

# **Advisory Committee on Antimicrobial Prescribing, Resistance and Healthcare Associated Infection (APRHAI)**

**9<sup>th</sup> Annual Report, April 2017 – December 2018**

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## Introduction

APRHAI is a Departmental Expert Committee that helps guide government priorities and provides practical and scientific advice on antimicrobial prescribing, resistance and healthcare-associated infections to UK health departments. In making recommendations, the Committee takes account of the relevant work of other expert groups in the human and veterinary fields.

APRHAI played a crucial role in the development of the current UK Antimicrobial Resistance (AMR) strategy. From 2014, it was represented on and provided advice to a cross government High Level Steering Group (HLSG), established to oversee and drive delivery of the strategy.

The current UK AMR strategy covers the five year period between 2013 and 2018. It recognises that to tackle AMR, we need to take a “One Health” approach, with actions at local and regional level in both human and animals. In May 2016, a global facing independent review on AMR led by Lord Jim O’Neill made recommendations in 10 key areas. The Government’s response to the review included the establishment of challenging new ambitions, including commitments to:

- halve specific kinds of healthcare associated bloodstream infections in England by 2020/21
- halve inappropriate antibiotic prescribing by 2020/21
- ensure that diagnostic tests and data are used to support clinical decision making, implement our vision and deliver high quality diagnostics in the NHS
- reduce use of antibiotics in livestock and fish farmed for food; to agree sector specific targets for the animal sectors by the end of 2017, and to set agreed rules for use of antibiotics which are most critically important for human health

In 2017-2018 APRHAI’s work focused on supporting the implementation of these ambitions and the development of the successor to the UK five year AMR strategy 2013-2018.

The full Committee meets three times yearly, with each meeting focusing on either healthcare associated infections (HAIs), Antimicrobial resistance (AMR) or antimicrobial prescribing (AMP). This report provides a high-level lay summary of the Committee’s work following those three themes together with its work on the refresh of the current strategy.

While the report is written for a lay audience, the recommendations of the committee are included in annex A and APRHAI meeting minutes and papers can be found at <https://www.gov.uk/government/groups/advisory-committee-on-antimicrobial-prescribing-resistance-and-healthcare-associated-infections>. Abbreviations are included in Annex B and the glossary, with a brief explanation of the terms used in the report, is included in Annex C.

## 1. Healthcare Associated infections (HAI)

A healthcare associated infection is one that is associated with the provision of healthcare in either a hospital or community setting. It can lead to severe illness and even death. MRSA and *Clostridium difficile* are two well-known HAIs. It is important to quickly identify and treat these infections and to prevent them from spreading to other people. The impact of these infections tends to be most severe in patients with weakened immune systems such as the very young and elderly and those patients in Intensive care units or receiving treatment for diseases such as HIV and cancer. Information on HAIs is collected and analysed by Public Health England (PHE) and APRHAI also reviews the trends each year.

### Gram-negative HAIs

Infections caused by Gram-negative bacteria are so called, because they do not pick up a coloured stain used in a laboratory to identify types of bacteria. Gram-negative bacteria include *E. coli*, a common bug found in the gut, which is becoming increasingly resistant to treatment. These bacteria cause infections such as pneumonia, urinary tract or surgical site infections.

In March 2018, APRHAI reviewed data from PHE that showed how these Gram-negative infections are slowly but steadily on the rise. Some of these infections particularly affect specific populations, such as men aged over 65, which shows the need for interventions for those high-risk groups, such as in the case of MSSA, a type of bacteria that will be discussed further in the report.

### Multi Drug Resistant Organism infections

In recent years, there has been an increase in the number of infections caused by bacteria that have become resistant to a number of different antibiotics, so called “multi-drug resistant” organisms (MDRO). Infections caused by these bacteria are very serious, with less chance of recovery for patients because antibiotic treatment is less effective. Of these, Gram-negative carbapenemase producing Gram-negative resistant bacteria are a severe health threat and are currently being closely monitored. Carbapenem resistant infections, caused by these bacteria, are currently on the rise in a number of European countries, demonstrating the need to ensure that cases are identified as early as possible and treated quickly in order to reduce both the risk of serious consequences for patients and the risk of these type of infections spreading further.

In 2017-2018, an APRHAI subgroup was set up to consider what actions could help prevent or reduce these infections and, in 2018, PHE developed an action plan to support the NHS to tackle the spread of Carbapenemase Producing

Enterobacteriaceae (CPE), a type of bacteria that causes carbapenem resistant Gram-negative infections. The action plan was presented to APRHAI in September 2018, and endorsed by the Committee.

## **MSSA**

In 2017-2018, another main area of investigation has been the rise in infections caused by bacteria called meticillin susceptible *Staphylococcus aureus* (MSSA). An APRHAI subcommittee reviewed the causes for the increase in these infections in order to develop more effective future interventions to combat MSSA. In March 2018, it found that the increase particularly affected certain populations such as older male patients, and that screening for MSSA in these high risk groups may be important, especially when they were undergoing surgical procedures or had invasive devices. The Committee unanimously agreed with the subgroup conclusions and endorsed the recommendations.

## **2. Resistance to antimicrobials (AMR)**

The overarching goal of the UK AMR strategy is to slow the growth and spread of antimicrobial resistance. We will only know whether our actions are having the desired effect through surveillance, which enables us to monitor changes in rates of resistance.










### **Drug/bug combinations and blood stream infections**

In 2013 APRHAI was asked to identify which combinations of bacterial infection and the drugs used to treat them should be monitored to assess changes in antimicrobial resistance.

The list of drug/bug combinations has been reviewed annually by APRHAI. In June 2017, the Committee reviewed the “main” and “shadow” lists and decided that these should be merged into one. In September 2018, the Committee reviewed the five-year summary trends in resistance to antibiotics for each key bug, concluding that, over this period, while there have been slight increases in resistance in some bugs, overall, the figures show stability in most combinations<sup>1</sup> (Table 1). A significant reduction has been shown in resistance rates in *Staphylococcus aureus*, demonstrating the success of measures taken by the NHS, based on recommendations endorsed by APRHAI, that have effectively driven down rates of MRSA.

<sup>1</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/749747/ESPAUR\\_2018\\_report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/749747/ESPAUR_2018_report.pdf)

**Table 1:** Summary of the 2013-2018 overall key bug/drug resistance trends

Bacteria	Trend %
<i>E. coli</i>	resistance rate going up 
<i>K. pneumoniae</i>	resistance rate going up 
<i>K. oxytoca</i>	resistance rate stable 
<i>Pseudomonas spp.</i>	resistance rate stable 
<i>Acinetobacter spp.</i>	resistance rate stable 
<i>Enterococcus spp.</i>	resistance rate stable 
<i>S. pneumoniae</i>	resistance rate stable 
<i>S. aureus</i>	resistance rate going down 
<i>N. gonorrhoea</i>	resistance rate stable 

In September 2018, APRHAI reviewed the latest data on antibiotic resistant bloodstream infections (BSI) presented by PHE. This showed an increase of 35% between 2013 and 2017 in England. While resistance rates have remained stable, the increase in new cases of infections each year has increased the overall burden of resistance, which was noted with concern by the Committee.

In reviewing both the drug/bug combinations and the burden of BSI, the Committee agreed that the spread of infections that are resistant to carbapenems, which has occurred with alarming consequences in other European countries, has been, at present, avoided in the UK. This is a significant achievement, likely due to surveillance and infection prevention and control practices, which have been developed during the life of the AMR strategy and that will continue to be strengthened in the next phase.

The Committee also recommended that there should be a specific focus on understanding the outcomes of antibiotic resistant infections for patients, including how much longer they need to stay in hospital and how many patients die as a result

of the resistant infection. More information, facts and figures about AMR, is available in the [ESPAUR report](#)<sup>1</sup>, published by PHE in October 2018.

Information on AMR in Scotland, Wales and Northern Ireland can be found in their equivalent surveillance reports.<sup>2</sup>

### **3. Antimicrobial prescribing and stewardship (AMP)**

Resistance to antibiotics is a naturally occurring phenomenon as bacteria change and adapt in response to exposure to antibiotics; this can be through antibiotic treatment or by exposure to antibiotics in the environment. For this reason, it is important to only use antibiotics when they are needed and to use the right ones and at the right dose. The duration of treatment is also important and antibiotics should be taken as prescribed.

The need to improve prescribing by GPs, nurses, dentists and hospital doctors is a key area for action in the UK AMR strategy. Only prescribing antibiotics when it is appropriate to do so will help ensure that the antibiotics we use now continue to work.

In September 2018, APRHAI reviewed data on antimicrobial prescribing over the 5 years of the strategy<sup>1</sup>. Antibiotic prescribing mostly occurs in community settings (72%), while 19% occurs in hospital settings (inpatients and outpatients), 5% in dental settings and 4% in other community settings. As for antibiotic consumption, figures show that overall, between 2014 and 2017, the consumption of antibiotics in England reduced by 6%, which the Committee marked as important progress, with total number of prescriptions reducing by 13%.

#### **Antimicrobial stewardship - financial incentives**

Good antimicrobial stewardship (AMS) is crucial in reducing the growth and spread of resistance and improves the quality and safety of patient care. It is about selecting the right drug and giving it in the right dose for the right amount of time to cure an infection while minimising toxicity and conditions that might encourage resistance. Good AMS includes a review of the continuing need for antibiotics following clinical diagnosis and documented actions to stop, continue or change antimicrobial treatment.

In order to support good antimicrobial stewardship, NHS England developed two financial incentive programmes on the basis of recommendations provided by APRHAI in 2015, One was for primary care settings (such as GP practices) called “Quality Premium” (QP) and the second for hospitals, called “Commissioning for Quality and Innovation”(CQUIN). These schemes set goals to reduce prescribing of antibiotics in total and of different categories of antibiotics.

The outcomes from both programmes were presented to APRHAI in September 2018, showing that they had positive effects on the reduction of antibiotics used by GPs and in hospitals. In particular, as a result of the QP scheme, there were over 3.7 million fewer antibiotic prescriptions in community settings, which was noted as very good progress by the Committee.

### **Inappropriate prescribing**

Inappropriate prescribing occurs when patients are given antibiotics when they are not needed, or with the wrong dosage or duration, or when another safe alternative antibiotic could have been given. APRHAI made recommendations in May 2017 for reducing inappropriate prescribing in primary and secondary care settings, based on modelling work done by PHE. It continued its work to refine recommendations with PHE and NHSI and in December 2017 these were submitted to DHSC and were endorsed by the Chief Medical Officer.

In 2018, PHE carried out a detailed study modelling inappropriate prescribing in hospital settings. Because inappropriate prescribing is very difficult to measure, PHE devised a method to assess it more accurately in order to propose estimates, or targets, for safe and achievable reductions. An important outcome of this work is that we still need to achieve a better understanding of why a third of antibiotics are prescribed. The recommendations made by PHE were reviewed and agreed to by the Committee at the September meeting.

### **A new way of using antibiotics: the AWaRe index**

In 2017, the World Health Organisation (WHO) reviewed and updated the Essential Medicines List (EML) and proposed a new way of dividing antibiotics into different groups, in order to ensure both access to necessary antibiotics and appropriate prescribing. The newly created AWaRe index lists antibiotics in three groups, Access (first choice treatment antibiotics), Watch (second choice treatment antibiotics or first choice treatment for some specific infections) and Reserve (last resort antibiotics), which should be used rarely and only for severe infections which cannot be treated otherwise.



The UK was the first country to adopt the AWaRe Index and, in 2017, APRHAI and PHE adapted the AWaRe index for national use in England. It is now being used by NHS England for the QP and CQUIN incentives programmes.

#### **4. UK AMR Strategy Refresh**

APRHAI was asked to contribute to the refresh of the AMR strategy in 2017. In April 2017, a workshop was held with additional experts, to identify areas of focus and its recommendations were endorsed by the full Committee in June. Recommendations included:

- The need for a greater focus on research in infection prevention and control
- work should be carried out to identify novel interventions for HAI Gram-negative infections.
- The need for more research to better understand the burden of AMR within the UK.
- more targeted and risk-based prescribing of antibiotics
- improvements in the use of surveillance data for example to improve targeted empiric therapy
- A focus on the use of built environment (e.g. water pipes, drains in hospital buildings, building design and materials.) to support infection prevention and control

Over the course of 2018, the Committee continued to advise on the development of the UK AMR National Action Plan 2019-2024 and potential new ambitions.

## **Annex A – Recommendations presented to APRHAI between April 2017 and September 2018**

Below are listed the recommendations that were endorsed in the period between April 2017 and September 2018. Some of these recommendations went through a process of further refinement by APRHAI subgroups before being finally endorsed by the Committee.

### **Recommendations for primary and secondary care antibiotic prescribing measures to support a 50% reduction in inappropriate prescribing (June 2017- further revision December 2017)**

The Committee agreed to continue to review the rapidly emerging scientific evidence in this field and the outcomes of the QP, CQUIN and other initiatives on optimal prescribing and that scientific advice from APRHAI on the optimal methods to achieve the Government's ambitions may need to be amended in the context of emerging data on prescribing and resistance.

Below are APRHAI's recommendations for primary and secondary care prescribing measures:

1. For primary care,

A total antibiotic prescribing reduction target of 10% by 2020/2021 (against 'baseline' 2015/16). The target translates to an Antibacterial Items/STAR-PU value of 0.965, and will address variation in prescribing seen at CCG and GP practice level due to integration into NHS England assurance systems.

2. For secondary care,

- Reductions for total antibiotics would be as follows:
  - 1% reduction for those trusts below the England median per trust type of four quarter rolling rate of total antibiotics.
  - 2% reduction for those trusts above the England median per trust type of four quarter rolling rate of total antibiotics.
- Reductions for carbapenems would be as follows:
  - 2% reduction for those trusts below the England median per trust type of four quarter rolling rate for carbapenems.
  - 3% reduction for those trusts above the England median per trust type of four quarter rolling rate for carbapenems.
- Proportion of antibiotic usage within the Access AWaRe category:

Access group  $\geq 55\%$  of total antibiotic consumption (as DDD/1000adm) OR increase by 3% from baseline 2016 calendar year. The Access group includes the following antibiotics:

- Phenoxyethylpenicillin
- Nitrofurantoin
- Metronidazole
- Gentamicin

- Flucloxacillin
- Doxycycline
- Co-trimoxazole
- Amoxicillin
- Ampicillin
- Benzylpenicillin
- Benzathine Benzylpenicillin
- Procaine Benzylpenicillin
- Fosfomycin
- Fusidic Acid (sodium fusidate)
- Pivmecillinam
- Tetracycline
- Trimethoprim
- TB drugs are excluded

With a baseline period/date: January 2016-December 2016

With a baseline value: As per validated prescription data in 2016

With a final indicator period/date (on which payment is based): 2018/19

With a final indicator reporting date: as soon as possible after Q4 2018/19

### **APRHAI subgroup: Revising the UK Five Year Antimicrobial Resistance Strategy: Final Recommendations (June 2017)**

The Committee endorsed the recommendations, which were received by DHSC and discussed with stakeholders during the development of the 2019-2024 NAP. Where considered viable, these have been incorporated in the NAP.

### **APRHAI recommendations - Post infection review (PIR) of MRSA blood stream infections – (September 2017)**

1. The mandatory requirement to carry out MRSA BSI PIRs should be modified according to local exceedance measurement and performance management by commissioners.
2. Mandatory reporting of MRSA BSI should not cease.
3. If an organisation has more cases than expected, based on their historical 12 months performance, as determined by PHE, this would trigger an alert and require a local PIR process in consultation with commissioners. This approach is considered to be more robust than setting a threshold rate, has been validated and peer-reviewed. Such an approach is currently used for monitoring of gastrointestinal infections and other community outbreaks.
4. Local teams/organisations should continue to investigate MRSA BSIs to identify any lessons learnt. CCGs should particularly focus on settings where MRSA BSIs continue to occur or increase in incidence.
5. PHE will continue to monitor the epidemiology of MRSA BSIs including the proportions of cases occurring pre- and post-48 hours (relative to hospital admission). The greatly reduced numbers of MRSA BSIs that now occur enhances the ability to detect significant changes or warnings of changes in infection incidence. Such monitoring can alert to changes in the incidence of MRSA BSIs that could necessitate a review of national control measures.

6. If an agreement is reached to modify the requirement for mandatory MRSA BSI PIRs, PHE will need to effect changes to the current configuration of the DCS. These changes are feasible but will take several months to achieve.
7. Infection prevention and control and administrative resources released by a modification of MRSA BSI PIRs should be redirected to the current NHS ambition to reduce healthcare associated GNBSIs.
8. MRSA BSI will also continue to be monitored via the NHS Improvement single oversight framework. Trusts whose performance is of concern will be managed via the existing escalation processes. NHS England will maintain oversight of CCG performance.

### **APRHAI Subgroup: update on bacteraemia caused by meticillin-susceptible *staphylococcus aureus* (MSSA)- Recommendations (March 2018)**

The Committee agreed that actions should be taken to improve understanding of MSSA bacteraemia and analysis and modelling of possible interventions.

### **APRHAI Subgroup: Healthcare Associated Pneumonia (HAP) subgroup- Recommendations (March 2018)**

The Committee agreed there was insufficient research evidence on HAP and that this will be reviewed when more data is available to make more specific recommendations.

### **APRHAI subgroup: Improving clinical pathways in multidrug resistant sepsis: community and healthcare-acquired infection. Recommendations (June 2018)**

The Committee agreed that carrying out a national audit would be recommended to NHS England, which will be reviewed by APRHAI once completed.

### **APRHAI recommendations on measures to reduce inappropriate antibiotic prescribing in secondary care (September 2018)**

The Committee endorsed PHE assessment of safe and achievable reductions to inappropriate prescribing in secondary care and recommendations on measures to support a 50% reduction in inappropriate prescribing in secondary care. The Committee agreed that the achievement of this target is a process in evolution and that a phased approach is both necessary and appropriate.

APRHAI therefore recommend the following:

1. Hospital antibiotic use should be reduced by a minimum of 2% and a maximum of 16% over the next three years. More specifically, the Committee deemed appropriate a reduction target of 5% as a short term ambition, which can form the basis for a 10% reduction by 2024, based on antibiotic duration.
2. Surgical prophylaxis should be targeted as a quality improvement initiative, where more than 95% of surgical prophylaxis should be delivered for less than 1 day and 90% as a single dose.

## **APRHAI subgroup: Stopping antibiotics safely. Recommendations (September 2018)**

The Committee agreed to review this workstream in the near future (1-2 years' time), when NICE guidelines become available as well as published data from the ARK (Antibiotic Kit Review) study.

## **Annex B - How the Committee works**

### **APRHAI Meetings**

From 2015/16, APRHAI's meeting format reflected the main areas within the committee's remit: HAI; AMR; AMP. The committee holds three main meetings per year, focusing on these areas sequentially in spring, summer and autumn. Meetings commence with a focused session on the main theme, provided by external speakers, giving technical updates on for example current research, surveillance and epidemiology.

A further meeting, involving the Chair, deputy-chair, sponsor and secretariat, is held each winter to review the committee's work over the past year, consider current and upcoming outputs and determine the forthcoming years' work programme. APRHAI also meets with counterparts at the DARC to discuss cross-cutting "one health" aspects of infectious disease and antimicrobial resistance on an annual basis.

### **APRHAI Subgroups**

Increasingly, the committee's work is carried forward by 'task and finish' subgroups, established to develop evidence-based synthesis and other detailed pieces of expert opinion and work. Subgroups are chaired by a member of APRHAI and include co-opted experts relevant to the task. Subgroup reports and recommendations are considered at the main committee meetings. Following agreement, advice is provided to the DHSC sponsor for consideration and, where appropriate, implementation.

### **Openness and Transparency**

APRHAI is an independent expert science advisory committee that operates in accordance with the Code of Practice for Scientific Advisory Committees, 2011.<sup>1</sup> As such the agenda, open papers and minutes of meetings are published and accessible from the APRHAI webpage.<sup>2,3</sup>

Declarations of interest are posted on the APRHAI webpage and are updated annually. Members are invited to declare interests at the beginning of each meeting. Declarations of interest are dealt with on a case by case basis and in line with Government guidance (Making and Managing Public Appointments - A Guide for Departments.<sup>4</sup>)

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<sup>1</sup> <http://www.bis.gov.uk/assets/goscience/docs/c/11-1382-code-of-practice-scientific-advisory-committees.pdf>

<sup>2</sup> <https://www.gov.uk/government/groups/advisory-committee-on-antimicrobial-resistance-and-healthcare-associated-infection>

<sup>3</sup> <http://webarchive.nationalarchives.gov.uk/20130402145952/http://transparency.dh.gov.uk/tag/arhai-minutes/>

<sup>4</sup> [http://www.civilservice.gov.uk/wp-content/uploads/2011/09/public\\_appt\\_guide-pdf\\_tcm6-3392.pdf](http://www.civilservice.gov.uk/wp-content/uploads/2011/09/public_appt_guide-pdf_tcm6-3392.pdf)

## **Membership**

The APRHAI membership list may be found on the APRHAI webpage, members present during the remit of this report may be found in Annex A. New members are appointed by the Department of Health and Social Care Senior Responsible Officer and are accountable to the Chair for carrying out their duties and for their performance. Members are expected to demonstrate a commitment to and an understanding of the value and importance of the seven principles of public life and act in accordance to CoPSAC guidance. Representatives of the Devolved Administrations are invited as observers to all APRHAI meetings.

## **Public and Patient Information**

APRHAI is dedicated to evolving and improving its engagement with the public. It strives to make its work better understood by the public and ensure that the work it undertakes is for the benefit of patients and the public. Inclusion of a lay summary is compulsory for all papers presented to the committee.

## Annex C - Abbreviations

AMP	Antimicrobial Prescribing
AMR	Antimicrobial Resistance
AMS	Antimicrobial Stewardship
AWaRe	Antibiotic Watch, Access, Reserve (list)
CCG	Clinical Commissioning Group
CDI	<i>Clostridium difficile</i> infection
CoPSAC	Code of Practice for Scientific Advisory Committees
CPE	Carbapenemase Producing Enterobacteriaceae
CRI	Carbapenem resistant infections
CQUIN	Commissioning for Quality and Innovation
DHSC	Department of Health and Social Care
<i>E. Coli</i>	<i>Escherichia Coli</i>
ESPAUR	English Surveillance Programme for Antimicrobial Utilisation and Resistance
GNHABSI	Gram-negative Healthcare-associated Bloodstream Infections
HAI	Healthcare Associated Infections
HLSG	High Level Steering Group (for the UK 5 year AMR strategy)
HIV	Human Immunodeficiency Virus
ICU	Intensive Care Unit
IPC	Infection Prevention and Control
MDR	Multi-drug Resistant
MRSA	Meticillin-resistant <i>Staphylococcus aureus</i>
MSSA	Meticillin -susceptible <i>Staphylococcus aureus</i>
NAP	National Action Plan
NHS	National Health Service
PHE	Public Health England
WHO	World Health Organisation



## Annex D - Glossary

Term	Definition
<b>Antimicrobial</b>	A drug that selectively destroys or inhibits the growth of microorganisms. Sometimes referred to as an 'antimicrobial agent'. Examples include antibiotics (also known as antibacterials) antiviral and antifungal agents. In the context of this document references to antimicrobials includes anti-infectives where that would be relevant in the context of the text.
<b>Antibiotic resistant bacteria</b>	Bacteria with the ability to resist the effects of an antibiotic to which they were once sensitive.
<b>Antimicrobial resistance (AMR)</b>	Occurs when the microorganisms that cause disease (including bacteria, viruses, fungi and parasites) cease to be affected by the drugs we use to kill them and treat the disease.
<b>Antimicrobial stewardship (AMS)</b>	A key component of a multifaceted approach to improve the safety and quality of patient care whilst preventing the emergence of antimicrobial resistance. Good antimicrobial stewardship involves selecting an appropriate drug and optimising its dose and duration to cure an infection while minimising toxicity and conditions for selection of resistant microbes. Good AMS includes a review of the continuing need for antibiotics following clinical diagnosis and documented actions to stop, continue or change antimicrobial treatment.
<b>Carbapenems</b>	Broad-spectrum antibiotics, often used as the last line of treatment for hard to treat human infections caused by Gram-negative bacteria.
<b>Carbapenemase Producing Gram-negative Organisms</b>	A group of bacteria that is resistant to carbapenems class of antibiotics.
<b><i>Clostridium Difficile</i></b>	A bacterium found in intestines that, when found in unusually high levels, infects the bowels, causing disease. It is the largest cause of infectious diarrhoea in hospitalised patients and spreads easily.
<b>Commissioning for Quality and Innovation (CQUIN)</b>	An NHS initiative intended to deliver clinical quality improvements and drive transformational change in the acute sector or hospitals. Achieving improvement against a defined set of criteria enables an NHS Trust to qualify for a payment.

<b>Disease burden</b>	This includes the number of infections in the population and also includes economic costs like treatment costs for hospital admissions and the cost to health in terms of mortality and morbidity.
<b><i>Escherichia coli</i> (<i>E. coli</i>)</b>	A type of bacteria common in human and animal intestines, and forms part of the normal gut flora (the bacteria that exist in the bowel).
<b>Enterobacteriaceae</b>	A family of Gram negative bacilli that contains many species of bacteria that normally inhabit the intestines. Enterobacteriaceae, that are commonly part of the normal intestinal tract flora, are referred to as coliforms.
<b>Gram-negative bacteria</b>	Those bacteria that do not retain crystal violet dye in the Gram-staining procedure. They can cause many types of infection and include <i>E. coli</i> and <i>Pseudomonas aeruginosa</i> .
<b>Healthcare associated infections (HAI)</b>	Infections associated with the provision of healthcare in either a hospital or community setting.
<b>Healthcare associated Gram-negative blood stream infection</b>	A laboratory-confirmed positive blood culture for a Gram-negative pathogen in patients who had received healthcare in either the community or hospital in the previous 28 days.
<b>Human immunodeficiency virus (HIV)</b>	A virus that damages the cells in your immune system and weakens your ability to fight everyday infections and disease.
<b>Inappropriate prescribing</b>	<p>For the purpose of delivering the ambition of halving inappropriate prescribing in the UK, inappropriate prescribing is defined as:</p> <p>Prescribing an antibiotic for a patient in the absence of (documented) evidence of bacterial infection.</p> <p>Prescribing a critical broad-spectrum antibiotic (piperacillin-tazobactam or carbapenems in secondary care; co-amoxiclav, cephalosporins and quinolones in primary care) to patients in the absence of a (documented) rationale.</p> <p>Continuing an antibiotic prescription beyond the course length recommended in local or national guidelines, in the absence of a (documented) rationale.</p>
<b><i>Klebsiella</i> spp</b>	Gram-negative bacteria that can cause infections including bloodstream infections; wound or surgical site infections; and meningitis.

<b>Meticillin-resistant <i>Staphylococcus aureus</i> (MRSA)</b>	A strain of <i>Staphylococcus aureus</i> that is resistant to beta lactam antibiotics which include penicillins (e.g. meticillin and oxacillin) and almost all cephalosporin antibiotics.
<b>Multi-drug resistant</b>	Resistant to multiple classes of antimicrobial.
<b>“One-Health” approach</b>	Collaborative multi-disciplinary work at local, national, and global levels to attain optimal health for people, animals and the environment.
<b>Pathogen Pathogenic</b>	An infectious agent (bug or germ), a microorganism such as a virus, bacterium, or fungus that causes disease in its host.
<b>Piperacillin-Tazobactam</b>	A drug combination that has activity against many Gram-positive and Gram-negative bacteria including <i>Pseudomonas aeruginosa</i> . Piperacillin is a synthetic penicillin; tazobactam enhances the effectiveness of piperacillin.
<b>Primary care</b>	Services provided by GP practices, dental practices, community pharmacies and high street optometrists.
<b>Quality Premium</b>	An NHS scheme intended to reward clinical commissioning groups (CCGs) for improvements in the quality of the services that they commission and for associated improvements in health outcomes and reducing inequalities.
<b><i>Staphylococcus aureus</i></b>	<i>Staphylococcus aureus</i> ( <i>S.aureus</i> ) is a Gram-positive bacterium which is not always pathogenic (and can commonly be found existing as a commensal) but is a common cause of infection and bacteraemia. Meticillin-resistant <i>Staphylococcus aureus</i> (MRSA) is the antibiotic-resistant strain of <i>S. aureus</i> .
<b>Secondary care</b>	Covers acute healthcare, either elective care (planned specialist medical care or surgery, usually following referral) or emergency care.
<b>Sepsis</b>	Is a serious complication of an infection. Without quick treatment, sepsis can lead to multiple organ failure and death.
<b>Surveillance</b>	Systematic collection of data from the population at risk, identification of infections using consistent definitions, analysis of these data and dissemination of the results to those responsible for the care of the patients and to those responsible for implementation of prevention and central measures.

## Annex E - APRHAI membership

<b>Member</b>	<b>Profession</b>	<b>Organisation</b>
Professor Mike Sharland (Chair)	Professor of Paediatric Infectious Diseases	St George's Hospital
Professor Mark Wilcox (Deputy Chair)	Professor of Medical Microbiology	Leeds Royal Infirmary
Ms Jane Binyon	Lay Member	
Dr Nicholas Brown	Consultant Medical Microbiologist	Addenbrooke Hospital, Cambridge
Dr Kieran Hand	Consultant Pharmacist of anti-infectives	University Hospital Southampton
Professor Alastair Hay	Professor of Primary Care	University of Bristol
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Professor Alan Johnson	Head of Surveillance HCAI & AMR (Healthcare Associated Infections & Antimicrobial Resistance) Division National Infection Service	Public Health England
Mr Martin Kiernan	Nurse Consultant	Southport and Ormskirk Hospital NHS Trust
Professor David Livermore	Professor of Medical Microbiology	University of East Anglia
Professor Michael Moore	Professor in Primary Health Care Research	University of Southampton
Professor Peter Moss	Consultant in Infectious diseases	Hull & East Yorkshire Hospitals NHS Trust
Professor Andrew Peter Wilson	Professor of Microbiology & Consultant Microbiologist	UCLH NHS Foundation Trust
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**Sponsor:**

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**Devolved Administrations:**

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**Pharmacist Lead to APRHAI**

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**Observers**

Care Quality Commission  
Defra (Department of food, rural affairs and agriculture)  
Imperial College Health Protection Research Unit  
NHS England  
NHS Improvement  
Public Health England  
Veterinary Medicines Directorate