Antimicrobial Resistance Impact Report for the UK:
The 2016 Antibiotic Awards Submissions
<table>
<thead>
<tr>
<th>CONTENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>2</td>
</tr>
<tr>
<td>Collaborative Stewardship</td>
<td>3</td>
</tr>
<tr>
<td>Community</td>
<td>4</td>
</tr>
<tr>
<td>Innovation</td>
<td>8</td>
</tr>
<tr>
<td>Point of Care Testing</td>
<td>11</td>
</tr>
<tr>
<td>Prescribing</td>
<td>15</td>
</tr>
<tr>
<td>Research</td>
<td>21</td>
</tr>
<tr>
<td>Staff Engagement</td>
<td>22</td>
</tr>
<tr>
<td>Stewardship</td>
<td>25</td>
</tr>
</tbody>
</table>
Introduction

Welcome to this independent Evidence Report as published by 4 All of us. This Report is compiled through submissions received by 4 All of us for the 2016 Antibiotic Awards.

As an organisation who supports the work of healthcare professionals to tackle Antimicrobial Resistance we believe this Report will provide inspiration and encouragement to individuals and organisations faced with tackling this global health crisis.

Within this Report you will find of best-practice examples being delivered by Health Professionals, Associations, Bodies, Organisations and Research Groups across the United Kingdom and Worldwide. Whether it is through Research or Innovation, Community Engagement or Stewardship, all the evidence within this Report points to a successful effort across the country and wider to tackle AMR.

We hope you find this Report both beneficial and inspiring and we would like to congratulate all those organisations which feature within.

Sincerely
S. Buckler
Director
4 All of us

Collaborative Stewardship

Different organisations and hierarchies can often create barriers to effective working. Working in isolation or silos has been shown to be ineffective. Combating Antimicrobial Resistance requires close working by all stakeholders, primary and secondary care, social care, pharmacists and dental practitioners. It also relies on working closely with the patients as individuals and through community groups, schools and colleges to ensure higher awareness of AMR, good hygiene and responsible use of A&Is.

This chapter covers a range of different approaches and the case studies illustrate the progress being made in Collaborative Stewardship on AMR. It is clear that where collaborative working is practised, better results are achieved.

Calderdale CCG, Greater Huddersfield CCG, NHS North Kirklees CCG, Wakefield CCG, Community Pharmacy West Yorkshire, Kirklees and Wakefield Council Infection Control

The four neighbouring CCGs across South West Yorkshire, covering a population of over 900,000, adopted a system-wide approach to promoting and monitoring the use of antimicrobials. The CCGs worked in partnership to develop Antimicrobial Guidelines for use in Primary Care. The guideline is reviewed regularly and prescribing data is monitored to ensure prescriber compliance and to highlight variance in practice.

Despite making considerable improvements to the volume of Cephalosporin and Quinolone antibiotics prescribed, the CCGs were struggling to have the same impact on the volume of all antibacterial agents and were consistently higher than the England average for this quality prescribing indicator. As a way of trying to tackle this problem a multi-disciplinary/multi-organisation working group was formed in April 2015 with the remit of developing an antibiotic campaign to commence in September 2015. The campaign targeted member practices, community pharmacies, members of the public and CCG staff.

The campaign focused on three key messages:
1. Become an Antibiotic Guardian
2. Antibiotics don’t work on self-limiting conditions

Existing resources such as TARGET were utilised for GP practices to enable the delivery of consistent messages. A comprehensive communications plan underpinned the campaign and utilised social media, press releases and messages on screen savers, email footers and on the CCG websites.

Engagement with community pharmacy was achieved through partnership working with Community Pharmacy West Yorkshire (CPWY – local pharmaceutical committee). Posters and scratch cards, designed to be used as a fun way of engaging the public in conversations about antibiotic resistance, were sent out to all pharmacies in West Yorkshire, and educational sessions were delivered at four community pharmacy events. Pharmacy staff were asked to reiterate to patients the importance of taking antibiotics as prescribed and completing the full course.

Public education was delivered by utilising existing relationships between one of the CCG pharmacists and the local Muslim community. A live radio broadcast was aired on European Antibiotic Awareness Day (EAAD). CCG staff were asked to become Antibiotic Guardians and staff events were held on EAAD across the CCGs. The two CCGs in Kirklees held the first Great British Tea Party in aid of Antibiotic Research UK and raised over £150 for Antibiotic Research UK.

The campaign is still being evaluated but even at this early stage a reduction in the prescribing of antibiotics can be seen across the CCGs. GPs and community pharmacies have been sent a survey to give them an opportunity to comment on the campaign resources to support planning for 2016-17.

Since the start of the antibiotic campaign in September 2015 all four CCGs have seen reductions in their antibacterial items prescribed and are on target to meet the Quality Premium measure for 2015-16. The following reductions have been seen in Q3 2015-16 compared to the same quarter the previous year:

- Wakefield – 5.6%
- Greater Huddersfield – 6%
- Calderdale – 7.4%
- North Kirklees – 8.4%

The CCGs worked in partnership to develop Antimicrobial Guidelines for use in Primary Care
Parents wanted to know what the average length of illness was and what the unwanted effects of antibiotics were.

Darent Valley Hospital
During World Antibiotic Awareness Week 2015 (WAAM, 16-22nd November) and on European Antibiotic Awareness Day (EAAD, 18th November) the antimicrobial stewardship team, including pharmacy, infection control and microbiologists, collaborated with Dartford, Gravesham and Swanley Clinical Commissioning Group to help raise awareness of the issues surrounding inappropriate antimicrobial use and the role we all have in managing this. A display stand was set up in the main foyer of Darent Valley Hospital and also at the local shopping centre, Bluewater. The stands included information on self-care, common winter ailments, the Antimicrobial Guardian scheme, sepis and antimicrobial resistance. The Trust stand included information for healthcare professionals on Start Smart Then Focus and local prescribing and audit data. There were also antimicrobial related quizzes which helped to engage people and were used as a learning tool. This collaboration enabled us to educate both healthcare professionals and members of the general public.

The lead antimicrobial pharmacist and microbiologist at the hospital have also been actively involved in building stronger links with our local GPs to support the improvement of care, the lead antimicrobial pharmacist and microbiologist at the hospital have also been actively involved in building stronger links with our local GPs to support the improvement of care, the lead antimicrobial pharmacist and microbiologist at the hospital have also been actively involved in building stronger links with our local GPs to support the improvement of care.

Community
Most antibiotics are prescribed within primary care, the first point of contact for the public community. Any effective control and reduction in all prescribing and AMR will necessarily involve educating the public about infection control, appropriate use of antibiotics and the threat from AMR. There is a widespread public misunderstanding that antibiotics are a ‘cure-all’, which is reflected in the pressure on some GPs to prescribe AAs for viral, colds, sore throats etc.

Within this chapter there are good examples wherebuyr clinicians and in some cases local politicians have engaged with the public in open forums, employing a broad range of different communications.

Devon County Council, Northern Devon Healthcare NHS Trust, NEW Devon CCG
In response to the stewardship roles outlined in the 2014 Antimicrobial Resistance Strategy Devon County Council Public Health led a partnership with North East West Devon Clinical Commissioning Group, Northern Devon Healthcare NHS Trust and the Devon Local Pharmaceutical Committee to develop a pilot social marketing intervention to reduce demand for antibiotics.

All parents, regardless of socio-economic status, shared a common desire to know how to care for their child and what role antibiotics play in that process. Parents wanted to know what the average length of illness was and what the unwanted effects of antibiotics were. Parents were unified in their request to have any more information during pregnancy or in leaflet form.

Comments included:
- "the consequences [about antibiotics] need to be made clear to us"
- "it’s really quite scary [when talking about the damage to gut flora]"
- "I don’t want antibiotics for my children unless they need them to get better"

These powerful insights ensured a step away from traditional communications toward a content-led digital strategy supported by a ‘prescribed only’ self-help guide. The campaign team, made up of parents who had experienced the exhaustion of caring for an ill child, wanted to make busy parents smile and feel good while at the same time empowering them to ‘Listen to their gut’ and have confidence in their parenting ability.

Tactics included:
- Short animated video of ‘talking mummy tummies’ at the school gate giving messages about how long common illnesses can last and tips for treating a child at home
- App-based quiz

The project took a different approach to reaching the community and this was dictated by the parents themselves with the focus groups. It took the complex subject of antimicrobial resistance and developed original, intelligent communications that would resonate with and matter to the target audience. It put parents at the centre and ensured reducing health inequalities was central to all planning.

Parents, GPs and pharmacists together agreed that a fresh positive approach using imagery was essential in translating this challenging and confusing subject.

Parents were driven by digital advertising and social media to the video on the Children’s Centre Facebook page and YouTube and ‘Listen to your gut’ linked up with the Public Health England Antibiotic Guardian campaign to capitalise on national coverage in the lead-up to European Antibiotic Awareness Day on 18 November. YouTube pages were linked and the online traffic peaked during this time.

The evaluation in 2014 showed:
- Approximately 20% reduction in the prescribing of amoxillin suspension
- The ‘Listen to your gut’ message resonated with 8 out of 10 participants with over 30% increase in knowledge
- Confidence to talk to a GP increased by one third.
- Participants associated their increased confidence with the knowledge of length of time and appropriateness of continuing to use paracetamol and water.

In real terms, the campaign delivered an additional 71% animation views, 5% game plays and 78% Facebook page likes.

Final figures were:
- 480 Facebook page likes
- 13,574 animation views
- 1,394 game plays.

In 2015 the www.listenonyourgut.org.uk was developed and the site’s video views exceeded 26,000. Interestingly 82% of views were on mobile.

Traditionally the stewardship role is deemed to be a clinician’s or prescriber’s, with the general public a passive receiver; however, the focus groups highlighted the opposite. That in fact people did want to know more about antibiotics, but they didn’t want to hear a futuristic message about the threat of no more medicine or a message about flu and colds. The groups highlighted that it was essential to make the message resonate with the here and now and make it about the immediate impact on gut flora.

The community messages supported the primary care teams to manage their winter demands and the self-care guides provided practical solutions to enable them to meet their stewardship responsibilities.

Pharmacies played a central role in the campaign:
1. Pharmacy staff promoted the key antimicrobial stewardship messages to people using the pharmacy. Promotional material in the form of a quiz will be used to instigate and facilitate conversations with patients, so key messages on antimicrobial use can be conveyed to increase the understanding of patients.

2. During a minor illness patient consultation the pharmacist will provide an intervention guide to the patient with self-care advice. The pharmacist would add the likely diagnosis, duration the illness and any relevant safety netting.

During the pilot the number of self-care interventions provided by the pharmacies was 223, with an average of 27 per pharmacy (nearly seven per week). The conditions that the pharmacies consulted on were as expected: cough/bronchitis and the common cold made up the majority (71%) of the consultations. The ages of the patients were distributed across all age groups, with the highest number of interventions in the adult age group (93%).

The project was part of a wider programme of collaborative working that included microbiologists, prescribing teams, General Practitioners, Nurse Prescribers, Health Care Assistants, Laboratory scientists and Public Health. Activities included:
- Regular feedback of prescribing data
- Regular small group discussions
- Larger group educational sessions to GPs and nurse prescribers
- New treatment guidelines
- New diagnostic guidelines
- Laboratory practices aligned to clinical need
- Working directly with complex patients.
North Kirklees CCG
Antibacterial prescribing rates in North Kirklees have traditionally been much higher than the England average and practices in Dewsbury and Batley in particular have struggled to make any impact on reducing prescribing rates. GPs working in these areas report difficulties in managing the demand for antibiotics from the South Asian population and struggle to get messages across due to different expectations from this sector of the population.

In the summer of 2015 a new Pharmacist joined the North Kirklees CCG Medicines Management team. Bilal was born and raised in North Kirklees and is a respected member of the local Muslim community. Bilal was well aware of the difficulties in communicating with this hard-to-reach community and was keen to use his contacts to deliver educational sessions at some of the local mosques.

Mosque Presentations
Bilal made contact with several mosques and their committees in the area and outlined his proposal including what the educational session would be about, the purpose of the session and what he hoped would be achieved from it. The request was well received from some of the mosques he approached, although there was a certain amount of uneasiness, as they had never been asked to participate in events like this before. Others were interested but didn’t want to be one of the early adopters, preferring to wait and partake in future programs. However, relationships were built with the committee members, all of whom are well connected and respected in the community, and information was left with them about the Antibiotic Guardian campaign. They promised to use their networks to get information out about the campaign. Some of the mosques agreed to a more formal presentation-style delivery of the educational sessions, whereas others opted for ad hoc short, targeted sessions after prayers.

Two presentations were made at the Institute of Islamic Education in Dewsbury, a private boarding school for boys aged 12 to 16 and a further education institute for Islamic studies from age 16 onwards (non-boarding). The first presentation was for approximately 200-250 people attended from both within and outside the Institute. The Institute actively encouraged everyone to become Antibiotic Guardians, and many of the staff led by example and signed up to the campaign.

The Institute of Islamic Education actively encouraged everyone to become Antibiotic Guardians, and many of the staff led by example and signed up to the campaign. The Institute also displayed the antibiotic posters and utilised some of the leaflets. In addition to this, four educational sessions were delivered across three mosques and across community groups.

Radio Programme
Al-Mubarak Radio has international coverage, but 70% of the listeners are from Yorkshire. The one-and-a-half-hour broadcast covered flu, staying well this winter, self-care and appropriate use of antibiotics and antibiotic resistance. The live broadcast was delivered by a North Kirklees GP, a Kirklees Public Health representative and a local Community Pharmacist. At the end of this hour the majority of the listeners are mothers with young children who frequently request antibiotics for their children, and the older generation, who have a historical belief on how and when antibiotics would and should be given.

Al Mubarak Radio has:
- Facebook – 5000 followers
- Twitter – 60000 followers across various accounts
- Whatsapp – 2000 broadcast list.

During the live broadcast a number of health-related questions came in from listeners that were answered by the participants. Sixty-two messages came in during the first hour of the show. There were approximately 300 listeners to the live broadcast. Further to this the show was recorded on the radio YouTube channel and has been viewed 550 times to date. The program was also broadcast over the local radio receivers people have in their homes. These total to a large number but cannot be numerically quantified. Furthermore, the radio station is played in a few of the local businesses. Listener results would once again not be quantifiable, but these venues still enabled the show to reach a larger number of people. The station also added the DH antibiotic guardian video to their news feed and sent links to it via their social media accounts.

Churchfields Medical Practice
Community pharmacies: the 3 pharmacies I visited in person were unaware of the campaign. I introduced them to the relevant PHE ‘treat your infection’ leaflet, which they were keen to utilise with presenting patients.

The subject of antibiotic misuse has been tackled by all the doctors for a period of at least five years. It has been Practice Policy to explain to patients why antibiotics are not an effective treatment for dealing with viral illnesses. This means that surgery consultations might be extended to allow time for the Doctor to explain in more detail why antibiotics have not been prescribed. The PPG meets quarterly and this is a permanent Agenda item. This policy extends to all Practice Staff, who reinforce the decisions the Doctors have made. The success of the Practice Policy is confirmed by a recent CCG report that places Dovecote as the second best surgery in the locality for the non-prescribing of antibiotics.

Evidence of the Practice Policy
1) Leaflets and posters are permanently on display in the surgery waiting room. Prior to the official leaflets, the Surgery published its own Antibiotic Resistance leaflet; this was handed to all relevant patients.

2) The subject of becoming an Antibiotic Guardian was covered in the autumn 2015 issue of the Dovecote News and the Public Health England Antibiotic Leaflet, and is permanently featured on the Dovecote website.

3) We believe much has been achieved by word of mouth in the surgery waiting room, where patients discuss the issue.

Kingfisher Treasure Seekers + Primary Care Unit, Public Health England
Kingfisher Treasure Seekers is a social enterprise that works with vulnerable and disadvantaged people in Gloucester. Kingfisher Treasure Seekers and Public Health England have worked together to develop Beat the Bugs, a 6-week hygiene course for different types of community settings. The course comprises the sessions Introduction to Microbes, Hand and Respiratory Hygiene, Food hygiene, Oral hygiene and Antibiotics, as well as a final session on self-care and action planning for the future. The aim of the final session is to reinforce the key messages learnt throughout the course and focus on behaviour change.

A pilot course was undertaken at Kingfisher with a group of 7 adults with learning disabilities. The results from the pilot suggest the course was successful in improving knowledge and awareness in vulnerable adults. Participants enjoyed the course and said they would recommend it to others. The hand washing and oral hygiene activities were the most enjoyable for the participants, and the course leader remarked that she ‘loved the interactions between participants and the questions about daily lives’. The course leader also noticed behaviour changes throughout the course, particularly around hand washing.

After each session, participants completed a ‘pledge’, or action planning sheet, in which they wrote down what they had learnt that day and what they were going to do differently now at home based on the content in the session. These were reviewed the following week and formed part of the final action-planning session.

The Beat the Bugs course has shown to be effective in improving knowledge around hygiene and antibiotic use. In particular, the course has a focus on self-care at home, and highlights that many common infections do not require antibiotics. During the final action-planning session, participants demonstrated an increase in knowledge around when they should take antibiotics and were more aware that they shouldn’t take leftover antibiotics or share antibiotics with others.

A course such as this is vital to educating a wider audience about prudent antibiotic use. Furthermore, by educating on hygiene and the spread of infection we can reduce the incidence of infection and thereby reduce the need for antibiotics.

Members of some community groups, such as disabled or vulnerable adults, are often no longer in education, and reaching these groups with healthcare information can be difficult. In addition, vulnerable adults often need more support to live independently; this course equips participants with the knowledge, skills and confidence they need to live a healthy lifestyle.

The course is also suitable for other community groups such as Guide and Scout groups and young mothers. These groups are often educated on life skills, such as cooking and first aid, and the topics covered in Beat the Bugs would complement these courses.

1. The Beat the Bugs session on ‘Bug Busters’ focuses on antibiotics.

The learning outcomes are:
- Antibiotics don’t help most infections as they don’t work on viruses
- If you use antibiotics when you don’t need them, they are less likely to work in the future when you really need them for severe infections such as meningitis, pneumonia or kidney/urine infection
- Bacteria are becoming resistant to antibiotics due to our overuse of antibiotics
Local GPs have recently provided ‘advice and tips’ in new local guidance for other GPs titled ‘Reducing Unnecessary Antibiotic Prescribing’.

Antibiotic-resistant bacteria spread easily from person to person.
Overuse of antibiotics can damage our normal/useful bacteria.
Most common infections will get better by themselves through time, bed rest, liquid intake and healthy living.
Take antibiotics exactly as prescribed by your doctor or nurse.
You must not use other people’s or leftover antibiotics.

This session starts with an introduction to common infections and explains that viral infections do not require antibiotic treatment. A balloon activity is used to introduce antibiotic resistance. Balloons with tape on them are used to represent resistant bacteria. They cannot be burst using pins, and therefore demonstrate how resistant bacteria are not killed by antibiotics. Finally, a cartoon strip is provided to show how antibiotics should be taken correctly. During the session summary participants are encouraged to take an Antibiotic Guardian pledge.

The learning outcomes for this session are:
- How to self-care at home when ill
- When to go to the doctor
- Where to access health information
- What information can be gained from healthcare leaflets.

After each session participants complete an action-planning card. These cards are discussed in the final session and remind participants of the pledges and behaviour changes made throughout the course. Participants can write their own pledge, which can include anything from hand washing and teeth brushing to not sharing antibiotics or becoming an Antibiotic Guardian.

Innovation
This chapter illustrates the importance of multi-faceted communications strategies aimed at all the community and healthcare stakeholders.
No one media or technique may suit all communities, and so the case studies within the chapter illustrate a wide range of different approaches. Changing technologies, increasing public awareness and the use of different media emphasises the need for constantly reviewing the methods used and the importance of challenging the tried and tested methods with new innovations.

Southern Derbyshire CCG (on behalf of all 4 Derbyshire CCGs).
A systematic review of interventions for promoting the prudent prescribing of antibiotics by general practitioners suggests that multifaceted interventions will maximise acceptability.

This award entry reports how this type of approach has been used successfully in Derbyshire over the last few years. The range of interventions used includes educational meetings for GPs and clinicians (both open group events and others targeted at higher prescribers in the surgery); using a supportive and guiding ethos; the provision of support materials aimed at empowering avoidance of or delayed antibiotic prescribing, where appropriate, and improving prescribers’ knowledge of and confidence in self-management; and the production of different treatment guidelines incorporating key messages accompanied by evidence indicating where antibiotics are unlikely to be of benefit.

Local GPs have recently provided ‘advice and tips’ in new local guidance for other GPs titled ‘Reducing Unnecessary Antibiotic Prescribing’. Furthermore, a GP has presented at a GP education event and explained how they reduced their antibiotic prescribing; how they overcame problems; and the resultant advantages for their practice.

It became apparent that a range of interventions was needed in order to try to highlight antimicrobial stewardship and influence the prescribing behaviour of GPs and other prescribers, while also providing advice for the public. Our work has demonstrated success in highlighting antibiotic stewardship via a variety of initiatives, including the following:
- Development of different treatment guidelines for prescribers, including key messages accompanied by evidence of where antibiotics are unlikely to be of benefit.
- Three-monthly reviews and written feedback is provided to GPs about GP practice prescribing rates on total antibiotic items, individual broad spectrum agents and PPIs, for comparison with their peers and CCG and national averages using a ‘traffic light’ grading system. The GP practices receive tailored letters in accordance with their antibiotic prescribing, are given achievable targets to reach along with advice and are thanked for their help. Practices receive a congratulations message if their prescribing has met the Quality Premium target. Help and support is offered to those practices that have higher prescribing rates.
- Messages are included on urine sensitivity reports, reminding prescribers that co-amoxiclav, cephalosporins and quinolones may be associated with an increased risk of C. difficile infection.
- Our team of pharmacists working in GP practices provides valuable help by conducting antibiotic prescribing audits and reminding GPs of the latest key messages and developing assistive protocols on GP computer systems, for example by reminding prescribers of the indications for co-amoxiclav.
- GPs receive feedback on their antibiotic prescribing as appropriate following analysis of C. difficile cases at C. difficile review meetings, the aim being to share learning from these cases.
- Provision of support materials, such as leaflets aimed at empowering avoidance of, or delayed, prescribing as appropriate; and improving patients’ knowledge of self-care for minor illnesses. Furthermore, we worked with our Out of Hours (OoH) Team to develop a ‘Treating Your Infection’ leaflet for patients who attended OoH centres. This leaflet was adopted as the national patient leaflet for prescribers at these centres.
- Commissioning for Quality indicators for prescribing of antibiotics; if so, they should be advised to contact their GP for advice rather than be sold treatment.
- GPs, non-medical prescribers and other clinical staff across Derbyshire attend education sessions on antibiotic resistance, evidence-based antibiotic prescribing and healthcare-associated infections (HCAs). Sessions usually involve presentations from the local microbiologist and where possible the antimicrobial lead pharmacist, usually including a quiz on antimicrobial prescribing, and feedback on C. difficile cases from the lead infection control nurse. GPs’ protected learning time is used where possible to ensure high attendance. Graphs of antibiotic prescribing rates for all GP practices are circulated, along with useful resources such as local treatment guidelines and patient leaflets; group discussions follow.
- Furthermore, GP education and support visits to practices are undertaken based on targeted prescribing performance or at the request of the practice. They are followed by further assistance, such as an antibiotic audit. After this, key messages based on the analysed results from the audit are discussed and circulated to the practice and support materials including guidance, posters and patient leaflets, e.g. the ‘Treating your Infection leaflet’, are provided.

We have taken the campaign into schools, where it has been well received. Suggestions for developing this initiative further include school nurses speaking to parents at parent evenings and giving them a patient leaflet about the appropriate use of antibiotics and caring for minor illnesses, and educating teachers about the topic so they can include it within personal, social, health and economic lessons.

We have used Twitter over the last few months (during autumn and winter) to share key messages to the public about the appropriate use of antibiotics, getting well without using antibiotics for ailments such as colds and asking local pharmacists for advice on treating symptoms. We will continue this work and will investigate using other social media, such as Facebook, to deliver similar messages.

Some of our GP practices are participating in a PHE research study regarding this topic that involves an answer phone message for patients. Once this study has finished and been evaluated, other GP practices may consider developing similar messages for use in their surgeries.
A dashboard has been developed to allow data about antimicrobial prescribing to be monitored remotely and holistically.

The patient is the ‘great winner’ with CRP POCT. Management decisions are more evidence-based, the service is much better

Point of Care Testing

Addressing the threat of antimicrobial resistance and recognising the role of diagnostics

There is without doubt a greater recognition now than ever before of the threat posed by AMR, and of the need to take coordinated global action to help address it. There has also been an increased appreciation of the role that innovative and rapid diagnostics can have in supporting these efforts, and how they can help to inform clinical decision-making and stimulate reductions in levels of inappropriate antibiotic prescribing, a key driver of AMR.

The growing awareness of the important role of diagnostics was reflected within the final report of the UK Government-commissioned Review on AMR, spearheaded by Lord Jim O’Neill. The report included a number of recommendations designed to help inform governments and policy-makers and specifically called upon countries to mandate the use of rapid diagnostics to inform all antibiotic prescribing by 2020. To help achieve this, the report encouraged health system leaders to consider how incentives could be used to facilitate accelerated uptake of these diagnostic tests. Whilst some of the focus has been around the development of new diagnostics, it is important to recognise that there are already existing diagnostics that can play a significant role in supporting improved antimicrobial stewardship efforts, and that these tests have been used successfully for many years across a number of mature health systems.

‘I call on the governments of the richest countries to mandate now that by 2020, all antibiotic prescriptions will need to be informed by up-to-date surveillance information and a rapid diagnostic test wherever one exists.’ Lord Jim O’Neill, Final Report and Recommendations, Review on Antimicrobial Resistance¹

Utilising C-Reactive Protein of Care Testing

C-Reactive Protein Point of Care Testing (CRP POCT) represents an example of a proven and cost-effective diagnostic test that already exists and which has been supporting efforts to reduce levels of inappropriate antibiotic prescribing for many years, without increasing the risk of complications or missed diagnoses. Used widely in a number of European countries, and increasingly in the UK, the test involves the measurement of the level of CRP in the patient’s blood, which increases significantly as part of the natural response to bacterial infection. A significantly increased CRP level result may indicate the need for immediate antibiotic treatment. A normal or moderately increased CRP level may support a diagnosis of viral or self-limiting infection, which provides valuable information to prevent unnecessary antibiotic prescriptions.

Guidance recommending the consideration of CRP POCT

NICE Clinical Guideline 91: Infection prevention and control (April 2014)²

NICE Guideline 15: Antimicrobial stewardship: systems and processes for effective antimicrobial use (August 2015)³

TARGET Antibiotics Toolkit: Joint Public Health England and Royal College of General Practitioner resource⁴

NICE’s Quality Standard on infection prevention and control (April 2014) also recommends that in order to help prevent the development of antibiotic resistance, antibiotics are prescribed only when needed and to review the continued need for them.⁴

Accelerated uptake of CRP POCT

CRP POCT is still not as widely used within the UK compared to a number of other European countries, such as in the Netherlands and across Scandinavia, where diagnostic testing forms a routine part of clinical practice and has helped to reduce respective levels of antibiotic prescribing.⁵ Recent years however have seen a more progressive approach on the use of diagnostic testing adopted across the UK, and the use of CRP POCT has been increasingly incorporated within both national and local antimicrobial stewardship strategies.

‘The patient is the ‘great winner’ with CRP POCT. Management decisions are more evidence-based, the service is much better—you can’t get faster and more convenient than CRP POCT. There is a greater likelihood of appropriate shared-decision making with skilled HCPs.’—Rogier Hopstaken, a GP from Utrecht, the Netherlands and POCT expert

Wales

In March 2016, the Welsh Government set out in its Delivery Plan on tackling antimicrobial resistance a specific recommendation to implement CRP POCT at a national level. These plans are currently being put in place and further information on the working group and the next steps for the national roll-out are expected to be published shortly.

¹ Antimicrobial Resistance Impact Report for the UK; The 2016 Antibiotic Awards Submissions

² Antimicrobial Resistance Impact Report for the UK; The 2016 Antibiotic Awards Submissions

³ Joint Public Health England and Royal College of General Practitioner resource

⁴ Royal College of General Practitioner resource

⁵ [April 2014] 3

⁶ [April 2014] 2

⁷ [April 2014] also recommends that in order to help prevent the development of antibiotic resistance, antibiotics are prescribed only when needed and to review the continued need for them.

⁸ [April 2014] 2

⁹ TARGET Antibiotics Toolkit: Joint Public Health England and Royal College of General Practitioner resource

¹⁰ Antimicrobial Resistance Impact Report for the UK; The 2016 Antibiotic Awards Submissions
CRP POCT can help support decision-making and provide reassurance to both clinicians and patients when the decision not to prescribe an antibiotic is taken

"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." Welsh Government, Together for Health, Tackling antimicrobial resistance and improving antibiotic prescribing

Scotland

As part of its efforts to encourage a reduction in inappropriate antibiotic prescribing for self-limiting respiratory tract infections, in 2016 the Scottish Antimicrobial Prescribing Group (SAPG) developed a proposal to evaluate the feasibility and acceptability of CRP testing in GP practices and unscheduled care settings, which could help to inform wider roll-out of the test in the future.

Case Study: Testing the feasibility and acceptability of CRP POCT in primary care settings in Scotland

Operating across 10 GP practices between November 2015 and February 2016, the pilot assessed both the practicalities of implementing CRP POCT as well as the perceived impact on antibiotic prescribing behaviour. The pilot was supported by training sessions to demonstrate how the test should be carried out and used NICE-recommended testing ranges to inform the treatment options:

- Low CRP (100mg/L) rules out need for antibiotics
- Intermediate (CRP 20 – 100mg/L) use clinical judgement to decide need for antibiotics
- High CRP (>100mg/L) rules in need for antibiotics

The results were informed by data from 246 individual patient consultations and the results of a questionnaire completed by 15 GPs. In feedback demonstrated that:

- All respondents found it easy to identify patients and one commented that it was useful to determine how serious the LRTI was to guide management options
- Over 90% of respondents felt that CRP POCT provided reassurance when not prescribing an antibiotic
- Almost two-thirds (60%) of GPs thought that CRP POCT was a useful additional tool to support clinical practice
- 40% of GPs subjectively thought that CRP POCT reduced levels of patient re-attendance

When the test was used, in 64% of cases the outcome was that no prescription for antibiotics was issued

Patient experience of the test appeared to be positive and the majority of respondents would like to see CRP testing used routinely.

Commenting on the results of the pilot, Dr Jacqueline Sneddon, Project Lead for the Scottish Antimicrobial Prescribing Group said:

‘This pilot has evaluated the feasibility of incorporating CRP POCT within our antimicrobial stewardship efforts across a number of settings in Scotland. As demonstrated by the results, CRP POCT can help support decision-making and provide reassurance to both clinicians and patients when the decision not to prescribe an antibiotic is taken. We hope this study will support wider use of CRP POCT as an additional tool to ensure antibiotics are used prudently.’

England

CRP POCT is also being used within a broad range of commissioning areas across England. Where the test is being used, it is helping to support reduced levels of inappropriate antibiotic prescribing and strengthen local antimicrobial stewardship initiatives.

Case Study: Herts Valley Clinical Commissioning Group

A 3-month pilot to introduce CRP POCT in a GP surgery in Hertfordshire (Attenborough GP Surgery, Bushley) received an NHS Innovation Prize for its contribution to local antimicrobial stewardship initiatives.

The pilot, which ran from November 2014 to early 2015, saw eligible patients presenting with acute cough symptoms offered a test to measure their CRP levels to help determine whether an antibiotic should be prescribed.

Every patient receiving a definitive test briefing against antibiotics was followed-up a month later by checking their record or by telephone. The results demonstrated that:

- Use of CRP POCT saw antibiotic prescribing fall by 23%
- The proportion of patients re-attending for the same complaint within 28 days halved
- Patients may have felt more reassured by having had a CRP test when not provided with an antibiotic

The study demonstrated that in addition to supporting a significant reduction in the numbers of antibiotics prescribed, the use of CRP POCT was cost-neutral, due in part to the reduced levels of patient re-attendance. The service usually sees around 100 urgent care appointments a week, with around half of these for coughs that have lasted for less than three weeks – reducing levels of re-attendance by using CRP POCT therefore helped to free up dozens of extra appointments in the process.

Commenting on the results of the pilot, advanced nurse practitioner Liz Cross who led the study (alongside GP Dr David Zemmel) said:

‘The most interesting part for me was if I didn’t prescribe antibiotics last winter when patients came in with their chesty coughs, a quarter would come back and present to a GP, out-of-hours or A&E. By using CRP POCT however, only half that number came back, so my re-attendance rates are really reduced. This, coupled with the fact that the test is cost-neutral, mean that the project is sustainable and that patients ultimately get better quality care. With this in mind, I would urge that CRP POCT is embedded fully both locally and also across the NHS as a whole.’

Case Study: South Tees Clinical Commissioning Group

In 2016 South Tees CCG agreed to fund CRP POCT, which will see the rapid point of care tests implemented within all 43 primary care practices across the locality. The introduction of these tests will contribute to local antimicrobial stewardship efforts, with the ultimate aim of supporting efforts to reduce levels of inappropriate antibiotic prescribing.

Roll-out of the test kits commenced in September 2016, and as of October 2016, CRP POCT has been introduced into 18 practices within the locality, with practitioners in these areas also receiving comprehensive training on the use of the tests and to support communication with patients. Full roll-out of the tests in all 43 practices is expected to be completed by the end November ’16.

A key aspect of the trial has been in ensuring that measurement and evaluation metrics are put in place so that the impact of CRP POCT can be measured effectively. It is anticipated that that initial feedback will be available from March ’17, the results of which will help to shape the project moving forwards, possibly over a wider footprint across the North East.

Commenting on the roll-out of CRP POCT within the South Tees area, Alastair Monk, Medicines Optimisation Pharmacist, NECS, said:

‘The work we are undertaking to roll-out C-Reactive Protein Point of Care Testing across South Tees represents a crucial part of our plans to strengthen local antimicrobial stewardship efforts and ultimately support the reduction of inappropriate antibiotic prescribing, which is rightly recognised as a key health priority.’

Almost a third (31%) of CCGs did not have a named individual responsible for the implementation of a local AMS programme

Supporting patient safety: a view from the Patients Association

In May 2016 the Patients Association published a report on the findings of an inquiry into the uptake of key antimicrobial stewardship policy measures by CCGs across England, including local consideration of the use of CRP POCT. Informed by a series of Freedom of Information requests, the results, which were presented at a meeting of the All-Party Parliamentary Group on Patient Safety, found that whilst some areas were embedding mature and multi-faceted AMS programmes within their localities, the national picture was very much mixed.

Many areas for instance reported that they had not yet put in place a number of key stewardship levers:

- 10% of CCGs did not have a local AMS programme in place at all
- Almost a third (31%) of CCGs did not have a named individual responsible for the implementation of a local AMS programme
- Only 12% of CCGs reported having implemented all recommendations from NICE Guidance on Antimicrobial Stewardship

Significantly, less than a fifth of CCGs reported having carried out an evaluation on the cost implications for implementing CRP POCT within their local area and over half of CCGs who responded said they had no plans to do so, despite the evidence supporting its use and the NICE guidance encouraging its consideration.

‘We cannot underestimate the scale of the challenge that growing levels of antimicrobial resistance constitutes, or the direct threat it represents to patient safety. Encouraging the uptake of measures that can help to address this threat is a key priority of the Patients Association and measures such as cost-effective diagnostics, if prioritised and implemented correctly, should form an integral part of this fight.’ Katherine Murphy, Chief Executive of the Patients Association

Providing Parliamentarians with a first-hand demonstration of CRP POCT

In May 2016, Public Health England, the Royal College of General Practitioners, the Patients Association and Alere came together to help raise awareness amongst Parliamentarians of the importance of ensuring that effective antimicrobial stewardship programmes, incorporating the use of CRP POCT, are being embedded at a local level.

Sponsored by Maggie Throup MP (Erewash, Derbyshire), the event showed a range of important antimicrobial stewardship initiatives, including the joint PHE and RCGP Antimicrobial Resistance Impact Report for the UK: The 2016 Antibiotic Awards Submissions 12 Antimicrobial Resistance Impact Report for the UK: The 2016 Antibiotic Awards Submissions 13
By introducing CRP testing as standard practice for GPs who are considering whether it is necessary to prescribe an antibiotic, we can improve both patient care and save our NHS money.

Prescribing

Diagnosing and prescribing an appropriate treatment is a skilled practice. The prescriber does not always have the benefit of laboratory analytics and has to rely on good diagnostics and judgement. The patient may have a perception that only antibiotics will do the job, and if refused them may go elsewhere or buy ABs on-line. Primary care practitioners are responsible for the majority of AB prescribing and national guidelines require them to critically examine the need and appropriateness of all AB prescribing. The following chapter provides good case studies of different approaches to audit existing guidance and practice, facilitate better diagnostics, and create better communications between clinicians themselves and their patients. It provides evidence of overall reduction in AB use and reduction in broad spectrum AB prescriptions.

Leicester City CCG (Medicines Optimisation Team)

The Medicines Optimisation Team at Leicester City CCG in 2013 embarked on a journey to join the global project of tackling antimicrobial resistance, and engaged key stakeholders to lead and establish robust antibiotic stewardship. Through engaging and developing a network of Antibiotic Guardians (champions); a proactive and sustained campaign to reduce antibiotic volume, the use of broad spectrum antibiotics and community-acquired C. diff infections; and the development of effective primary care antibiotic guidance it has delivered remarkable local change.

The journey is summarised below:

- December 2013 Medicines Optimisation Team (MOT) base-lined antimicrobial prescribing practice across the City (snapshot audit of 62 GP practices).
- A key outcome from the audits highlighted gaps in the primary care antibiotic guidance. Conditions not covered in the guidance were driving up the use of broad spectrum cephalosporin and quinolone antibiotics.
- A review of the local antimicrobial policy and guidelines ensued, in consultation with the Antimicrobial Working Party (AWP), a secondary care and area prescribing committee.
- MOT drove the agenda for change in primary care guidance at the local AWP, which has broad specialist membership across primary care, secondary care and public health.
- The new robust guidance now covers over 45 conditions (of which 15 are new). This has been well received by busy primary care clinicians, who were in need of at-a-glance antibiotic guidance in consultations.
- Guidance buried within an intranet system carries little value, so the next part of the journey was to raise awareness of the new guidelines. This was achieved through promotion at CCG locality events and incentivised mandatory antibiotic audit in 62 City practices as part of the Prescribing Quality Scheme (PQS) in 2014/15, which helped reduce Ceph and Quin.
- The next step was to reduce antimicrobial prescribing volume. This was achieved through campaigning and promoting patient awareness along with the use of the invaluable TARGET toolkit. This was not only as part of European Antibiotic Awareness day (EAAD) but also for the whole winter, as described in the next section.
- The 2015/16 PQS was reformed to target antibiotic volume reduction and self-care conversations. TARGET toolkit resources were integral to this, but so too was encouraging general practice to confidently have self-care conversations with patients. To ensure we could record these interactions we submitted an application to HSIC to provide read codes for when GPs issue leaflets for:
  a) Provision of Treating Your Infection self-care patient leaflet
  b) Provision of Treating Your Infection self-care patient leaflet with issue of antibiotic prescription.
- To keep focus on appropriate antibiotic use we also instigated quarterly reporting of antibiotic data (all items, cephalosporin and quinolones) at practice level. These are discussed in formal locality meetings with GPs, a powerful method for harnessing peer support and pressure.
- A CRP testing pilot project was commissioned in two GP practices in the City for 6 months.
- A snapshot audit conducted in 2013 looked at 40 patients prescribed acutely broad spectrum antibiotics (co-amoxiclav, cephalosporins, quinolones and macrolides). This was conducted in every City practice (62). Audit results showed a wide variation in adherence to the antibiotic formulary. Co-amoxiclav, cephalosporin and quinolones were prescribed against all antibiotic items ranged from 2% to 32% across the practices, with a CCG average of 10%.
- A common theme was GPs using cephalosporins and quinolones to treat conditions not covered by the local primary care antibiotic guidance. A review of the local antimicrobial policy and guidelines ensued, in consultation with the...
Antimicrobial Working Party (JAWP) and area prescribing committee. (See journey above)

Robust new guidance covering over 45 conditions (of which 15 were new) coupled with the launch of a mandatory antibiotic audit in 62 city practices, as part of Prescribing Quality Schemes (PQS) in 2014/15 and 2015/16 helped to achieve 4 key aims:

1. The percentage of antibiotics prescribed as broad spectrum co-amoxiclav, cephalexin and quinine reduced in 2014/2015 to 9% for the CCG (significantly lower than the NHS England target of 11.3%). The biggest achievement was narrowing of the variation in practice across the City, a reduction of 2% -18%.

2. A reduction in antimicrobial prescribing volume (see graph 4 and others attached).

3. Awareness of the new antibiotic guidance. Promotion and awareness of the guidance has helped ensure patients get the right antibiotic at the right time and at the right dose.

4. The campaigns and mandatory audits have helped enshrine the right antibiotic at the right time and at the right dose.

5. The campaigns and mandatory audits have helped enshrine the standards expected in the City, which our GPs have embraced. We now have a nominated antibiotic champion in each and every practice. The antibiotic champions act as a link at practice level for CCG to communicate and feedback stewardship aspects; they in turn discuss antibiotic issues at practice clinical meetings.

Antibiotic Stewardship has gained momentum in the last 12 months. We changed our approach in 2015 to reduce antimicrobial prescribing volume. This was achieved through campaigning (EAAD) and promoting patient awareness and the use of the invaluable TARGET toolkit. Efforts included:

• Getting the local council to include in the local schools newspaper the resources available on the e-Bug website.

• The presentation ‘Antibiotic Stewardship’ given by a Consultant Microbiologist at a protected learning time session attended by more than 120 City GPs (18 Nov 2015, European Antibiotic Awareness Day).

• Antibiotic packs for practices consisting of posters, antibiotic guardian leaflets and signed GP pledges to display in waiting rooms.

• Social media and press release by CCG, along with an article in the local newspaper (Leicester Mercury) and a BBC1 East Midlands Today feature on 18th Nov 2015 with a GP and a local Pharmacist that ran throughout the day/ evening.

• Feature on Radio Leicester breakfast show on 18th Nov 2015

2015-2016 antibiotic mandatory key elements included:

• Launch of the new revised antimicrobial policy and formulary at CCG protected learning time to all City GPs.

• Each practice to nominate an antibiotic champion GP.

• Antibiotic Champion GP to complete the TARGET assessment toolkit and become familiar with the various resources available on the website for GPs.

• Antibiotic champion GP to ensure training log completed and signed by all prescribers in the practice, ensuring all prescribers are familiar with and have read the new LLR Antibiotic Policy and Guidance.

• Practice to conduct a baseline audit of 50 patients prescribed acute broad spectrum antibiotics (Clindamycin, Cephalexin, Quinolones, Macrolides, and Co-amoxiclav).

• Re-audit in 3 months for another set of 50 patients to demonstrate education, awareness and discussion at a practice level, to reduce prescribing rate.

• Creating awareness among prescribers of local guidance and, where gaps exist, referral to local microbiologists or reference to evidence based resources such as the Health Protection Agency (HPA) or NICE Clinical Knowledge Summaries.

NHS Nene CCG

Our project has involved a multifaceted approach to reducing inappropriate antibiotic prescribing in the GP practices within the NHS Nene CCG.

The initiatives we have implemented have included:

• Joint working with our two local acute trusts to modify the antibiotic sensitivity reporting for Urinary Tract Infections to include piperacillin and to remove co-amoxiclav. Trusts were offered a percentage share in the CCG’s Quality Premium payment, if achieved, to acknowledge their efforts.

• Promotion of the antimicrobial markers within the Quality Premium to GP practices. This includes a gain share with the practices if they achieve the Quality Premium target and if the CCG achieves the overall target. There is an improved gain share if they achieve a stretch target. There is also a requirement that all prescribers in GP practices complete the UTI and RTI sections of the RCGP TARGET training.

This work has resulted in improved performance according to the antimicrobial indicators in the Quality premium, with reduction in both overall antibiotic use and specifically, use of co-amoxiclav, cephalexins and quinolones.

• Antibacterial Items/StarPU Baseline = 1.202; Target = 1.198; 12 months to Dec 2015 = 1.163

• Co-amoxiclav, Cephalexins and Quinolones % Items Baseline = 14.8%; Target = 13.3%; 12 months to Dec 2015 = 12.2%.

A 6 month pilot of point-of-care CRP testing in the 7 GP practices with the highest antibiotic prescribing is being undertaken.

A further 7 (different) GP practices are taking part in the PHE Behavioural Insights Team trial ‘Reducing patient demand for antibiotics.’ At the end of Q3 the CCG is now meeting the antibiotic Quality Premium targets; we hope that this progress will continue to the year-end and beyond.

GP feel that they are being rewarded for their work and are very engaged to improve i.e. quite reasonably sharing in the CCG payment. GPs and nurse prescribers have submitted their RCGP TARGET certificates as evidence of undertaking the training.
The prescribing targets over the last 6 years have led to a reduction in the prescribing of the broad spectrum antibiotics.

Pennine Acute Hospitals NHS Trust

The carbapenems are a group of broad spectrum beta-lactam antibiotics, which in many cases are the last effective defence against infections caused by multiple-resistant bacteria. However, resistance to carbapenems has emerged and is beginning to spread. In the UK, over the last five years, we have seen a rapid increase in the incidence of infection and colonisation by multi-drug resistant carbapenemase-producing organisms. In this study, we stratified carbapenem prescriptions in an acute hospital into different categories and used different strategies to attempt to reduce carbapenem usage safely.

The electronic prescribing system was used weekly from January to April 2015 to generate a list of adult inpatients prescribed a carbapenem. The details of the prescription and any drug allergies were documented. The microbiology system was used to identify whether the carbapenem had been approved by a microbiologist or infectious diseases (ID) physician and if there was any supporting microbiological evidence, i.e. history of organisms producing extended spectrum beta-lactamases (ESBLs), AmpC or a classic penicillinase hyperproducer (CPH) within 2 years. The prescription was then categorised as:

- **A1**: in line with the hospital policy
- **A2.1**: microbiologist/ID physician approved with microbiological evidence
- **A2.2**: microbiologist/ID physician approved without microbiological evidence
- **A3.1**: clinically appropriate with microbiological evidence
- **A3.2**: clinically appropriate without microbiological evidence
- **A3.3**: clinically appropriate without microbiological evidence

A total of 103 carbapenem prescriptions were audited:

- **57.3%** were graded as **A1** or **A2.1**
- **35.3%** were supported by microbiological evidence
- **19.4%** had no supportive microbiological evidence but used in patients with a documented penicillin allergy
- **44.7%** had no supportive microbiological evidence and no penicillin allergy documentation.

Thus up to a 64% reduction in carbapenem prescriptions could be safely achieved if these agents were only used with supporting microbiological evidence, i.e. for the systemic infections caused by ESBL, AmpC or CPH producing gram-negative organisms.

The audit results demonstrated that there were two key areas where our stewardship message needed to be delivered. These included the haematology team and to the microbiology team itself.

The audit results were shared with the team and individual patient case reports were used as a learning tool. The microbiologists were asked to consider the patient’s resistance history prior to recommending a carbapenem. They were also asked to consider using carbapenem-sparing agents such as a glycopeptide for chest-oriented sepsis in patients failing to respond to first line antibiotics of piperacillin/tazobactam with no resistance history. It was recommended that they follow up with the patients for whom they had recommended a carbapenem, especially out of hours, and rationalise as soon as possible. Moreover, they were reminded of their privilege of being able to recommend the use of carbapenems and the importance of documenting their decisions on the microbiology system to enable effective communication and follow-up by colleagues.

In addition a separate session was completed with the haematology team. Again the issues surrounding the emergence of resistant bacteria were discussed and the audit results presented. Mechanisms by which the overall antimicrobial prescribing rate could be reduced on the haematology unit were discussed, along with the importance of good documentation. The significance of confirming the patient’s drug allergy status and the validity of the allergy were covered. Additionally the management of haematology patients using carbapenem-sparing agents was discussed together with the situations in which it is imperative that carbapenem be used.

The project has also facilitated a reduction in the prescribing of carbapenems that have not been authorised for use by microbiology or ID. This has been achieved by tackling the prescribers who were found to have repeatedly prescribed ‘unauthorised’ carbapenems and explaining the need for using these drugs more prudently.

Guidelines have been developed for use within microbiology to facilitate the decision-making process relating to the instances when a carbapenem should be recommended. This has enabled a more pragmatic approach to be deployed when considering the need for treatment escalation. For example promoting the use of carbapenem-sparing agents such as adding a glycopeptide to piperacillin/tazobactam rather than changing straight to a carbapenem. This guideline has provided more junior colleagues with additional confidence in their decision-making process when recommending appropriate antibiotics for patients.

All of this work has enabled us to promote the prudent use of carbapenems, which are in many cases are the last effective defence against infections caused by multi-resistant bacteria. This is especially pertinent as resistance to carbapenems has emerged and is spreading.

Since this audit was conducted a reduction in spend on meropenem (our first line carbapenem) from £7739 in December 2014 to £4791 in December 2015 has been identified. Furthermore, a re-audit is currently underway to assess the impact of the interventions. The preliminary results are encouraging, and the approach is subsequently being implemented across other hospitals in the Trust.

The novel and practical aspects of this project have been recognised by the European Congress of Clinical Microbiology and Infectious Diseases (ECCMID), and the findings were displayed as an e-poster at the conference in April 2016, Amsterdam.

The project has promoted a reduction in the prescribing of carbapenems by encouraging their use only in severe septic patients with known resistance or penicillin allergy. This has been supported by the production of guidelines and the delivery of educational sessions.

It has promoted a ‘start smart then focus’ approach to carbapenem prescribing. It was recognised that some patients may be started on or escalated to a carbapenem empirically, especially out of hours. The project emphasised the importance of reviewing the patient and rationalising the prescribing decision once additional information becomes available, and monitoring the patient throughout treatment so that adjustments to therapy can be made when needed or possible. Finally, it has promoted the importance of preserving the antibiotics are available to us, especially the carbapenems, to ensure that treatments will be available in the future in order to combat pan-resistant organisms.

This work and the project’s achievement are the results of teamwork. The core team members are:

- **Microbiology Team:** Z. Fang, I. Cartmill, H. Panigrahi, J. Paul, E. Hughes, M. Livingstone, C. Chow, I. Smiles, S. Shah, A. Stone
- **Haematology Team:** D. Osborne, A. Allameddine, S. Chandhuri, H. Greenfield, M. Pervaiz, M. Rowlands, A. Zhelyazkova
- **NHS Southwark CCG:** M. Przybylo

Antimicrobial pharmacist team: E. Hughes, M. Livingstone, C. Chow, I. Smiles, S. Shah, A. Stone

This project has promoted a reduction in the prescribing of the broad spectrum antibiotics.

- **Southwark CCG values for items/STAR PU 2015/16** are lower than the equivalent quarters for 2014/15 – CCG average 2015/16=0.77 (lower than the NHSE target of 0.93)
- **Our biggest success has been with the broad spectrum agents:** baseline average 2014/15=12.8%; 2015/16 average=11.7%.

The greatest improvement in prescribing has taken place during Q3 of 2015/16, which has seen a 2.8% decrease in broad spectrum agent prescribing compared with Q3 2014/15.

- **The number of co-amoxiclav prescriptions** has fallen from 1200 items in December 2014 to 600 items in December 2015. The items/STAR PU value has also decreased from the previous year; therefore, the decrease in co-amoxiclav prescriptions does not mean that other agents have been prescribed in their place.

When the CCG QP targets for antimicrobials were introduced in 2015/16 the Medicine Optimisation Team (MOT) decided to continue to target antimicrobial prescribing to encourage individual practices to review their antibiotic stewardship and support the CCG in achieving its targets.

The prescribing targets over the last 6 years have led to a reduction in the prescribing of the broad spectrum antibiotics. This was primarily driven by identifying where these agents were being prescribed inappropriately and encouraging the GPs to follow local antibacterial guidelines to select more appropriate
choices. In 2013/14 and 2014/15 the prescribing of these agents plateaued with the MOT concentrating on ensuring the broad spectrum antibacterials were only being prescribed for indications identified in the local guidelines.

In 2014/15 the focus changed slightly and the CCGs decided to concentrate in a different area of antibacterial prescribing, targeting the practice to audit its use of antibiotics in the treatment of UTIs.

The CCG Quality Premium targets have successfully driven down the prescribing of the 3Cs (Cephalosporins, Co-amoxiclav and Quinolones) across the federation from April 2015. Benchmarking data was sent to all practices on a monthly basis and discussed at the CCG council meetings. Practices were also sent data at individual prescriber level.

Early results from a Sore Throat audit are showing a change in the way GP are treating bacterial sore throat, with the majority of patients being advised that no prescription is necessary and to self-medicate as per the PHE advice. This will not only have an impact on breaking the cycle of attending the GP practice with a sore throat, but will also have an impact on the other QP target, which is to reduce the total number of antibacterial prescriptions issued.

1. Auditing by prescribers themselves of the broad spectrum antibiotics to check adherence to guidelines
2. The use of the RCGP audit on sore throat and the use of the Centor criteria. It was also suggested that this audit be used as part of the GPs’ appraisal. Again the GPs were asked to undertake the audit themselves and produce an action plan to be discussed at a practice meeting.
3. The benchmarking of data at practice level but also by individual prescriber level. This data was shared across the CCG at high level CCG council meeting, to ‘name and shame’ and/or ‘name and fame’.

The Dudley Group NHS Foundation Trust
Historically antibiotic audits have been carried out by Pharmacy or by the stewardship team. This project has engaged prescribers not only in the data collection process, but in ownership of the results. The feedback at specialty level, with area-specific data, has provided prescribers with the opportunity to review their own practice as well as that of their peers.

Compliance with guidelines improved with the introduction of new guidelines in collaboration with the stewardship team and the specialist areas. This ensured buy-in from the prescribers from the outset, ensuring shared agendas were met. For example, compliance with guidelines in one specialty increased by 22% with the introduction of mutually agreed guidelines.

Since the introduction of the antimicrobial stewardship programme in August 2014, C. diff cases have fallen from 14 per month in August 2014 to 3 per month in November 2015

Cwm Taf University Health Board
Cwm Taf University Health Board provides NHS services across both primary and secondary care to one of the most deprived populations in Wales. Our population represents a particularly high healthcare burden due to its historical heavy industry presence, and has the lowest life expectancy for both males and females of any other Health Board in Wales.

Because of these demands, Cwm Taf University Health Board is one of the highest prescribers of antimicrobials and is the highest user of co-amoxiclav in Wales. Due to this high usage, E. coli bacteraemia resistance to co-amoxiclav is the highest in Wales at 51.3%.

In August 2014 an antimicrobial pharmacist was appointed to implement antimicrobial stewardship initiatives within both primary and secondary care.

The initiatives introduced have caused a shift from the universal prescribing of broad spectrum antibiotics to the selection of narrower spectrum agents. This is reflected in our co-amoxiclav use, which has decreased considerably at both district general hospitals (DGH), and at one site has fallen below the All Wales average. The other DGH has seen a significant decrease in co-amoxiclav use, which has dropped from 500 to 300 DDD/1000 bed days. However, co-amoxiclav resistance for E. coli bacteraemia remains high at both hospitals with 51.3% in 2014 at one DGH and 43.2% in the second DGH. Changes to resistance will take time and we expect to see a decrease next year.

Research
Antibiotic Research UK
No new antibiotics have been developed for 25 years. Developing and selling antibiotics is not a commercial opportunity addressed by many pharma companies as, despite antibiotics’ overuse in many circumstances, they are not used repeatedly by most patients, unlike drugs for chronic conditions. Cynics might claim that ‘antibiotics cure, not manage’ and that the money is in managing chronic conditions. The challenge is for governments to find ways of financing research into the development of new antibiotics such that we can continue to enjoy lives relatively free of serious infection.

Professor Garner led a group of eminent colleagues to establish the first charity devoted entirely to antibiotics. Antibiotic Research UK (acronym ANTRUK) is a national charity dedicated to finding new antibiotics against resistant bacteria.

ANTRUK has ambitious goals to reverse the decline in antibiotic drug development, particularly given the lack of appetite among ‘big pharma’ to find new therapies. This is critical as the WHO believes antibiotic resistance threatens a global situation as serious as the AIDS epidemic; this has been supported by the UK’s Chief Medical Officer Dame Sally Davies and the Prime Minister. From ANTRUK press release.

ANTRUK aims to raise money primarily in the UK and seeks support from Foundations, Trusts, Industry and the general public. The Charity is a Charitable Incorporated Organisation (CIO) and is able to act as a not-for-profit company. It has a Board of eminent Trustees; its patron is the Archbishop of York.

• We have raised over £300,000 towards funding our innovative research programme to develop one new antibiotic therapy by the early 2020s
• We have developed a research strategy, including our first project on Antibiotic Resistance Breakers
• We were chosen by the UK BioIndustry Association (BIA) as their Charity of the Year. Over £23,000 was raised for the charity at the BIA’s Gala Dinner at the Natural History Museum in London
• We organised the Great British Tea Party on European Antibiotic Awareness Day on the 18 November.

We achieved promotion of the protection of antibiotics through:

• Endorsement from the newly elected MP for Morley and Outwood, Andrea Jenkyns, whose father died from an antibiotic-resistant infection
• Media coverage including features on the BBC News, Sky, ITV, Channel and multiple national and local radio slots. Our press releases can be seen at http://www.antibioticrosearch.org.uk/press-releases/
• The publication of heat maps of antibiotic prescribing patterns throughout England, in collaboration with Exasol AG
Involving our pre-registration pharmacists at all stages of this event has improved their knowledge of antibiotic stewardship

Our Trust Executive Board, having heard about our EAAD activities via the Antimicrobial Stewardship Team and Infection Prevention Team, requested a learning session on our activities from the Consultant Pharmacists. We took this opportunity to promote antimicrobial stewardship at the highest level in our organisation. This has resulted in greater engagement with the work of the team.

The ‘Rx Factor Awards’ allowed us to recognise the contributions of two clinical teams, our Acute Surgical Unit consultants, and Respiratory High Care consultants, to good antimicrobial stewardship practice. These teams were nominated for their prompt review of antimicrobial prescriptions and their regular discussions with the microbiology/ID consultants. We also recognised three pharmacists, two individual doctors and a nurse for their continuous efforts to promote appropriate antimicrobial prescribing and ensure best practice in infection management.

We extended our reach beyond the Trust via Twitter and Facebook, and would like to have a higher profile external to the Trust next year. This may be achieved by going into schools and/or the city centre.

Involving our pre-registration pharmacists at all stages of this event has improved their knowledge of antibiotic stewardship and has developed their skills in sharing this knowledge with other professionals. They will start their careers well-equipped to encourage others to protect antibiotics.

Staff Engagement
University Hospital Southampton NHS Foundation Trust

For European Antibiotic Awareness Day 2015, the UHS antimicrobial stewardship team enlisted the help of our pre-registration pharmacists to promote careful use of antibiotics to staff, patients and visitors to our hospital. We arranged and staffed a stand outside the hospital restaurant, providing information on our local use of antimicrobials and public health messages around appropriate antimicrobial prescribing. We helped 76 people to make their Antibiotic Guardian pledge on the day, using laptops on the stall, and promoted the campaign to many more.

The team also visited wards throughout the hospital, speaking to over 150 clinical staff. They used a specially designed flyer showing how our local prescribing compares to national data and promoting our local antibiotic guideline smartphone app.

The team ran a stewardship-themed crossword competition, a social media campaign on Twitter and Facebook, a poster campaign throughout the Trust, changed all computer screensavers throughout the Trust to carry antibiotic stewardship messages, and presented on antibiotic stewardship at the Trust-wide Grand Rounds meeting that weekend.

In addition, we run a annual competition known as the ‘Rx Factor Awards’ to identify and celebrate local role models demonstrating good antimicrobial stewardship. We take nominations from pharmacists and infection doctors, look at objective measures of referrals to the microbiology team for review, and identify the most prolific antibiotic audit data collector. The winners, chosen on EAAD each year, are given a small prize and an ‘Rx Factor winner’ certificate; their achievement is celebrated through hospital media channels.

Dudley Pharmaceutical Health Team, Dudley Office of Public Health, Dudley Metropolitan Borough Council

The project focused on the use of social media and promotion of information relating to antibiotic stewardship. For the launch of the ‘StartSmart’ module, posters were printed for GP practices to use for clinical consultations. Packs containing posters, leaflets and a signed letter from both Community Health Practitioner, Community Pharmacist, Prescribing Advisor and a communications team that handed out leaflets, conducted questionnaires and talked to the public about antibiotics.

A YouTube video featuring a GP lead talking about the prudent use of antibiotics was produced. This video has been rolled out to GP practices’ waiting rooms.

Staff training and education on AMS was also a key necessity to help improve practice in the Trust. A bespoke e-learning module was developed, introduced and launched with the executive director and L&D team support.

A YouTube video featuring a GP lead talking about the prudent use of antibiotics was produced.

Antimicrobial Resistance Impact Report for the UK; The 2016 Antibiotic Awards Submissions

The national ‘call for action’ to improve antimicrobial practices resulted in the first Trust-wide inpatient antimicrobial prescribing audit. The results showed a real need to improve antimicrobial stewardship (AMS) and prescribing in accordance to national standards across the Trust.

Quickier and smarter access to Trust prescribing guidelines was a major request from practitioners across the Trust. A smartphone app (the Microguide®) was developed, along with an intranet version. The launch and promotion of this was important to ensure good access, so we worked together with our communications and infection prevention and control teams to launch it Trust-wide on EAAD. We did so using a variety of methods, including computer screensavers during the week leading up to EAAD, a pharmacy team promotional video, promotional stands across all Trust sites in the county and face-to-face sessions at ward level for staff.

The ‘call for action’ to improve antimicrobial practices resulted in the first Trust-wide inpatient antimicrobial prescribing audit. The results showed a real need to improve antimicrobial stewardship (AMS) and prescribing in accordance to national standards across the Trust.

The results showed that after training the GPs who provide contracted care showed improvements across most standards; two standards improved to 100%.

The Trust-wide re-audit of inpatient prescriptions was carried out after the interventions above were made. The results showed significant improvements in most standards audited, with 2 out of 8 standards being 100%.

Collaborating with local primary care and CCG colleagues to spread the word into primary care has continued, with work currently being undertaken to develop a cross-sector AMS committee and joint guidelines.

All inpatient wards have received a series of face-to-face training sessions run by the project pharmacist via the training package delivered by the ward pharmacist. These training sessions have highlighted the Start Smart Then Focus campaign, the need to use local guidelines and how to access and use the smartphone app. Staff have also been trained in appropriate AMS prescribing.

Usage figures from Microguide® indicate improved staff engagement with the Trust’s antimicrobial formulary and increased usage soon after the ward face-to-face training sessions. This along with prominently displayed laminated Start Smart posters, Start Smart laminated quick reference cards attached to Trust badge lanyards and antibiotic allergy traffic light posters have all raised the profile of AMS and have been welcomed by ward staff.

The e-Learning package has been made essential training for new medical staff and all pharmacists.

Anecdotal evidence from our community hospital wards showed that after training the GPs who provide contracted services to the wards were making prescriptions for antibiotics according to Trust guidelines, and that antibiotics were prescribed in line with trust standards from the Start Smart guidance.

The Trust-wide re-audit (2015) undertaken after these initial interventions above were made showed improvements across most standards; two standards improved to 100%.
The audit results and project work have been shared with the Trust executive and closer links have been forged with Infection and Control as a result of the work. A staff engagement survey was conducted and sent to all staff who attended the ward training. This survey consisted of 20 questions devised to gain staff opinion on their experience of the Microguide app, e-Learning and antimicrobial ward training face-to-face sessions.

- 50% of respondents were nurses, 29% pharmacy staff and 21% medical staff.
- Prior to any education or training about AMS, 2/3 of responders had no previous formal education from the Trust about AMS.
- 40% had downloaded and used the smartphone app; the majority had used the Trust intranet.
- 90% of all respondents said the new guidelines available on the app or on the Trust intranet were useful.
- 73% of responders had started or completed the e-Learning module.
- 80% of responders preferred the face-to-face ward training.
- 73% of responders felt they had positively changed their practice. This was reflected in better knowledge, making sure that cultures and tests were carried out and followed up on, quicker access to guidelines and general awareness of good AMS.

The re-audit results outlined above have been encouraging. The third annual audit was conducted in February 2016. This third audit will follow the completion of AMS training on all wards and although being a snapshot in time, it will direct future training needs.

1. Start Smart Then Focus posters and penicillin traffic light posters put up in prominent places on all wards.
2. Updated guidelines quickly and smartly accessible now via the smartphone app and Trust intranet reflecting local sensitivities.
3. RRAT drug lists having limited access to broad spectrum antibiotics.

Isle of Wight NHS Trust
We run regular ‘Bug club’ lunchtime teaching sessions over several years. Staff involved in prescribing and administering antibiotics attend the sessions. These including nurses, pharmacists and junior doctors. Sessions include the use of materials from the Centre for Pharmacy Postgraduate Education and cover antibiotic pharmacology, antibiotic selection and treating infection, antibiotic administration issues, antibiotic monitoring and the role different members of ward staff can play in effective antimicrobial stewardship. The club has been especially proactive in getting nursing staff involved in the sessions and highlighting their important role in antimicrobial stewardship. This includes both ward-based nursing staff as well as the nurses based in the OPAT (outpatient antimicrobial therapy) clinic, where they can use the knowledge they have developed about antibiotic use to educate their patients about appropriate antibiotic use and antibiotic effects.

Staff who have attended bug clubs are more empowered to identify and challenge or highlight to the antimicrobial stewardship team pharmacy prescriptions that are not in line with Trust antibiotic guidelines. Nursing staff also have improved awareness of the importance of timely administration of antibiotics and its impact on the successful treatment of infections and development of antibiotic resistance.

- Highlighting to nurses their role in antibiotic stewardship by improving awareness of the importance of timely antibiotic administration.
- Highlighting to pharmacists the importance of antibiotic stewardship and improving their understanding of the antibiotic guidelines and acting where antibiotics outside the guidelines are prescribed.
- Educating junior doctors about the importance of appropriate antibiotic use to encourage appropriate antibiotic use.

Stewardship
North of England Commissioning Support unit
The challenge was to develop an easy to follow and easily accessible toolkit of antimicrobial prescribing resources and interventions to support doctors, nurses, DOH services and other primary care clinicians in the rational use of antibiotics across the North East and Cumbria (NE&C).

Prior to 2013 across NE&C, each PCT produced individual guidelines/resources to support antibiotic prescribing. Although each area demonstrated good practice, there was no effective mechanism for the wider sharing of these resources. Organisational boundaries and a multitude of secondary care trusts mitigated against sharing of good practice.

A NECS Medicines Optimisation (MO) working group thus focused on what could be done to implement good practice across a wider footprint, making shared resources easily accessible to all.

As secondary care influences antibiotic prescribing in primary care, the NECS team identified that involvement; buy-in from secondary care colleagues was vital for producing a regional guideline.

Links were established with the regional hospital antimicrobial pharmacist group and microbiologist colleagues, building and strengthening relationships between primary & secondary care and facilitating cross-organisational working across the primary/secondary care interface. Links were established with the regional PHE Lead Microbiologist and NHSE Antimicrobial Stewardship Leads, adding wider awareness of national issues.

Our awareness work culminated in a regional conference focusing solely on antibiotic stewardship attended by 90 healthcare professionals from across the North east & Cumbria (NE&C). We were supported by national speakers from PHE and NHSE, together with local clinicians running a series of afternoon workshops.

Building upon existing work, a collection of multifaceted interventions were developed. These were designed for use at individual prescriber, GP practice and CCG organisational levels:

1. NE&C antibiotic guideline – providing accessible, clear and concise guidance for primary care clinicians, and developed by NECS-MO in collaboration with specialist antibiotic pharmacists and microbiologists from NE&C Trusts and PHE. The single guideline promotes appropriate use of antimicrobials, addresses variations in prescribing and aims to support patients with strategies other than antibiotics.

The guideline has had more than 1500 views on the NECS-MO website.

2. ‘MicroGuide’ smartphone app – providing prescribing guidance in an accessible, user-friendly format. In the first 3 months it has been downloaded by more than 600 clinicians and accessed more than 1000 times.

3. E Learning – developed with NECS IT, and raising awareness of the antimicrobial stewardship agenda and focusing on strategies for appropriate prescribing. This built upon the eLearning programme driven by NHS County Durham and Darlington, a finalist in the 2013 HSI Efficiency Awards. The eLearning had been accessed more than 650 times in 10 months.

4. Face-to-face Clinician workshops – developed and delivered by NECS-MO to GPs, nurses and pharmacists in all interested CCGs.

5. Public communications campaign – designed and developed with NECS Communications & Engagement. The campaign reached 3.38m people in the North East (53% of the total population), and consisted of resources for health professionals and the public to promote self-care and raise awareness of the ineffectiveness and potential harms of antibiotics for common winter illnesses. The campaign coincided with European Antibiotics Awareness Day in November 2014 and continued throughout the winter. Resources were designed to be used all year round and comprised:

- Patient advice leaflets – for prescribers to support patients presenting with self-limiting respiratory tract infections where no, or a delayed, antibiotic prescription is appropriate. The leaflets were distributed to all GP practices in NE&C, NECS practice based pharmacists supported the implementation.
- ‘Antibiotics aren’t always the answer’ posters – distributed to all NE&C GP practices and community pharmacies and displayed in waiting areas and consulting rooms.
- Information postcards – informing patients about expected length of symptoms and self-care advice. Distributed through GP practices and community pharmacies.
- Media coverage – ‘Antibiotics aren’t always the answer’ television adverts, shown throughout November/December 2014 with news items featuring local clinicians on BBC local radio.
Community-acquired pneumonia (CAP) is a major cause of morbidity and mortality worldwide, resulting in over 100,000 patients being admitted to UK hospitals annually.

Moving to a regional approach had never been done before on this scale across NE&C, yet feedback has been very positive. The regional guideline has been downloaded over 2000 times across NE&C, yet feedback has been very positive. The project demonstrated the importance of engagement across the primary/secondary care interface and partnership working between professional groups and with patients. The regional conference was attended by 90 healthcare professionals from across the North East & Cumbria. We were supported by keynote speakers from both PHE and NHSE. A series of afternoon workshops were also delivered, and covered:

- UTI management in care homes
- TARGET toolkit
- C. diff management in primary care

Derby Hospitals NHS Foundation Trust

Community-acquired pneumonia (CAP) is a major cause of morbidity and mortality worldwide, resulting in over 100,000 patients being admitted to UK hospitals annually. Broad-spectrum antibiotics are used to treat CAP, but half of the patients are misdiagnosed and inappropriately over-treated, and only 13% have a positive microbiological diagnosis allowing a switch to narrow spectrum regimens. Appropriate antibiotic prescribing based on robust diagnosis, microbiological aetiology and inflammatory markers rather than broad spectrum empiricism has also been shown to reduce antibiotic use in lower respiratory tract infections. Such targeted prescribing minimises the development of antibiotic resistance, antibiotic-associated infections (such as Clostridium difficile) and drug side effects, and does not worsen outcomes.

Intervention:

We have introduced a Respiratory Infection Team working within the acute admission areas of the Derby Hospitals NHS Foundation Trust (DHFT). This team comprises a nurse specialist with antimicrobial pharmacist and respiratory consultant supervision. The team reviews all adults admitted between Monday and Friday with suspected CAP within 18 hours of admission, and performs the following functions:

1. Within the group of patients with suspected CAP, distinguish true CAP from other lower respiratory tract infection (LRTI) using British Thoracic Society criteria.

2. Perform point-of-care bedside microbiology testing for Streptococcus pneumoniae, Legionella pneumophila and influenza using commercially available non-culture assays, with sputum samples sent urgently to the pathology laboratory for Gram stain where practicable.

3. Using these data, empower the attending acute medical team to a) change or stop antibiotics in patients where there is no evidence of CAP, and b) streamline antibiotic regimens for patients with confirmed CAP within 48 hours of admission, thereby reducing total amount of antibiotics prescribed both in route (oral over intravenous) and spectrum (narrow over broad).

4. Ensure severity scoring in all patients, encouraging the use of guideline concordant narrow spectrum antibiotic regimens where appropriate in patients with low severity CAP, and facilitating appropriate early discharge and outpatient management. We are undertaking continuous audit and statistical process control methods to monitor in near real time the effect of our novel service on antibiotic prescribing.

This project is a radical departure from the conventional, empirical ‘one size fits all’ approach to CAP care, replacing it with a personalised antibiotic and management strategy based on severity and microbiological aetiology.

Within the field of CAP, appropriate antibiotic prescribing is growing to a much higher extent as effective as broad spectrum empiricism. However, the vast majority of patients are still managed without a positive microbiological diagnosis (see BTS national audit data). This project has completely changed the way that decisions about antibiotic choice are made. We have demonstrated success in the following ways:

1. Ensuring that, where possible, a microbiological diagnosis is made in patients with CAP. To date, 50% of patients reviewed by the service have had a positive microbiological diagnosis, which is in line with the proportions expected from previous research studies in this area. This has allowed the admitting teams to inform antibiotic choice while the patient is still in the acute admitting area.

2. Reduce the time taken for a microbiological diagnosis to be made. Of the patients reviewed so far, the positive microbiological diagnosis has been made within 18 hours of admission. This means that the opportunity for antibiotic streamlining for individual patients occurs earlier in the admission episode, and hence the potential for reducing total antibiotic use is higher.

3. Within periods of peak seasonal influenza, the service has been valuable in providing a rapid influenza diagnosis, in place of the four days it previous took to obtain a throat swab viral PCR result. This has enabled infection control teams to make rapid decisions as to whether patients need isolation and respiratory viral precautions; in particular, it has enabled a reduction in the number of patients requiring such isolation, improving patient flow through the hospital.

4. Improving awareness of antibiotic stewardship. The respiratory infections team is based in the medical assessment unit, through which all patients with suspected CAP are admitted. This presence, and the frequent clinical interaction between the respiratory infections team and the admitting clinical teams builds clinical partnerships and furthers education of the junior acute medical doctors. The hope is that this emphasis on correct microbiological diagnosis informing antibiotic choice will persist in the junior doctors’ practice as they rotate through other specialities. The team is also participating in local departmental and governance meetings to further the cause of antibiotic stewardship.

The respiratory infections team is promoting reduction in antibiotic use in three main ways:

1. By making an early microbiological diagnosis in patients admitted with CAP, we empower the medical team to narrow the antibiotic spectrum to reflect the infecting pathogen, rather than to empirically cover all potential pathogens.

2. We promote accurate diagnosis for CAP, distinguishing it from other lower respiratory tract infections, which have different antibiotic recommendations, usually with a narrower spectrum.

3. By promoting severity scoring we encourage guideline-concordant prescribing of narrow spectrum antibiotics where appropriate. British Thoracic Society and NICE guidance uses severity scoring to determine antibiotic choice; higher severity is reflected in broader spectrum of antibiotic use. However, national audit suggests that patients with low severity CAP are frequently treated empirically with broad spectrum antibiotics as for patients with higher severity.

British Equine Veterinary Association

In 2012 The British Equine Veterinary Association (BEVA) developed an antimicrobial stewardship toolkit under the title of PROTECT ME. The name was designed to represent a plea to preserve the use of essential medicines for both human and animal health as well as to represent an acronym around which policy was built. The principle of this protocol was for the development of local practices for empirical use, dosing and selection of PROTECTED antimicrobials.

P: Practice policy – creating a summary toolkit for clinical use of antimicrobials based on common clinical scenarios, classifying the highest order critically important antimicrobials as PROTECTED

R: Reducing prophylaxis – encouraging the development of evidence-based review for surgical prophylaxis and identifying other methods to reduce perioperative morbidities.

O: Other options – encouraging the use of topical, local therapy, wound lavage or debridement

T: Types of drug – bacteria – providing a toolkit whereby local policies for empirical use versus culture and sensitivity before using ‘PROTECTED’ antibiotics

E: Employing narrow-spectrum antibiotics by highlighting evidence for suitable drug–bacteria combinations based on common infections seen in horses.

C: Using culture and sensitivity

T: Treating effectively – it is common for doses of other antimicrobials to be licensed for use at doses and frequencies that have since been shown to be ineffective. This aspect of the toolkit encourages practitioners to develop evidence-based policies for effective dosing in horses based on a common template.

M: Monitoring – monitoring use of antibiotics, including encouraging local policies that require users to ‘sign out’ protected antimicrobials as though they are controlled drugs. Also to monitor local susceptibility and changes in bacterial susceptibility.

E: Education – of both the veterinary team and the owners of horses about the importance of antimicrobial resistance and measures that can be adopted to reduce its development. Each year, to coincide with EAAD, BEVA has launched additional tools. These include posters and cartoons to be used in social media around EAAD (2013); tools to encourage clinical audit (2014), a process very much in its infancy in veterinary practice; and most recently detailed information about handling of antibiotics for horse owners (2015).
Since 2012 there has been a 30% reduction in sales of 3rd and 4th generation cephalosporins in the UK. Since the introduction of the Pennine Model for Antimicrobial Stewardship, a massive reduction in the number of post 72 hour cases of C. diff infection rates has been observed.

In 2014 a survey of the membership indicated that this had increased to 66% of UK veterinary practices. It is well established that the development of such policies is an important driver to effective stewardship. The practice protocols have been downloaded over 14,000 times (there are approximately 5000 UK equine veterinary surgeons in the UK, suggesting widespread international access). It is widely cited as evidence of best practice throughout the UK: http://www.bva.co.uk/News-campaigns-and-policy/Policy/Medicines/Antimicrobials/ and within the European Commission: Guidelines for the prudent use of antimicrobials in veterinary medicine. Practical examples (2015) Official Journal of the European Union (2015/C 299/04) Since 2012, there has been a 30% reduction in sales of 3rd and 4th generation cephalosporins in the UK. Although national sales figures for fluoroquinolones for use in horses are not available within the UK, an audit in one major veterinary practice in the UK showed a 95% reduction in use of this class of antibiotic after the adoption of the PROTECT ME toolkit. This reduction has been sustained, with sales figures remaining 90% lower than before adoption in each year since 2012. Equine Veterinary Journal, the highest impact peer-reviewed single species veterinary journal, introduced an antimicrobial stewardship policy in 2013. This requires any scientific research that considers antibiotics listed by the WHO as being the highest priority critically important antimicrobials to discuss and defend the use of these medicines, ensuring that clinical practice is not primarily manipulated by the latter veterinary research. This was the first journal internationally to develop such a responsible use policy, although other veterinary journals have since followed this leadership. Cornwall Antimicrobial Resistance Group (CARG) The main purpose of the group is to ensure a coordinated Cornwall-wide response to the UK AMR strategy. The group has a wide and far-reaching membership: Public Health Consultant, Cornwall Council (Chair), Chief Pharmacist Royal Cornwall Hospital (RCHT) (Deputy Chair), Infection Prevention & Control Nurse Consultants (NHS Kernow CCG & RCHT), representatives from community hospitals and mental health, Antimicrobial Pharmacist RCHT, Lead Microbiologist RCHT, Public Health England Consultant, GP Clinical Lead & Pharmaceutical Advisor NHS Kernow CCG, APHA Veterinary Representative, Dentists from private sector and urgent care, Out of Hours Medical Director, University of Exeter Medical School lecturer, Community Pharmacist (LPC chief officer), new ‘Drug & Bug’ nurse and Healthwatch Cornwall (patient group).

Since forming, the group has built strong collaborative relationships between members, provided an increased awareness of the challenges faced by each sector and provided organisational assurance that the AMR strategy is being implemented. CARG looks at the following on a regular basis:
- Primary & secondary care antibiotic prescribing reviewed every 6 months, data on veterinary antibiotic usage in UK, environmental drivers for AMR and ongoing research, provision of education about AMR to public and healthcare professionals, discussion of published reports.
- It was agreed that primary care POC CRP testing and UTI testing look promising.
- Our APHA veterinary representative is looking to engage with the Cornwall Veterinary Association to share awareness of AMR and improve stewardship for this sector.
- PHE has set up a national dental group, and work has already been done on antibiotic prescribing in Cheshire. A local initiative on dental antibiotic prescribing will share its experience before further progress is made.
- Cornwall Healthly Schools link established and implementation of E-bug material to one secondary school as a pilot site.
- Nissan Timeside and Glossop CCG

- Reducing unnecessary and inappropriate antibiotic prescribing by working towards achieving our quality premium (QP) targets. As part of this we chose to look at the weaker prescribing areas in our CCG and work towards improving them.
- Undertaking practice-based antibiotic audits in order to highlight issues within the Practice.
- Ensuring prescribers are aware of the local antibiotic guidelines and always prescribing accordingly.
- The Walk-in Centre was also given priority and audits undertaken to reduce antibiotic prescribing.

The main issue was inappropriate prescribing of co-amoxiclav – which has reduced. Our total antibiotic prescribing was very good, so our plan was to target the broad spectrum prescribing. In most practices we used co-amoxiclav as a marker to audit prescribing and then advise on general antibiotic stewardship principles when giving feedback to individuals.

A lot more prescribers are now aware of how to access the guidelines through the web and the smartphone app. High prescribers of broad spectrum antibiotics have slowly reduced, with most of them now below the national average.

1. The walk-in centre had 102 fewer prescriptions for antibiotics issued when like-for-like quarters were compared (quarter 2 14/15 vs 15/16).
2. Most of the high broad spectrum prescribing practices are now below the national average (the majority are below CCG average)
3. A lot more prescribers are now aware of our local antibiotic guidelines and access them regularly. These are based on PHE guidelines, taking into account local resistance.

Penne Acute Hospitals NHS Trust

The Penne Acute Hospitals NHS Trust has developed a multifaceted approach to antimicrobial stewardship in an attempt to improve antimicrobial prescribing in the trust and facilitate in the reduction of healthcare associated infections. The four main components of the ‘Penne Model for Antimicrobial Stewardship’ are:
- Antimicrobial ward rounds & audits
- Bi-annual antimicrobial point prevalence studies
- Emergency infection control ward rounds.

The ward rounds are conducted by a consultant clinical microbiologist and an antimicrobial pharmacist. During these sessions patients have their antimicrobial therapy reviewed and modified where necessary.

Antimicrobial ward audits are conducted by a consultant clinical microbiologist and an antimicrobial pharmacist to assess compliance with the Trust’s Antibiotic Policy. Lead clinicians and ward managers are given written reports. During the bi-annual antimicrobial point prevalence study every inpatient across the Trust is audited and those found to be prescribed an antimicrobial have their prescription assessed for compliance with the Trust Antibiotic Policy.

Emergency infection control ward rounds are deployed when a particular infection issue arises on an individual ward, for example multiple C. diff infections. The consultant clinical microbiologist and the antimicrobial pharmacist make daily visits to the ward in order to control the antimicrobial prescriptions and to enforce infection control measures when necessary.

These are supported by formal education sessions and by additional ad-hoc audits conducted by the team and their supporting colleagues in response to issues that arise.

The compliance rates observed through completing the antimicrobial ward audits have improved from 80% (2012). Currently rates of 100% are far more commonly observed. There has been a massive reduction in the number of patients referred for the antimicrobial ward rounds. When first introduced approximately ten years ago around 20-30 patients per week were being referred to the team for review, whereas currently only 3 patients on average are referred each week. The bi-annual antimicrobial point prevalence study was introduced in November 2013. At the time the non-compliance rate for the whole Trust was 2%. In July 2015 the non-compliance rate had fallen to 0.8%.

Since the introduction of the Pennine Model for Antimicrobial Stewardship there has been a massive reduction in the number of post 72 hour cases of C. diff infection rates has been observed. In 2010/11 160 cases were reported Trust-wide; this fell to 86 cases in 2012/1. We are currently on track to meet the trajectory of no more than 55 cases for 2013/14. This significant reduction in C. diff infection rates has markedly reduced the number of emergency infection control ward rounds.

The results obtained from the various elements of the Pennine Model for Antimicrobial Stewardship have been widely communicated to staff at all levels. By deploying a multifaceted approach to antimicrobial stewardship it has been possible to engage and involve staff from many different disciplines. This allows the importance of antimicrobial stewardship to be highlighted and taught across the Trust.

This work was recognised by the European Congress Programme Committee of Clinical Microbiology and Infectious Diseases and was selected as an e-poster to be presented at the ECCMID in 2014.

This work and the achievement are the results of teamwork. The core team members are:
- Microbiology Team: Z. Fang, I. Cartmill, H. Panigrahi, J. Paul, E. Trautt, M. Przybylo;
Stewardship strategies already in place in our institution included an antimicrobial prescribing policy

St George’s University Hospital Foundation Trust

In May 2013 a review of recent Clostridium difficile root cause analyses (RCAs), prompted by a large number of cases in the first quarter of the financial year (25), identified suboptimal antibiotic prescribing. Issues included unjustified non-compliance with guidelines, prolonged administration of broad-spectrum antibiotics and poor review of antibiotics following initiation.

The RCAs also identified a lack of evidence that pharmacists were challenging poor prescribing practices and assisting in reviewing prescriptions, although it was unclear whether this related to poor practice or poor documentation.

Stewardship strategies already in place in our institution included an antimicrobial prescribing policy; readily available treatment, prophylaxis and IV to oral switch guidelines; mandatory documentation of indication and duration on the drug charts; and education on stewardship for all pharmacy, nursing and junior medical staff. These strategies are overseen by the Antimicrobial Stewardship Committee and supported by three-times weekly multidisciplinary team (MDT) stewardship rounds and quarterly auditing of compliance with antimicrobial prescribing policies/guidelines.

Pharmacy responded to the issues highlighted by disseminating information gathered from the RCAs to all staff and implementing a programme of senior pharmacist stewardship rounds. Every inpatient ward was allocated a senior pharmacist (band 8) who would conduct a monthly antibiotic pharmacist on a monthly basis and reported at the pharmacy directorate meeting.

The aims of the stewardship round were to raise the profile of stewardship within pharmacy; increase supervision of junior pharmacists on the wards; provide ward-based education on stewardship; improve the documentation of pharmacist interventions in the medical notes; and increase the number of patients whose antibiotics were reviewed by a senior member of staff outside the clinical team caring for the patient.

Experience from the MDT stewardship rounds suggested that interventions often did not require in-depth knowledge of infectious diseases and antimicrobial therapy, just that time was taken to scrutinise prescriptions with stewardship at the forefront of the mind.

All senior pharmacists undertaking stewardship rounds were given education on how to review an antibiotic prescription, opportunities to attend the MDT stewardship rounds and feedback on their ward round reports from the antibiotic pharmacist. They were encouraged to refer complex cases to the MDT stewardship rounds for further review.

Introduction of these stewardship rounds has significantly increased the number of patients having a review with a primary focus on stewardship. The rounds took time to embed in clinical practice with on average 18 rounds per month conducted in 2013, compared with 31 in 2015. This is a significant addition to the 3 times weekly MDT rounds, which reach an average of 123 patients per month.

A sample of intervention data from November and December 2015 shows that 297 patients were reviewed by a senior pharmacist (186 in November and 111 in December). The intervention rate was 31% (61 interventions made in November and 30 in December). This is significantly lower than the intervention rate on the MDT ward rounds (46% of patients reviewed). Intervention rate was also highly variable, ranging from 0% to 100% of patients reviewed.

The most common intervention on the pharmacy stewardship rounds in this 2 month period was documentation of the indication or a review date on the drug chart (20% of interventions, 6% of reviews), followed by dose adjustment and IV to oral switch (both 10% of interventions in 6% of reviews). Rates of IV to oral switch were similar on the MDT rounds (8% of reviews, 18% of interventions made). However, documentation of indication and review date is not classified as an intervention on these rounds and dose adjustments were made infrequently.

MDT ward rounds more commonly recommended stopping antibiotics; a future stop date was advised in 22% of reviews and a recommendation to stop antibiotics on the day of the review was made in 5% of reviews. Just 2% of pharmacist reviews involved a recommendation to stop therapy.

The stewardship rounds did promote a small number of referrals to microbiology, with the medical team advised to refer to microbiology in 7 patients (2% of those seen on pharmacy stewardship rounds). One further patient was referred to the OPAT service.

CDI rates fell in the final 3 quarters of the financial year, with reductions seen in inappropriate antimicrobial use on RCAs.