

Together for Health

Tackling antimicrobial resistance and improving antibiotic prescribing

A Delivery Plan for NHS Wales and its partners



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Foreword by the Minister for Health and Social Services

Antimicrobial resistance (AMR) is one of the greatest health threats to humans and animals. The problem has been building over decades so that today many common and life-threatening infections are becoming difficult – or even impossible – to treat. The effectiveness of many invasive medical procedures and treatments routinely undertaken now – such as organ transplantation and chemotherapy – would be at considerable risk without antibiotics being available. The seriousness of this threat is recognised by the UK Government in its 2015 National Risk Register of Civil Emergencies.

The scale of the threat of AMR and the need for action was set out in the *UK Five Year Antimicrobial Resistance Strategy 2013 -18*. This outlined the actions being taken at UK level to address the key challenges in slowing the development and spread of AMR by improving knowledge and understanding; conserving the effectiveness of existing treatments; and stimulating the development of new antibiotics, diagnostics and therapies.

We must avoid a return to an era when common infections and minor injuries could be life-threatening. While AMR cannot be eradicated, healthcare organisations across Wales can and must work together through a multi-disciplinary approach involving a wide range of partners to take ownership of this public health priority and minimise its impact now and for the future. Patients, and the public, need to be full participants in this effort. There are things which services must do, but there are actions which each of us as individuals can discharge which will make a real difference.

Building on previous successes, Wales must continue to play its part in UK and European partners' efforts to minimise the effects of AMR on human and animal health. The *AMR Delivery Plan* sets out clearly the direction of travel for Wales and the key priorities for action. This is a complex health challenge and one in which everyone has to play a part for us to succeed. Our prudent healthcare approach provides a clear foundation for renewed effort in this area and is reflected in the plan which we are determined to take forward in Wales.

Foreword by the Chief Executive of NHS Wales

The threat from AMR is very real and something must be done – inaction cannot be tolerated. AMR is linked to antimicrobial usage and we know there is great variation in prescribing across Wales. This suggests a proportion of antimicrobials prescribed are unnecessary or inaccurate in respect to the choice of medicine, dosage or duration of treatment. Ensuring rational use at both hospital and community levels requires continuous education through treatment guidelines, formulary restrictions and surveillance and audit. Infection prevention is better than treatment, so efforts need to be strengthened thereby reducing the reliance on antibiotics.

This *AMR Delivery Plan* provides a framework for empowering and enabling NHS organisations across Wales to work with partner organisations, patients and the public in meeting Welsh Government expectations in tackling resistance and its

consequences. It sets out a series of priority actions related to optimising antimicrobial use; infection prevention and control; surveillance; education and training; and research. Each priority area is intended to have a direct impact on AMR by limiting its development or transmission.

1. OVERVIEW

- 1.1 The World Health Organization's first global report on AMR reveals that it is no longer purely a prediction for the future. Antibiotic resistance – when bacteria adapt so antibiotics fail – is happening right now across the world. *Without urgent action we are heading for a post-antibiotic era, in which common infections and minor injuries can once again kill.*¹
- 1.2 The threat of AMR is a global public health problem that requires sustained, co-ordinated multi-sector, multidisciplinary and public action at local, national and international level. Although AMR is increasing, the rapid emergence of resistance to antibiotics is of particular concern. Although AMR cannot be eradicated it can be managed to reduce the risk of life-threatening and untreatable complications increasingly occurring following minor injuries, common infections and surgical procedures.
- 1.3 The widespread and often excessive use of antimicrobials is one of the main factors contributing to the increasing emergence of AMR. Within Wales, antimicrobial usage and AMR has been increasing year on year for at least the last 7 years in acute hospital settings although there has been a marginal reduction in primary care in the last two years.
- 1.4 *E. coli* is the commonest organism grown from blood cultures in Wales and the UK. The All-Wales patterns of AMR for 2005 to 2014 are shown in **Figure 1**. The resistance rates for all of the antimicrobial agents increased between 2011 and 2014:

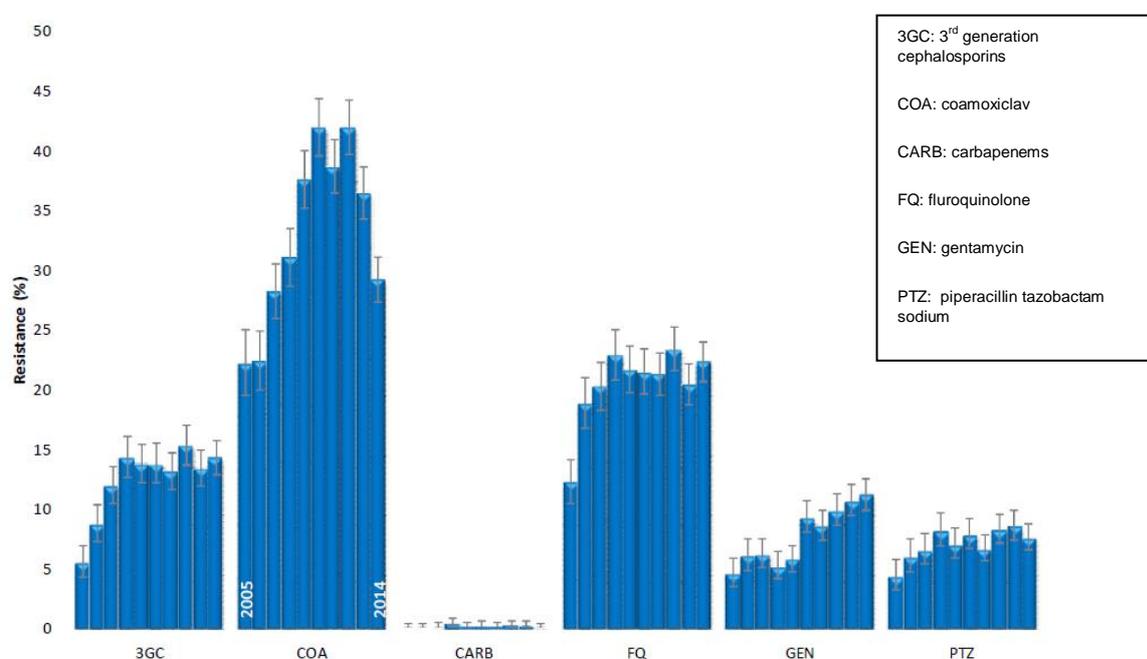


Figure 1: All-Wales resistance rates for *E. coli* bacteraemia (2005 to 2014)

¹ [WHO 2014 Global report on AMR surveillance](#)

1.5 The difference in average total antibacterial usage per quarter between the acute hospitals in Wales for 2014 is shown in **Figure 2**.

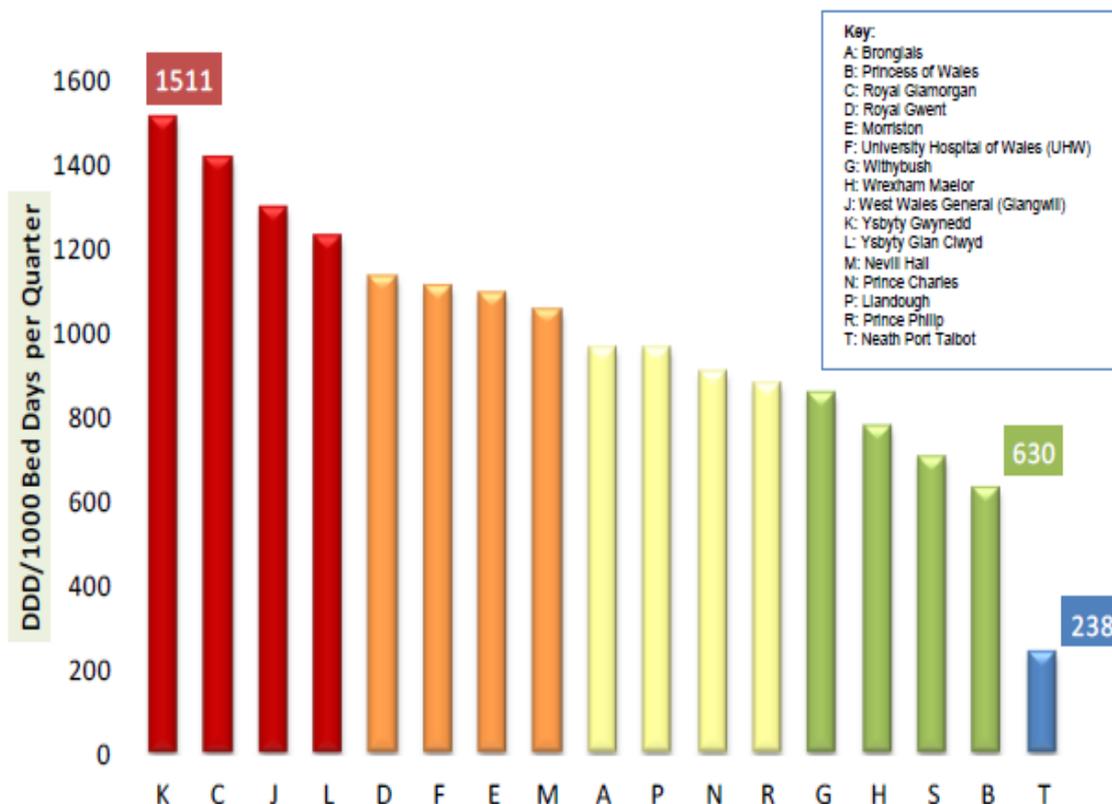


Figure 2: Total antibacterial usage by hospital (2014)

1.6 This indicates there was a more than 3-fold variation in antibacterial usage between hospitals at either end of the scale; the hospital at the low end of the scale used 238 Defined Daily Dose/1000 Bed Days) compared to 1511 DDD/1000 BD for the hospital at the high end of the scale. There may be many good reasons for these differences e.g. case-mix, amounts dispensed as to take out and prescription only medicines, differences in dosage, duration and choice of antimicrobial, but there must also be substantial room for improvement. Any improvement seen will reduce inequalities and tackle variation in access.

1.7 The differences in average total antibacterial usage between GP clusters across Wales for the first Quarter of 2015 is shown in **Figure 3**

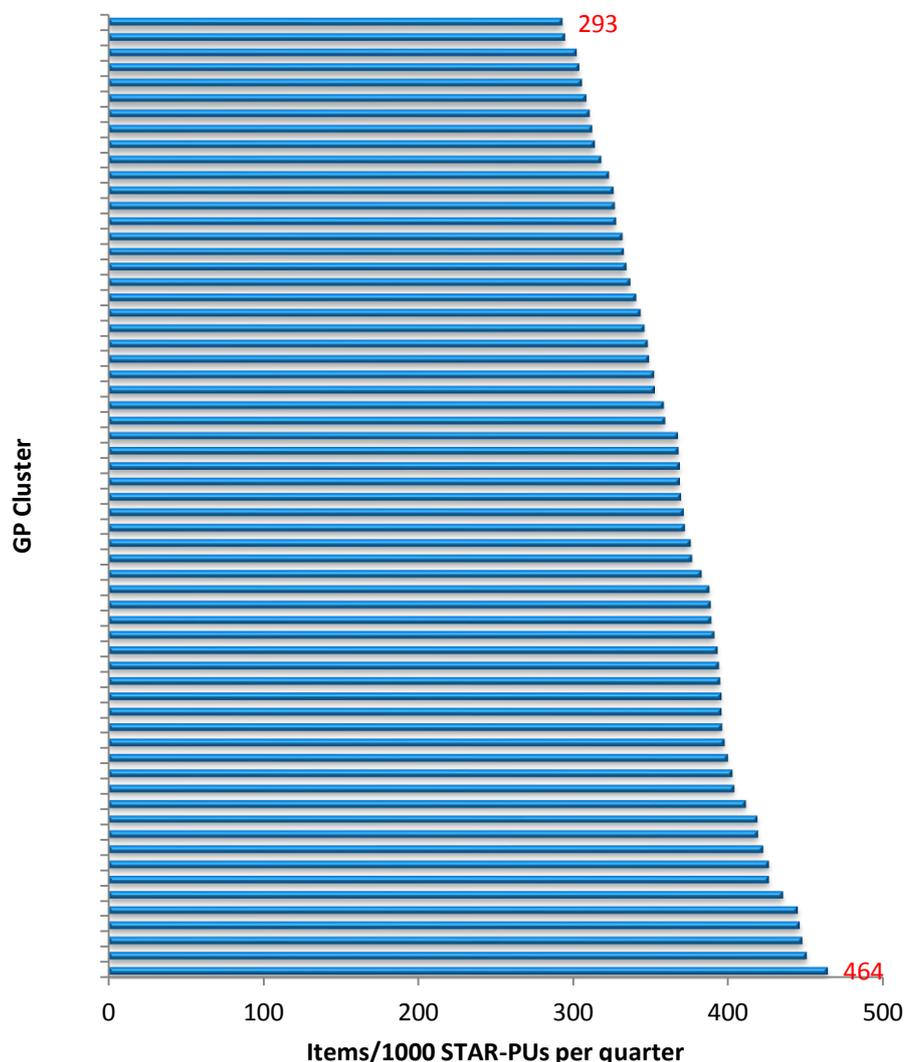


Figure 3: Total antibacterial usage by GP Cluster (Q1 2015)

1.8 This indicates a significant variation in usage: between clusters from 293 to 464 dispensed items/1000STAR-PU's². Any improvement seen will reduce inequalities and tackle variation in access.

1.9 The Delivery Plan (Plan) provides a framework for action by a wide range of stakeholders with an interest in antimicrobial usage and resistance. Under seven Delivery Themes, it sets out the Welsh Government's expectations of the NHS in Wales in delivering high quality prudent health care, ensuring the right patient has the right care at the right time, delivering efficiency and effectiveness, tackling variation in access and reducing inequalities.

² **STAR-PU's** – Specific therapeutic group age-sex related prescribing units are designed to measure prescribing weighted for age and sex of patients.

1.10 The plan has been divided into seven themes:

Delivery Theme 1:	Improving infection prevention and control practices
Delivery Theme 2:	Optimising prescribing practice
Delivery Theme 3:	Improving professional education, training and public engagement
Delivery Theme 4:	Developing new drugs, treatments and diagnostics
Delivery Theme 5:	Better identification and prioritisation of AMR research needs
Delivery Theme 6:	Better access to and use of surveillance data
Delivery Theme 7:	Strengthened international collaboration

For each theme, the Plan sets out:

- delivery expectations to ensure the right patient, receives the right care at the right time in a safe environment;
- specific priorities for 2015 – 2018;
- responsibilities to develop and deliver actions; and
- assurance measures that will be used to monitor that this plan is effectively delivered and outcomes achieved.

2. STRATEGIC CONTEXT

2.1 The *UK Five Year Antimicrobial Resistance Strategy 2013-18*³ (*UK Strategy*) published in September 2013 was developed collaboratively by the UK Government, devolved administrations and the various bodies that will be responsible for delivering the work. The control of veterinary use and prescribing of antimicrobials is not devolved to the Welsh Government and initiatives and actions in this context are being addressed at the UK level with Welsh Government input. This Plan will therefore largely focus on human healthcare and the contributions Wales will make in that context.

2.2 Since January 2014, there has been a Ministerially-led philosophy for NHS Wales – *Prudent Health and Care*. This seeks to minimise harm from care by avoiding interventions that are not of the highest value, through greater individual responsibility for decision making. It is therefore imperative that we determine the true value of medicines prescribed and this has underpinned

³ [UK 2013-18 AMR Strategy](#)

the Plan. Tackling AMR is an example of *Prudent Health and Care* as these medicines should be used to avoid or treat significant harm. The aim is not to reduce the appropriate use of antibiotics but their inappropriate use.

- 2.3 The development of the Plan has been informed also by the NICE clinical guideline *Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use* published in August 2015.
- 2.4 The importance of preventing infection in order to preserve the effectiveness of antimicrobials as a major patient safety concern cannot be overstated. Making infection prevention and control everybody's business has been health policy in Wales ever since there was a shared understanding on how infections spread and the role of quarantine and good hygiene etc. National expectations (*Healthcare Associated Infections Strategies for Hospitals in Wales* in 2004⁴ and for the *Community* in 2007⁵) were reinforced in the healthcare associated infections (HCAIs) framework *Commitment to Purpose Eliminating Preventable Healthcare Associated Infections* December 2011⁶ and in the 2014 *Code of Practice for the Prevention and Control of Healthcare Infection*⁷ (*Code of Practice*).
- 2.5 The Welsh Government's Programme for Government⁸ and its five-year NHS Plan, *Together for Health* and the NHS Outcomes Framework⁹ each set out an ambitious programme for health and well-being in Wales. The overarching aims are:
- health and well-being will be better for everyone;
 - access and patient experience will be better; and
 - better service safety and quality will improve well-being and health outcomes.
- 2.6 Furthermore, *Achieving Excellence: The Quality Delivery Plan for the NHS in Wales for 2012-16*¹⁰ describes the ways in which excellence in service delivery will be achieved. It includes actions related to quality assurance, quality improvement and a quality-driven NHS that provides safe, effective, accessible, affordable and sustainable services.

⁴ [HCAIs Strategy for hospitals](#)

⁵ [HCAIs Community Strategy](#)

⁶ [HCAIs Framework of Actions](#)

⁷ [CoP on infection prevention](#)

⁸ [Together for Health](#)

⁹ [NHS Outcomes Framework](#)

¹⁰ [Quality Delivery Plan](#)

3. VISION

3.1 The Welsh Government's vision is to limit the risk of AMR and minimise its impact for health now and in the future. The Plan characterises the achievement of that vision by seeking to deliver the following outcomes:

- excellent infection prevention and control measures are the norm for everyone and zero tolerance to poor practice is a reality in all health and social care settings;
- all healthcare providers adhere to the *Code of Practice*;
- care in all health care premises is provided in a safe environment;
- infections are diagnosed quickly and the right treatment used;
- prudent antimicrobial prescribing is a reality;
- all surgical patients can expect infection risk to be reduced through adherence to guidelines on prophylaxis;
- the public are aware of the appropriate use of antimicrobial treatment regimens and adhere to them;
- surveillance guides good practice and quickly identifies new threats or changing patterns in organism resistance; and
- the NHS, health professionals and academic centres in Wales are actively contributing to and involving Welsh patients in AMR research agenda and the development of new drugs, treatments and diagnostics.

4. WHY THIS IS A PRIORITY

4.1 Since the introduction of penicillin in the 1940s antimicrobial medicines, such as antibiotics have become essential for the treatment of many microbial infections in humans and animals. In addition to the treatment of infectious diseases (pneumonia, tuberculosis, HIV, malaria etc) and HCAs such as *Meticillin resistant Staphylococcus aureus* bacteraemias (*MRSA* bacteraemia) they are vital in reducing the complications in relation to complex medical interventions such as hip replacements, organ transplants, cancer chemotherapy, care of premature babies. Now 70 years later the value of these antimicrobials is seriously jeopardized by the emergence and world wide spread of microbes that are resistant to affordable and effective first choice medicines.

4.2 Resistance mechanisms in microbes are a natural phenomenon but have been amplified (selected for) by the growth in the use and misuse of

antimicrobials both in humans and animals and by poor infection prevention and control.

- 4.3 A communication from the European Commission to the European Parliament and the Council in 2011 estimated that a subset of drug-resistant bacteria is responsible for about 25,000 human deaths annually and 1.5 billion euro in essential but avoidable health care and productivity losses.
- 4.4 AMR costs lives, livelihoods and money and undermines health programmes and health care delivery.
- 4.5 AMR is a global public health challenge which has been accelerated due to the inappropriate use of antimicrobials worldwide. Multifaceted interventions to reduce the inappropriate use of antimicrobials have been found to be effective.

5. OUR JOURNEY SO FAR

- 5.1 Health Boards/Trusts have worked closely with Public Health Wales, the All Wales Medicines Strategy Group (AWMSG), professional bodies and higher education providers on a range of antimicrobial stewardship activities. These include monitoring prescribing patterns and usage data in both primary and secondary care with feedback to prescribers, the development of audit tools and the provision of educational support materials for healthcare professionals and the public.
- 5.2 Public Health Wales has developed systems for effective surveillance of AMR and promoted high quality antimicrobial susceptibility testing and reporting across Wales. This information is used to inform, support and promote the prudent use of antimicrobials.
- 5.3 It is clear that within a prudent healthcare agenda, a zero tolerance approach to preventable HCAs is essential. Major reductions in HCAs have been achieved over the past few years but there are still many in some care settings. Organisations should continually strive for further reductions; rates should be as low as they can possibly be. To reflect this, the Welsh Government set challenging population based reduction expectations for *Clostridium difficile* and MRSA bacteraemias for the Health Boards with the expectation they will be met by March 2017.

6. WORKING TOGETHER

- 6.1 This Plan identifies the tasks that will fall to the Welsh Government, Health Boards/Trusts, Public Health Wales and other bodies. At an all-Wales level many agencies and people have a key part to play in our efforts to tackle AMR. Together, the actions specified will help establish a framework that will enable all concerned to play an active and positive role in this.

- 6.2 The people of Wales also have a role to play in prudent antimicrobial use. More needs to be done to educate patients and the wider public about appropriate use to increase the expectation an antibiotic might not always be provided.
- 6.3 Self care and co-production are key elements of prudent healthcare, the principles of which include: avoiding harm, minimal intervention and care discussed and agreed between the individual and the professional. In this context the Welsh Government is developing two key documents which set out a range of actions to highlight and promote self care along with a practical guide for professionals to agree self-care goals and actions with individuals through a care plan.
- 6.4 All organisations and staff within the health and social care community must also contribute fully to the efforts to eliminate preventable HCAs and manage infections effectively.
- 6.5 Public Health Wales supported by the All Wales Therapeutics and Toxicology Centre (AWTTC) is establishing a multi-agency/multi-disciplinary Implementation Oversight Group to take forward and ensure successful implementation of the Plan that will be delivered using existing health and social care resources. Health Boards/Trusts and their partners should work with the clinical, public health, and wider communities to prioritise resources in order to optimise health gain.
- 6.6 Many of the anticipated improvements in outcomes will only be seen over the longer term but the Welsh Government expects to see clear progress demonstrated through annual reports published by Health Boards/Trusts. Some of the bodies in Wales responsible for taking this Plan forward are listed below:

The Welsh Government is responsible for strategic leadership through setting the policy objectives and health outcomes it expects for the people of Wales and for providing funding, principally to NHS Wales that facilitates their achievement. It holds NHS Wales to account on how well it delivers based on these outcomes. The lines of accountability are via the Chief Executive Officers of the Health Boards/Trusts to the Minister for Health and Social Services.

Health Boards/Trusts are responsible for providing health care in a safe environment, ensuring that every patient receives the right treatment at the right time. All their health professionals have a role to play in maintaining and protecting the health of their population and reducing iatrogenic harm.

Public Health Wales is responsible for supporting Welsh Government and Health Boards/Trusts in achieving the Plan's objectives by leading the Implementation Oversight Group and through data collation and dissemination of intelligence on AMR, HCAs and infections and day to day guidance in support of Welsh Government's policies. PHW will work with relevant Royal Colleges, professional bodies and institutions where appropriate.

The **NHS Wales Informatics Service** supports Health Boards/Trusts in the collecting and reporting of information on patient demographics and antimicrobial prescribing activity across the NHS.

Community pharmacies, all healthcare professionals and NHS Direct Wales have a vital role in educating and supporting both patients and the wider public with the self-care of minor ailments and about appropriate antibiotic use.

The **AWMSG (and its sub-groups) supported by the AWTTTC** has a key role in the development of national guidance on medicines, including antimicrobial prescribing for NHS Wales.

The **Wales' wider research community in Wales** - with appropriate support from the Welsh Government through its Division for Social Care and Health Research (DSCHR) - has a vital role in creating, testing and ensuring translation, through high quality research, new knowledge, new evidence and interventions capable of informing and optimising delivery of the key themes of this plan.

Public and patient groups – will be encouraged to support the plan by helping to inform and educate patients.

7. MEASURING SUCCESS

- 7.1 While the objectives of the Plan are clear, the precise measures of success will be agreed in year one by partners on the Implementation Oversight Group. Measures of success will be agreed for:

- **Trends in AMR** - changes in the level of resistance to antibiotics like the carbapenems, which are often the last option for hard to treat infections, will be monitored. Generally, the trends will be established by looking at changes in a number of these combinations rather than single products. The following drug-bug combinations are the suggested areas for monitoring in the UK:

Multi-Drug Resistant bacteria	Metric
<i>Klebsiella</i> spp - carbapenem	% non-susceptible to imipenem and/or meropenem
<i>E. coli</i> - carbapenem	% non-susceptible to imipenem and/or meropenem
<i>E. coli</i> - cephalosporin	% non-susceptible to cefotaxime and/or ceftazidime
<i>E. coli</i> – fluoroquinolone	% non-susceptible to ciprofloxacin
<i>Pseudomonas</i> - carbapenem	% non-susceptible to imipenem and/or meropenem
<i>N. gonorrhoeae</i> – ceftriaxone	% non-susceptible
<i>Klebsiella</i> spp - cephalosporin	% non-susceptible to cefotaxime and/or ceftazidime
<i>Pseudomonas</i> – cephalosporin	% non-susceptible to ceftazidime
<i>E. coli</i> – gentamicin	% non-susceptible
<i>S. pneumoniae</i> – penicillin	% non-susceptible

- **Trends in antibiotic prescribing.**
- **Improved public and professional knowledge and understanding** of prudent use of antibiotics.
- **Reduction in HCAI rates and improved infection prevention practices** in health and social care settings. Achievement of Welsh Government reduction expectations for *C.difficile* and *S. aureus* bacteraemias by end March 2017.
- **Continued year-on-year reductions in other key infections** beyond 2016.

8. LOCAL PLANS – LOCAL ACTIONS

Having an impact 2016 - 2018

- 8.1 At the local level, leadership by the clinical community - including lead pharmacists, Medical and Nurse Directors and Directors of Primary Care - will be vital to the success of the Plan. All Health Boards/Trusts must have clearly designated executive and clinical leads who will work with the support of an Antimicrobial Management Team.
- 8.2 A local delivery plan will be produced and published by the agreed clinical lead with appropriate support from an executive lead in each Health Board/Trust.

Reporting progress

- 8.3 An annual accounting on achievements will be provided by the clinical lead in Health Boards/Trusts to the Implementation Oversight Group on progress against the actions laid out in this Plan.
- 8.4 The Implementation Oversight Group should hold an annual Wales AMR meeting to enable all concerned to share and assess overall progress.
- 8.5 To maximise opportunities for influencing change, it would be beneficial if the Implementation Oversight Group has formal linkage/reporting across to relevant all-Wales networks (critical care, renal, neonatal, etc).

Delivery themes and action

- 8.6 The overarching goal of this Plan is to slow the development and spread of AMR by focusing on the following three strategic aims agreed in the *UK Strategy* namely:
- **Improve the knowledge and understanding of AMR** through better information, intelligence, supporting data and developing more effective early warning systems to improve health security.
 - **Conserve and steward the effectiveness of existing treatments** through improving infection prevention and control and development of resources to facilitate optimal use of antibiotics in both humans and animals.
 - **Stimulate the development of new antibiotics, diagnostics and novel therapies** by promoting innovation and investment in the development of new drugs and ensuring that new therapeutics reach the market quickly.
- 8.7 Delivery expectations; specific priorities for 2016 to 2018; responsibilities to develop and deliver actions, and outcome indicators have been set out for each of the Delivery Themes.

Delivery Theme 1: Improving infection prevention and control practices

Delivery expectation: Avoidable HCAs do not occur in health and social care settings

- 8.8 NHS Wales will continue to implement Welsh Government policy as set out in the HCAs framework *Commitment to Purpose Eliminating Preventable Healthcare Associated Infections* December 2011. Action to deliver this will be supported by implementation of the *Code of Practice*.

Specific Priorities for 2016 to 2018

1.	The <i>Code of Practice</i> will be implemented across Wales.
2.	Public Health Wales will work with Healthcare Inspectorate Wales to develop tools to measure compliance with the <i>Code of Practice</i> .
3.	Health Boards/Trusts will develop annual plans that will describe local action required to meet the delivery expectations.
4.	Public Health Wales will ensure that its annual work programme complements those of the HBs and Trusts.
5.	Infection prevention and control in both acute and community settings will be improved through the implementation of clear, unambiguous and easily accessible policies and procedures. A written approved programme of audit to monitor compliance with key policies will be in place in each Health Board/Trust.
6.	Public Health Wales will implement an action plan for the infection prevention management of patients with Carbapenemase-producing Enterobacteriaceae to identify cases and contain further spread of carbapenemase-producing Enterobacteriaceae.
7.	Public Health Wales will lead a multi-agency working group to roll out the use of C-Reactive Protein Point of Care Testing as a prognostic tool in primary care to aid clinical decisions about the appropriateness of prescribing antibiotics.
8.	Public Health Wales will work with Health Boards/Trusts to ensure that they are supported in understanding their local data and the possible factors contributing to infections in their areas.
9.	Each Health Board/Trust will agree a joint plan of action with partners, to reduce avoidable HCAs across health and social care.
10.	Public Health Wales will review and expand available E-learning modules in support of this delivery expectation.

Responsibility to develop and deliver actions

- 8.9 Health Boards/Trusts, Public Health Wales, NHS Wales Information Service and the AWMSG working with partners.

Outcome indicators

- Reduction in all HCAs and particularly the target infections.
- Reductions in HCAs, as measured by all Wales Mandatory Surveillance Schemes.

Delivery Theme 2: Optimising prescribing practice

Delivery expectation: Health professionals will prescribe antibiotics responsibly adhering to the extensive range of guidance available

- 8.10 Indiscriminate or inappropriate use of antibiotics is a key driver in the spread of antibiotic resistance. As an example: there is very little evidence to support the administration of antibiotic prophylaxis for surgical procedures, for more than 24 hours. However, the sixth annual Point Prevalence Survey of antimicrobial prescribing in secondary care in November 2013 showed that surgical prophylaxis was administered for > 24 hours thirty per cent of the time.
- 8.11 Prescribing behaviour can be influenced by: knowledge, attitudes and subjective norms; peer pressure, patient expectations and drug promotion; prescriber's diagnostic skill and exposure to hospital formularies and treatment guidelines.

Specific Priorities for 2016 to 2018

1.	Public Health Wales will promote antimicrobial stewardship and support the expansion of the antimicrobial pharmacist role in primary and secondary care.
2.	Health Boards/Trusts and private healthcare providers will actively promote antimicrobial stewardship by supporting and empowering an Antimicrobial Management Team including lead antimicrobial physician, microbiologist, antimicrobial pharmacist and other appropriate professionals to work supportively to promote prudent antimicrobial use through the specific actions outlined in this section: <ul style="list-style-type: none">- <i>Start Smart and then Focus</i>- an initiative for secondary care launched in November 2011 should be at the centre of all antimicrobial prescribing in secondary care. Supported by Public Health Wales, Health Boards/Trusts will undertake an audit programme annually to measure compliance;- Health Boards/Trusts will support an annual audit of antimicrobial prescribing for acute respiratory infections in secondary care;- Health Boards/Trusts will undertake a targeted campaign to ensure that surgical prophylaxis administered for > 24 hours is the exception;- Health Boards/Trusts, supported by Public Health Wales and

	local primary care pharmacy advisors will deliver a multifaceted intervention programme to reduce antibiotic prescribing in highest-prescribing 10% of practices.
3.	Health Boards/Trusts must ensure local organisational structures for clinical governance and risk management are in place to support antimicrobial stewardship and the broader HCAs agenda.
4.	The NHS informatics Service will work with Public Health Wales, the AWMSG's All Wales Prescribing Advisory Group (AWPAG), General Practitioner representatives and Health Boards/Trusts to develop an audit programme of antimicrobial prescribing for patients presenting with specific infections in primary care.
5.	Public Health Wales will work with partners to develop resource material for staff and prescribers in care homes.
6.	Dental advisors will measure compliance with prescribing guidance for dentistry and work with the profession to ensure that this is implemented.
7.	Public Health Wales will work with the AWMSG and partners to refine primary care antimicrobial prescribing indicators and develop prescribing indicators for secondary care.
8.	Public Health Wales will continue to work with partners in the development of tools to support good prescribing practice; antimicrobial guidance smart phone app, antibiotic prescribing sticker etc.
9.	Public Health Wales will develop tools so that Health Boards/Trusts can assess their own performance and support the all-Wales audit of surgical prophylaxis.
10.	The All Wales Antimicrobial Guideline Group will continue its programme of work in the development of guidance for primary and secondary care ensuring that nationally-coordinated local infection management guidance is available.
11.	Through the all-Wales managed network of Microbiology diagnostic laboratories, Public Health Wales and Health Boards/Trusts will deliver first class diagnostics to support early appropriate management of infection.
12.	The Welsh Government will consider the benefit of electronic prescribing to the people of Wales and support the development of a business case.

Responsibility to develop and deliver actions

8.12 Health Boards/Trusts, Public Health Wales, NHS Wales Information Service and the AWMSG working with partners.

Outcome Indicators

- Reduction in antibiotic prescribing and increased concordance between prescribing and guidance.
- Improved clinical outcomes for patients with infections.

Delivery Theme 3: Improved Education, Training and Engagement

Delivery expectations: All prescribers are competent and comply with national guidance. The people of Wales have an understanding of the role of antibiotics and the risks of inappropriate use

- 8.13 Clinicians involved in prescribing need to remain up to date with emerging evidence on resistance and appropriate antibiotic usage.
- 8.14 The public and patients need to be educated about appropriate antibiotic use with suitable evaluation of effectiveness of any awareness raising campaigns. What patients know about antibiotics they learn primarily from health professionals during medical visits and from their social milieu. It is difficult to assess for Wales the contribution the annual *European Antibiotic Awareness Day* makes to raising awareness with the general public. Wales has never had an awareness raising campaign targeting the general public.

Specific Priorities for 2016 to 2018

1.	The Implementation Oversight Group will agree an effective model for an awareness raising campaign for the public that includes the use of social media for informed shared decision making and submit a business case to Welsh Government.
2.	Primary care prescribing rates are publically available and will be utilised so that patients can understand how their expectations can influence prescribing practice. Similar data will be available for Out of Hours services.
3.	Public Health Wales and partners will consider and agree how best to promote the annual <i>European Antibiotic Awareness Day</i> and act on recommendations.
4.	Public Health Wales will deliver targeted information to schools.
5.	Public Health Wales, supported by NHS Wales Informatics Service and the NHS Wales Shared Services Partnership, will improve feedback on both antimicrobial usage and resistance to healthcare community, this to include GP cluster level data.
6.	Building on the UK resistance alerts disseminated about azithromycin-resistant gonococci, carbapenem-resistant Gram negatives, plasmid-mediated linezolid resistance Public Health Wales will develop alert systems for action for Wales.
7.	Public Health Wales will review undergraduate and postgraduate training of prescribers (medical, non-medical, dental) and make recommendations as appropriate to the Implementation Oversight Group.

8.	Public Health Wales will work with Antimicrobial Management Teams and Health Board/Trust Medical and Nurse Directors to implement the prescribing competencies developed by ARHAI ¹¹ for all antibiotic prescribers in secondary care.
9.	Public Health Wales will develop an e-learning module in support of this.
10.	Health Boards/Trusts will, through their Antimicrobial Management Team, implement a competency-based assessment for all new medical/non-medical prescribers in secondary care.

Responsibility to develop and deliver actions

8.15 Health Boards/Trusts, Public Health Wales, NHS Wales Information Service and AWPAG working with partners. The Implementation Oversight Group will need to co-ordinate actions at national level and present recommendations to relevant stakeholders.

Outcome Indicators

- Improved antibiotic use.
- Less AMR.
- Improved clinical outcomes for patients with infections.

Delivery Themes 4 and 5: Developing new Drugs, Treatments and Diagnostics/Better identification and prioritisation of AMR research needs

Delivery expectations: Wales is contributing to international action to stimulate the antibiotic pipeline, diagnostic tests and vaccines and providing a supportive environment in which research into new drugs, treatments and diagnostics may take place. The identification and prioritisation of funded AMR research is informed by the needs of Welsh people and health professionals and actively supported by Wales' research community

8.16 There is already a critical mass of world-class infection-related research happening in Wales and researchers in Wales are already part of a UK and global collaborative effort to shape research to combat AMR.

8.17 The Welsh Government is also playing an active part in shaping international and global research action and, principally through Health and Care Research Wales¹², is supporting the growth of both Wales-led research and research undertaken in Welsh health and other settings. Health and Care Research

¹¹ ARHAI - the Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) provides practical and scientific advice to the Government on minimising the risk of HCAs.

¹² The Welsh Government commissions and funds [Health and Care Research Wales](#) to support research that has a positive impact on the health, wellbeing and prosperity of the people in Wales.

Wales is already supporting - and will continue to do so in the future - a broad range of programmes and initiatives aimed at creating an optimum environment in which commercial and academic research can take place. Together, these serve as a strong platform for future AMR and infection prevention research undertaken in Wales and research grant capture for Wales.

Specific Priorities for 2016 to 2018

1.	<p>Health and Care Research Wales will:</p> <ul style="list-style-type: none"> • continue to invest in research infrastructure and the creation of a supportive academic/clinical research environment helping to facilitate translational research in this space and drive access to further external research income to our brightest scientist and HBs (T5). • continue to invest in and help shape relevant research programmes e.g. the National Institute for Health Research (NIHR)¹³ and Research Councils¹⁴ in particular themed calls around AMR, including infection prevention (T6). • maximise opportunities for researchers based in Wales to participate in European research efforts and access appropriate research funding opportunities, for example Framework Programme 8 (Horizon 2020), the Innovative Medicines Initiative and the ERA-Met scheme on AMR (T5). • align with industry and market pull, continue to facilitate the successful delivery of commercial research in the NHS and promote Wales as an effective place to do research (T4). • through initiatives such as the Support Centre and the Life Science Hub, provide information and support for companies wishing to undertake clinical research in Wales (T4). • engage with, support and inform initiatives that help to create new collaborations and consortia (e.g. along the lines of the Stratified Medicine consortia) between academia and with pharma and the biotech industry important in order to focus UK/Wales research strengths and to develop science-driven research proposals which can be brought to funders (T4). • engage with, support and inform UK and other international initiatives aimed at providing a framework for a more coordinated approach to tackling AMR research, such as the AMR Funders' Forum, the UK Cross Research Council initiative aimed at tackling the key research challenges, the EU level Joint Programming Initiative on AMR, the Canada-UK partnership on antibiotic resistance, and the development of a global action plan in support of
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¹³ [NIHR](#) – The National Institute for Health Research

¹⁴ [Research Councils UK](#)

	<p>the May 2014 WHO AMR Resolution (T5).</p> <ul style="list-style-type: none"> ensure the optimal utilisation of Wales' informatics research infrastructure, e.g. the Farr Institute in Swansea, CIPHER¹⁵, SAIL¹⁶, HIRU¹⁷, and in particular, the Medical Research Council Consortium for Medical Microbial Bioinformatics in Swansea/Cardiff to support relevant research in this area. Examples include outbreak tracking, population genomics and metagenomics along with vaccine, diagnostics and drug development (T5). ensure the optimal utilisation of Wales' public health research infrastructure to support relevant research in this area (T5).
2.	<p>Health Boards/Trusts will foster a strong culture of research, in particular to:</p> <ul style="list-style-type: none"> support and encourage protected research time for clinical staff. build on and extend academic training schemes to develop a highly skilled workforce. promote and facilitate collaboration with key research initiatives. collaborate effectively to ensure that new knowledge acquired as a result of high quality research can be translated into practice for the benefit of patients as soon as possible. maximise opportunities for patients to participate in relevant clinical trials and studies.
3.	<p>Public Health Wales will work with and support research initiatives and collaborations with Health Boards/Trusts</p>

Responsibility to develop and deliver actions

8.18 Progress will depend on a range of actions at international, national and local level and the active involvement and participation of multiple agencies, Welsh Government including Health and Social Services Group, DSCHR, and Economy, Science and Transport Group(EST); other UK health departments; academia; industry; health professionals (including Health Boards/Trusts and, Public Health Wales); and the general public.

Outcome Indicators

- Research spend on AMR (both research project and infrastructure).
- External grant income relating to AMR won by researchers in Wales.
- Participation in clinical studies (commercial and non commercial).
- Collaborations supported, assisted.

¹⁵ [CIPHER](#) - The Centre for Improvement in Population Health through E-records Research

¹⁶ [SAIL](#) - Secure Anonymised Information Linkage

¹⁷ [HIRU - Swansea University Health Information Research Unit](#)

- Behaviour change through knowledge mobilisation, and improved clinical practices.

Delivery Theme 6: Better access to, and use of, surveillance data

Delivery expectations: Publish data and information to drive public understanding. Surveillance of AMR strengthened through use of routine susceptibility data. Prescribing information available to guide local stewardship. Ability to monitor success in controlling the development of resistance. Epidemiology of carbapenemase-producing organisms in Wales understood

8.19 At present all microbiology data is available through DataStore and an annual report published on AMR rates across Wales for all major pathogens. Bespoke local reports are published as required.

Specific Priorities for 2016 to 2018

1.	<p>Public Health Wales will:</p> <ul style="list-style-type: none"> • develop web access tool for availability of local resistance data. • develop regular resistance reports for specific clinical areas (e.g. intensive care). • develop automated trend analysis to enable early detection of threats at local level. • develop with NWIS a resistance alerts system to highlight resistant organisms in real time. • will review with Wales the Welsh Analytical Prescribing Unit (WAPSU) publication of antimicrobial usage with stakeholders (in both primary and secondary care) and implement findings of review. • develop health board reports that integrate local antibiotic usage and resistance data to inform areas for action. • develop IT infrastructure to enable local access to monthly ward-based reports of usage. • develop web tools to facilitate annual and local point prevalence surveys. • develop outcome measures to establish the baseline and subsequent trends for key <i>drug/bug</i> combinations. • develop targeted surveillance of carbapenemase-producing bacteria. • develop, with the support of the Welsh Government, a genomic platform to support molecular epidemiological studies.
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Responsibility to develop and deliver actions

8.20 Public Health Wales in dialogue with stakeholders.

Outcome Indicators

- Improved access to surveillance data at a local level.
- Threats identified early and dealt with appropriately.

Delivery Theme 7: Strengthen international collaboration

Delivery expectation: International collaboration strengthened

- 8.21 Currently Public Health Wales collaborates with the European Centre for Disease Prevention and Control (ECDC) networks - ESAC-Net¹⁸; EARS-Net¹⁹; and a European Early Warning Response System (EWRS)²⁰ for Member States and their public health bodies.
- 8.22 Strengthened arrangements are in place for collaboration within the UK, including relevant Health Board/Trust collaborations with neighbouring areas in England, and all-Wales networks collaboration with relevant English networks.

¹⁸ [European Surveillance of AM Consumption Network \(ESAC-Net\)](#)

¹⁹ [EARS-Net - ECDC AMR interactive database](#)

²⁰ [Early Warning Response System - EWRS](#)