Antimicrobial Stewardship (AMS) Handbook for Primary Care Network (PCN) Pharmacy Technicians

Contents

SECTION 1 FOUNDATIONS

Introduction

Antimicrobial resistance (AMR) is one of the greatest global health challenges of our time. Without effective antibiotics, routine treatments and procedures, from chemotherapy and surgery to organ transplants, would become high-risk due to untreatable infections.

Pharmacy technicians are well placed to make a meaningful impact by embedding antimicrobial stewardship (AMS) into everyday practice. Growing evidence demonstrates that pharmacy technicians actively participating in AMS programmes through targeted intervention and active participation can improve prescribing practices, support timely interventions, and enhance patient safety.

This handbook supports pharmacy technicians in developing the knowledge and skills needed to apply antimicrobial stewardship principles in real-world settings, enabling them to improve patient safety, enhance clinical impact, and contribute to better outcomes through active participation in AMS programmes.

Purpose of this Handbook

This handbook is designed to support pharmacy technicians working in PCN/GP practice roles to

- ✓ Understand the principles of AMS and the impact of AMR.
- ✓ Recognise their role in supporting AMS.
- ✓ Promote safe and appropriate prescribing and dispensing of antimicrobials.
- ✓ Educate patients and the public on responsible antibiotic use.
- ✓ Monitor, report, and contribute to AMS activities within their workplace.
- ✓ Act as AMS champions by promoting best practice within their teams.
- ✓ Review antimicrobial prescribing against local and national guidelines.
- ✓ Record and escalate interventions to clinical teams.

Understanding Antimicrobial Resistance (AMR): Why It Matters?

Antimicrobial resistance (AMR) occurs when microorganisms such as bacteria, viruses, fungi, or parasites adapt in ways that make the medicines used to treat them less effective. Although resistance develops naturally over time, this process is made worse by the inappropriate or excessive use of antimicrobials.

Read How Germs Fight Back to understand how germs develop resistance mechanisms

AMR is a global concern - For patients, it can mean infections that are harder to treat, leading to longer illnesses, extended hospital stays, and in some cases, higher risk of death. For healthcare systems, AMR increases treatment costs and places additional strain on already stretched services. On a wider scale, AMR threatens the foundations of modern medicine: without effective antibiotics, routine operations, cancer treatments, and intensive care procedures all carry far greater risks of untreatable infection.

The World Health Organisation (WHO) has declared AMR as one of the top 10 global public health threats, and AMR is listed on the UK Government's National Risk Register. In 2019 there were 4.95 million deaths associated with bacterial AMR across 204 countries, and 1.27 million of those were directly attributed, leading the WHO to declare it a top global public health threat.

The main drivers of antimicrobial resistance worldwide include:

- overuse and misuse of antimicrobials in human and animal health and in agriculture, through health facilities, prescription and over-the-counter sales;
- people's lack of access to safe water, sanitation and hygiene;
- poor infection prevention and control in health facilities and on farms; and
- limited access to quality and affordable medicines, vaccines and diagnostics

What is Antimicrobial Stewardship (AMS)?

Antimicrobial stewardship refers to an organisational or healthcare system-wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness.

AMS requires coordinated efforts within healthcare settings to ensure that antimicrobials are used appropriately, safely, and effectively. The aim is to optimise patient outcomes, reduce the risk of antimicrobial resistance, and preserve the effectiveness of these medicines for future generations.

AMS involves using antimicrobials only when necessary, choosing the right drug at the correct dose, via the appropriate route, and for the proper duration. It also includes monitoring the impact of antimicrobial use and implementing interventions to improve prescribing practices.

What are the intended benefits of AMS?

- Preventing AMR by ensuring antibiotics are only used when necessary to slow resistance development
- Reducing healthcare costs by reducing unnecessary drug use, healthcare associated infections and complications
- Protecting future generations by ensuring that future patients still have effective antibiotics when needed.
- Supporting public health efforts in combating the growing AMR crisis
- Ensuring better surveillance, education and policies to improve antibiotic practices

World Health Organisation (WHO) AWaRe Framework

To improve access to appropriate treatment and reduce inappropriate use of antibiotics, the World Health Organization (WHO) developed the AWaRe classification (Access, Watch, Reserve).

1. Access: First- or second-choice antibiotics recommended for the most common infections. They are generally narrow-spectrum, lower resistance risk, and should be widely available.
2. Watch: Broad-spectrum antibiotics with a higher potential to cause resistance. Their use should be prioritised and monitored carefully.
3. Reserve: Last-resort antibiotics, reserved for confirmed or suspected multi-drug-resistant infections.

The TARGET website has a link to empirical guidance for treatment of common infections in primary care in the UK. Summary of antimicrobial guidance: Summary of antimicrobial prescribing guidance - managing common infections | RCGP Learning Due to differences in antibiotic resistance patterns and availability of antimicrobials, local guidelines should always be used if they differ from national guidance.

In the UK, an adapted UK-AWaRe list is available to support:

1. Healthcare policy and guideline development
2. Research and surveillance
3. Clinical decision-making in primary and secondary care

Some antibiotics do not fall within the three categories because they are used only for very specific conditions. These are classified as “Other”.

One Health

The One Health approach recognises that interconnections link human, animal, plant, and environmental health and the need for collaborative action at local, national, and global levels. It is particularly relevant to addressing antimicrobial

resistance, as antibiotic use and resistance span healthcare, agriculture and the environment. By promoting coordinated efforts across sectors, One Health supports the prevention of infection, safer antimicrobial use and the protection of antibiotic effectiveness for the future.

Read the UK One Health Report - Joint report on antibiotic use and antibiotic resistance

One Health

Pharmacy Technicians as AMS Champions

Pharmacy Technicians play an important role within General Practice and complement the work of Clinical Pharmacists through utilisation of their technical skillset. Their deployment within primary care settings allows the application of their acquired pharmaceutical knowledge in tasks such as audits, discharge medicines reconciliation, prescription issuing, and training and education of other members of the clinical workforce, as well as awareness raising with patients and the public. Work is often under the direction of clinical pharmacists, and this benefit is realised through the creation of a PCN pharmacy team.

The PCN Network Direct Enhanced Service (DES) contract states that pharmacy technicians in general practice have a clinical responsibility to support initiatives for AMS to reduce inappropriate antibiotic prescribing. Doing this successfully requires collaboration between all members of the healthcare team, including clinicians, practice managers, administrative staff and service users, with a recognition that good AMS extends beyond prescribing, and encompasses medication reviews, audit and monitoring, education and research.

The following are AMS principles for use in general practice;

1. **Avoid unnecessary antimicrobial use** – for example by giving self-care advice for self-limiting infections and promoting back-up prescribing with appropriate safety netting.
2. **Understand when there is a need for referral** – either to nursing teams or GPs for review for example when reviewing rescue packs being issued for COPD or for patients on UTI prophylaxis with breakthrough infections
3. **Ensure optimal dosing regimen and route** –the correct dose, frequency and route
4. **Advise on antimicrobials that will have the most benefit and least harm** – for example by advising on NICE guidance and local formulary.
5. **Ensure optimal duration of antimicrobials** – avoiding unnecessarily prolonged durations of antimicrobials

6. **Communicate effectively with patients, carers and public about antimicrobials and antimicrobial resistance** – for example by using patient information leaflets, awareness campaigns, signposting to resources etc.
7. **Prevention of infections** - arrange for patients to receive vaccines, administer vaccines under PGD or advise patients on IPC measures
8. **Ensure appropriate documentation** for example indication, review date for long-term antibiotic, coded back-up prescribing etc

Domains of Practice

Pharmacy Technicians can build and progress in their AMS roles by aligning their development to the AMS Capability Framework *(Due to be published 2026),* ensuring they maintain the necessary professional competencies and skills. AMS activities suitable for PCN Pharmacy Technicians fall within four key domains – AMS Professional Practice, Education & Training (of others), Leadership and Management, Research and Quality Improvement.

Appendix 1 *gives examples of AMS activities that fall under these four domains.*

Further learning on AMR and AMS

Education & Training Provider	Available courses	Target audience
eLearning for healthcare	Antimicrobial resistance (eLearning for healthcare): CPPE	This course is designed to support staff to understand the threats of antimicrobial resistance (AMR).
Centre for Postgraduate Pharmacy Education (CPPE)	Antimicrobial resistance gateway	For staff looking to engage with AMS, improve prescribing of antimicrobials and educate the public about the problems associated with AMR.
Future Learn	Managing Antibiotic Resistance Online Course - FutureLearn	This course requires an active interest and prior experience in the prevention, diagnosis and management of infectious disease.
FutureLearn	Tackling Antimicrobial Resistance: A Social Science Approach - FutureLearn	This course is designed for health professionals, junior researchers, and doctoral students new to social science with an interest in antimicrobial stewardship.

NHS Learning Hub	Antimicrobials: origins, consumption and resistance	This resource aims to describe the historical context of antimicrobial discovery and emergence of antimicrobial resistance, the distribution of antimicrobial usage in the UK and explains the fundamental considerations of antimicrobial management.

SECTION 2: AMS IN PRACTICE

Appropriate antimicrobial prescribing

Pharmacy Technicians working in general practice have a vital role in supporting safe, evidence-based antimicrobial prescribing. Appropriate prescribing is essential to minimise the development of antimicrobial resistance (AMR), reduce adverse effects, and ensure patients receive the most effective treatment for their condition. By supporting prescribers to follow national AMS guidance and by embedding practical tools and processes into everyday practice, Pharmacy Technicians can significantly improve prescribing quality across their PCN or practice.

Pharmacy Technicians can support this area of work by:

- Implementing AMS guidance in practice.
- Rolling out tools, resources, and training to the wider team.
- Supporting prescribing audits and monitoring.
- Reviewing repeat and long-term antimicrobial prescriptions.
- Supporting penicillin allergy review and delabelling.
- Improving documentation and safety.
- Promoting shortest effective course lengths.
- Encouraging good practice in back-up (delayed) prescribing.
- Supporting safe and effective treatment of common infections.
- Strengthening AMS for specific groups (e.g., children).

Below is a curated list of tools and resources that Pharmacy Technicians can use to support these activities ***(For resources on FutureNHS, please ensure that you are first registered for FutureNHS and request access to the Antimicrobial Resistance Workspace)***

1. Summary of antimicrobial prescribing - managing common infections | RCGP Learning
2. Reviewing repeat and long term prescribing of antimicrobials using TARGET How to… resources for Chronic Obstructive Pulmonary Disease (COPD), recurrent Urinary Tract Infection (UTI) and Acne Vulgaris Antibiotic

stewardship tools, audits and other resources: How to..? Resources (repeat and long-term antibiotics) | RCGP Learning

3. Primary care Penicillin Allergy Delabelling tools
4. PADL Library - Antimicrobial Resistance Programme - Futures
5. Further reading Antimicrobials 3: antibiotic allergy NHS Learning Hub
6. Optimising antimicrobial course lengths Shortest effective course lengths - Antimicrobial Resistance Programme - Futures
7. Primary Care AMS webinars Primary Care AMS Webinars
8. Prescribing Improvement Schemes Antibiotic Prescribing Improvement Scheme Concepts
9. Supporting appropriate prescribing in children Paediatric AMS (South East & Midlands) - Antimicrobial Resistance Programme - Futures
10. Antimicrobials Medicines Safety - Antimicrobial Resistance Programme - Futures
11. Back-up (delayed) prescribing
    a. NICE guidance Back-up (delayed) prescribing
    b. Good practice resources back-up prescribing guidance
12. UTI management How to avoid UTIs - Antimicrobial Resistance Programme - Futures

Reviewing Penicillin Allergy Labelling

The penicillin class of antibiotic are often a first-line antibiotic due to theireffectiveness, better clinical outcomes, narrower antimicrobial spectrum, and lower risk of resistance and complications compared to alternative agents. The penicillin class of antibiotic includes penicillin V, amoxicillin, flucloxacillin, pivmecillinam and co-amoxiclav.

It is estimated around 10% of patients who are admitted to hospital are labelled as penicillin allergic, but the vast majority have not experienced an allergic reaction.

Over-reporting of penicillin allergy leads to unnecessary use of broad-spectrum/less effective alternatives which increases costs, resistance and adverse outcomes such as increased rates of *clostridium difficile* (CDI)

Differentiating true allergies from other reactions

It is essential to distinguish between true allergic reactions or adverse drug (ADRs), intolerances, and side effects. **True** penicillin allergy includes Type I reactions (e.g. anaphylaxis, urticaria or rash immediately after penicillin administration) AND Type 4 reactions (e.g. Stevens-Johnson syndrome, DRESS (Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS), or drug-induced hypersensitivity syndrome (DIHS).). In **true** penicillin allergy avoid **all** penicillins, cephalosporins and other beta-lactam antibiotics

Appendix 2 *will help you understand the different reaction types and suitability for addressing which patients require a review*

Appendix 3 *shows how patients coded with penicillin allergy had been assessed using the CATALYST tool for delabelling*

Identifying and Reviewing Patients with Penicillin Allergy Labels

1. Run clinical system searches for penicillin/beta-lactam allergy codes and alternative prescribing patterns
2. Identify unclear or allergy entries stating reactions that are adverse effects
3. Compile lists for pharmacist/GP to review
4. Engage with Patients to clarify allergy history
    - ✓ Drug Details – Confirm name of antibiotics and route of administration (oral or IV)
    - ✓ Symptoms – Confirm which symptoms occurred at time of administration.
    - ✓ Timing – Confirm when the reaction occurred and how long after taking the drug did the symptoms start
    - ✓ Severity – Confirm is urgent medical attention was required, or adrenaline was administered
    - ✓ Subsequent Exposure – Confirm if the patient has taken penicillin or cephalosporins since. If yes, when and what happened. Check full prescribing history
5. Maintaining allergy coding and documentation
    - ✓ Symptom description and severity
    - ✓ Timing in relation to drug exposure
    - ✓ Type of reaction (immune vs non-immune)
    - ✓ Clinical consequences (A&E attendance, hospital care, etc.)
    - ✓ Evidence of recent antimicrobial use, including any penicillin tolerated
    - ✓ Flag concerns to a pharmacist or prescriber if the allergy may be incorrectly recorded

Key Resources

- Regional Primary Care PADL protocol - Antimicrobial Resistance Programme - Futures
- Module Antibiotic allergy An online learning module focused on antibiotic allergy, especially penicillin; includes epidemiology, reaction types, and assessment/de-labelling principles.
- RPS (Royal Pharmaceutical Society) Penicillin Allergy Checklist A concise checklist for allergy history assessment, and pointers to setting up de-labelling services. Can be included or adapted in your documentation.

Optimising Antimicrobial Course Lengths

Why is this important?

- Unnecessarily long antibiotic courses increase the risks of antimicrobial resistance, adverse side effects and *Clostridioides difficile* infection

- Evidence shows that short, guideline-based durations are equally effective and safer for patients. ***Each additional day of antibiotics increases the risk of side effects by 4% and the risk of resistance by 3%*** *(Curran, 2022).*
- Pharmacy technicians can make a significant impact by identifying inappropriate antibiotic durations, supporting consistent prescribing, and ensuring adherence to national/local guidelines.

Examples of Pharmacy Technician- Led Activities

1. Clinical System Searches –
   - Identify patients prescribed longer than recommended durations (e.g., amoxicillin, doxycycline, lymecycline)
   - Flag to prescribers where duration does not meet clinical guidance or lacks clinical justification
   - Run education session on appropriate course lengths

2. Digital optimisation
   - Check and Update system defaults/templates (e.g., Ardens, SystmOne)
   - For SystmOne users – create or amend the formulary for amoxicillin 500mg capsules and doycycline 100mg capsules to reflect total quantity as 5-day prescribing (for example: pack of 15 amoxicillin 500mg capsules).
   - Ensure/Enable point-of-prescribing alerts (such as OptimiseRx and Script Switch) are active to aid the prescribing of appropriate course lengths. (See IT Guides (SE Course Lengths) - Antimicrobial Resistance Programme - Futures)

3. Education and Training
   - Share evidence and infographics supporting 5-day prescribing for common infections (see Shortest Effective Course lengths - Antimicrobial Resistance Programme - Futures)
   - Promote local and national antimicrobial guidance.
   - Use the RCGP's TARGET resources to support prescribers in managing patient expectations on antibiotics and symptom resolution

4. Data and Audit Support
   - Extract data on prescribed durations by condition (e.g., UTI, CAP, COPD etc.)
   - Prepare concise reports for AMS meetings, ICB/PCN reviews to highlight trends and areas for improvement

5. Engage with patients/carers (during reviews or requests for antibiotics)
   - Reassure patients/carers that course length prescribed is safe and effective (See Discussing antibiotics with patients: Overview | RCGP Learning and Leaflets to discuss with patients: How to use these leaflets | RCGP Learning
   - Provide safety-netting advice and escalate concerns to clinician

Engaging with Patients and Public

Pharmacy Technicians play a key role in helping patients and carers develop a clearer understanding of appropriate antimicrobial use, antimicrobial resistance, and the impact these factors can have on their care. Involving people who use healthcare services in decisions about their treatment is central to patient-centred care.

Because terms such as *antimicrobial resistance* and *antimicrobial stewardship* may not be easily understood by the public, clear communication is essential. Public awareness campaigns and interactions with healthcare professionals are major drivers of public knowledge, awareness, and understanding of antimicrobial use.

Examples of public engagement activities

1. Display patient/public resources in waiting areas
2. Distribute resources to members of the public and organisations via e-mail, bulletins, newsletters
3. Promote resources and key messages via social media
4. Send resources to relevant groups i.e. e-Bug resources to young people's organisations and children's centres
5. Present to GP Patient Participation Groups
6. Display posters and leaflets in public libraries

Tools and resources to support engagement with the public

1. World Antimicrobial Resistance Awareness Week (WAAW) and European Antibiotic Awareness Day (EAAD) - GOV.UK
2. Public Health England's national campaign: Keep Antibiotics Working – Antibiotic Guardian
3. AMR Toolkit for Public Engagement - Presentation-standard
4. Information for the public - Public Health Wales
5. Discussing antibiotics with patients: Overview | RCGP Learning
6. Leaflets to discuss with patients: How to use these leaflets | RCGP Learning
7. Tools for Schools AMR Toolkit (Requires FutureNHS registration)
8. e-Bug resources - health education programme
9. Super Bodies - NHS Cheshire and Merseyside
10. https://www.healthiertogether.nhs.uk/
11. Patient facing videos
    - AMR - why it's important to take action (also available in Urdu and Romanian
    - Patient facing video (Punjabi) Keep antibiotics working
    - What is Antimicrobial Resistance (AMR) and how can you help combat it? – UK Health Security Agency
    - Multilingual Antibiotic Guardian Messaging (2) UCL SOP WAAW Multilingual Video Project - YouTube

Information may need to be provided in different languages, formats and styles and should be tailored to the needs and preferences of the patient and/or carer.

Appendix 4 and Appendix 5 *shows case studies of public awareness campaigns in practice*

Supporting Vaccination as Part of Antimicrobial Stewardship

Preventing infection through vaccination reduces the need for antibiotic prescribing and helps limit the development of antimicrobial resistance. This aligns with the PCN Network Direct Enhanced Service (DES) contract, which recognises the role of pharmacy teams in supporting population health, prevention, and medicines optimisation.

Pharmacy Technicians working in general practice and PCNs can support vaccination and infection prevention as part of their AMS role by:

- Promoting routine and seasonal vaccinations (e.g. flu, COVID-19 and childhood immunisations) during patient interactions, medicines optimisation activities, prescription queries and reviews.
- Identifying eligible patients using clinical systems and assisting with invitation and follow-up processes, in line with local practice or PCN arrangements.
- Reinforcing consistent, evidence-based messages to address common questions or concerns about vaccines, and signposting patients and carers to trusted NHS information.
- Linking vaccination to reduced risk of infection, complications and hospital admission, and to a reduced need for antibiotics, supporting safer and more appropriate antimicrobial use.
- Working collaboratively with clinical colleagues to support vaccination delivery where appropriate, including administration under Patient Group Directions (PGDs) where trained, authorised and supported by local governance.

Supporting vaccination also reflects the **One Health approach against AMR**, recognising that preventing infection in individuals helps protect communities, reduces transmission, and contributes to safeguarding the effectiveness of antimicrobials across human, animal and environmental health systems.

Further learning – The Role of Vaccines in Preventing Infectious Diseases and Antimicrobial Resistance Vaccines and Infectious Diseases - Online Course

SECTION 3 – IT AND DIGITIAL SOLUTIONS TO ENHANCE AMS IN GENERAL PRACTICE

Pharmacy teams in general practice are increasingly involved in supporting IT and digital solutions that enhance AMS with skills in systems management, data handling, and medicines optimisation being used to promote safe, effective, and appropriate antibiotic use, ultimately improving patient outcomes. Examples of these include

Data Extraction and reporting – using clinical systems to generate reports of antimicrobial prescribing for review. This informs audits and action plans with targeted interventions

Optimising repeat prescription systems – reviewing and managing antibiotic items on repeat templates, adding alerts or notes for prescriber to review to prevent unnecessary antibiotic exposure for patients and reduce risk of AMR

Supporting clinical decision tools – help implement, maintain and audit pop-up alerts for guideline compliance, support formulary set up/maintenance on Ardens/SystemOne/EMIS/Vision templates to support structured process for prescribing. This encourages prescribers to follow best practice and improves data quality

Patient facing tools and resources - AMS tools and resources such as those available on TARGET Leaflets to discuss with patients: Leaflets to discuss | RCGP Learning and self-care messages can be shared via practice website or text messages. This supports patients understanding of antimicrobials and reduces pressure on clinicians to prescribe.

Supporting medication reviews and messaging – use clinical IT systems to follow up patients who require a medication review, send messages or letters to patients about upcoming reviews. Using IT systems to follow up with patients reduces the risk of inappropriate long-term use of antibiotics and reduces risk of AMR.

Contributing to digital training and protocol development – develop or maintain local digital prescribing protocols, train staff on how to code, document and use templates on the clinical system. This promotes consistency in adherence to antimicrobial guidance and best practice.

Read the NHS England Digital vision for antimicrobial stewardship in England for further information

Data surveillance, audits and Quality Improvement

Data is required to inform workplans, measure performance, and evaluate effectiveness of an AMS programme.

Data Surveillance

Data surveillance involves monitoring antibiotic use and resistance patterns. It Supports AMS by:

- Identifying trends in prescribing (e.g. Increase in prescribing of broad-spectrum antibiotics in winter months).
- Monitoring of compliance to NICE guidance (e.g. number of 5-day prescriptions vs no. of 7-day prescriptions for amoxicillin)
- Identifying trends in age/sex groups

Useful dashboards to support data surveillance

PrescQIPP (Requires registration)

- NHS Performance and Assessment Framework 2025-2026 - ICB performance dashboard: Children prescribed antibiotics in primary care
- Optimising antimicrobial duration dashboard - Amoxicillin 500mg capsules
- Optimising antimicrobial duration dashboard - Doxycycline 100mg capsules
- Optimising antimicrobial duration dashboard - Flucloxacillin 500mg capsules
- Optimising antimicrobial duration dashboard - Lymecycline 408mg capsules
- Optimising antimicrobial duration dashboard - Phenoxymethylpenicillin 250mg tablets

Open prescribing

- **Home | OpenPrescribing**

ePACT2 – Antimicrobial Stewardship (Requires registration)

- **Antimicrobial stewardship | NHSBSA**
- **Antimicrobial Stewardship – Urinary Tract Infection dashboard | NHSBSA**
- **Antimicrobial Stewardship - RightCare UTI Focus Pack dashboard | NHSBSA**
- **National medicines optimisation opportunities | NHSBSA**
- **Antimicrobial Stewardship - Children dashboard | NHSBSA**
- **Antimicrobial Stewardship - Pharmacy First dashboard | NHSBSA**

Audits

Audits assess how well current prescribing practices align with clinical guidelines. Supports AMS by:

- Measuring compliance with prescribing standards (e.g. right drug, dose, duration).
- Identifying inappropriate or suboptimal prescribing and areas for improvement
- Providing data for benchmarking across practices or teams.

Supporting resources

- Audits **Antibiotic stewardship tools, audits and other resources: Audit toolkits | RCGP Learning**
- **Action planning - Antibiotic stewardship tools, audits and other resources: Action planning | RCGP Learning**
- **Quality improvement (QI): an introduction for pharmacy professionals : CPPE**

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Appendix 1 AMS Capability – The Four Domains of Practice

Domain of Practice	Definition / Purpose	Examples of Activities
AMS Professional Practice	The knowledge, skills and practices required to deliver antimicrobial stewardship for the benefit of patients and services. Involves collaborative working with clinicians, managers, teams, patients and the public.	• Supporting appropriate antimicrobial prescribing audits (guideline adherence, indication records, appropriate course duration). • Conducting repeat prescribing reviews, e.g. for COPD, acne, UTI • Supporting structured medication reviews, including antimicrobial safety and appropriateness. • Identifying and addressing incorrect or spurious penicillin allergy labels. • Communicating and engaging with patients on appropriate antimicrobial use and self-care. • Delivering self-care messaging for COPD, acne, UTI and other conditions to avoid unnecessary antibiotics.
Education and Training	To develop the knowledge, behaviours and practices of others regarding optimal antimicrobial use. To use personal development to improve AMS education programmes and support better patient care.	• Delivering AMS education and training to healthcare professionals. • Participating in public health/AMR awareness campaigns. • Communicating regulatory (MHRA) alerts, e.g., fluoroquinolone safety updates. • Educating patients on appropriate antimicrobial use and the effects of AMR. • Advising on safe disposal of antimicrobials. • Educating patients and professionals on self-care to prevent unnecessary antimicrobial treatment. • Supporting patient understanding of expected symptom duration in self-limiting infections.
Leadership and Management	To provide organisational leadership in optimising infection and antimicrobial management, addressing AMR, and influencing behaviours that drive antimicrobial use.	• Supporting delivery of public health messaging on vaccines and reducing vaccine hesitancy. • Using data dashboards to lead on data interpretation and practice-level action plans.

Domain of Practice	Definition / Purpose	Examples of Activities
		• Supporting or contributing to primary care AMS guidelines, protocols and pathways. • Contributing to strategy development for local or system-level AMS programmes.
Research and Quality Improvement	To conduct surveillance, monitoring and evaluation of antimicrobial use. To develop or apply evidence to improve AMS programmes, interventions and antimicrobial optimisation.	• Using data dashboards to analyse prescribing trends and inform action plans. • Designing, conducting or supporting audits related to AMS. • Implementing quality improvement projects targeting antimicrobial optimisation. • Collecting and analysing data to evidence improvement, outcomes and impact of AMS interventions.

Appendix 2 Penicillin Allergies – Differentiating symptoms for review

Reaction Type	Symptoms	Recommended Action
True Allergic (Immune-mediated)	• Anaphylaxis • Collapse / loss of consciousness • Severe skin reactions (Stevens-Johnson Syndrome (SJS, Toxic Epidermal Necrolysis (TEN) • Wheezing, shortness of breath • Rash with blistering / hives • Swelling of throat, tongue, lips (angioedema) • Hypotension	**Avoid all beta-lactams** (penicillin, cephalosporins, carbapenems). **Requires allergy label**

Severe Delayed Reactions	• Serum sickness-like reaction • DRESS (drug rash with eosinophilia and systemic symptoms) • Vasculitis rash • SJS/ TEN	**Contraindication to future use. Allergy label must remain.**
Non-allergic (Intolerance / Side-effect)	• Nausea, vomiting, diarrhoea • Headache, drowsiness • Stomach upset • Muscle pain / weakness • Swelling/oedema not involving face/throat	**Not a contraindication - Review required**
Unclear	• Allergy recorded >10 years ago • Free-text notes without detail • Patient has tolerated penicillin/cephalosporin since	**Review required**.

Appendix 3 Penicillin allergy de-labelling case study

Novel risk assessment tool CATALYST identifies patients with an inaccurate label of penicillin allergy for de-labelling without direct oral penicillin challenge

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Provenance: North Tyneside CCG, Northeast Commissioning Support

Introduction

Around 1 in 10 people of the UK population are currently labelled as having a penicillin allergy. Research suggests that over 5 million of these people are not truly allergic. Having a penicillin allergy is associated with significant negative health impact.

CATALYST is an innovative allergy risk assessment tool designed in North Tyneside to identify patients unlikely to have a true allergy.

Methodology

Patients with a coded penicillin allergy were identified using EMIS/SystmOne searches within a pilot practice. In discussion with the patient, Pharmacists can then assess the patients' risk of true allergy using the CATALYST tool.

Patients in the lowest risk group (Green) were then safely de-labelled without the need for direct oral penicillin challenge (DOPC). Other patients unlikely to have a true allergy were signposted for future testing via DOPC. Patient satisfaction was assessed via a Google Form.

Discussion

The pilot project identified 58 patients in green group. The Pharmacy team successfully contacted 48 of these. 11 patients (23%) were successfully de-labelled following discussion with the Pharmacist.

94% of patients were satisfied with their CATALYST assessment, with 61% feeling confident about taking a penicillin in the future.

Conclusion

Patients with inaccurate penicillin allergy labels can be identified and safely de-labelled without DOPC using the CATALYST tool.

Future Work

Penicillin allergy de-labelling using the CATALYST tool has been rolled out across North Tyneside as part of

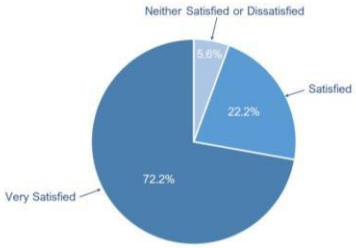
the 2022-2023 Prescribing Engagement Scheme.

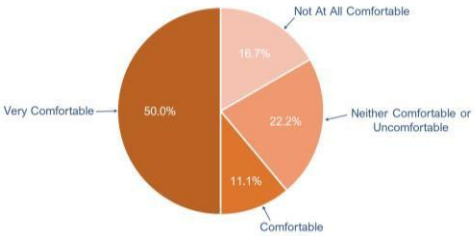
Work is on-going to establish a regional 'Challenge Clinic' where patients can undergo direct oral penicillin challenge if required.

Planned quality improvement work with clinicians will take place to reduce the risk of inaccurate allergy labelling in the future.

	LEVEL 1	LEVEL 2	LEVEL 3
SYMPTOMS	Gastro-intestinal symptoms (nausea, vomiting, diarrhoea) Mild neurological symptoms (e.g. headache, confusion, mood disorders) Mild renal / liver impairment (unless resulting in severe renal failure/impairment) Secondary infections (e.g. oromucosal candida, C. Diff colitis)	Unknown Reaction > 10years ago (including unknown childhood reaction) Diffuse or localised rash with no other symptoms more than 1hour post dose > 10years ago Non-specific childhood rash	Suspected allergy < 10years ago Collapse requiring resuscitation Severe skin reaction (urticaria within 1 hour of dose, blistering / peeling, oral / genital ulceration) New Wheeze Swelling of lips / tongue / eyes (angioedema) Severe renal / liver impairment
ACTION	**DE-LABEL** without DOPC or further testing	**REFER** for direct oral penicillin challenge	**MAINTAIN ALLERGY STATUS** improve documentation if possible

Patients with a coded penicillin allergy	172
Patients with a coded allergy for > 10 years	58
Patients successfully contacted by CATALYST team	41
Patients de-labelled without direct oral penicillin challenge	11





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1. Devchand, Misha, et al. "Pathways to improved antibiotic allergy and antimicrobial stewardship practice: the validation of a beta-lactam antibiotic allergy assessment tool." The Journal of Allergy and Clinical Immunology: In Practice 7.3 (2019): 1063-1065.
2. Sneddon, Jacqueline, et al. "An algorithm for safe de-labelling of antibiotic allergy in adult hospital in-patients." Clinical and Experimental Allergy: Journal of the British Society for Allergy and Clinical Immunology (2021).
3. Trubiano, Jason A., et al. "Development and validation of a penicillin allergy clinical decision rule." JAMA internal medicine 180.5 (2020): 745-752

Appendix 4 Case Study – Antibiotic Myth Busting - Raising Public Awareness of Antibiotic Resistance

Primary Care Antimicrobial Stewardship Best Practice Template

Amy John / Specialist Antimicrobial Pharmacy Technician / Cwm Taf Morgannwg University Health Board

Background/History

An antibiotic resistance education session, called 'antibiotic myth busting', was designed and undertaken with community groups in Cwm Taf University Health (CTUHB). The session aimed to increase awareness of the harms of taking antibiotics, encourage self-care, and discourage inappropriate antibiotic seeking behaviour.

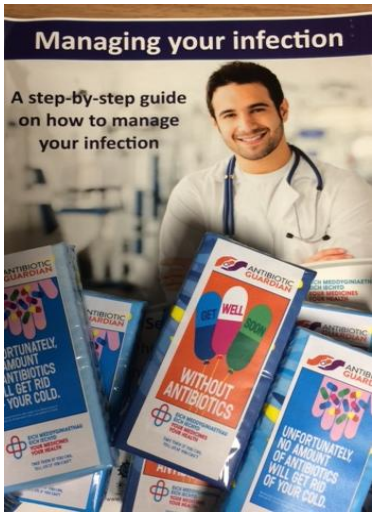
Reference 1. Jim O'Neill. Antimicrobial Resistance: Tackling a crisis for the health and wealth of nations - the review on antimicrobial resistance. The Wellcome Trust and The UK Government. 2014

My objectives

- To improve participant's understanding that antibiotics should not be taken for viral or self-limiting infections.
- To improve participant's understanding of the harms associated with taking unnecessary antibiotics
- To improve participant's understanding of antimicrobial resistance

Method

- Developed an 'antibiotic myth busting session' in the form of an interactive PowerPoint presentation and paddle board true/false game.
- Community groups identified via community co-ordinators and word of mouth.
- Pharmacy technician delivered sessions to community groups in CTUHB over 10 months
- Sessions evaluated using before and after questionnaires utilising diads to assess self-reported changes in knowledge
- Results analysed using Microsoft Excel®.



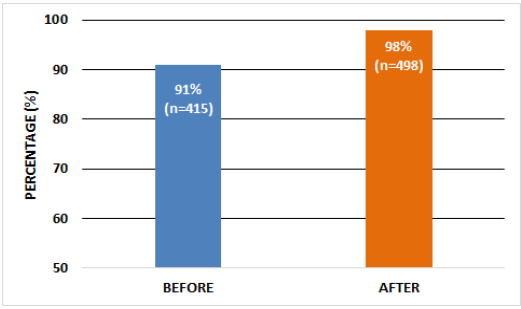
What was the impact/outcome?

The most significant impact of the 'myth busting sessions' was to improve participant's understanding of what antibiotic resistance is and consequently their confidence to explain antibiotic resistance to someone else. An interesting finding was that a high percentage of participants already knew that taking antibiotics all the time can be harmful prior to the sessions and that they should not be taken for self-limiting viral infections. Further work is needed to understand why the public still seek antibiotics for self-limiting infections despite this knowledge.

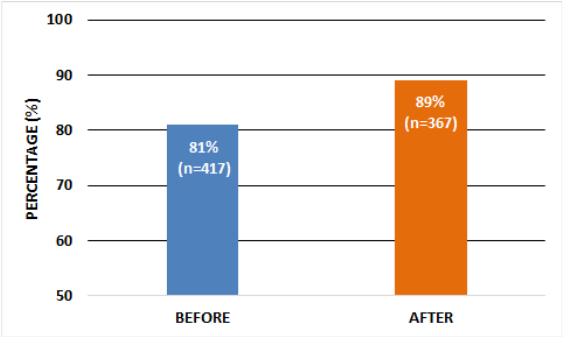
Antibiotic Myth Busting Sessions were delivered to:

- 56 community groups
- 625 members of the public

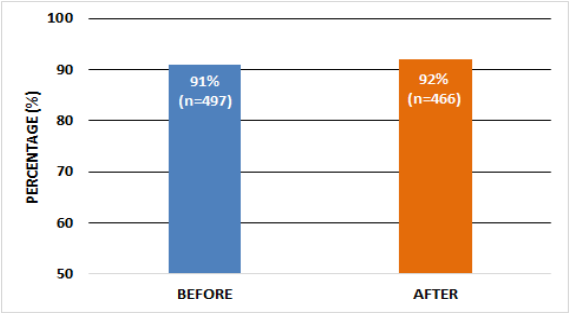
Proportion of participants who thought they should **NEVER** take antibiotics for a cough or cold.



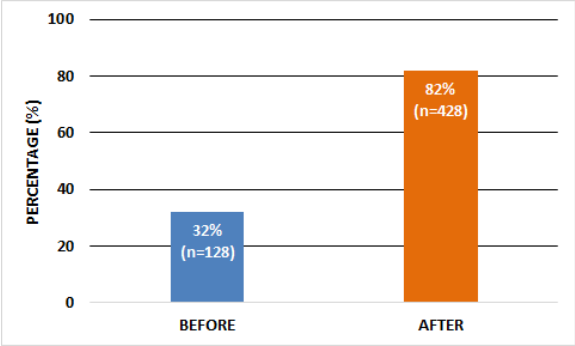
Proportion of participants who think antibiotics are **GREAT** at
bacterial infections.



Proportion of participants who would AGREE that using antibiotics all the time can be harmful.



Proportion of participants who feel CONFIDENT to explain what antibiotic resistance is to a friend.



Comments/feedback from stakeholders

The Antibiotic Myth busting sessions were well received within the community groups and nursing home staff.

Attendees where “surprised” at what antimicrobial resistance meant and what impact it will have on the future of medicine and health of the population.

Links for further information

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Appendix 5 Antibiotic Guardian Badge for Scouts

Primary Care Antimicrobial Stewardship Best Practice Template

Amy John / Specialist Antimicrobial Pharmacy Technician / Cwm Taf Morgannwg University Health board

Background/History

After the success of the Antibiotic Myth Busting sessions where over 600 members of the public age 50+ were educated on antibiotic resistance the Cwm Taf Morgannwg Antimicrobial pharmacy team, have been working with the local community in Rhondda Cynon Taff (RCT) to educate the children. The sessions included how to prevent the spread of infections, how antibiotics only work on bacterial infections and what they can do to look after themselves when they have a viral infection.

Our Interventions

The team attended the RCT Scare Fest Scout camp where over 50 Cubs became Young Antibiotic Guardians. During the session the children played a ball game where the ball was covered in UV gel. After the game we showed the children their hands under the UV light to show how the contact with the ball had spread the UV gel around. This was to show them how easily germs are spread.

We then had a conversation with them about sneezing. How far a sneeze travels and what sort of things you find in snot. We then had a discussion on how to prevent a sneeze spreading germs i.e., sneezing into a tissue and washing hands. During this we used a spray gun with green coloured solution so the children could have a go at seeing how far the “green snot” would travel.

Next, we used a colour changing solution to show how antibiotics will only work on bacterial infections and not viral.

To finish we went through the hand washing technique.

After completing the 45-minute session the Cubs made their own pledge on how they will help protect antibiotics. The Cubs were presented with a Certificate and a Scouts badge, for completing the session and to show they are now a Young Antibiotic Guardian.

What was the impact/outcome?

We didn't measure the outcome of this event but we hoped that these children would have conversations with their parents and family members to spread the word on what they had learnt during the session.

Links for further information

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