

## **REPORT OF THE DIRECTOR OF PUBLIC HEALTH**

### **ANTIMICROBIAL RESISTANCE**

#### **Purpose of the Report**

1. The purpose of this report is to:
  - Raise awareness of the issues associated with antimicrobial resistance
  - Highlight national and local action that has taken place to help address antimicrobial resistance
  - Identify how Health & Wellbeing Board members can support the antimicrobial resistance agenda.

#### **Information**

##### **Why is antimicrobial resistance a concern?**

2. Antimicrobial resistance (AMR) poses a significant threat to the entire population and demands a local, national and global response beyond the confines of the medical community. AMR arises when the micro-organisms that cause infection evolve to survive exposure to a medicine that would normally kill them or stop their growth. The term antimicrobial includes antibiotic, antiprotozoal<sup>1</sup>, antiviral and antifungal medicines. Resistance is a natural biological phenomenon but is increased and accelerated by various factors such as unnecessary use or misuse of antimicrobial medicines, poor infection control practices and global spread through trade and travel. This is a particular concern with antibiotics.
3. Before the advent of antimicrobials, even a simple cut had the potential to kill if it became infected. Antimicrobials make it possible to carry out routine surgery, make childbirth safer and protect cancer patients whilst their immune systems are weakened by chemotherapy. Without effective antimicrobial treatments, simple infections will once again kill people and cancer treatment or surgery will have to be weighed against the possibility of death through infection. The rise and spread of AMR is creating a new generation of 'superbugs' that cannot be treated with existing medicines.

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<sup>1</sup> Antiprotozoal drugs are a class of medication used to treat infections caused by protozoa, which are single cell organisms either free-living or parasitic.

4. Inappropriate and over-use of antimicrobials is the main cause of AMR. According to a 2018 House of Commons Report<sup>2</sup>, antimicrobial use is rising across the world, with global consumption of antibiotics increasing by nearly 40% between 2000 and 2010, which is in turn accelerating the rate at which resistance is developing. In the UK, it is estimated that 20% of prescriptions are inappropriate<sup>2</sup> and there is also an increasing expectation from patients to receive antibiotics. Antimicrobial use in animals is also of concern, where antibiotics have in the past been added routinely to animal feed or given to a whole herd when only one or two animals have been infected.
5. Professor Dame Sally Davis, former Chief Medical Officer, described AMR as a 'catastrophic threat' and stated that if action is not taken, 'modern medicine will be lost'. Similarly, the World Health Organisation states: 'There is no time to wait. Unless the world acts urgently, antimicrobial resistance will have disastrous impact within a generation'<sup>3</sup>. The estimate of global mortality from AMR across the world by 2050 is ten million people per year, which would represent a greater death toll than cancer and diabetes combined<sup>4</sup>. Those at most risk of resistant infections are care home residents, people who are immuno-compromised, and those who travel to specific countries or have multiple health care contacts or courses of antibiotics.
6. An increase in AMR places a greater burden on both health and social care services. The estimated cost to the NHS of treating drug-resistant infections with more expensive alternatives is £180 million per year. However, there are not always alternative treatments available, particularly given the fact that no new classes of antibiotics have been developed for over thirty years. No reliable estimates have yet been modelled for the financial impact on adult social care caused by AMR, but the burden is undoubtedly considerable and upfront investment in the prevention of infection occurring in the first place is crucial.
7. A recent review<sup>5</sup> of the impact of five types of antibiotic resistant bacteria in Europe has identified significant increases in the burden associated with resistant infections. This is measured in the number of cases, attributable deaths and disability-adjusted life-years<sup>6</sup> (DALYs), which includes the increased need for long term health and social care. There was an overall increase in the burden between 2007 and 2015, with the largest impact in the countries with the higher rates of multi-resistant infections and in the under-1 and over-65 year old age groups (see Figures 1 and 2 overleaf).

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<sup>2</sup> <https://publications.parliament.uk/pa/cm201719/cmselect/cmhealth/962/962.pdf>

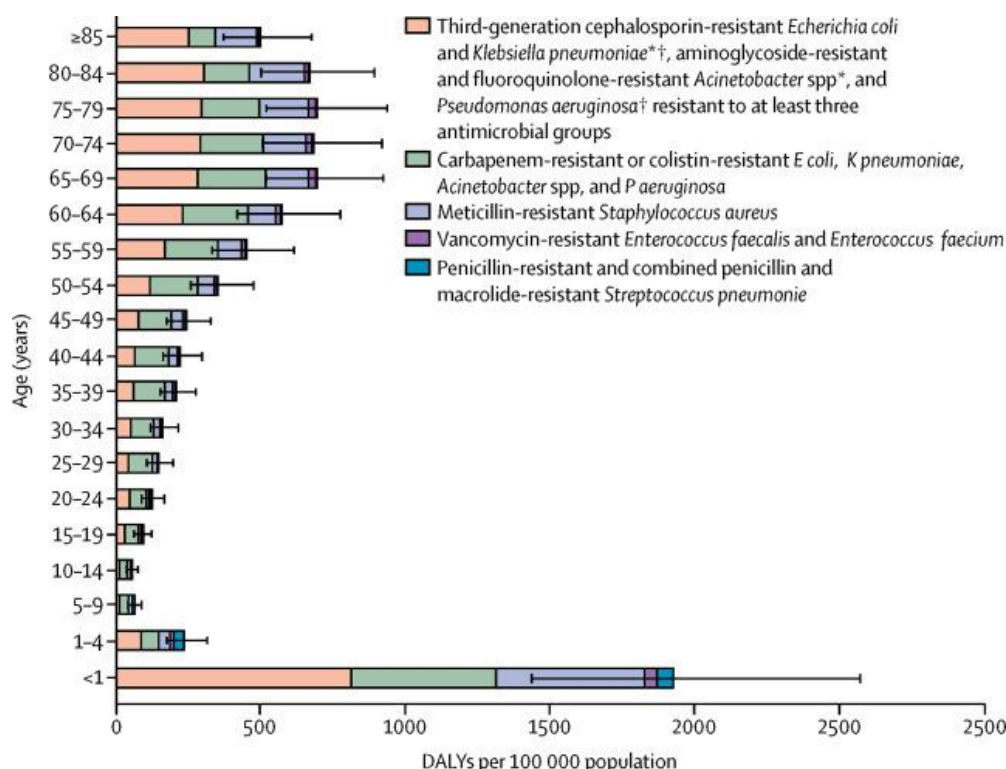
<sup>3</sup> [https://www.who.int/antimicrobial-resistance/interagency-coordination-group/IACG\\_final\\_report\\_EN.pdf?ua=1](https://www.who.int/antimicrobial-resistance/interagency-coordination-group/IACG_final_report_EN.pdf?ua=1)

<sup>4</sup> <https://publications.parliament.uk/pa/cm201719/cmselect/cmhealth/962/962.pdf>

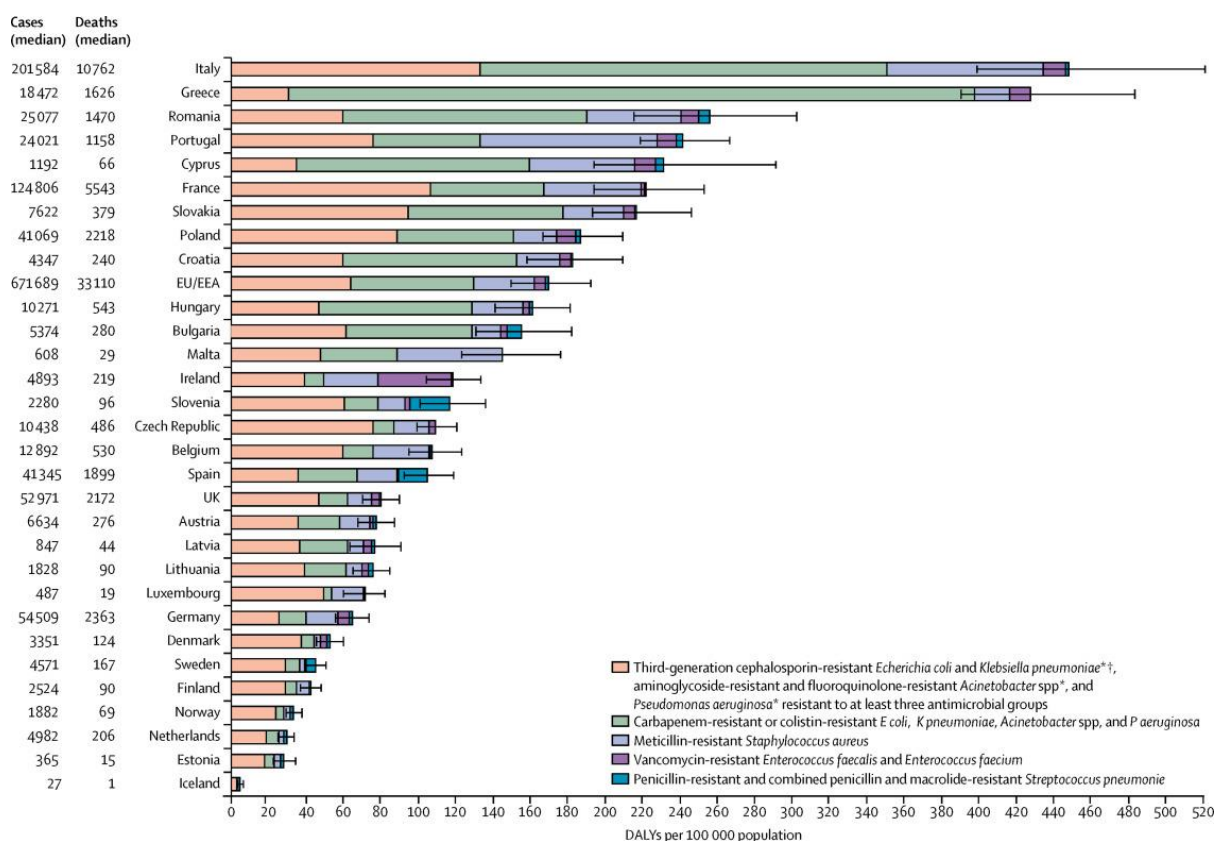
<sup>5</sup> [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(18\)30605-4/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(18)30605-4/fulltext)

<sup>6</sup> One DALY can be thought of as one lost year of "healthy" life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability.

**Figure 1 Model estimates of the burden of infections with antibiotic-resistant bacteria of public health importance in DALYs, EU and European Economic Area, 2015**



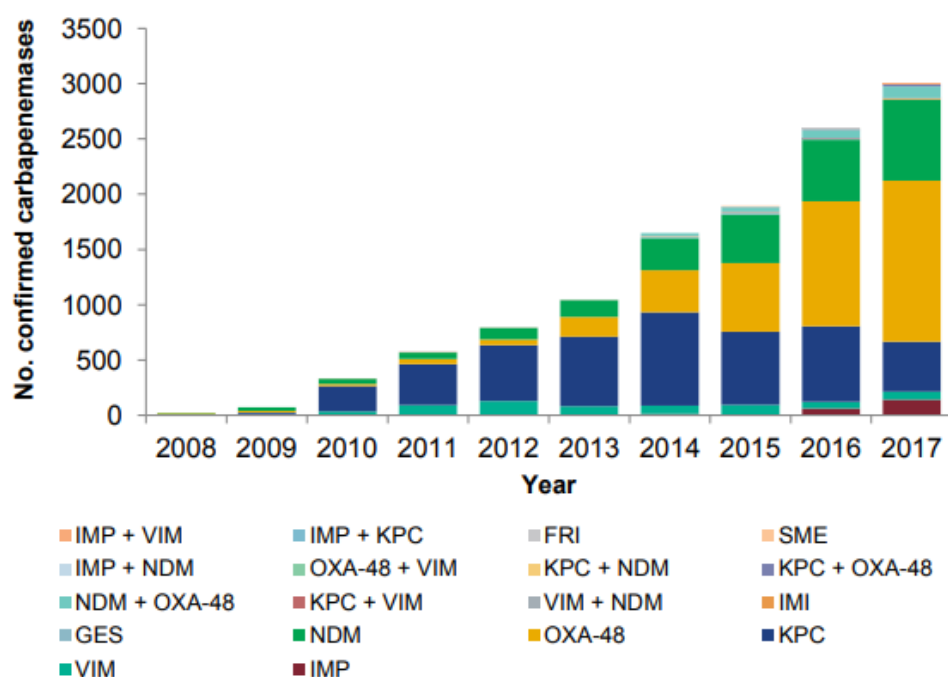
**Figure 2 Burden of infections with antibiotic-resistant bacteria in DALYs, EU and European Economic Area, 2015**



## Local issues

8. In Nottinghamshire, there has been a significant decrease in infections caused by resistant *S. aureus* strains (MRSA), but in some areas there have been an increasing number of cases colonised<sup>7</sup> or infected with multi-resistant Gram-negative organisms<sup>8</sup>, including carbapenemase producing enterobacteriaceae (CPE)<sup>9</sup>. Initially all cases had acquired CPE in healthcare settings abroad, but in the last few years we have also experienced cases in Nottinghamshire and the East Midlands which have not had this risk factor and, worryingly, numbers have significantly increased in other areas in England with multiple different mechanisms of resistance (Figure 3).

**Figure 3 Number of confirmed CPE isolates referred to PHE's AMR Healthcare Acquired Infection Reference Unit, 2008-17(England<sup>10</sup>)** (Note: the three letter acronyms below indicate the names of the different identified carbapenemasae enzymes)



<sup>7</sup> Colonisation describes the growth of bacteria on body sites exposed to the environment (such as the skin, mouth, intestines or airway), without causing any infection.

<sup>8</sup> Gram-negative bacteria are classified by the colour that they turn after a chemical process called Gram staining is used on them. Gram-negative bacteria counter-stain red and Gram-positive bacteria keep the original purple stain due to differences in their cell walls.

<sup>9</sup> Enterobacteriaceae are bacteria that can live in the gut of humans and animals. Most of the time they are harmless and there are no signs or symptoms because a person's immune system keeps them in check. If they get into other parts of the body (such as the urine or the bloodstream), they can cause an infection that needs treatment. Patients who have a weakened immune system may be more at risk of developing infection. Enterobacteriaceae which have become resistant to carbapenems are 'carbapenem resistant enterobacteriaceae' (CRE), and those that have become so by producing a carbapenemase enzyme are 'carbapenemase producing enterobacteriaceae' (CPE). CPE infections can be very difficult to treat because they are often resistant to multiple classes of antibiotics.

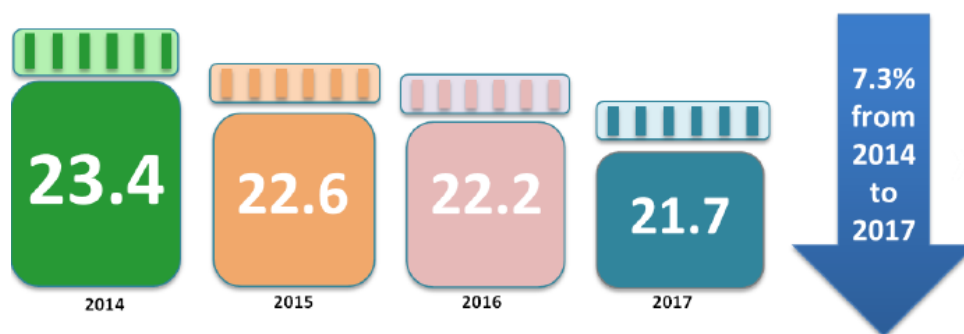
<sup>10</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/759975/ESPAUR\\_2018\\_report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/759975/ESPAUR_2018_report.pdf)

## How is AMR being addressed nationally?

9. The Government initially launched its five year UK strategy to tackle AMR in 2013 and earlier this year a renewed action plan was published, Tackling Antimicrobial Resistance (2019-2024)<sup>11</sup>, alongside the UK's 20-year Vision for Antimicrobial Resistance<sup>12</sup>. The action plan is also supported in the NHS Long Term Plan (2019) and focuses on three key ways of tackling AMR:
- Reducing the need for, and unintentional exposure to, antimicrobials
  - Optimising the use of antimicrobials
  - Investing in innovation, supply and access.
10. Along with global efforts to tackle AMR, the UK has identified six key areas for action:
- Improving infection prevention and control (IPC) practices in animals and humans
  - Optimising prescribing practice
  - Improving professional education, training and public engagement
  - Developing new drugs, treatments and diagnostics
  - Improving access to, and use of, surveillance data
  - Identifying and prioritising AMR research needs.
11. Over the last five years there have been a range of approaches to improving IPC practices in humans (e.g. regulations, audits of practice, and training and vaccination of healthcare workers). There has also been significant progress in reducing IPC in animals and voluntary targets have been set. Various initiatives have been put in place to optimise prescribing and, as a result, there has been a significant reduction in antibiotic consumption since 2014 as outlined in Figure 4. The reduction in antibiotic consumption has also been mirrored in the animal health sector, where the amount of antibiotics sold for UK food-producing animals has reduced by 40% (Figure 5).

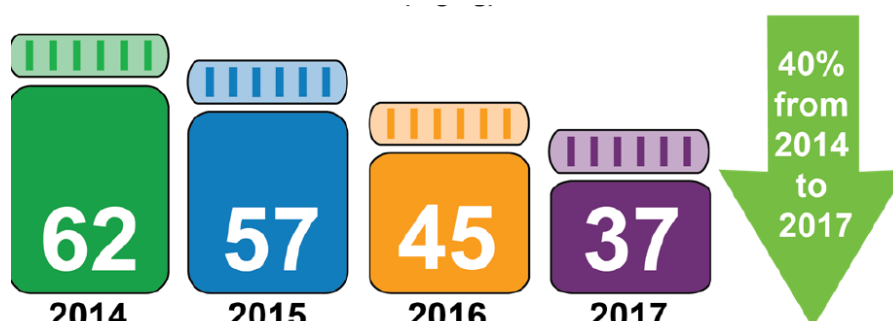
**Figure 4 Amount of antibiotics consumed in the UK (defined daily doses per 1000 inhabitants per day)**



<sup>11</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/784894/UK\\_AMR\\_5\\_year\\_national\\_action\\_plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784894/UK_AMR_5_year_national_action_plan.pdf)

<sup>12</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/773065/uk-20-year-vision-for-antimicrobial-resistance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/773065/uk-20-year-vision-for-antimicrobial-resistance.pdf)

**Figure 5 Amount of antibiotics sold for use in UK food-producing animals (milligrams of active ingredient per kilogram of bodyweight, mg/kg)**



### How is AMR being addressed locally?

12. In response to the national 2013 five-year AMR strategy, the Nottinghamshire Antimicrobial Stewardship (AMS) Group was formed in 2015. The group has expanded over time and now has cross-sector representation working to agree and deliver a common message. It is unique in that it has veterinary, dentistry, private, acute, community, public health (Public Health England and local authority), GP and lay representation. The group does not have identified resource to drive the AMS agenda, but relies on organisational membership to contribute to deliverables.
13. The original aim of the AMS Group was to identify what work was already being delivered across Nottinghamshire in each of the areas of the national strategy and how to address any gaps. An AMS work plan was produced as a result of this and has been refined over the subsequent years and in response to the most recent Government publications.
14. In line with the identified actions in the national strategy, the AMS group prioritised working on: a) improving professional education, training and public engagement; and b) improving local antibiotic guidance and prescribing, for example documentation of allergy status and improving the diagnosis and management of urinary tract infections (UTIs). It has also addressed other areas, such as prevention of infections (especially in care homes) and improving the diagnosis of infection.
15. Key achievements for the group to date include:
  - Cross-organisation working to develop and agree local communication campaigns, such as the highly successful '1,2,3 Healthy Wee' hydration poster.
  - Winning a national Antibiotic Guardian award in 2017.
  - Raising local concerns about online prescribing at a national level.
  - Being the first area to successfully introduce the national change in treatment of UTIs and seeing a resultant decrease in trimethoprim (antibiotic) resistant *E. coli* UTIs.
  - Supporting the promotion of world antibiotic awareness weeks with cross-organisational agreed messages, including a Nottinghamshire antibiotic amnesty to safely dispose of unused antibiotics (which was given a prime-time slot on the local BBC news) and a local AMR message under the national 'keep antibiotics working campaign', which successfully reached over 200,000 people using social media.
  - Sharing of hospital initiatives, including the use of specialty consultant antimicrobial champions to help support appropriate prescribing.

- Running a successful multi-agency communications and training campaign, supported by Nottinghamshire County Council, which was undertaken to inform residents about overuse or misuse of antibiotics and to encourage a reduction in demand.
16. To improve prescribing within GP practices, clinical commissioning groups (CCGs) have been required to work to national Quality Premium (QP) antibiotic targets. The QP scheme is about rewarding CCGs for improvements in the quality of the services they commission. The scheme also incentivises CCGs to improve patient health outcomes, tackle inequalities and improve access to services. The antibiotic targets aim to reduce total antibiotic prescribing and encourage narrow spectrum antibiotic prescribing<sup>13</sup>.
17. The CCGs review their QP targets on a monthly basis. The first target is the number of antibiotic items (prescriptions) prescribed per Specific Therapeutic group Age-sex Related Prescribing Unit (STAR-PUs), which monitors the volume of prescribing. The target has recently been updated, changing from being equal to or below the England mean of 1.161 to now being equal to or below 0.965. Figure 6 shows that there are currently three CCGs achieving this target (Nottingham North & East, Nottingham West and Rushcliffe), and the direction of travel for all CCGs is positive (Figure 7 overleaf).

**Figure 6 Antibiotic prescribing volumes in Nottinghamshire, 2018/19**

<b>Commissioner (CCG)</b>	<b>Antibacterial items/STAR-PU (new target &lt;0.965) (April 2018 – March 2019, 12-month rolling average)</b>
Bassetlaw	0.978
Mansfield & Ashfield	1.125
Newark & Sherwood	0.98
Nottingham North & East	0.935
Nottingham West	0.845
Rushcliffe	0.809

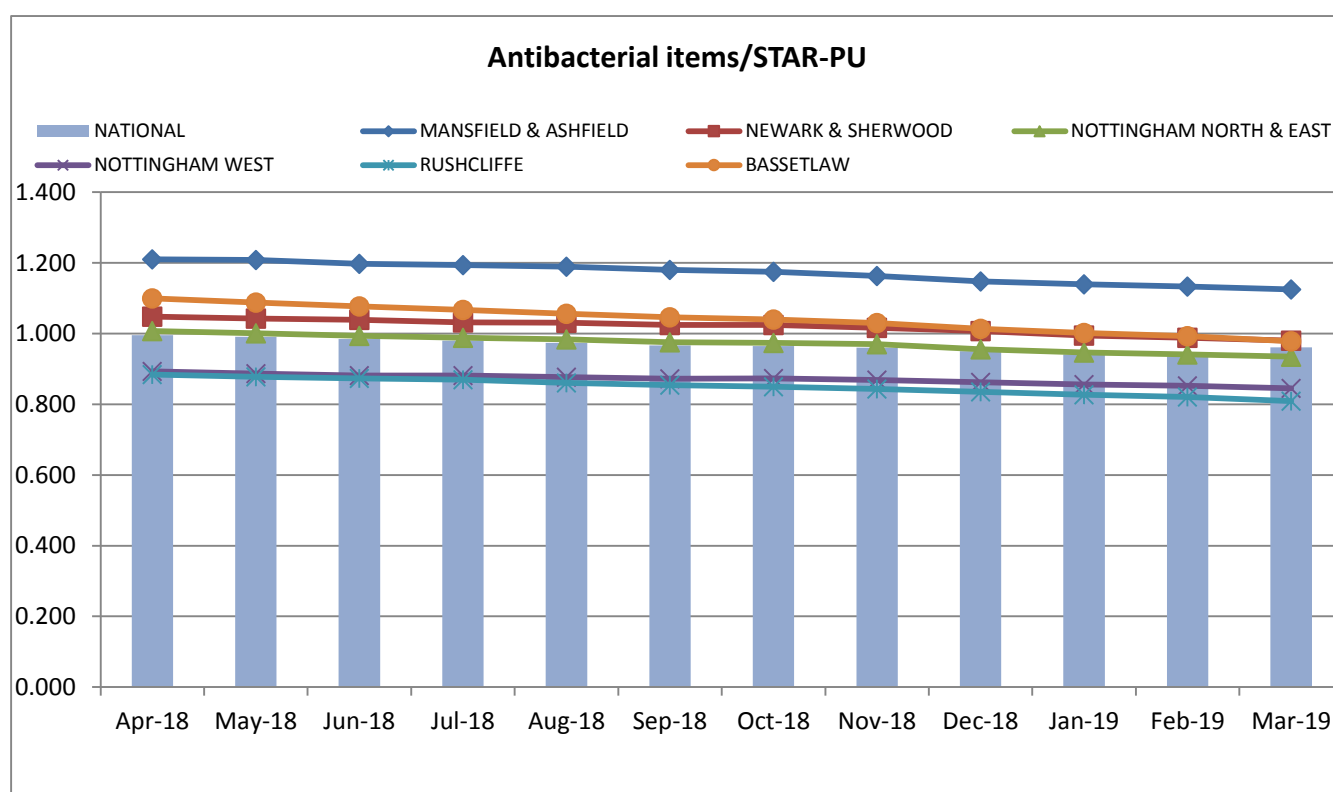
18. The second target looks at the proportion of prescriptions where the antibiotic prescribed is either co-amoxiclav, cephalosporin or a quinolone. The aim is to reduce the prescribing of these antibiotics, as they are broad spectrum antibiotics. Although powerful, broad-spectrum antibiotics<sup>14</sup> pose specific risks, particularly the disruption of native, normal bacteria and the development of antimicrobial resistance. Narrow spectrum antibiotics are active against a selected group of bacterial types and are used for the specific infection when the causative organism is known. They will not kill as many of the normal microorganisms in the body as the broad-spectrum antibiotics.

<sup>13</sup> In the case of narrow-spectrum antibiotics, the range of bacteria that are targeted by the medication is small. These antibiotics are designed only to treat a specific type of bacteria.

<sup>14</sup> Broad spectrum antibiotics are formulated to destroy a large number of different types of bacteria. They are effective against a wide range of infections caused by a variety of bacteria. They are designed to attack several strains and species of bacteria.



**Figure 7 Antibiotic prescribing volumes in Nottinghamshire, 2018-19**



19. The national target is for the proportion of broad-spectrum antibiotic prescriptions to be below 10% of antibiotic prescriptions written. The results in Figure 8 show that all local CCGs are currently achieving this target.

**Figure 8 Broad-spectrum antibiotic prescribing volumes in Nottinghamshire, 2018-19**

Commissioner (CCG)	Proportion of co-amoxiclav, cephalosporin & quinolone items (April 2018 – March 2019, 12-month rolling average)
Bassetlaw	4.83%
Mansfield & Ashfield	7.66%
Newark & Sherwood	8.36%
Nottingham North & East	8.94%
Nottingham West	7.25%
Rushcliffe	8.11%

20. To support practices to achieve their targets, antibiotic prescribing is included in each practice's annual CCG prescribing visit. These visits highlight to prescribers the requirement to adhere to Nottinghamshire-wide Area Prescribing Committee antimicrobial guidance and to promote the national targets. Prescribers are also signposted to the use of local and national resources, which include patient leaflets, audit toolkits, posters and videos for use in patient waiting areas. In addition, each prescriber is encouraged to become an Antibiotic Guardian to promote messages about antibiotic resistance.



## **What are the local issues and how might they be addressed?**

21. Good progress has been made so far locally, but there are further challenges that the Antimicrobial Stewardship (AMS) Group is looking to address:

- There is evidence to suggest there is a higher demand for, and reliance on, antibiotics in some cultural groups. The AMS Group plans to review public awareness materials and adapt the message to different age and cultural groups, particularly under-served populations, such as the homeless, Gypsy, Roma & Travellers and those where English is not the first language. The AMS Group would welcome support from Health & Wellbeing Board partners to engage with and promote messages to key groups.
- Documentation of antibiotic allergy status, particularly penicillin, is an issue. The Group is working with the NUH allergy service to improve the diagnosis and communication in relation to this.
- Whilst it remains an aspiration, none of the Nottinghamshire hospital trusts currently have an e-prescribing system, which makes real time feedback, intervention of antimicrobial prescribing issues and promotion of guidelines more difficult.
- The introduction of point of care/near patient diagnostic tests to improve the diagnosis of infection in the community (including in care homes) and reduce unnecessary antibiotic use has been difficult to introduce locally and there is no funding stream to support their introduction.
- There is potential for community pharmacies to play a more active role in promoting antimicrobial stewardship to the public and the group aims to look into this, ensuring appropriate training is available.
- Although training around infection prevention and control has taken place with care home and domiciliary care workers, there is an ongoing need for the development of multi-agency training strategies due to the turnover of workers in this area.

## **Other Options Considered**

22. No other options were considered.

## **Reason/s for Recommendation/s**

23. The Health & Wellbeing Board is well-placed to exert a positive influence upon agencies across the health and social care economy and, in turn, upon members of the public who use their services.

## **Statutory and Policy Implications**

24. This report has been compiled after consideration of implications in respect of crime and disorder, data protection and information governance finance, human resources, human rights, the NHS Constitution (public health services), the public sector equality duty, safeguarding of children and adults at risk, service users, smarter working, sustainability and the environment and where such implications are material they are described below. Appropriate consultation has been undertaken and advice sought on these issues as required.

## **Financial Implications**

25. There are no direct financial implications arising from this report. However, the long-term financial implications to the health and social care sector of inaction in relation to AMR are considerable.

## **RECOMMENDATIONS**

The stewardship of antimicrobials is a health protection issue that affects the whole population and requires multi-agency ownership. Members of the Health & Wellbeing Board are asked to consider:

- 1) Promoting awareness of antimicrobial resistance and infection prevention with their employees and service users, using resources from the Antimicrobial Stewardship Group.
- 2) Providing advice and support to the Antimicrobial Stewardship Group with the delivery of antimicrobial resistance and infection prevention messages across Health & Wellbeing Board partners and their networks, specifically to under-served populations such as the homeless, Gypsy, Roma & Travellers and those where English is not the first language.

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**Coral Osborn**  
**Associate Chief Pharmacist - QiPP, Governance and Social Care on behalf of:**  
**NHS Mansfield and Ashfield Clinical Commissioning Group**  
**NHS Newark & Sherwood Clinical Commissioning Group**  
**Greater Nottingham Clinical Commissioning Partnership**

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## **Constitutional Comments (LW 23/10/19)**

26. Health and Wellbeing Board is the appropriate body to consider the content of the report.

## **Financial Comments (DG 23/10/2019)**

27. There are no specific financial implications arising directly from this report.

## Background Papers and Published Documents

Except for previously published documents, which will be available elsewhere, the documents listed here will be available for inspection in accordance with Section 100D of the Local Government Act 1972.

- NHS Long Term Plan (<https://www.england.nhs.uk/long-term-plan/>)
- Tackling Antimicrobial Resistance (2019-24)  
(<https://www.gov.uk/government/publications/uk-5-year-action-plan-for-antimicrobial-resistance-2019-to-2024>)
- UK 20-Year Vision for Antimicrobial Resistance  
(<https://www.gov.uk/government/publications/uk-20-year-vision-for-antimicrobial-resistance>)
- House of Commons Report on Antimicrobial Resistance (2018)  
(<https://www.gov.uk/government/publications/uk-20-year-vision-for-antimicrobial-resistance>)
- World Health Organisation: Securing the Future from Drug Resistant Infections (2019)  
([https://www.who.int/antimicrobial-resistance/interagency-coordination-group/IACG\\_final\\_report\\_EN.pdf?ua=1](https://www.who.int/antimicrobial-resistance/interagency-coordination-group/IACG_final_report_EN.pdf?ua=1))
- Public Health England: English Surveillance Programme for Antimicrobial Utilisation and Resistance (2018)  
([https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/759975/ESPAUR\\_2018\\_report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/759975/ESPAUR_2018_report.pdf))

## Electoral Division(s) and Member(s) Affected

- All