests that this is a strong, long-term commitment to tackling AMR, which shows global leadership. However, it highlights a lack of specificity around which drug-resistant infections it plans to reduce, and there is a pressing need to put into action commitments to address market failure in antibiotics.¹⁸ The plan itself also highlights the need for more evidence about how to influence practitioner and patient behaviour to help fight AMR.

Specific targets in the national action plan include:

- Halving certain blood stream infections caused by bacteria, such as E. coli
- Reducing the number of specific drug-resistant infections in people by 10% by 2025
- Reducing UK antimicrobial use in humans by 15% by 2024
- Reducing UK antibiotic use in food-producing animals by 25% between 2016 and 2020 and define new objectives by 2021 for 2025
- Being able to report on the percentage of prescriptions supported by a diagnostic test or decision support tool by 2024.

The 2019-24 national action plan contains a commitment to strengthening stewardship programmes, as part of optimising use of antimicrobials. Therapeutic and diagnostic stewardship, with leadership commitment, accountability, education, training and communications, and robust auditing and feedback are cited as important factors in successful programmes. It also includes processes to ensure timely treatment to save lives and reduce long-term consequences of serious infections, such as sepsis. The plan brings together workforce and leadership needs for infection prevention and control (IPC) and AMS roles, with commitments to ensure board-level leadership with a combined IPC and AMS role for all regulated health and social care providers, and to assess current and future workforce needs for strong stewardship.

Alongside these, the plan commits the UK to the following actions to strengthen stewardship programmes:

- Develop a patient-level prescribing and resistance data source with timely access at point of care to support clinical decision making
- Enhance the role of pharmacists in primary care in reviewing antimicrobial prescriptions
- Raise public awareness to encourage self-care and reduce expectations of antibiotics.
- An editorial in the Journal of Hospital Infection noted that it would be essential to involve professionals across multidisciplinary teams in the AMS ambitions of the plan, given the range of factors influencing prescribing practices for different health professionals, and the need to tailor interventions to the population and context in which they are delivered.¹⁹

Alongside national AMR action plans, NHS England introduced a new element to the existing Quality Premium scheme in 2015 to 2016, to offer a financial incentive to CCGs to tackle AMR. This included target measures to reduce total antibiotic prescribing by 1%, and a 10% reduction in prescriptions for broad spectrum antibiotics, used to tackle a range of bacterial infections. A government study found that the number of patients prescribed antibiotics by their GP for common respiratory infections, for which antibiotics are generally not needed, fell by 3% following the introduction of the national incentive scheme.²⁰ The Quality Premium included further AMR indicators in subsequent years; the 2018/19 guidance includes targets on reducing E-Coli bloodstream infections by 10-20%, a 30% reduction in inappropriate antibiotic prescribing for urinary tract infections, further reductions in inappropriate prescribing, and relevant data collection.²¹ The NHS Long Term Plan, published in 2019, also includes AMR as a key area for progress on prevention and health inequalities. It commits the health service to supporting implementation and delivery of the five-year action plan on AMR, including supporting the development of new antimicrobials, ensuring access to appropriate tools such as diagnostics and e-prescribing, and supporting AMS programmes.²²

A range of guidance and practice toolkits has been produced in response to and in line with government policy on AMR. These are discussed below.



Current guidance and practice

NICE guidance on AMR and AMS

The National Institute for Health and Clinical Excellence (NICE) first published guidance on antibiotic use in 2008. Since then it has published 27 sets of guidance on antimicrobial prescribing for conditions including urinary tract infections (UTIs), respiratory tract infections (RTIs), acute cough, sore throat and sinusitis, leg ulcer infection and more.²³ This includes a guideline specifically for AMS programmes.

NICE guideline **NG15 Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use**, was published in 2015. It outlines ways in which commissioners and providers, prescribers, laboratories, local decision making groups and others can ensure effective healthcare-system-wide AMS programmes and interventions.⁵

The guideline asks all commissioners to ensure AMS works across all health and care settings, by establishing an AMS programme with adequate resources, clearly defined roles and responsibilities, local guidelines informed by prescribing data, and systems for providing regular updates. NICE suggests four key elements of an AMS programme:

- Monitoring and evaluating antimicrobial prescribing, in relation to local resistance patterns
- Providing regular feedback to prescribers about performance and patient safety incidents
- Providing education and training about AMS and AMR
- And conducting audits as part of wider quality improvement programmes.

AMS teams should be able to co-opt additional members into their core teams as needed. They should make use of a range of AMS interventions, including reviews of inappropriate or unusual prescribing patterns, promotion of national prescribing guidelines, IT and decision support systems and education programmes. There should also be consistent and effective communication to practitioners across all settings about appropriate antimicrobial use, good practice and sharing learning, and referring appropriately between services.

- Prescribers should follow local and national guidelines and consider:
- Prescribing the shortest effective course of antibiotics
- The most effective dose
- And the most appropriate route of administration.

This includes limiting immediate prescriptions for those who are likely to get better without medication, making use of back-up or delayed prescriptions that patients can use if their condition deteriorates later, considering allergies, interactions and other illnesses, avoiding repeat prescriptions unless necessary, and reviewing prescriptions, particularly intravenous ones, in a timely manner. They should also discuss decisions and options with patients, their families and carers, so they understand the reasons for their course of treatment, and know what to do if the situation changes.

NICE published a second guideline, NG63 Antimicrobial stewardship: changing risk-related behaviours in the general population, in 2017. This predominantly focuses on the role of local

authority directors of public health, CCGs, education providers, prescribers and others in providing consistent and accurate information on AMR. This includes information on self-care and managing self-limiting infections, safe and appropriate use of prescribed antimicrobials, reducing the spread of infections and ensuring good food hygiene.²⁴

NICE clinical guideline **CG191 Pneumonia in adults: diagnosis and management**, recommended considering a POC C-reactive protein test, used to measure biomarkers of inflammation, for patients presenting with symptoms of lower RTI in primary care, 'if after clinical assessment a diagnosis of pneumonia has not been made and it is not clear whether antibiotics should be prescribed.'²⁵ However, in light of the COVID-19 global pandemic, this guideline has been suspended and replaced by **NG173 COVID-19 rapid guideline: antibiotics for pneumonia in adults in hospital**. During the pandemic to date, most pneumonia has been viral, rather than bacterial, in which case antibiotics are ineffective and should not be prescribed. The rapid guideline also highlights raised levels of C-reactive protein in COVID-19 patients, suggesting that C-reactive protein tests may not indicate bacterial, rather than viral, pneumonia, and so cannot be relied upon.²⁶

Tools for developing skills and knowledge

A range of toolkits, resources and hubs have been created around AMR in the UK. NICE has a range of [tools and resources](#) related to its AMR and AMS guidelines, for instance, including audit resources, a baseline assessment tool and endorsed information and training resources created by other organisations. The Royal Pharmaceutical Society has its own [AMS Portal](#) to support pharmacy practice in the UK. Community Interest Company PrescQIPP also hosts an [AMS Hub](#), in collaboration with NHS Improvement, to help CCGs with their AMR strategies, and to meet targets under the NHS Quality Premium.

Alongside a hospital-based toolkit for AMS – Start Smart, Then Focus (SSTF) – PHE, in collaboration with the Royal College of General Practitioners (RCGP) and others, has developed an extensive resource toolkit for primary care, called **TARGET: Treat Antibiotics Responsibly, Guidance, Education, Tools**. Resources include:

- An interactive workshop presentation and clinical eModule
- Leaflets shared with patients
- Audit toolkits and action planning
- National antibiotic management guidance
- Training resources
- Resources for clinical and waiting rooms (a series of posters and videos that can be used to change patient expectations for antibiotics)
- A self- assessment checklist for GP practices to measure AMS programmes.²⁷

This final element includes 16 questions and spaces for reflection on dimensions of an AMS programme including using local antibiotic guidance, bench-marking prescribing figures, distributing patient materials, auditing antibiotic prescribing, recording clinical indications when prescribing antibiotics, consistent approaches to information, use of back-up or delayed prescribing and using strategies to avoid patients re-consulting with other clinicians in order to get antibiotics, creating an implementing an AMR action plan, undertaking training courses, and appointing a lead practitioner for AMS.

Resources for clinical practice – data and diagnostics

NICE guidance and government AMR action plans stress the importance of using accurate data to monitor and measure prescriber and practice performance based on national and local AMR indicators. [NHS Information Services](#) hosts practice-level antimicrobial prescribing data and an antimicrobial stewardship dashboard for practitioners, while Public Health England (PHE) has published freely-available data via its AMR Portal [Fingertips](#) tool, discussed in more detail later.

Diagnostic tests are cited by a wide range of reports as important to fighting AMR through ‘rational’ prescribing. Promoting new rapid diagnostics is one of the 10 recommendations of the 2016 O’Neill review.¹² However, work needs to be done to make these trusted, affordable, widely available, accurate, and timely. Some have pointed out that there remains a challenge of how and when to integrate diagnostics into clinical pathways, whether at consultation or dispensing stage via community pharmacists, as well as where funding for often expensive diagnostic kits will come from.²⁸ A 2015 evidence review by the Centre for Evidence-Based Medicine examined research on a range of tests used in primary care, with a number identified as having potential to aid antibiotic prescribing. Its recommendations included further evaluating rapid reporting of laboratory results, along with POC testing, and further evaluating POC C-reactive protein (CRP) testing in primary care targeted towards reducing unnecessary prescribing.²⁹ The report also pointed out that, while evidence of efficacy was mixed overall, these tests were routinely used in the Netherlands and Scandinavia; another study of the use of C-reactive protein tests in Sweden found that they were an important factor when deciding whether to prescribe antibiotics for RTIs.³⁰ NICE also recommends further research 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.’⁵

COVID-19 and AMR

The global COVID-19 pandemic has had a profound impact on public health and healthcare systems in the short term, and is expected to have long term consequences too. This includes bringing AMR into sharper focus. WHO, for instance, recognised the need for greater public and professional awareness of the role of antibiotics, and the difference between viruses like COVID-19 and bacterial infections, producing a simple [infographic](#) as a guide. Issues potentially compounded by COVID-19 include clinical ones, but also possible disruption to supply chains for medicines, and the spread of AMR beyond the medical system, through hospital waste water, food chains and natural systems.³

Others have called AMR the ‘hidden threat’ behind COVID-19. While pharmaceutical companies and researchers, rightly, concentrate efforts on finding effective antivirals and vaccines for the novel virus, the pipeline of drug development to treat resistant bacterial infections is ‘nearly dry’. The issue is compounded by marketplaces that do not incentivise the development of new, potentially low-use drugs.³¹ This has been an issue of concern for much longer, and WHO published two reports on the weak pipeline for antibiotic agents earlier this year.³² Reform of the marketplace for drug development is cited as a key concern in the 2016 O’Neill Review, and in subsequent UK national action plans on AMR. There is potential, however, in new collaborative and open access drug development programmes for COVID-19, to ‘solve the antibiotic R&D crisis by allowing alternative approaches to emerge and be tested’, according to AMR network ReAct.⁴

AMR itself is already a significant and growing global cause of death, and will complicate treatment and care of patients with viruses like COVID-19. Those most at risk of healthcare-related infections from so-called ‘superbugs’, resistant to current antibiotics, are also those at risk from viral respiratory infections. While more time will be needed to properly research links between COVID-19 and AMR, and while some links will only emerge in the longer term, researchers have started to look at how the virus and secondary bacterial infections interact. A small-scale study on COVID-19 mortality in Wuhan, China, found that half of the sample of patients who had died had also had a secondary infection, and that all but one had been treated with broad-spectrum antibiotics. All of the patients in the sample developed sepsis during their illness, although this may have been caused by the virus itself rather than bacterial infection. However, there is no evidence of antibiotic resistance in these cases, and no suggestion that this directly caused death.³³ Larger studies may shed further light on the presence of secondary bacterial infections in cases of COVID-19 mortality, and on the efficacy of antimicrobial treatment. If patients do commonly develop additional bacterial complications, it is clearly crucial that the drugs designed to combat them work. It is also important to use these drugs appropriately; the Joint Programming Initiative on Antimicrobial Resistance (JPIAMR) calls for the use of international guidelines on appropriate use of antibiotics, and of rapid diagnostics to promote the use of effective narrow-spectrum antibiotics where possible.³⁴

Research into AMR and AMS covers other elements of the challenges faced by policy makers, practitioners and developers. A selection of this will be explored in the following section.



research and data on AMR and AMS

There is extensive research into AMR, with several dedicated journals and work examining different aspects of the challenge. This includes testing different treatments and interventions, measuring the effectiveness of public engagement campaigns, looking at workforce training, multidisciplinary working and evaluating AMS schemes. Following commitments made in successive AMR national action plans, more data has been made publicly available, opening up opportunities for further research, and for better understanding the UK AMR landscape. The discussion below looks at some of these areas of research, and some of the data openly available.

Evaluating AMS programmes in primary care

There is a range of research looking at the impact of AMS programmes and interventions in the UK, including evaluations of toolkits and assessments of AMS efficacy. Researchers tested whether a TARGET antibiotic interactive workshop would lead to improved antibiotic dispensing in general practice. They found that practices where individuals had attended training had antibiotic dispensing of 2.7% less than other practices, with statistically significant lower rates of dispensing for specific drugs including amoxicillin/ampicillin and trimethoprim. (35) Another study looked at the TARGET toolkit as a whole. Evaluations from 269 workshop participants showed that it was seen as useful overall, complementing existing AMS activities, but that some work could be done to recentre workshops around clinical cases and to enable more action planning. Cost of printing, lack of awareness, time and workload concerns and competing demands were highlighted as barriers to uptake.³⁶

A further review of AMS activity using the TARGET self-assessment tool completed by 1415 professionals found that 98% of all users had used antibiotic guidance for treating common infections, 94% of GP respondents had used delayed prescribing where appropriate and 77% had developed an antibiotic audit action plan. However, only 8% had already fulfilled the four key criteria of an antibiotic practice: having patient focused strategies to highlight the importance of responsible antibiotic use, sharing patient information leaflets, implementing a strategy to avoid patients re-consulting with other clinicians to obtain antibiotics, and undertaking related clinical courses. Most (71%) had not yet undertaken any antibiotic-related prescribing clinical courses, although many expressed an intention to so.³⁷ Researchers also looked at what resources CCGs use to support AMS, finding that 99% of responding CCGs (184 of 186) actively promoted using the TARGET toolkit to primary care practitioners, but 78% did not know what percentage of those practitioners actually used the toolkit. They recommend quality improvement programmes to monitor and evaluate uptake, and promoting AMS information resources across all healthcare settings. Respondents again noted lack of time and resource to use and evaluate AMS programmes.³⁸

A 2019 consultation with stakeholders in different English primary care settings asked participants to identify ways to improve existing AMS programmes and interventions, and to rate them according to their affordability, practicability, effectiveness, acceptability, safety and equity (APEASE criteria). Nine interventions were identified to improve antibiotic prescribing in primary care, including quality improvement (such as improving Information Technology (IT)

systems, creating practice plans and using prescribing data), multidisciplinary peer learning, appointing AMS leads, auditing individual-level prescribing, developing tools for prescribing audits, improving inductions for new prescribers, ensuring consistent local approaches to antibiotic prescribing, providing online AMS training to all patient-facing staff, and increasing staff time available for AMS work with standard AMS-related roles. The intervention deemed least useful or applicable in community pharmacy settings, and second-least useful in general practice, was 'providing diagnostic point-of-care CRP testing, including training in using it, interpreting the results and maintaining the equipment'. Participants suggested that cost and funding, time to do the tests, and concern about over-use of the tests by patients and clinicians were considered the main barriers to using this intervention.³⁹

A case study of the Cornwall One Health AMR Group identified some innovative practice with practical results. Originally set up as a sub-group of the local Health and Wellbeing Board's Health Protection Committee, it set local priorities and existing work across different sectors, allowing for better coordination of 'One Health' AMS activity. The report highlights the opportunity presented by the creation of Sustainability and Transformation Plans to further develop integrated primary and secondary care AMS activities.⁴⁰ Finally, a study into the impact of the 2015-16 NHS England Quality Premium, as an example of a national AMS programme, found that prescribing of antibiotic items decreased by 8.2% after the introduction of the premium, and an 18.9% reduction in prescribing of broad-spectrum antibiotics (specifically co-amoxiclav, cephalosporins, and quinolones).⁴¹

AMS in other settings

Learning from hospital-based AMS programmes can be useful for informing similar schemes in primary care. Research on barriers to uptake of antimicrobial advice in one UK hospital, for instance, shared between antimicrobial specialist clinicians and other doctors, suggests that more attention needs to be paid to building the professional relationships between these two roles.⁴² Another paper analysed AMS structure and process in English hospitals, identifying strengths in antimicrobial policies, stewardship team structure, and having designated AMS leads and specialist pharmacists. There were weaknesses in terms of senior clinical leadership support and dedicated programme funding.⁴³

Other research focused on specific professional groups, specialists and settings. One study highlighted the low number of antimicrobial specialist pharmacist roles in primary care in England, despite 85% of antimicrobials being prescribed outside of hospitals, and despite pharmacists' significant role in meeting actions set out in AMR national action plans.⁴⁴ Another paper looked at antibiotic prescribing in long-term-care facilities (LTCFs) across the UK, finding that half of LTCF residents, in a sample of over 340,000, were prescribed at least one antibiotic over a 12-month period. The authors suggested this presented an opportunity to optimize antibiotic use among a vulnerable population, and that pharmacy teams would be key to this effort.⁴⁵ A further study explored reducing antimicrobial prescribing in care homes; the creation of a decision-making algorithm for different infections, and training on how to use it, resulted in increased knowledge of AMR, but professionals found the tool difficult to operationalise.⁴⁶ A review of uptake of two national AMS toolkits – SSTF and TARGET – among specialist community health organisations providing services such as district nursing, physiotherapy and speech and language therapy found that less than half of respondents had developed local action plans for either toolkit.⁴⁷

Other issues: prescribing and public engagement

An extensive review of over eight million patient records across 587 UK general practices showed that antibiotic prescribing varied considerably, and that this variance increased over time. However, variances did not reflect updates to national guidelines, was not consistent for different infectious conditions, and was influenced by individual patient factors such as history of antibiotic use. Particularly high prescribing in some practices, contrary to national guidance, was seen in cases of respiratory tract infections (RTIs), UTIs and ear-related infections, which included a large proportion of middle-aged, otherwise healthy patients that would probably recover if left untreated.⁽⁴⁸⁾ Some of these findings supported an earlier study, using 2013-15 data, which found that the majority of antibiotic prescriptions in English primary care were for RTIs and UTIs, but that almost one third had no clinical justification documented.⁴⁹

Looking at articles in six high circulation UK newspapers, researchers found that while coverage of both AMR and sepsis, a serious complication of untreated infection, had increased, the two issues tended to be represented separately, and the solutions to AMR were often presented as technical steps such as the development of new drugs, or systemic issues such as reforming research and development. On the whole, articles about sepsis did not include messages about overuse of antimicrobials and 'rational' prescribing, alongside important messages about timely treatment with antibiotics.⁵⁰

Public Health England data on AMR

Public Health England (PHE) started making data on AMR practice and outcomes publicly available in 2016 through a tool called Fingertips, as part of its wider Public Health Profiles data toolkit. The tool presents data across five domains: antibiotic prescribing, healthcare-associated infection, IPC and AMS.⁵¹

PHE also runs a global, mostly UK focused, Antibiotic Guardian pledge campaign, for health and social care professionals, scientists, people working with animals and other members of the public, with over 84,000 pledges taken. Pledges range from displaying information and leaflets, and reviewing practice prescribing, for primary care providers; avoiding the GP or making use of community pharmacists for colds and sore throats if a member of the general public; and asking scientists to participate in collaborative antibiotic resistance research.⁵² This scheme is used as a measure of area engagement in AMS in the data toolkit.



The count of Antibiotic Guardians for the whole of England in 2018 (latest available) was 11.5 per 100,000 population, or 6,375 in total. This was based on postcode data submitted when health professionals, members of the public and education sector professionals made pledges. NHS Hammersmith had the highest ratio, with 84 guardians per 100,000 population – 154 in total. NHS West Norfolk had the lowest rate, with 0.6 per 100,000 population, or just one for the whole area. This is one CCG that has been merged with others into a new body – NHS Norfolk and Waveney CCG – and so the new footprint may have a higher number.

Table 1: Antibiotic Guardians per 100,000 population in CCGs, 2018.⁵³

Top 10 areas			
Name	Rate	Number	Population
England	11.5	6,375	55,549,890
NHS Hammersmith And Fulham CCG	84.2	154	182998
NHS Luton CCG	83.4	179	214658
NHS Greater Huddersfield CCG	71.8	176	245043
NHS Dudley CCG	53.8	172	319419
NHS South Eastern Hampshire CCG	44.3	95	214649
NHS Manchester CCG	40.3	220	545501
NHS Bury CCG	36.9	70	189628
NHS Hillingdon CCG	36.4	110	302343
NHS West London (K&C & QPP) CCG	33.6	75	223057
NHS Calderdale CCG	32.9	69	209454
Lowest 10 areas			
Name	Rate	Number	Population
England	11.5	6,375	55,549,890
NHS Nene CCG	2.0	13	654847
NHS Nottingham North And East CCG	2.0	3	151815
NHS Crawley CCG	1.8	2	111664
NHS North Norfolk CCG	1.7	3	172899
NHS Castle Point And Rochford CCG	1.7	3	176023
NHS Lincolnshire East CCG	1.7	4	235652
NHS Blackpool CCG	1.4	2	139870
NHS West Suffolk CCG	1.3	3	230921
NHS Morecambe Bay CCG	1.2	4	328671
NHS West Norfolk CCG	0.57	1	175890

PHE measures the number of prescribed antibiotic items by population quarterly and on a 12-month rolling basis, at primary care level. A set of standard measures, called Specific Therapeutic group Age-sex weightings Related Prescribing Unit (STAR-PU), is used to make sure the data takes into account age and gender differences in local populations, which might affect antibiotic prescribing rates. Those with the lowest number of items per adjusted population have lower rates of antibiotics being prescribed in the year in question. The NHS Quality Premium set two benchmarks for performance in reducing inappropriate prescribing in primary care related to this measure. To qualify for this part of the Quality Premium financial incentive, CCGs must have had a performance value of 1.161 items per STAR-PU or below (the average for England in 2013/14), with an additional target value of 0.965 items per STAR-PU or below, new for 2018/19. According to PHE data, all but eight CCGs achieved the first target, while 95 – or around half – met the second.

In 2018/19, the latest data available, the England-wide value was 0.9 antibiotic items prescribed per STAR-PU adjusted population value. This represented 31,169,616 items prescribed in total in the 12 months to September 2019. The area with the lowest number was NHS Camden CCG, with a value of 0.5 per STAR-PU value, or 80,598 items prescribed for a population of 147,515. NHS St Helens had the highest rate with 1.2 per STAR-PU measure, or 139,877 in total for an adjusted population of 113,427.

All ten of the best-performing areas shown in Table 2 are in London boroughs. Of the ten worst performing, five are in the North West and four in the North East of England. The remaining one, North East Essex, is an area including some of the poorest areas in England, according to the Index of Multiple Deprivation. There is a clear geographical disparity in performance here. Some of this may be related to more effective London-wide practice and processes, whether at city, CCG or individual practice level, compared to other areas of England, better access to resources in the Capital or other factors. There may also be links to areas of poverty and deprivation, and the need for more funding for resource-poor areas to combat AMR. More research, and particularly qualitative research with prescribers working in different parts of the country, could shed further light on different factors affecting prescribing rates, in relation to local demographics. Likewise, data could be presented that explores any possible links between prescribing rates and ethnicity and class of populations, as well as the STAR-PU measures of age and sex.



Table 2: Twelve-month rolling total number of prescribed antibiotic items per STAR-PU Sep 2019 Indirectly standardised ratio, September 2019 – highest and lowest rated CCGs.⁵³

Top 10 areas with lowest prescribing rates (best performing)			
Name	Rate	Number	Population
England	0.9	31,169,616	33,237,971
NHS Camden CCG	0.5	80598	147515
NHS West London (K&C & QPP) CCG	0.6	73654	133534
NHS Central London (Westminster) CCG	0.6	68801	119328
NHS Lambeth CCG	0.6	127537	208729
NHS Southwark CCG	0.6	102897	167793
NHS City And Hackney CCG	0.6	99387	160645
NHS Haringey CCG	0.6	103737	165464
NHS Brent CCG	0.7	132403	199586
NHS Islington CCG	0.7	88921	130239
NHS Hammersmith And Fulham CCG	0.7	90529	131630
Bottom 10 areas with highest prescribing rates (worst performing)			
Name	Rate	Number	Population
England	0.9	31,169,616	33,237,971
NHS Blackpool CCG	1.1	112249	99662
NHS Halton CCG	1.2	84945	73481
NHS South Sefton CCG	1.2	103487	89135
NHS Darlington CCG NE	1.2	72170	62032
NHS North East Essex CCG	1.2	242853	208118
NHS Sunderland CCG NE	1.2	190326	160730
NHS South Tees CCG NE	1.2	199850	167342
NHS Durham Dales, Easington And Sedgefield CCG NE	1.2	203512	168623
NHS Oldham CCG	1.2	170083	140673
NHS Knowsley CCG	1.2	112337	92076

These summaries of data, research, policy and practice have set the context in which AMS programmes operate. The next section will look at how CCGs are implementing these programmes.

What do CCGs tell us about implementing AMS Programmes?

Freedom of Information (FOI) requests were sent out to 191 Clinical Commissioning Groups (CCGs). However, this was done so at a time of transition for CCGs, with 74 CCGs merging into 18 new bodies, leaving 135 in total. Most responses were from pre-merger CCGs, including those within 11 of these new CCG footprints. There were three responses from new CCG bodies, however. In order to count these responses, these were split into duplicate answers according to the number of CCGs within the new footprint in question. This is not an exact science; the result from the new North Yorkshire CCG, used as a proxy for Scarborough and Ryedale CCG, differs to those in the other two pre-merger bodies that make up the new area. However, this approach allows us to analyse results across a single consistent clinical commissioning landscape. It would be useful to repeat this exercise with newly merged CCGs, to see whether they have successfully identified and adopted good practice from their component parts across their new geographies. Seven of the new CCGs are not represented at all. Using this methodology, there were 107 responses out of 191 Clinical Commissioning Groups (CCGs), a response rate of 56%. While geographical coverage was generally good, there were few responses from the East of England, and from the East Midlands.



Table 3: New CCGs represented in FOI data

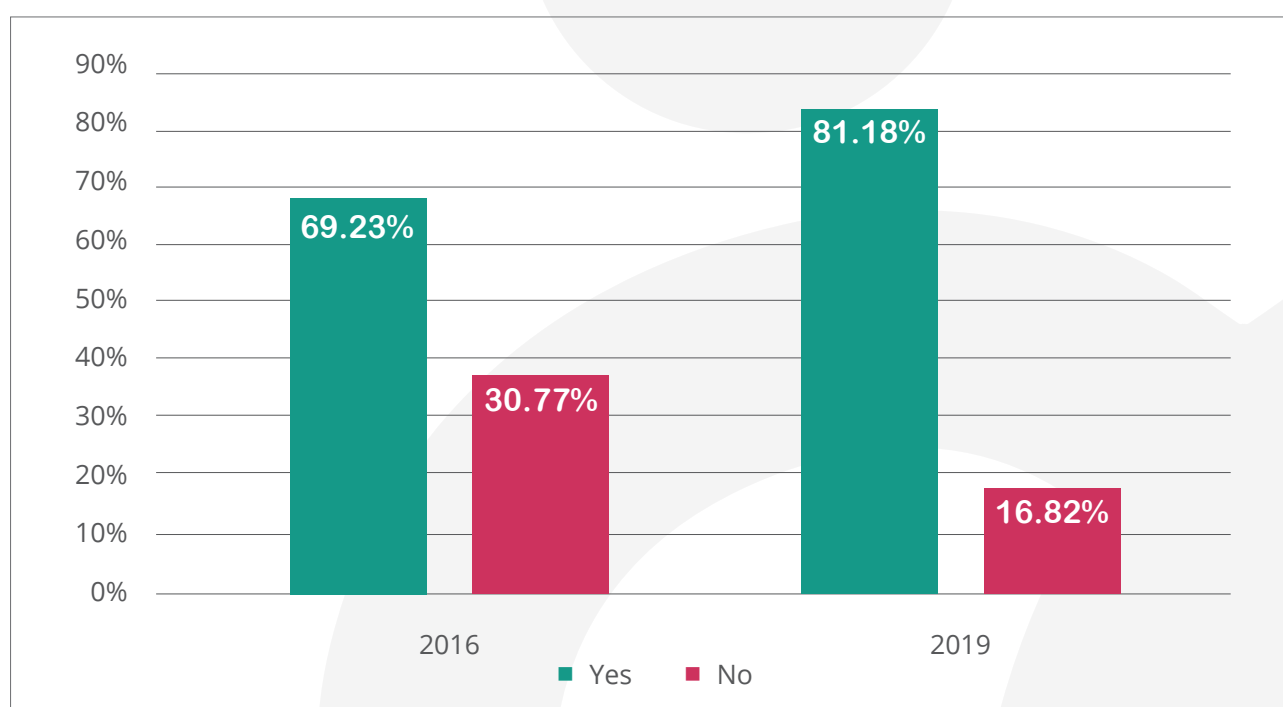
New CCG	
Bath and North East Somerset, Swindon and Wiltshire CCG	Responses from all three constituent CCGs represented separately.
Bradford District and Craven CCG	Responses from all three constituent CCGs represented separately.
County Durham CCG	Responses from all three constituent CCGs represented separately.
East Sussex CCG	Responses for Eastbourne, Hailsham & Seaford and Hastings and Rother CCGs. Other old CCG not represented.
Herefordshire and Worcestershire CCG	Response from new CCG used as proxy for old CCG areas, none of which had responded.
North Yorkshire CCG	Constituent CCG responses for Hamleton, Richmondshire and Whitby CCG and Harrogate and Rural District CCG. Response from new North Yorkshire CCG used as proxy for Scarborough and Ryedale CCG, which did not respond.
Nottingham and Nottinghamshire CCG	Response from new CCG used as proxy for old CCG areas, none of which had responded.
South East London CCG	Responses for Bexley, Lambeth, Bromley and Southwark CCGs. Others not represented.
South West London CCG	Response from Kingston CCG. Others not represented.
Surrey Heartlands CCG	Responses from all four constituent CCGs represented separately.
Tees Valley CCG	Responses from all three constituent CCGs represented separately.
Norfolk and Waveney CCG	Not represented – no responses.
Northamptonshire CCG	Not represented – no responses.
West Sussex CCG	Not represented – no responses.
North Central London CCG	Not represented – no responses.
Kent and Medway CCG	Not represented – no responses.
Cheshire CCG	Not represented – no responses.

Local AMS programmes

Around 10% of respondents reported having no antimicrobial stewardship (AMS) programme, in line with results from 2016. This remains a concern, given the importance of widespread engagement on AMR. A small number of CCGs told us they were in the process of reviewing AMS programmes, and it is likely that new CCGs will work to build programmes across their new footprints. It is hoped these will make full use of any existing local good practice. However, 79% reported having an AMS programme for over a year, an increase of 19% on the previous 2016 FOI. This suggests that AMS programmes may be increasingly embedded in local areas. Small numbers had introduced a programme more recently; 7% within the last six months and 11% within the last 12 months.

In 2016, one third of respondents reported having no named individual responsible for the implementation of their AMS programme. Results from 2019 show considerable improvement, having almost halved, with only 17% reporting the same, as recommended by government policy, NICE guidance and other resources. Where CCGs provided details of who these leads were, the role was usually held by someone at a high level, often a pharmacist, or sometimes a senior nurse or general practitioner.

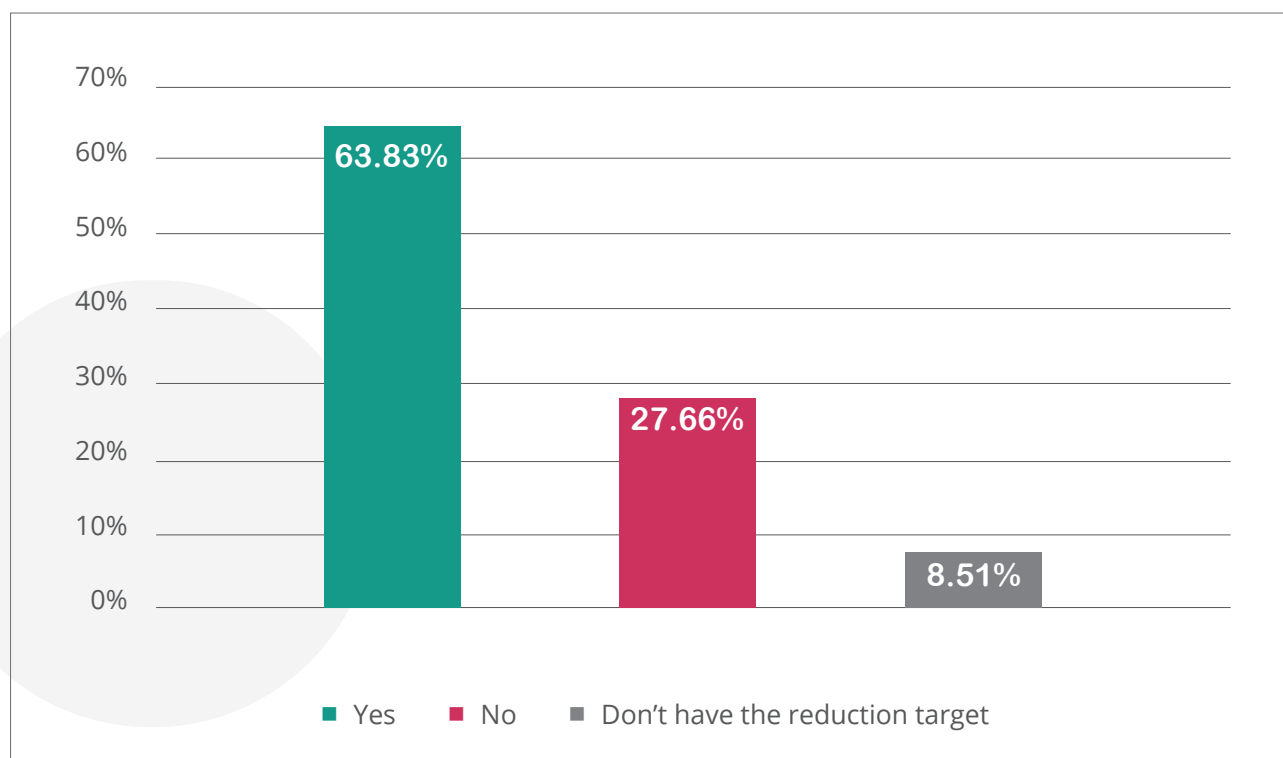
Figure 2: percentage responses to question ‘Does your Clinical Commissioning Group have a named individual responsible for the implementation of a local antimicrobial stewardship (AMS) programme?’, 2016 and 2019



Unfortunately, only 5% of CCGs that responded (a total of 95) told us they had a ringfenced budget for AMS programmes. NICE guidance recommends that AMS programmes are properly resourced, but a number of studies discussed earlier point to a lack of resources, including funding, for full implementation of AMR tools. Funders and commissioners must think about the budgets required to tackle AMR, both in terms of practice and public awareness, and provide the necessary resource.

64% of respondents said they were currently achieving their antibiotics reduction target. 9% said they did not have a target (94 respondents answered this question). While the number is small, and there may be different reasons for not having set targets, it is concerning that this is still not part of some CCG and wider health system strategies; these remaining CCGs should establish targets as soon as possible, based on local and national data and guidelines.

Figure 3: percentage responses to question ‘Are you currently achieving your antibiotics reduction target?’ (94 respondents)



Encouragingly, 93% reported that their CCG was part of a local wider partnership group addressing AMR, with partnerships commonly involving other CCGs, pharmacists, public health, local authorities and NHS acute trusts. 90% (of 97 respondents to this question) stated they collaborate with other CCGs around AMR, or have plans to.

Only 67 respondents answered the final question: ‘do you believe that your CCG could practically do more to achieve the aims of its AMS programme?’. However, of these, 73% said yes.

Implementing guidance and toolkits

In 2016, we asked CCGs to what extent they had implemented recommendations within NICE Guideline 15 on AMS. In 2019 we asked about specific dimensions of this guideline. The results below show that monitoring and evaluating prescribing, co-opting additional members and integrating into existing quality improvement programmes were dimensions most commonly featured. Involving health and social care practitioners and providing education and training to health and care practitioners were the least common dimensions, suggesting some work may be needed in engaging front line staff across integrated care systems. As the table below shows, however, all dimensions were present for the majority of respondents.

Table 4: dimensions of NICE Guideline 15 on antimicrobial stewardship programmes

Your local AMS Programme...		
	Yes	No
clearly defines members' roles, responsibilities and accountabilities	79.12%	20.88%
core members include an antimicrobial pharmacist and a medical microbiologist	76.92%	24.18%
can co-opt additional members as required	83.52%	16.48%
involves lead health and social care practitioners	70.33%	29.67%
monitors and evaluates antimicrobial prescribing	93.41%	7.69%
provides AMR education and training to health and social care practitioners	70.33%	29.67%
integrates audit into existing quality improvement programmes	82.42%	17.58%
provides regular feedback to individual prescribers in all care settings	70.33%	29.67%

Both sets of FOIs asked about uptake of the PHE and RCGP TARGET Antibiotics toolkit and training resources. The results for both years are below. More than double the respondents – just over half - reported implementing the full toolkit, which likely accounts for lower reported percentages in uptake of single elements. Taking out those CCGs that reported utilising the full range of features left 52 respondents who reported using none, one or more than one of the tools. 81% of these had implemented at least one element. Most commonly this was leaflets shared with patients (62%), audit toolkits and action planning (62%) and resources for clinical and waiting areas (56%). Only 21% of these respondents had used the interactive workshop presentation and clinical eModule, and only 29% had used resources for commissioners. A small number of respondents indicated they had also developed their own resources.

Table 5: uptake of components of RCGP TARGET Antibiotics toolkit and training resources

	This has been used or implemented	
	2016	2019
Interactive workshop presentation and clinical eModule	28.47%	10.28%
Leaflets shared with patients	60.58%	28.97%
Audit toolkits and action planning	48.18%	28.97%
Antibiotic and diagnostic quick reference tools		21.50%
Training resources	40.15%	24.30%
Resources for clinical and waiting areas	60.58	25.23%
Self- assessment checklists	24.82%	20.56%
Resources for commissioners		13.08%
All of the above	23.36%	51.40%
None of the above	6.57%	9.35%

“The TARGET resources have always been very helpful and the collaboration across organisations and joined up guidance is key e.g. TARGET, BMA, NICE, PHE.”

“The RCGP toolkit has been the basis for primary care training around antimicrobials for several years and we recently expanded training to include all prescribing groups and practice nurses.”

“We have also developed our [own] resource through the [local] area prescribing committee.”

Comments on use of the TARGET toolkit Using point-of-care diagnostic tests

As discussed, diagnostic tests are a key part of global AMR strategies, and a focus of national and international action plans and reports. Both NICE guideline 15 on AMS and the currently suspended NICE guideline 191 on pneumonia in adults recommend considering point-of-care tests in primary care for patients with suspected lower respiratory tract infections.

Despite this, the 2016 study found that less than a fifth of CCGs (19 per cent) had carried out a feasibility test on the potential introduction of C-reactive protein point-of-care tests locally. Almost a third of respondents (30 per cent) said that they had not carried out a feasibility study so far but planned to do so, while over half (51 per cent) said that they had not carried out a feasibility study and had no plans to do so.

In 2019 we asked CCGs whether they had a policy to promote the use of point-of-care C-reactive protein tests in primary care settings. Only 15% reported having such a policy. A small number of respondents told us they were either planning to or in the process of piloting use. Two had made an active choice not to promote these tests; one after an unsuccessful pilot, and the other because they considered it a 'non-specific measure of inflammation [not] a specific marker for infection'. One CCG noted alternative approaches to a policy, while another felt national leadership was needed.

"We do not a policy as such but we have a programme for point of care CRP testing so that practices can access a machine for a loan period. The programme has a number of associated resources for practices."

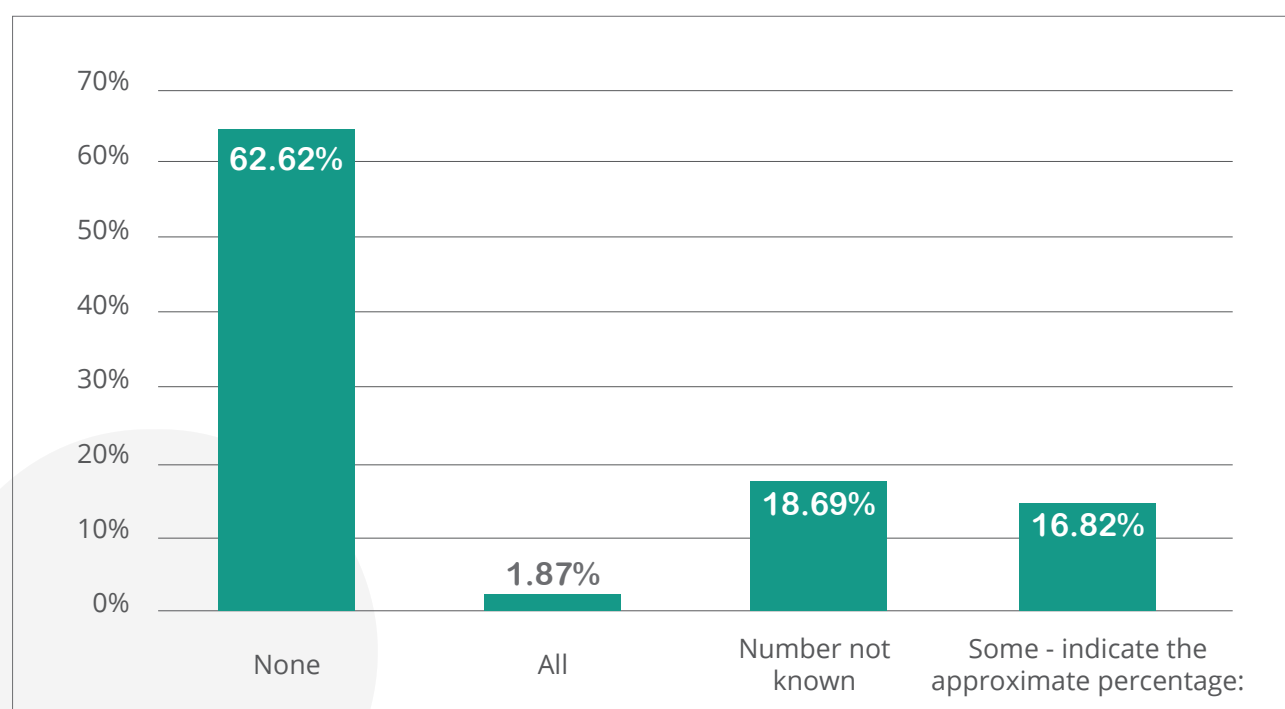
"The organisation is supportive of the role of PoC testing but in the absence of national direction, we feel unable to launch a local programme of testing."

Comments on point-of-care C-reactive protein testing

63% of respondents also reported that no GP practices in their CCG area offered point of care C-reactive protein tests for patients with an uncertain diagnosis of pneumonia, as recommended by NICE Clinical Guideline 191. Just two CCGs said that all GP practices in their area did this.



Table 6: percentage respondents to the question ‘What proportion of GP practices in your Clinical Commissioning Group area offer point of care C-reactive protein tests for patients with an uncertain diagnosis of pneumonia, as recommended by CG191’ (107 respondents)



Of those who provided an approximate percentage, these ranged from a single practice to 70% of practices.

Development and uptake of rapid diagnostic testing is one area consistently cited as important in tackling AMR, but one where practical, effective and affordable solutions are slow to emerge. More should be done to understand both the reluctance to use point-of-care testing of this kind, and the experience where it has been implemented widely.

Conclusions and recommendations

Results from CCGs show an encouraging level of engagement with AMS strategies and programmes, and some considerable progress in three years. Taken in the context of other successes identified in the policy and research literature, this suggests that, at least in some areas, primary care professionals are engaging well with AMR efforts. Policy and practice guidance is extensive in this area, and ‘rational’ prescribing guidelines seem clear and robust.

However, as previous reports have identified, there remains significant variation between different geographical areas, and areas of policy where progress is lagging behind. Of particular relevance here, problems with resources and funding and a lack of trust in current POC diagnostic testing options to aid prescribing are evident in CCGs responses and in other research.

For the most part, these are not simple issues, and there are few simple solutions. The recommendations below suggest some areas for further work by different stakeholders to take forward the fight against antimicrobial resistance.

Conclusions and recommendations

- Further research should be conducted with the 17 new CCGs created by mergers in 2020 to monitor and evaluate how they develop high quality integrated AMS programmes across their new territories
- Research into why some CCGs do not appear to have established AMS programmes, targets or other interventions should identify barriers and solutions to this small volume of lack of engagement
- There should be further research into geographical disparities in prescribing rates, particularly qualitative comparative research into different practices and attitudes in different areas. This should be supplemented by additional data on prescribing rates that reflect demographics including ethnicity, rates of poverty or other factors, alongside existing measures of age and sex
- CCGs and Health and Wellbeing Boards should include measures of AMR in system targets and monitoring mechanisms in order to embed antimicrobial monitoring and evaluation practice across the whole health and care system. There should also be clarity over the role of integrated care systems, as they continue to develop, in relation to AMS across health economies.
- Government, commissioners, health and wellbeing boards and other relevant stakeholders should establish dedicated core local funds, outside of payment-by-results funding, to help primary care practitioners raise awareness of AMR and AMS among professionals and the general public. This should include high quality information for patients on appropriate use of antibiotics.
- Government should establish a local AMR innovation fund, to pilot and purchase new diagnostic technologies, including point-of-care (POC) testing kits to enable clinicians to determine appropriate use of antibiotics, and e-prescribing systems
- Research should develop a better understanding of the barriers to introducing POC diagnostic testing in primary care in England, whether these can be overcome, and what are the results and success factors where CCGs are already making use of diagnostics
- Government should establish evidence-based national guidance on use and monitoring of diagnostic tests to aid prescribing, in order to aid CCGs in decision-making and to meet its commitment to report on the percentage of prescriptions supported by a diagnostic test or decision support tool by 2024.



References

- (1) British Society for Antimicrobial Chemotherapy. Antimicrobial Stewardship: From Principles to Practice . London: British Society for Antimicrobial Chemotherapy; 2018.
- (2) Department of Health and Social Care. UK 5-year action plan for antimicrobial resistance 2019 to 2024. 2019.
- (3) Manton J. Unexpected dimensions of the COVID-19 outbreak . 2020; Available at: <https://www.lshtm.ac.uk/newsevents/news/2020/unexpected-dimensions-covid-19-outbreak>.
- (4) ReAct. COVID-19 and AMR - what do we know so far? 2020; Available at: <https://www.reactgroup.org/news-and-views/news-and-opinions/year-2020/covid-19-and-amr-what-do-we-know-so-far/>.
- (5) National Institute for Health and Care Excellence. Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use (NICE guideline [NG15]). 2015.
- (6) World Health Organisation. Record number of countries contribute data revealing disturbing rates of antimicrobial resistance . 2020; Available at: <https://www.who.int/news-room/detail/01-06-2020-record-number-of-countries-contribute-data-revealing-disturbing-rates-of-antimicrobial-resistance>.
- (7) National Institute for Health and Care Excellence. NICE impact antimicrobial resistance . 2018.
- (8) The Patients Association. Antimicrobial Resistance: A Patient Safety Issue. 2016.
- (9) Eastmure E, Fraser A, Al-Haboubi M, Bennani H, Black N, Blake L, et al. National and Local Implementation of the UK Antimicrobial Resistance (AMR) Strategy, 2013-2018. 2019.
- (10) World Health Organisation. One Health. 2017; Available at: <https://www.who.int/news-room/q-a-detail/one-health>.
- (11) Department of Health, Department for Environment, Food and Rural Affairs. UK Five Year Antimicrobial Resistance Strategy 2013 to 2018 . 2013.
- (12) The Review on Antimicrobial Resistance. Tackling Drug-Resistant Infections Globally: Final Report and Recommendations. 2016.
- (13) The Pharmaceutical Journal. Little progress made to develop incentives for new antibiotics, vaccines and diagnostics, AMR review concludes . 2019; Available at: <https://www.pharmaceutical-journal.com/news-and-analysis/news-in-brief/little-progress-made-to-develop-incentives-for-new-antibiotics-vaccines-and-diagnostics-amr-review-concludes/20207177.article?firstPass=false>.
- (14) The Fleming Fund. Antimicrobial resistance (AMR) and the Sustainable Development Goals: Consultation for a new AMR indicator . 2019; Available at: <https://www.flemingfund.org/publications/antimicrobial-resistance-amr-and-the-sustainable-development-goals-consultation-for-a-new-amr-indicator>.
- (15) World Bank. Drug-resistant Infections: A Threat to Our Economic Future . 2017.
- (16) World Health Organisation. Global Action Plan on Antimicrobial Resistance . 2015.
- (17) HM Government. Contained and controlled: The UK's 20-year vision for antimicrobial resistance . 2019.
- (18) Rahman S. Highlights from the UK AMR Strategy . 2019; Available at: <https://microbiologysociety.org/blog/highlights-from-the-uk-amr-strategy.html>.
- (19) Courtenay M, Castro-Sanchez E, Fitzpatrick M, Gallagher R, Lim R, Morris G. Tackling antimicrobial resistance 2019–2024 – The UK's five-year national action plan. Journal of Hospital Infection 2019 Apr;101(4):426-427.

- (20) Public Health England. Financial incentives effective at reducing antibiotic prescribing . 2018; Available at: <https://www.gov.uk/government/news/financial-incentives-effective-at-reducing-antibiotic-prescribing>.
- (21) NHS England. Quality Premium . 2019; Available at: <https://www.england.nhs.uk/ccg-out-tool/qual-prem/>.
- (22) NHS England. NHS Long Term Plan. 2019; Available at: <https://www.england.nhs.uk/long-term-plan>.
- (23) National Institute for Health and Care Excellence. NICE guidelines and guidance on antibiotic use . 2020; Available at: <https://www.nice.org.uk/guidance/conditions-and-diseases/infections/antibiotic-use/products?ProductType=Guidance&Status=Published>.
- (24) National Institute for Health and Care Excellence. Antimicrobial Stewardship: Changing Risk-related Behaviours in the General Population . 2017.
- (25) National Institute for Health and Care Excellence. Pneumonia in adults: diagnosis and management [CG191] . 2019.
- (26) National Institute for Health and Care Excellence. COVID-19 rapid guideline: managing suspected or confirmed pneumonia in adults in the community [NG165] . 2020.
- (27) Royal College of General Practitioners. TARGET Antibiotics Toolkit . 2017.
- (28) Elvidge S. AMR and diagnostics: pointing the way to better infection control. The Pharmaceutical Journal 2017.
- (29) Pluddemann A, Onakpoya I, Harrison S, Shinkins B, Tompson A, Davis R, et al. Position Paper on Anti-Microbial Resistance Diagnostics. 2015.
- (30) Lindström J, Nordeman L, Hagström B. What a difference a CRP makes. A prospective observational study on how point-of-care C-reactive protein testing influences antibiotic prescription for respiratory tract infections in Swedish primary health care. Scandinavian Journal of Primary Health Care 2015;33(4):275-282.
- (31) Gerberding JL. Antibiotic resistance: the hidden threat lurking behind Covid-19 . 2020; Available at: <https://www.statnews.com/2020/03/23/antibiotic-resistance-hidden-threat-lurking-behind-covid-19/>.
- (32) World Health Organisation. Lack of new antibiotics threatens global efforts to contain drug-resistant infections . 2020; Available at: <https://www.who.int/news-room/detail/17-01-2020-lack-of-new-antibiotics-threatens-global-efforts-to-contain-drug-resistant-infections>.
- (33) Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. The Lancet 2020 Mar 28;;395(10229):1054-1062.
- (34) Sundin A. Considerations for AMR in the Covid-19 pandemic . 2020; Available at: <https://www.jpiamr.eu/considerations-for-antibiotic-resistance-in-the-covid-19-pandemic>.
- (35) McNulty C, Hawking M, Lecky D, Jones L, Owens R, Charlett A, et al. Effects of primary care antimicrobial stewardship outreach on antibiotic use by general practice staff: pragmatic randomized controlled trial of the TARGET antibiotics workshop. Journal of antimicrobial chemotherapy 2018 May 1;;73(5):1423-1432.
- (36) Jones LF, Hawking MKD, Owens R, Lecky D, Francis NA, Butler C, et al. An evaluation of the TARGET (Treat Antibiotics Responsibly; Guidance, Education, Tools) Antibiotics Toolkit to improve antimicrobial stewardship in primary care—is it fit for purpose? Family Practice 2018 Jul 23;;35(4):461-467.
- (37) Owens R, Jones LF, Moore M, Pilat D, McNulty C. Self-Assessment of Antimicrobial Stewardship in Primary Care: Self-Reported Practice Using the TARGET Primary Care Self-Assessment Tool. Antibiotics 2017;6(3):1-11.
- (38) Allison R, Lecky DM, Beech E, Ashiru-Oredope D, Costelloe C, Owens R, et al. What Resources do NHS Commissioning Organisations Use to Support Antimicrobial Stewardship in

Primary Care in England? *Antibiotics* 2020 Apr 2;;9(4):1-12.

(39) Borek AJ, Wanat M, Sallis A, Ashiru-Oredope D, Atkins L, Beech E, et al. How Can National Antimicrobial Stewardship Interventions in Primary Care Be Improved? A Stakeholder Consultation. *Antibiotics* 2019;8(4):1-15.

(40) Powell N, Davidson I, Yelling P, Collinson A, Pollard A, Johnson L, et al. Developing a local antimicrobial resistance action plan: the Cornwall One Health Antimicrobial Resistance Group. *Journal of antimicrobial chemotherapy* 2017 Sep 1;;72(9):2661-2665.

(41) Balinskaite V, Johnson AP, Holmes A, Aylin P. The Impact of a National Antimicrobial Stewardship Program on Antibiotic Prescribing in Primary Care: An Interrupted Time Series Analysis. *Clinical infectious diseases* 2019;69(2):227-232.

(42) Broom J, Broom A, Plage S, Adams K, Post JJ. Barriers to uptake of antimicrobial advice in a UK hospital: a qualitative study. *Journal of Hospital Infection* 2016;93(4):418-422.

(43) Scobie A, Budd EL, Harris RJ, Hopkins S, Shetty N. Antimicrobial stewardship: an evaluation of structure and process and their association with antimicrobial prescribing in NHS hospitals in England. *Journal of Antimicrobial Chemotherapy* 2019 Apr 1;;74(4):1143-1152.

(44) Gilchrist M, Wade P, Ashiru-Oredope D, Howard P, Sneddon J, Whitney L, et al. Antimicrobial Stewardship from Policy to Practice: Experiences from UK Antimicrobial Pharmacists. 2015;93(4).

(45) Thornley T, Ashiru-Oredope D, Normington A, Beech E, Howard P. Antibiotic prescribing for residents in long-term-care facilities across the UK. *Journal of antimicrobial chemotherapy* 2019;74(5):1447-1451.

(46) Potter R, Campbell A, Ellard DR, Shaw C, Gardner E, Agus A, et al. Multifaceted intervention to Reduce Antimicrobial Prescribing in Care Homes: a process evaluation of a UK-based non-randomised feasibility study. *BMJ Open* 2019 Nov 21;;9(11).

(47) Ashiru-Oredope D, Doble A, Akpan MR, Hansraj S, Shebl NA, Ahmad R, et al. Antimicrobial Stewardship Programmes in Community Healthcare Organisations in England: A Cross-Sectional Survey to Assess Implementation of Programmes and National Toolkits. *Antibiotics* 2018 Nov 7;;7(4):1-10.

(48) Palin V, Mölter A, Belmonte M, Ashcroft DM, White A, Welfare W, et al. Antibiotic prescribing for common infections in UK general practice: variability and drivers. *Journal of antimicrobial chemotherapy* 2019;74(8):2440-2450.

(49) Dolk FCK, Pouwels KB, Smith DRM, Robotham JV, Smieszek T. Antibiotics in primary care in England: which antibiotics are prescribed and for which conditions? *Journal of Antimicrobial Chemotherapy* 2018;73(2):2-10.

(50) Rush L, Patterson C, McDaid L, Hilton S. Communicating antimicrobial resistance and stewardship in the national press: Lessons from sepsis awareness campaigns. *Journal of Infection* 2019;78(2):88-94.

(51) Johnson AP, Muller-Pebody B, Budd E, Ashiru-Oredope D, Ladenheim D, Hain D, et al. Improving feedback of surveillance data on antimicrobial consumption, resistance and stewardship in England: putting the data at your Fingertips. *Journal of antimicrobial chemotherapy* 2017 Apr 1;;72(4):953-956.

(52) Public Health England. Become an Antibiotic Guardian . 2020; Available at: <https://antibioticguardian.com>.

(53) Public Health England. AMR Local Indicators (Fingertips). 2019; Available at: <https://fingertips.phe.org.uk/profile/amr-local-indicators>.

This report was produced by the Patients Association, commissioned through an educational grant provided by Abbott. Abbott has had no influence over the content of the report.

Contact

The Patients Association
PO Box 935
Harrow
HA1 3YJ

Email: mailbox@patients-association.com
Telephone: 020 8423 9111
Website: www.patients-association.org.uk

Twitter: @PatientsAssoc
Facebook: @thepatientsassociation



Listening to patients, speaking up for change.

The Patients Association is a registered charity in England and Wales (1006733). A company limited by guarantee. Registered company in England and Wales (02620761) Registered address: P Block, Northwick Park Hospital, The North West Hospitals NHS Trust, Watford Road, Harrow, Middlesex, HA1 3UJ