Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection (ARHAI)

5th Annual Report, April 2013 - March 2014

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Chair's Foreword

The threat of antimicrobial resistance (AMR) was highlighted by the Chief Medical Officer for England in her annual report published in 2013.[1] This call for action culminated in the publication of the UK five year antimicrobial resistance strategy (2013-2018) jointly by the Department of Health and the Department for Environment, Food and Rural Affairs,[2] thereby cementing a whole healthcare approach to tackling the challenge of AMR. The aims of the strategy are to improve the knowledge and understanding of AMR, conserve and steward the effectiveness of existing treatments and stimulate the development of new antibiotics, diagnostics and novel therapies. These aims are at the core of the work plan of ARHAI.

Many task and finish subgroups formed by ARHAI in the past year have directly addressed key questions required to deliver aims of the UK 5 year AMR strategy in relation to human and animal health. These included developing a simple matrix of the key drug/bug combinations to monitor the overall burden of AMR, as a system to monitor the impact of the UK 5 year AMR strategy. ARHAI has also developed antimicrobial prescribing quality measures to drive appropriate prescribing of antibiotics and improve patient safety.

The past year has also seen the ever growing threat of multi-drug resistant gram negative micro-organisms. A task and finish subgroup delivered it's recommendations regarding *E. coli* bacteraemia, it is hoped that the interventions proposed will lessen the incidence of infection thereby negating the need for antibiotic treatment and decreasing the evolutionary pressure for these bugs to develop resistance to antibiotics. Resistance in Gram-negative bacteria will remain a focus of ARHAI in the coming year.

ARHAI were delighted to welcome Professor David Livermore and Professor Alastair Hay as members over the past year. I am indebted to Dr Edward Smyth and Professor Susan Dawson for their contributions to ARHAI and wish them well as they leave the committee. An open appointment process for new members will commence later in 2014. We also welcomed Dr Emma Budd and Mr Alex Bhattacharya to the secretariat team and bid farewell to Dr Jo Wallace and Ms Sharon LeCount.

Professor Mike Sharland
Professor of Paediatric Infectious Diseases,
St George's, University of London
Chair, Advisory Committee on Antimicrobial Resistance and Healthcare-Associated Infections (ARHAI)

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[1] Davies S. Annual Report of the Chief Medical Officer 2011: Volume Two. Infections and the Rise of Antimicrobial Resistance. http://www.dh.gov.uk/health/2013/03/cmo-vol2 (07 May 2014, date last accessed).
[2] Department of Health. UK 5 Year Antimicrobial Resistance Strategy 2013 to 2018. https://www.gov.uk/government/publications/uk-5-year-antimicrobial-resistance-strategy-2013-to-2018 (07 May 2014, date last accessed)

Plain English Summary

ARHAI is the expert scientific advisory committee providing independent advice to the Department of Health on antimicrobial resistance and healthcare-associated infection. The committee provides advice on policies and guidance to minimise healthcare-associated infections, and to conserve the effectiveness of antibiotics by encouraging best practice in prescribing.

This annual report covers the period from April 2013 – March 2014.

Resistance to antimicrobials (antibiotics, but also antifungals and antivirals) continues to increase. The threat that many common infections, as well as serious infections, will become increasingly difficult to treat is now being recognised worldwide. Despite increased public awareness of the danger of antibiotic resistance, the amount of antibiotics being prescribed in the UK continues to rise. There is a clear need to educate the public about using antibiotics only when they are really needed, and a need to ensure that doctors always prescribe according to professional guidance.

In November 2013, the UK Five Year Antimicrobial Resistance Strategy was published. Much of the committee's work in the year was in developing the strategy and planning measures to achieve the objectives set out in the strategy. The strategy covers animal health and the environment, as well as human health, in recognition that all three are linked.

Examples of ARHAI's work in connection with the strategy include:
- recommendations on which specific types of resistance should be most closely monitored, i.e. resistance to which antibiotics being used for which bacteria: "drug-bug combinations".
- Goals to reduce prescribing of antibiotics both in primary care and in hospitals to specific levels within the 5 years of the strategy: known as "prescribing quality measures"
- Raising awareness through European Antibiotic Awareness day on November 18th each year, with an increasing effort to target the public and patients, as well as vets, farmers and pet owners.

Turning to healthcare associated infections, the committee's work concentrated on infections caused by a group of bacteria called "gram negative". These bacteria include *E. coli*, a common bug in the gut which is becoming increasingly resistant to treatment. Meanwhile bloodstream infections caused by MRSA and also *C. difficile* infections remain at the much reduced levels achieved by the NHS since their peaks in 2003 and 2010 respectively. Recent research on *C. difficile* indicates that it is not always being spread from one sick patient to another, so more research is needed to understand fully how it is spread in order to reduce cases further.

Infections in wounds after surgery remain a concern, so the committee reviewed the need for further guidance. However, the recommendation is that the current guidance is appropriate, but still needs to be followed more consistently in hospitals in order to reduce the number of infections.

ARHAI publishes committee papers and minutes on its website (unless these are required to be confidential). There are also plain English summaries in all papers presented to the committee and also in guidance or recommendations which ARHAI publishes.

Ms Isabel Boyer
Lay member, ARHAI

Abbreviations

AMP	Antimicrobial Prescribing
AMR	Antimicrobial Resistance
APQM	Antimicrobial Prescribing Quality Measure
ARHAI	Antimicrobial Resistance and Healthcare Associated Infections
CDI	*Clostridium difficile* infection
CMO	Chief Medical Officer
DARC	Defra Antimicrobial Resistance Coordination group
DH	Department of Health
EAAD	European Antimicrobial Awareness Day
ESPAUR	English Surveillance Programme for Antimicrobial Usage and Resistance
HCAI	Healthcare Associated Infections
HLSG	High Level Steering Group (for the UK 5 year AMR strategy)
HPA	Health Protection Agency
HPRU	Health Protection Research Unit
ICU	Intensive Care Unit
MRSA	Meticillin Resistant *Staphylococcus aureus*
PHE	Public Health England
PIR	Post Infection Review
SSI	Surgical Site Infections
SSTF	Start Smart Then Focus
UTI	Urinary Tract Infection

Introduction

This is the fifth annual report of the expert advisory committee on Antimicrobial Resistance and Healthcare Associated Infection (ARHAI). The Annual Report is produced as part of ARHAI's policy on openness, as set out in its Code of Practice.

This report outlines ARHAI's activities and achievements in the period April 2013 to March 2014 and highlights the value that its independent scientific advice adds to the Department of Health England (DH).

Remit

ARHAI was established in April 2007 to provide practical and scientific advice to DH on strategies to minimise the incidence of healthcare associated infections (HCAI) and to maintain the effectiveness of antimicrobial agents in the treatment and prevention of microbial infections in man and animals. In making recommendations, the committee takes into account the relevant work of other expert groups in the human and veterinary fields.

From 2013 ARHAI has made recommendations to the High Level Steering Group (HLSG) for the UK 5 year AMR strategy and has formed a partnership with national bodies such as Public Health England (PHE) and NHS England to enable pragmatic and effective implementation of ARHAI recommendations.

Meetings

In 2013/14 ARHAI's meeting format reflected the main areas within the committee's remit: HCAI; Antimicrobial Resistance (AMR); Antimicrobial Prescribing and Stewardship (AMP). The committee holds three main meetings per year, focusing on these areas sequentially in spring, summer and autumn. Meetings commence with a focused session on the main theme, provided by external speakers, giving technical updates on e.g. current research, surveillance, epidemiology, modelling, optimising data linkage.

A further meeting, involving the Chair, deputy-chair, sponsor and secretariat, is held each winter to review the committee's work over the past year, consider current and upcoming research outputs and determine the forthcoming years work programme. ARHAI also meet with their counterparts at the Defra antimicrobial resistance co-ordination group (DARC) to discuss cross-cutting "one health" aspects of infectious disease and antimicrobial resistance.

ARHAI Subgroups

Increasingly, the committee's work is carried forward by 'task and finish' subgroups; established to develop evidence-based guidance and other detailed pieces of work. Subgroups are chaired by a member of ARHAI and include co-opted experts relevant to the task. Subgroup reports and recommendations are considered at the main committee

meetings. Following agreement advice is provided to the DH sponsor for consideration and, where appropriate, implementation.

Openness and Transparency

ARHAI is an independent expert science advisory committee that operates in accordance with the Code of Practice for Scientific Advisory Committees, 2011.[3] As such the agenda open papers and minutes of meetings are published and accessible from the ARHAI webpage.[4,5]

Declarations of interest are posted on the ARHAI webpage. Members are invited to declare interests at the beginning of each meeting. Declarations of interest are dealt with on a case by case basis and in line with government guidance (Making and Managing Public Appointments - A Guide for Departments.[6]

Membership

The ARHAI membership list may be found on the ARHAI webpage, members present during the remit of this report may be found in annex A. New members are appointed by the Department of Health's Senior Responsible Officer and are accountable to the Chair for carrying out their duties and for their performance. Members are expected to demonstrate a commitment to and an understanding of the value and importance of the seven principles of public life and act in accordance to CoPSAC guidance.

Public and Patient Information

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

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[3] http://www.bis.gov.uk/assets/goscience/docs/c/11-1382-code-of-practice-scientific-advisory-committees.pdf
[4] https://www.gov.uk/government/groups/advisory-committee-on-antimicrobial-resistance-and-healthcare-associated-infection
[5] http://webarchive.nationalarchives.gov.uk/20130402145952/http://transparency.dh.gov.uk/tag/arhai-minutes/
[6] http://www.civilservice.gov.uk/wp-content/uploads/2011/09/public_appt_guide-pdf_tcm6-3392.pdf

Healthcare associated infections

HCAIs are infections that occur following or during a healthcare intervention undertaken in a healthcare setting. HCAIs remain a major cause of avoidable morbidity and mortality in patients admitted to hospital. The consequences of HCAIs are frequently the most severe in patients with weakened immune systems for example the very young, the very elderly, patients within intensive care units (ICUs) patients on treatment for other diseases such as HIV and cancer which suppress their immune systems.
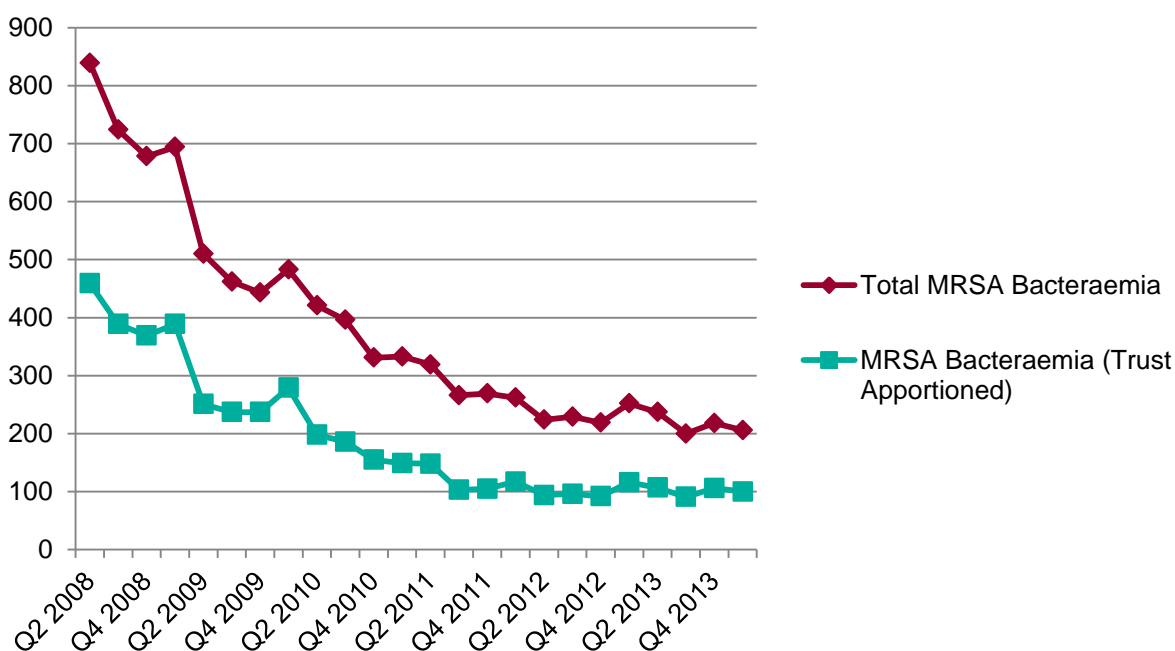
The incidence of HCAIs within NHS hospitals in England is monitored by surveillance using both continuous surveillance and, less frequently, point prevalence ('snapshot') surveys. Data are collated and analysed by Public Health England (PHE) and provide an indication of the prevalence of HCAIs, the impact of infection prevention and control measures and emerging issues at both national and local levels.

The landscape of healthcare associated infections continues to change. The incidence of both meticillin resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* (*C. difficile*) in English NHS hospitals has fallen markedly, and focus is shifting to the increasing burden of infections caused by Gram-negative organisms such as *E. coli*.

MRSA

Infection rates for MRSA as measured by cases causing bacteraemia have fallen in recent years from a high of 7659 cases in 2003 to 907 in 2013.

Figure 1: Total and Secondary care associated MRSA bloodstream infections.

Data imported from the PHE mandatory surveillance service[7]

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[7] https://www.gov.uk/government/collections/staphylococcus-aureus-guidance-data-and-analysis

The National One Week (NOW) Study of MRSA Screening was presented to ARHAI in 2013, and a subgroup was formed to develop guidance using the study as an evidence base.

Recommendation 1: In order to improve the focus and maximize the clinical impact for patients who are most likely to benefit from MRSA screening, all patients admitted to high risk specialties (defined below*) and all critical care units, whether elective or emergency admissions, should be screened for MRSA.

Recommendation 2: Trusts should make every effort to ensure very high levels of screening in the patient groups identified above. All patients identified as carrying MRSA must wherever possible, be isolated and given decolonisation/suppressive therapy.

Recommendation 3: Trusts should also actively identify and re-screen any patient previously known to be MRSA positive and isolate pre-emptively pending the results of laboratory tests.

*High risk specialties are defined as: vascular and all critical care, renal/dialysis, neurosurgery, cardiothoracic surgery, haematology/oncology/BMT, orthopaedics and trauma.

Following a consultation process, ARHAI published guidance for implementation of a pragmatic and cost effective modified admission MRSA screening guidance for the NHS reflecting this change in the burden of disease.[8] This was disseminated by NHS England through the chief nursing officers' bulletin.

C. difficile
Large increases in *C. difficile* infection (CDI) rates occurred in England up until 2007-08, with associated increases in morbidity and mortality. Since this peak incidence, there has been a substantial (circa 80%) decline in CDIs and associated deaths. The rate of decrease in CDIs has slowed in the last year (Figure 2).

Figure 2: Total and Secondary care associated *C. difficile* infections.

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[8] https://www.gov.uk/government/publications/how-to-approach-mrsa-screening
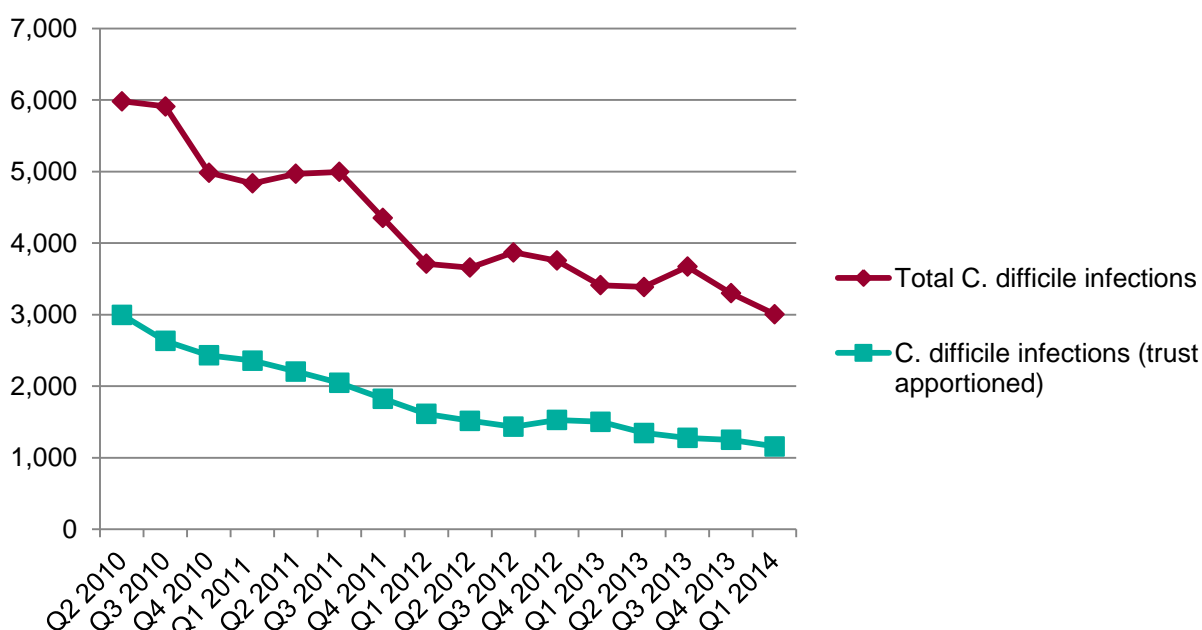
Data imported from the PHE mandatory surveillance service[9]

ARHAI reviewed a paper in 2012 on the epidemiology of CDI. It was concluded that whilst progress was being made to accurately determine the number of CDIs, it was not currently possible to calculate the irreducible minimum CDI level for primary and secondary healthcare settings. In March 2014 ARHAI was presented with an update regarding changes in *C. difficile* epidemiology.

The continued decrease in CDI incidence was thought to be mostly due to the reduction in *C. difficile* from the ribotype 027 strain which had been prevalent in hospitals. Multiple interventions, including enhanced surveillance, rapid provision of ribotyping data, standardised diagnosis, optimised infection control, changes in antimicrobial prescribing, and improved treatment, has likely contributed to this marked decrease. The relative contribution of each individual intervention is unclear. UK CDI rates now compare favourably with most European countries.

There was emerging evidence that case-case transmission was not the most common way that *C. difficile* is transmitted in hospitals. Possible sources of *C. difficile*, other than CDI cases, included asymptomatically colonised individuals, colonised individuals with transient symptoms, infants, food/water, animals, the environment, and healthcare workers.

ARHAI concluded that the potential for reducing CDI further was unknown until the current epidemiology of CDI was better understood. ARHAI provided advice to PHE regarding the evidence required to inform changes to *C. difficile* recognition and control and the potential studies that could enrich this evidence base. PHE were to use this evidence base to inform NHS England in their design of *C. difficile* infection objectives for NHS organisations from 2015 onwards.

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[9] https://www.gov.uk/government/collections/clostridium-difficile-guidance-data-and-analysis

In 2012 ARHAI had advised that current UK definitions for CDI should be amended to bring them in line with international definitions for CDI to distinguish community-onset cases and healthcare-associated cases, rather than trust apportioned and non-trust apportioned cases. In 2014 ARHAI re-iterated this recommendation and was supported in its view by the PHE CDI working group. NHS England reported that they would give consideration to the recommendation; however, it was unlikely that any change would be made prior to the setting of 2014/15 infection objectives.

Recommendation 1: Judging the totality of CDI
The internationally agreed definitions of community-associated, community-onset cases and healthcare-associated *Clostridium difficile* infection (CDI) cases should be used to categorise mandatory surveillance data instead of the current trust/non-trust apportionment definitions.

Recommendation 2: Implementing CDI prevention and control interventions
  a) All CDI case reviews should include ascertainment of contact with/proximity to patients with diarrhoea. Optimal diarrhoea management, including early isolation, diagnosis and optimised management, should be emphasised as a goal for the NHS.
 b) Compliance with national guidance on CDI testing should be part of the performance management framework for CDI.

Recommendation 3: Informing future guidance for the control of CDO
  a) The results of the PHE sponsored Whole Genome Sequencing study should be used to update guidance on the control of CDI and future research into possible sources of *C. difficile* and routes of transmission.
  b) Research is needed to determine the importance of the potential alternative sources of *C. difficile* for transmission and CDI.

E. coli
Incidence of bacteraemia caused by multi-resistant gram negative bacteria such as *E. coli* has been steadily increasing since 2005.

Figure 3: Total *E. coli* bacteraemia from voluntary and mandatory surveillance systems.
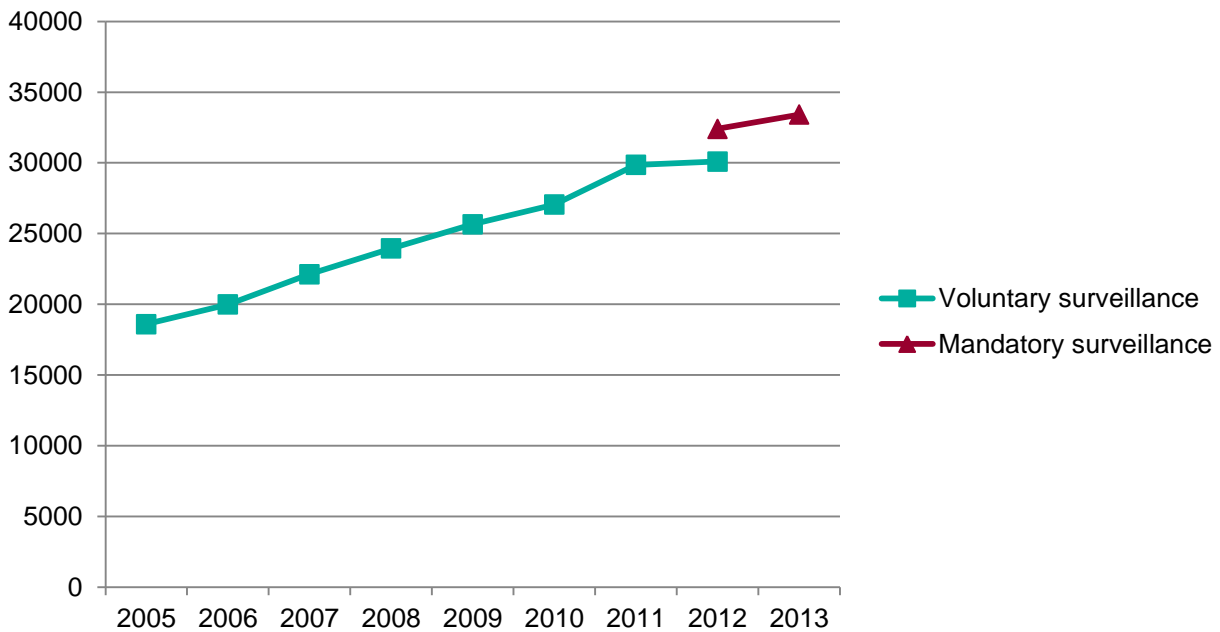
Data imported from the PHE surveillance service[10]

Mandatory surveillance by PHE had demonstrated a sustained increase in *E. coli* bacteraemia that is unexplained by improved ascertainment. In 2013 ARHAI commissioned a task and finish subgroup to investigate effective interventions and target populations to reduce *E. coli* bacteraemia.

Analysis of *E. coli* bacteraemia surveillance by the sub-group demonstrated that only a small proportion of infections were related to urinary catheterisation and that other factors such as repeated urinary tract infections (UTIs) treated by sub-optimal antibiotic prescribing and dehydration as a risk factors for UTIs had a significant impact.

The following recommendations were presented and ratified by ARHAI at its meeting on 28th March 2014:

Recommendation 1: All organisations providing care to patients with indwelling urinary catheters should ensure that the recommendations of EPIC 3 (short-term catheters) and NICE (long-term catheters) are being implemented and provide evidence of this.

Recommendation 2: Prevention of UTIs will reduce the need for treatment with antibiotics. Maintenance of hydration status must be a priority for those at risk of dehydration, particularly in hospitals, long-term care facilities and when significant rises in ambient temperatures are likely. National and local heatwave plans should incorporate specific guidance on this issue.

Recommendation 3: Significant numbers of *E. coli* bacteraemias occur in patients with a history of repeated urinary tract infections in the period leading up to bacteraemia.

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[10] https://www.gov.uk/government/collections/escherichia-coli-e-coli-guidance-data-and-analysis

Treatment of urinary tract infections should be based on local antibiotic resistance patterns and patients diagnosed with a urinary tract infection (UTI), especially those with a history of repeated infections, should be subject to a 'safety netting' procedure to ensure that treatment has been effective.

Recommendation 4: Consideration should be given to the continued requirement for mandatory surveillance of *E. coli* bacteraemia.

The subgroup was asked by ARHAI to reconvene and consider the options for future *E. coli* surveillance and provide recommendations. Draft recommendations were expected to be ratified in July 2014.

Surgical Site Infections

In 2012 ARHAI agreed the recommendations of the HCAI Surveillance Review Subgroup which had proposed that the categories currently used in surveillance of surgical site infections (SSI) should be narrowed to focus on areas of greatest need. At its meeting in March 2014, ARHAI noted that only modest progress had been made towards the implementation of the recommendations made.

The outputs of a survey of NHS Acute Trusts, undertaken by the PHE SSI Surveillance Unit in 2013 indicated an appetite for change in the areas currently surveyed. Following consideration of the survey results ARHAI concluded that the concerns underpinning their original recommendations remained, namely that key SSIs with high infection rates where there is potential for interventions and reductions in incidence, are not being optimally addressed across the NHS. ARHAI re-iterated its support for the recommendations made by the HCAI Surveillance Review subgroup in 2012, and agreed the need to review progress at its HCAI themed meeting in 2016.

HCAI research needs

HCAI research needs were summarised by ARHAI as part of its annual review and include:

- Research is needed to determine the importance of the potential alternative sources of *C. difficile f*or transmission and CDI.
- The proportion of UTIs that are treated inappropriately should be studied in greater detail to determine whether local policies are based on resistance patterns and if the policies are complied with.
- A study of the use of safety netting in general practice with elderly patients (this has only been undertaken with children to date)
- Does follow-up of patients who have been prescribed antibiotics for UTI indicate non-effectiveness of treatment and provide opportunities for alternative treatment, preventing progression to bacteraemia

- Susceptibility testing of organisms causing bacteraemias to oral agents to determine if failed treatment of lower UTI with nitrofurantoin, trimethoprim and fosfomycin would contribute to bacteraemias
- Controlled, prospective, randomised studies are needed to address the uncertainties of whether mild dehydration has any detrimental effect on health and whether a yet to be determined optimal fluid intake might be beneficial in the prevention of infections relating to the urogenital tract
- Investigation of the role of 3 versus 5 or 7 days in E. coli bacteraemia. Systematic review of relapse with 3 vs. 5 vs. 7 day treatment for lower UTI
- Investigation of the role of increasing nitrofurantoin and trimethoprim usage and its relationship to increasing bacteraemias
- Determination and validation of a simple assessment tool for dehydration risk, with follow-up studies of implementation
- Controlled, prospective, randomised studies are needed to address the uncertainties of whether antibiotic prophylaxis is beneficial in long-term catheters
- Controlled, prospective, randomised studies are needed to address the uncertainties of whether urethral or suprapubic catheters present less risk of symptomatic infection in long-term catheterised patients.

Antimicrobial resistance

One of seven key aims of the UK five year AMR strategy was better access to and use of surveillance data. This would be achieved through greater consistency and standardisation of data collected and improved data linkage. ARHAI were commissioned by DH to determine the critically important antibiotic resistances and specific bacterial infections to be included in surveillance with reference to the best available evidence.

Quantifying and reporting AMR

ARHAI commissioned a subgroup to develop recommendations regarding quantifying and reporting AMR using national and regional UK Drug/Bug resistance data in support of the UK Five Year Antimicrobial Resistance Strategy. The following recommendations were presented and ratified by ARHAI at its meeting on 28th March 2014.

Recommendation 1: The bug/drug combinations to be included in the UK AMR surveillance programme in support of the 5-year AMR strategy should include: resistance of *Escherichia coli* and *Klebsiella pneumoniae* to third-generation cephalosporins (cefotaxime and/or ceftazidime), carbapenems (imipenem and/or meropenem), ciprofloxacin and gentamicin; resistance of *Pseudomonas* spp. to ceftazidime and carbapenems (imipenem and/or meropenem); resistance of *Streptococcus pneumoniae* to penicillin; resistance of *Neisseria gonorrhoeae* to ceftriaxone and azithromycin.

Recommendation 2: AMR surveillance, with the exception of gonococcal surveillance, should continue to focus on bloodstream infections.

Recommendation 3: AMR surveillance should continue to be based primarily on the collection of routinely generated antimicrobial susceptibility test results provided by hospital microbiology laboratories. The geographical coverage to be used for regional analyses will need to take account of availability of local data, to ensure outputs are useful in understanding the local epidemiology of AMR.

These ratified recommendations were delivered to the HLSG for the UK 5 year AMR strategy to inform the implementation of critical surveillance outputs. ARHAI will review both national bug/drug data outputs and the bug/drug combinations included for surveillance annually from 2014.

ARHAI/DARC

In July ARHAI held a joint meeting with the Defra Antimicrobial Resistance Coordination (DARC) Group to discuss the threat of antimicrobial resistance to human and animal health and the environment.

The joint working the group had been asked to provide an evidence based response to the Soil Association briefing 'Farm antibiotic use and the resistance national emergency'. In

their considerations the group discussed the relationship between antimicrobial consumption and antimicrobial resistance in farm animals and humans in terms of antimicrobial use, AMR rates and surveillance in humans and animals.

ARHAI and DARC will continue to meet once a year to discuss mutually important aspects.

Antimicrobial prescribing and stewardship

There is strong evidence to suggest that the inappropriate prescribing of antibiotics drives antimicrobial resistance, which can persist for at least 12 months.[11] Optimisation of prescribing practices was identified as one of seven key areas in the UK 5 year AMR strategy, with the aim of conserving the effectiveness of available antimicrobials.

Antimicrobial Prescribing Quality Measures

The antimicrobial prescribing quality measures (APQM) subgroup Chaired by Dr Kieran Hand was commissioned with the aim of improving the quality of antimicrobial prescribing in primary and secondary care. These quality measures were informed by antimicrobial prescribing data kindly shared ahead of publication by the English surveillance programme for antimicrobial utilisation and resistance (ESPAUR).[12]

The following evidence based antimicrobial prescribing quality measures were presented and ratified by ARHAI at its meeting on 28th March 2014:

Primary care quality measures:
- A reduction in total prescribing to 2009/10 financial year levels at a CCG level.
- A reduction in the proportion of antibiotics from cephalosporin, quinolone or co-amoxiclav classes to <10% of total antibiotic prescribing.

Secondary care quality measures:
- A reduction in total antimicrobial consumption by 1% per annum for next 5 years.
- A reduction in total carbapenem consumption to previous consumption levels of 5 years ago (corresponding to an approximate 20-25% average reduction).

An implementation strategy for these quality measures will be formulated by a second ARHAI subgroup later in 2014, details of which may be found in the forward work plan in annex B. ARHAI will also review antimicrobial prescribing data in relation to the quality measures annually and work with PHE and the antibiotic resistance focused Health Protection Research Units (HPRUs) to develop a methodology for monitoring the clinical outcomes associated with reductions in antibiotic prescribing.

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[11] Costelloe C, Metcalfe C, Lovering A, et al. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. BMJ 2010;340(May18_2):c2096. http://www.ncbi.nlm.nih.gov/pubmed/20483949

[12] PHE. English Surveillance Programme for Antimicrobial Utilisation and Resistance (ESPAUR) report 2014. https://www.gov.uk/government/publications/english-surveillance-programme-antimicrobial-utilisation-and-resistance-espaur-report

Start Smart Then Focus

Start Smart Then Focus (SSTF) antimicrobial stewardship guidance for English hospitals was developed and published by ARHAI in 2011.[13] In September 2013 the pharmacist lead for ARHAI presented the results of two surveys which assessed the extent of uptake of antimicrobial stewardship activities in English hospitals. ARHAI recommended a national survey should be undertaken to assess the extent to which audit measures within SSTF were being used. Results are to be presented to ARHAI in July 2014.

European Antibiotic Awareness Day

European Antibiotic Awareness Day (EAAD) 2013 was highly publicised for both the public and professionals.[14] Access of educational materials hosted by the Department of Health, including widespread uptake of the TARGET toolkit for primary care, Start Smart Then Focus guidance for secondary care and new quizzes and crosswords, reached unprecedented levels. Importantly, there was greater veterinary involvement than previous years, this collaboration with Defra and several veterinary professional bodies led to conferences, publications and information for veterinarians and animal owners (both pets and livestock).

There was a large amount of national media coverage on the day with coverage by both the BBC and The Times of the PHE press release "green phlegm and snot 'not always a sign of an infection needing antibiotics'", and several televised interviews on SkyNEWS. In addition, there were several high-impact online campaigns aimed at the general public, such as the Treat Yourself Better without Antibiotics and the British Society for Antimicrobial Chemotherapy sponsored Thunderclap petitions, where personal pledge messages to refuse unnecessary antibiotics for colds and flu reached over 300,000 people.

For professionals, there were thirty-six professional bulletins and thirty-seven publications in peer-reviewed journals on the topic of antibiotic resistance and stewardship with a special-edition timed for EAAD released in both The Lancet and the Journal of Antimicrobial Chemotherapy; combined this was a 400% increase from 2012.

DH had led annual antibiotic campaigns in the UK for the past fifteen years, joining the EU in the EAAD initiative since its inception in 2008; leadership for EAAD will be taken over by PHE from April 2014.

Antimicrobial prescribing and stewardship research needs
- Prescribing software system manufacturers for primary care should be encouraged to incorporate functionality to reliably capture metrics of the issuing of antibiotic prescriptions with deferred start-date (delayed prescribing) at the level of individual GPs and practices.

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[13] https://www.gov.uk/government/publications/antimicrobial-stewardship-start-smart-then-focus
[14] https://www.gov.uk/government/publications/european-antibiotic-awareness-day-evaluation-2013

- Research to understand the impact of case mix upon antibiotic prescribing in secondary care is urgently needed to allow valid benchmarking of hospital Trusts and identify genuine outliers for further evaluation and support. Acute Trusts should be encouraged to collect and provide antibiotic dispensing data to allow differentiation between inpatient consumption and outpatient/discharge prescription/community hospital dispensing.
- Further exploration and validation of potential 'balancing measures' is warranted in order to provide reassurance of the absence of unintended consequences of reductions in antibiotic prescribing at a population level. Examples include: incidence of complications of upper RTI from primary care; prevalence of extended spectrum beta-lactamase producing organisms and associations with carbapenem prescribing in secondary care; standardised mortality from infection in hospitals.
- Surveillance of antibiotic prescribing from both primary and secondary care combined at Area Team level is required to further understand the contribution of patient health-seeking behaviours to variability in prescribing between CCGs and hospital Trusts. Decreases in antibiotic prescribing at CCGs may be mirrored by increases in secondary care associated with increased Emergency Department attendances.
- Investment in information systems infrastructure to link antibiotic prescribing with recorded infection diagnosis in primary care and secondary care is essential to allow routine surveillance of quality of antibiotic prescribing by indication. Until this infrastructure exists, evaluation of prescribing quality is limited.
- NHS Trusts should be encouraged to participate in forthcoming point prevalence surveys of healthcare-associated infection and antimicrobial prescribing co-ordinated by the European Centre for Disease Control to facilitate evaluation of quality of antibiotic prescribing according to indication. Public Health England should be supported to provide resource for central analysis of survey data on behalf of England. Design of this survey may be adapted to further explore the existence of evidence of infection prior to initiation of antibiotic treatment for community-acquired infection (already collected for healthcare-associated infection).
- Current methodology for adjusting primary care antibiotic prescribing for case mix (e.g. STAR-PU) has been validated for total antibiotic prescribing. Surveillance of prescribing of individual antibiotics or antibiotic classes requires re-validation of case mix adjustment.

Summary

Within the past year, ARHAI have made wide ranging recommendations regarding the monitoring, reporting and reduction of healthcare associated infections, antimicrobial resistance and antimicrobial prescribing. ARHAI began work in support of the UK 5 year AMR strategy and to address the inexorable rise in infections caused by Gram-negative bacteria, work in both of these areas will continue in the coming year as can be seen in the ARHAI forward work plan (annex B).

Annex A

ARHAI membership

Member	Profession	Organisation
Professor Mike Sharland (Chair)	Professor of Paediatric Infectious Diseases	St George's Hospital
Professor Mark Wilcox (Deputy Chair)	Professor of Medical Microbiology	Leeds Royal Infirmary
Ms Isabel Boyer	Lay Member	
Professor Peter Hawkey	Professor of Clinical and Public Health Bacteriology	Birmingham Heartlands Hospital
Dr Kieran Hand	Consultant Pharmacist of anti-infectives	University Hospital Southampton
Professor Alison Holmes	Professor of Infectious Diseases	Imperial College London
Professor Alan Johnson	Head of HCAI & AMR (Healthcare Associated Infections & Antimicrobial Resistance) Department	Public Health England
Mr Martin Kiernan	Nurse Consultant	Southport and Ormskirk Hospital NHS Trust
Professor David John Leaper (Retired April 2013)	Emeritus Professor	Cardiff University
Dr Cliodna McNulty	Head of PHE Primary Care Unit	Gloucestershire Royal Hospital
Dr Julie Robotham	Senior Mathematical Modeller & Health economist	Public Health England
Dr William Tong	Consultant Virologist, Department of Infectious diseases	Guy's and St. Thomas' NHS Foundation Trust
Professor Andrew Peter Wilson	Professor of Microbiology & Consultant Microbiologist	UCLH NHS Foundation Trust
Professor Alastair Hay	Professor of Primary Care	University of Bristol
Professor David Livermore	Professor of Medical Microbiology	University of East Anglia

Observers

Dr Lorna Willocks/Dr Carol Fraser (Scotland)
Mrs Tracey Gauci/Ms Jenny Thorne (Wales)
Dr Elizabeth Reaney (Northern Ireland)
Mr Brian Brown (Care Quality Commission)
Ms Suzanne Eckford (Veterinary Medicines Directorate, Defra)
Ms Kara Thomas/Mr Paul Cook (Food Standards Agency)

Dr Paul Lee/Ms Mair Powell (Medicines and Healthcare products Regulatory Agency)
Professor Anthony Kessel/Dr Anna Cichowska (Public Health England)

Department of Health
Mr Mike DeSilva (Sponsor)
Ms Claire Boville (Assessor)
Ms Carole Fry (Assessor)
Ms Sally Wellsteed (Assessor)

Public Health England Secretariat
Dr Joanne Wallace (April 2012 - April 2014)
Dr Diane Ashiru-Oredope (Pharmacist Lead, September 2010 - Present)
Dr Emma Budd (September 2013 - Present)
Mr Alex Bhattacharya (November 2013 - Present)
Ms Sharon LeCount (January 2012 - November 2013)

Annex B

ARHAI forward work plan 2014

Further ARHAI main meetings in 2014
3rd July (AMR theme)
2nd October (AMP theme)

Proposed subgroups in 2014

Antimicrobial Prescribing Quality Measures Implementation subgroup
Professor Alastair Hay will Chair a subgroup which will address how to pilot antimicrobial prescribing quality measures in both primary and secondary care, as recommended by ARHAI, with the aim of safely reducing inappropriate antibiotic prescribing. This multidisciplinary subgroup will comprise experts from across the healthcare sector. The subgroup is to report to the October 2014 ARHAI meeting and key outputs of this would be used to advise NHSE on effective implementation of ARHAI recommended quality measures.

CRO monitoring subgroup
Professor Peter Wilson will Chair a short-term task and finish subgroup to explore optimal methods of CRO reporting and whether this should be voluntary or mandatory. Subgroup members will include representatives from CQC, PHE, NHS-England and the NHS Trust Development Authority. Any recommendations made by the group should reflect current UK and international guidance and practice with regard to CRO BSI surveillance. The subgroup is to report preliminary findings at the July ARHAI meeting and their final recommendations, for ratification by ARHAI, in October 2014.

Multi-drug resistant Gram-negative early outbreak detection surveillance subgroup
David Livermore will Chair a subgroup with the aim of determining the feasibility of rapidly recognising and defining outbreaks caused by Gram-negative organisms in hospitals. This in turn would allow both a fuller interpretation of the totality of the burden of outbreaks and early recognition, reporting and intervention of outbreaks. The subgroup would consider laboratory definitions, IT and statistical/analytical components. The subgroup is to report preliminary findings at the July ARHAI meeting and their final recommendations, for ratification by ARHAI, in October 2014.

Annex C

Glossary

Antibiotic A drug that destroys or inhibits the growth of bacteria. The action of the drug may be selective against certain bacteria.

Antimicrobial stewardship Antimicrobial stewardship is a key component of a multifaceted approach to preventing emergence of antimicrobial resistance. Good antimicrobial stewardship involves selecting an appropriate drug and optimising its dose and duration to cure an infection while minimising toxicity and conditions for selection of resistant bacterial strains.

Antimicrobials An antimicrobial is a drug that selectively destroys or inhibits the growth of micro-organisms.

Bacteraemia The presence of bacteria in the bloodstream.

Catheter A tubular flexible device passed through body channels (e.g. artery, vein, or urethra) for the withdrawal or introduction of fluids.

Clostridium difficile A toxin producing bacterium which can cause severe diarrhoea or enterocolitis. This most commonly occurs following a course of antibiotics which has disturbed the normal bacterial flora of the patient's gut.

Enterobacteriaceae A family of Gram negative bacilli that contains many species of bacteria that normally inhabit the intestines. Enterobacteriaceae, that are commonly part of the normal intestinal tract flora, are referred to as coliforms.

Epidemiology The study of the incidence, spread, causes, and effects of diseases in defined populations. Epidemiology forms an evidence base which may inform policy decisions and targets for preventive healthcare.

HCAI An infection that was neither present nor incubating at the time of the patient's admission (normally seen more than 48 hours after admission to hospital).

Incidence The number of new events/episodes of a disease that occur in a population in a given time period.

Infection Invasion and multiplication of harmful microorganisms in body tissues.

One Health Collaborative multi-disciplinary work at local and national levels to attain optimal health for people, animals and the environment.

Pathogenic organisms Microorganisms that can cause disease in a host.

Surgery a procedure, where an incision is made (not just a needle puncture) with breach of mucosa and/or skin - not necessarily in the operating theatre.

Surgical site infection Surgical site infection can be defined as being present when pathogenic organisms multiply in a wound giving rise to local signs and symptoms, for example heat, redness, pain and swelling, and (in more serious cases) with systemic signs of fever or a raised white blood cell count. Infection in the surgical wound may prevent healing taking place so that the wound edges separate or it may cause an abscess to form in the deeper tissues.

Surveillance Systematic collection of data from the population at risk, identification of infections using consistent definitions, analysis of these data and dissemination of the results to those responsible for the care of the patients and to those responsible for implementation of prevention and central measures.