AAW 2016 “On the Radar”

A Compilation of Articles and Resources on Antimicrobial Stewardship (AMS) and Antimicrobial Resistance (AMR)

Below is a selection of suggested reading taken from the last 12 months of the Commission’s weekly publication “On the Radar”. The selection highlights papers and reporting exploring the evidence for the effectiveness of antimicrobial stewardship in hospitals, the scope of the problem of antimicrobial resistance, and some specific stewardship strategies. Commission projects supporting antimicrobial stewardship are also highlighted.

Clinical and Economic Outcomes from the Implementation of Hospital-based Antimicrobial Stewardship Programs: A Systematic Review and Meta-Analysis
Karanika S, Paudel S, Grigoras C, Kalbasi A, Mylonakis E.
Antimicrobial Agents and Chemotherapy. 2016 [epub].
http://dx.doi.org/10.1128/aac.00825-16

This review and meta-analysis examined 26 studies to examine the question of whether antimicrobial stewardship programs. The results suggest that hospital antimicrobial stewardship programs may reduce the use of these agents by almost 20%, and in the ICU setting as much as 40%. The results also found:

- the use of broad-spectrum antibiotics, the overall antimicrobial cost and the hospital length of stay decreased
- implementation was associated with decrease of infections due to methicillin-resistant Staphylococcus aureus, imipenem-resistant Pseudomonas aeruginosa and extensive-spectrum beta-lactamase Klebsiella spp.
- these improvements were not associated with adverse outcomes, as all-cause, infection-related 30-day mortality and infection rates were not significantly different after implementation.

The authors concluded “Hospital ASPs [Antimicrobial Stewardship Programs] result in significant decrease in antimicrobial consumption and cost, and the benefit is higher in the critical care setting. Infections due to specific antimicrobial-resistant pathogens and the overall hospital length of stay are improved as well.” (Issue 277)
Current evidence on hospital antimicrobial stewardship objectives: a systematic review and meta-analysis
http://dx.doi.org/10.1016/S1473-3099(16)00065-7

Further to recent items on antimicrobial stewardship is this paper reporting on a review and meta-analysis that sought to assess whether antimicrobial stewardship objectives had any effects in hospitals and long-term care facilities on four predefined patients' outcomes: clinical outcomes, adverse events, costs, and bacterial resistance rates.

The study group identified 14 stewardship objectives and found 145 unique studies with data on nine stewardship objectives. The authors concluded "findings of beneficial effects on outcomes with nine antimicrobial stewardship objectives suggest they can guide stewardship teams in their efforts to improve the quality of antibiotic use in hospitals". (Issue 279)

Antibiotic Stewardship in Acute Care: A Practical Playbook
National Quality Forum, National Quality Partners, Antibiotic Stewardship Action Team
http://www.qualityforum.org/Publications/2016/05/Antibiotic_Stewardship_Playbook.aspx

The USA’s National Quality Forum (NQF), Centers for Disease Control and Prevention (CDC), and the Hospital Corporation of America (HCA) have jointly developed and released a short (38 page) ‘playbook’. The Playbook is designed to help hospitals and health systems strengthen existing antibiotic stewardship initiatives or create antibiotic stewardship programs from the ground up. Based on CDC’s Core Elements of Hospital Antibiotic Stewardship Programs, the Playbook offers practical strategies for implementing antibiotic stewardship programs.

For information on the Commission’s work on antibiotic stewardship, including Antimicrobial Stewardship in Australian Hospitals and the resources around the relevant National Safety and Quality Health Service (NSQHS) Standard see http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-stewardship/ (Issue 276)

Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America
Barlam TF, Cosgrove SE, Abbo LM, MacDougall C, Schuetz AN, Septimus EJ, et al
Clinical Infectious Diseases. 2016 [epub].
http://dx.doi.org/10.1093/cid/ciw118

A multidisciplinary expert panel convened by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America has developed these evidence-based guidelines for the implementation and measurement of antibiotic stewardship interventions in inpatient populations including long-term care. These recommendations describe best practices for antibiotic stewardship programs to influence the optimal use of antibiotics in the US context. (Issue 271)
Tackling drug-resistant infections globally: Final report and recommendations
Review on Antimicrobial Resistance
http://amr-review.org/

Over the last couple of years the reports from the UK Review on Antimicrobial Resistance have been covered in On the Radar. The Review's final report has now been released and has been accompanied with a high level of media coverage globally. This report rehearses the growing problem of resistance and why action is needed, provides an overview of the solutions that the Review team thinks should be implemented to curtail unnecessary use and increase the supply of new antimicrobials. The report also discusses public awareness campaigns, the need to improve sanitation and hygiene, reduce pollution from agriculture and the environment, improve global surveillance, introduce rapid diagnostics and vaccines, the need to increase the number of people in this area, and use of market entry rewards and an innovation fund to generate more drugs. The paper also examines how these solutions may be funded and looks at ways to build political consensus around them. (Issue 274)

Resistance sans frontières: containing antimicrobial resistance nationally and globally
Turnidge J, Baggoley C, Schipp M, Martin R
http://dx.doi.org/10.5694/mja15.01304

This article explains in simple terms the intrinsically evolving problem of antimicrobial resistance, and why a global strategy, (in every sense of the word), is essential. The authors describe the seven elements of Australia’s First National Antimicrobial Resistance Strategy, released in 2015, which is described as the first “to fully embrace the idea that resistance has no borders.

The authors conclude with the exhortation that “All prescribers and users of antimicrobials have a responsibility to preserve their long term effectiveness and to protect the health of their nation’s citizens, animals and ecosystems. With the ever increasing global movements of people, animals and goods, all nations must work together to protect each other. Resistant bugs don’t respect borders.” (Issue 268)

Drug-Resistant Infections: A Threat to Our Economic Future
(Discussion Draft)
World Bank

This report from the World Bank highlights how antimicrobial resistance (AMR) is not only a potential threat to health but may also have significant economic consequences. The scale of this impact could be as great as that of the 2008 financial crisis. However, as the World Bank notes “unlike the financial crisis of 2008, there would be no prospects for a cyclical recovery in the medium term, as the costly impact of AMR would persist.” The consequences could also include low-income countries to losing more than 5% of their GDP and up to 28 million people, mostly in developing countries, being pushed into poverty by 2050. Just in health costs alone the report suggests that global increases may range from $300 billion to more than $1 trillion per year by 2050. (Issue 292)
The new antibiotic mantra – “shorter is better”
Spellberg B
http://dx.doi.org/10.1001/jamainternmed.2016.3646

Editorial reflecting on how evidence – including an article in this issue of JAMA Internal Medicine reporting on a randomised trial comparing short-course vs longer courses of therapy for patients with community-acquired pneumonia – that has shown that shorter courses of antibiotics are as efficacious as longer courses. (Issue 290)

Addressing the Appropriateness of Outpatient Antibiotic Prescribing in the United States: An Important First Step
Tamma PD, Cosgrove SE
http://dx.doi.org/10.1001/jama.2016.4286

Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits, 2010-2011
http://dx.doi.org/10.1001/jama.2016.4151

The (appropriate) use antimicrobials and the influence on antimicrobial resistance is a global issue and one that has seen a range of estimates of the scale of the problem. These two items (a research article and related editorial) from the Journal of the American Medical Association describe how antibiotics are used in the outpatient setting, including the proportion of antibiotics that likely are not prescribed appropriately.

The study investigated data for 2010 and 2011 from two (US) national annual surveys (National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS)) Both surveys collect data about patients’ demographic characteristics and symptoms, diagnoses, and medications ordered, including antibiotics. The data used covered 184,032 visits with 12.6% of encounters were associated with antibiotic prescriptions. The study examined the diagnoses to determine whether antibiotics are almost always indicated, may be indicated or are not indicated. National guidelines, when available, were used to estimate appropriate levels of antibiotic prescribing by age group. The investigators estimated that approximately 30% of outpatient prescriptions were inappropriate. (Issue 272)
Provision of social norm feedback to high prescribers of antibiotics in general practice: a pragmatic national randomised controlled trial
The Lancet. 2016 [epub].
http://dx.doi.org/10.1016/s0140-6736(16)00215-4

One of the facets of a learning health system is feedback on activity, including how one compares with one’s peers. This paper found that providing GPs with feedback on their prescribing habits contribute to a reducing the use of antibiotics. As unnecessary antibiotic prescribing contributes to antimicrobial resistance, the authors suggest that such a feedback mechanism may “substantially reduce antibiotic prescribing at low cost and at national scale; this outcome makes it a worthwhile addition to antimicrobial stewardship programmes.” (Issue 262)

Antimicrobial stewardship in wound care: a Position Paper from the British Society for Antimicrobial Chemotherapy and European Wound Management Association
Lipsky BA, Dryden M, Gottrup F, Nathwani D, Seaton RA, Stryja J
http://dx.doi.org/10.1093/jac/dkw287

This paper is a position paper from the British Society for Antimicrobial Chemotherapy and European Wound Management Association that seeks to establish standards for diagnosing and treating clinically infected wounds and to incorporate antimicrobial stewardship (AMS) practices into routine wound care. The authors observe that “All open wounds will be colonized with bacteria, but antibiotic therapy is only required for those that are clinically infected. Therapy is usually empirical to start, but definitive therapy should be based on results of appropriately collected specimens for culture. When prescribed, it should be as narrowly focused, and administered for the shortest duration, as possible. AMS teams should be interdisciplinary, especially including specialists in infection and pharmacy, with input from administrative personnel, the treating clinicians and their patients.” (Issue 286)

Effect of behavioral interventions on inappropriate antibiotic prescribing among primary care practices: A randomized clinical trial
http://dx.doi.org/10.1001/jama.2016.0275

In a similar vein this study looked at impact of three behavioural interventions on the inappropriate (not guideline-concordant) antibiotic prescribing during ambulatory visits for acute respiratory tract infections. The three interventions, implemented alone or in combination were:

- **suggested alternatives** presented electronic order sets suggesting non-antibiotic treatments;
- **accountable justification** prompted clinicians to enter free-text justifications for prescribing antibiotics into patients’ electronic health records;
- **peer comparison** sent emails to clinicians that compared their antibiotic prescribing rates with those of “top performers” (those with the lowest inappropriate prescribing rates).
The study looked at the antibiotic prescribing rates for visits with antibiotic-inappropriate diagnoses (non-specific upper respiratory tract infections, acute bronchitis, and influenza) from 18 months before the intervention to 18 months afterward and covered 14,753 visits during the baseline period and 16,959 visits during the intervention period for 248 clinicians.

The authors report that mean antibiotic prescribing rates decreased from 24.1% at intervention start to 13.1% at intervention month 18 for control practices; from 22.1% to 6.1% for suggested alternatives; from 23.2% to 5.2% for accountable justification; and from 19.9% to 3.7% for peer comparison. As the authors conclude, “accountable justification and peer comparison as behavioural interventions resulted in lower rates of inappropriate antibiotic prescribing for acute respiratory tract infections.” (Issue 262)

Commission projects

**AURA 2016: first Australian report on antimicrobial use and resistance in human health**
Australian Commission on Safety and Quality in Health Care
Sydney: ACSHQc; 2016. p. 196.

The Australian Commission on Safety and Quality in Health Care has released the report *Antimicrobial Use and Resistance in Australia (AURA 2016): First Australian report on antimicrobial use and resistance in human health*. AURA 2016 contains valuable data on antimicrobial use in the community, hospitals and residential aged care facilities; key emerging issues for antimicrobial resistance; and a comparison of Australia’s situation with other countries.

Antimicrobial use and resistance is a critical and immediate challenge to health systems in Australia and around the world. High and inappropriate antimicrobial use has accelerated the process of increasing resistance worldwide, including in Australia. Resistance to antibiotics is commonly found in Australian hospitals and increasingly in the community. The prevalence of multidrug-resistant bacterial pathogens is rising. In 2014, nearly half the people in the Australian community were prescribed antimicrobials; the threat of antimicrobial resistance has the potential to affect every individual.

AURA data and reports will allow trends to be monitored over time and inform action to prevent the spread of antimicrobial resistance.


**Australian Atlas of Healthcare Variation**
Australian Commission on Safety and Quality in Health Care and National Health Performance Authority
Sydney: ACSQHC; 2015 26 November 2015
On Thursday 26 November, the Honourable Sussan Ley, Australian Minister for Health, launched the first national healthcare ‘atlas’, illuminating variation in health care provision across Australia. The Australian Atlas of Healthcare Variation presents a clear picture of substantial variation in healthcare use across Australia, across areas such as antibiotic prescribing, surgical, mental health and diagnostic services.

Some variation is expected and associated with need-related factors such as underlying differences in the health of specific populations, or personal preferences. However, the weight of evidence in Australia and internationally suggests that much of the variation documented in the atlas is likely to be unwarranted. Understanding this variation is critical to improving the quality, value and appropriateness of health care.

Six clinical areas are examined in the atlas, covering prescribing, diagnostic, medical and surgical interventions. Priority areas for investigation and action include the use of antimicrobials and psychotropic medicines; variation in rates of fibre optic colonoscopy, knee arthroscopy, hysterectomy and endometrial ablation; and inequitable access to cataract surgery.

The Australian Commission on Safety and Quality in Health Care collaborated with the Australian, state and territory governments, specialist medical colleges, clinicians and consumer representatives to develop the atlas.

It is the first time that data from the Medicare Benefits Schedule (MBS), Pharmaceutical Benefits Scheme (PBS) and Admitted Patient Care National Minimum Data Set (APC NMDS) have all been used to explore variation across different healthcare settings.

The atlas includes key findings and recommendations for action. The atlas identifies a number of geographic and clinical areas where marked variation in practice is occurring. One of the aims is of providing information to improve the appropriateness of care for populations and individuals in Australia and increasing the value obtained from resources allocated to health.

Antimicrobial Stewardship Clinical Care Standard
Australian Commission on Safety and Quality in Health Care
Sydney: ACSQHC; 2014

Antibiotic resistance poses a significant threat to public health because antibiotics underpin routine clinical practice in a variety of healthcare settings. Bacteria can develop resistance to specific antibiotics, meaning that the antibiotic is no longer effective against those bacteria. Although antibiotic resistance is a natural feature of bacterial evolution, the inappropriate use of antibiotics has increased the development of antibiotic-resistant bacteria, not only in hospitals and healthcare facilities but also in the community. To help prevent the development of current and future bacterial resistance, it is important to prescribe antibiotics according to the principles of antimicrobial stewardship, such as prescribing antibiotics only when needed. The Australian Commission on Safety and Quality in Health Care, in collaboration with consumers, clinicians, researchers and health organisations, has developed the Antimicrobial Stewardship Clinical Care Standard and resources to guide and support its implementation.