



Government of **Western Australia**
Department of **Health**



Executive Summary Report and Recommendations

Superbugs

Clinical Senate of Western Australia
4 March 2016

Executive Summary

The first meeting of the Clinical Senate of Western Australia for 2016 was held on 4 March at the University Club of WA.

The topic for debate was “Superbugs”.

The World Health Organisation’s 2014 report on global surveillance of antimicrobial resistance revealed that antibiotic resistance is no longer a prediction for the future; it is happening, putting at risk the ability to treat common infections in the community and hospitals. Without urgent, coordinated action, the world is heading towards a post-antibiotic era in which common infections and minor injuries, which have been treatable for decades, can once again kill.

According to the National Health and Medical Research Council (NMHRC) and Australian Commission on Safety and Quality in Healthcare (NSQHS), infection is the most common complication affecting hospital patients, affecting 200,000 patients per year.¹ At least half of healthcare associated infections are preventable. Successful infection control to minimise the risk of transmission requires a range of strategies across all levels of the healthcare system and a collaborative approach for successful implementation.

Excess length of stay due to a surgical site infection is between 3.5 and 23 hospital bed days, depending on the type of infection. The total national number of bed days due to surgical site infections for a one year period was estimated to be 206,527 bed days.² If there was optimal use of antimicrobials and containment of antimicrobial resistance, \$300 million of the Australian national healthcare budget could be redirected to more effective use every year.³

The NSQHS *Standard 3 Preventing and Controlling Healthcare Associated Infections* calls for clinical leaders and senior managers of a health service organisation to implement systems to prevent and manage healthcare associated infection and communicate these to the health workforce to achieve appropriate outcomes.

The specific focus for debate was to consider how the inappropriate and overuse of antimicrobials contributes to the emergence of resistant bacteria and potential patient harm. Senators were asked to consider strategies to reduce antibiotic resistance through changes in practice, and consider what WA Health should be doing to promote system wide infection control and antibiotic stewardship.

The co-Sponsors for the debate were Professor Tarun Weeramanthri, Assistant Director General, Public Health and Professor Gary Geelhoed, Chief Medical Officer and Assistant Director General, Clinical Services and Research.

Experts invited to the debate included clinicians with direct involvement in infection prevention and control and antibiotic stewardship across the WA Health system. Experts also included leading researchers who provided both a local and interstate perspective.

¹ National Health and Medical Research Council. Australian Guidelines for the Prevention and Control of Infection in Healthcare. Canberra: NHMRC, 2010:260.

² Graves N, Halton K, Robertus L. Costs of Health Care Associated Infection. In: Cruickshank M, Ferguson J, editors. Reducing Harm to Patients from Health Care Associated Infection: The Role of Surveillance. Sydney: Australian Commission on Safety and Quality in Health Care, 2008:307–335.

³ Australian Commission on Safety and Quality in Health Care. Windows into safety and quality in health care 2009. Sydney: Australian Commission on Safety and Quality in Health Care, 2009.

The opening session

The meeting was opened by Nyungar Elder, Ms Marie Taylor, who offered a Traditional blessing.

Professor Julie Quinlivan, Chair of the Clinical Senate, introduced the topic by sharing a quote from the World Health Organization “Preserve the miracle of antibiotics – “No action today, no cure tomorrow”. She called on senators to use their diverse skill base to consider how we can prevent and manage antibiotic resistance and the emergence of multidrug resistant organisms (“Superbugs”) through changes in clinical practice within our hospitals.

Director General, Dr David Russell-Weisz confirmed the problem of growing antibiotic resistance. Research into hospital antibiotic use found 33% of prescriptions were not in accordance with antibiotic guidelines. He emphasized the need for antibiotic stewardship programs and policy frameworks in hospitals. He challenged senators to consider how they could involve patients in order to change demand. He concluded by stating: “I urge you to embrace this opportunity to discuss these important issues, knowing that the outcomes from today’s debate will be vital in helping WA Health to address the issue of superbugs – both in our hospitals, and in our community”.

Dr Paul Armstrong, Director, Communicable Diseases Control Directorate, Public Health Division, Department of Health WA set the scene for debate. He provided an overview of the topic. Superbugs were multi-resistant organisms (MROs), resistant to a number of antibiotics. MROs arose from natural selection, that is, evolutionary pressure that selected resistant organisms following exposure to antibiotics within human medicine, veterinary medicine and agriculture. He stated the pressure on bacteria to develop resistance occurs in both hospitals (especially large tertiary hospitals) where the sickest patients are cared for and where the need for powerful antibiotics is greatest, and in the community. The key driver is unnecessary prescribing of antibiotics, including in developing countries where people are able to access and purchase antibiotics over the counter. What is also known is that by reducing the use of antibiotics makes the resistance dissipate.

Antibiotic resistance organisms are, to some extent, a natural process. However, overuse and misuse of antibiotics accelerates the emergence of drug-resistant strains, to the point where a drug that was previously effective to treat a particular microorganism is rendered ineffective.

Dr Armstrong cited the Centers for Disease Control and Prevention (CDC) in the USA where it was estimated that \$20 billion in direct costs was associated with antimicrobial resistance per year. There was an impact on the health system due to increased costs of antibiotics, special equipment, prolonged length of stay, increased staff time and diversion of resources. Some bacteria now have no antibiotic effective against them.

He outlined the impact of primary care. General Practitioners prescribed nearly 75% of all antibiotics in clinical medicine in Australia. This was driven in part by pressure from patients who overestimated the benefits of antibiotics and underestimated their harm. Globalisation was also a factor. Food imported from countries with higher resistance levels were a risk. International travel and medical tourism were also drivers, as people were at risk of returning with infections that were resistant to antibiotics. The final driver was environmental contamination with antibiotics, which is a particular problem in developing countries that manufacture pharmaceuticals.

In order to address what could be done, Dr Armstrong offered two high level solutions: prevent antimicrobial resistance from developing in the first place and determine how to manage MROs when they arise. Strategies for prevention included good infection control practices, vaccines and thorough cleaning practices. There must also be surveillance systems to determine the pressure points and guidelines that provide advice on appropriate antibiotics use. Screening programs must also be in place and clinicians should have the ability to screen patients who have been hospitalised within Australia or abroad. He reminded clinicians to consider the 5Rs

of antimicrobial stewardship: give the right patient, the right drug, at the right dose, via the right route, and for the right time period.

Dr David Speers, Infectious Disease Physician, Head of Microbiology at QEII PathWest Laboratory Medicine, Sir Charles Gairdner Hospital offered a WA perspective. He spoke of the need for both antimicrobial stewardship (AMS) programs and strong infection prevention and control. An AMS program alone was not sufficient to control resistance. To be effective, a comprehensive infection prevention and control program that included hand hygiene, standard transmission based precautions and cleaning and disinfection was required.

He emphasised that prevention is also about understanding the epidemiology. Bugs were either endemic or exotic. For an endemic bacteria (within the WA population and regularly encountered), there is no easily identifiable risk factor to screen, so the risk factor of any one person being colonised by one of these resistant bacteria is higher. Therefore, the infection prevention approach is to concentrate on universal precautions. For exotic superbugs (not regularly encountered in the WA population) such as certain Carbapenemase-producing Enterobacteriaceae (CPE) (like the New Delhi metallo-beta-lactamase (NDM) strains), these have a more easily identifiable source. You can identify a risk group, concentrate screening and use barrier precautions.

Dr Speers shared data on what he termed the most challenging MROs. These included: methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin resistant enterococci (VRE), and multi-drug resistant gram negative organisms such as CPE.

Dr Speers shared his 'wish list' to prevent the acquisition of superbugs. He emphasised the need for: continued improvement of hand hygiene; to mandate technique training and competency; and the need to mandate the disinfection/cleaning protocols with regard to shared equipment. He stressed the importance of investment in environmental cleaning. With regard to controlling superbug outbreaks, there is the need for a rollout of a statewide budget for approved infection control and antimicrobial stewardship; there is the need for an IT solution for surveillance and reporting; and there is the need for investment in molecular typing (whole genome sequencing) of organisms.

A/Professor Owen Robinson, Infectious Disease Consultant, Royal Perth Hospital and Fiona Stanley Hospital provided an overview of antimicrobial stewardship (AMS). He stated that AMS involved a systemic approach to optimizing the use of antimicrobials with the aims to: reduce inappropriate antimicrobial use; improve patient outcomes and reduce adverse effects of antibiotic use and/or consequences of antimicrobial use, including resistance, toxicity and unnecessary costs.

Prof Robinson described the front end of AMS and the many factors that drove it, starting with collecting the right specimens from patients, processing of those specimens and reporting of results. The teaching of microbiology at the university level had been diminished, leading to indecision at the coalface on how and what to do with swabs. This directly impacted on results. Education was critical.

Other key factors were management of the drug formulary, including restricting drug availability, and guidelines for rational prescribing. In describing the back end approaches to stewardship he said it came down to reviewing antibiotics that are prescribed in a hospital. He outlined the current process for restricted antibiotics and shared the results of a post prescription review. The review looked at between 750-800 cases in SCGH and 1200 in FSH. This involved rounds, reviewing clinical cases and providing advice on dose, dose adjustment due to renal failure, mode of delivery of antibiotics (oral versus intravenous) and sometimes simply suggesting that antibiotics be stopped. He reported a high acceptance rate of antimicrobial stewardship by clinicians of between 85-90% with only one complaint and that was in RPH in 2005.

Prof Robinson stated WA were pioneers with regard to AMS, but our system had limitations. Only 25% of the restricted antibiotics were captured by current systems, the remaining 50%

were not reviewed. There was poor documentation of antibiotics in our hospitals, no planned duration of use, and review dates were often missing. WA data capture was poor. He reported national level data collection was done via the National Antimicrobial Utilisation Surveillance Program (NAUSP). Results indicated ¼ of all antibiotic prescribing was inappropriate after review.

Prof Robinson provided his view for the future, highlighting the need for an electronic medicine management system (EMMS). The system would allow for: better documentation of indication approval; linkage to appropriate guidelines and the ability to check for drug interactions; and checking for bug/drug mismatches and drug allergies. By using the patient identifier, AMS could be provided across the state, with greater control of antimicrobial stock lists resulting in less wastage.

Plenary

The focus of the plenary debate was on “Improving outcomes in WA hospitals”. The session commenced with a video presentation “New initiatives that seem to work” by Professor Lindsay Grayson, Director, Infectious Diseases and Microbiology Department at Austin Health, Professor of Medicine at the University of Melbourne, Professor in the Department of Epidemiology and Preventative Medicine at Monash University.

Professor Grayson emphasized the importance of hand hygiene. He shared statistics with regard to hand hygiene in Australian hospitals from 2010-2015 from 890 groups (65% public sites and 35% private sites) and reported there had been an aggregate national compliance of 83% with steady improvement in compliance amongst medical practitioners (71.2%).

Professor Grayson then shared three initiatives implemented at Austin Health with good results: standards for IV devices (both peripheral IV cannulae and central venous catheters); hospital cleaning standards; and the Good Antimicrobial Prescribing Program (GAPP).

He outlined work in standardising insertion and removal of IV devices: peripheral IV cannulae and central venous catheters. The “Austin Heath IV insertion method” reduced *Staphylococcus aureus* bacteraemia (SAB) and was cost effective. He suggested it was the first step towards a national standard for IV insertion and maintenance.

In regard to hospital cleaning standards, he reported on a multimodal VRE intervention to manage the entire hospital against VRE contamination. First, they employed universal routine daily bleach cleaning (bleach 1000ppm + detergent) and single step cleaning. Second, they employed cleaning supervisors who were given formal training, charged with establishing performance benchmarks. Third, they modified the personal protective equipment dress code for VRE, using sleeveless aprons with an emphasis on alcohol-based hand rub and no gloves except for procedures. Results from the multimodal bleach cleaning intervention were a 37.4% reduction rate of new VRE colonisation and reduced VRE inpatient acquisition. With regard to VRE, disease there was a 70.8% reduction in VRE bacteraemia.

In regard to their Good Antimicrobial Prescribing Program (GAPP), he said the starting rules for antibiotic prescribing were that all inpatient orders for restricted antimicrobials required approval from the Infectious Disease team via the Registrar (24/7) or by using an online system. An approval number code included the duration of approval. This assisted with issues related to enforcement and bullying by the prescribing doctors. The trial outcomes resulted in cessation of unapproved imprecise usage.

In the facilitated plenary session that followed, senators discussed the issues they saw in their areas of practice, current infection prevention and control strategies and examples of change across the health services. They also heard from experts in the field.

The key messages emerging from the plenary were that there is often pressure to prescribe antibiotics and prescribing behaviour is not always evidence-based. Furthermore there is specific pressure on clinicians to prescribe in remote Aboriginal communities. Behavioural

change is required at a personal, institutional and system level. Clinicians must lead the change at the institutional level.

Within our hospitals, clinicians (particularly consultants) must lead change in hand hygiene and aseptic technique. Decisions regarding AMS are often made after the decision to give the antibiotic, therefore, more emphasis must be placed on establishing an early diagnosis to guide prescribing. Inappropriate hospital prescribing needs to be targeted through better surveillance, monitoring and feedback. Senators agreed that more emphasis needs to be placed on diagnosis skills, improving the collection of the correct diagnostic specimens (including blood cultures) leading to a reduction in unnecessary testing.

Senators raised the need for better tools to rapidly detect antibiotic resistance. There is the need for better training on interpreting tests and for earlier identification of patients with MROs who require isolation. There is a need to modify physician and patient expectations for antibiotic prescribing through better point-of-care testing.

It is critical that we partner with consumers and the community to manage expectations and to better educate all with regard to the benefits and/or adverse effects of antibiotics. Culture change must be across the spectrum.

Finally, Senators were challenged to consider health economics as a motivator for change. How could we incentivise good behaviour? Senators agreed with new governance there were opportunities to promote AMS and address the clinical economics to inform decisions.

The afternoon sessions were devoted to two concurrent workshops that provided recommendations on: Improving AB stewardship in WA Health; and Preventing and controlling antibiotic resistance in WA hospitals. The themes of antibiotic prescription surveillance, education, standardisation in cleaning and monitoring were key recommendation outcomes.

In conclusion, the Clinical Senate recommendations offer a way forward to prevent and control superbugs and support antimicrobial stewardship programs. Changes are critical and there is opportunity to make these changes within the devolved governance structure and Health Service Boards.

The Clinical Senate's nine recommendations suggest a way forward to address this critical clinical issue.

A response from the Director General to each of the recommendations of endorsed, endorsed in principle, or not endorsed is requested.

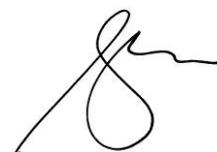
Sincerely,



Professor Julie Quinlivan
Chair
Clinical Senate of WA



Professor Tarun Weeramanthri
Assistant Director General
Public Health
Department of Health



Professor Gary Geelhoed
Chief Medical Officer
Assistant Director General
Clinical Services and Research
Department of Health

Superbugs

Recommendations

1. That WA Health implement an Electronic Prescribing System (EPS) that may be used across all health facilities and can capture prescribing data so it can be benchmarked and used to monitor compliance with therapeutic guidelines.
2. The Clinical Senate recommends development of a statewide policy of facility cleaning standards for WA Health.

These will include:

- standardised cleaning procedures that are evidence-based and standard use (detergent, bleach, water). WACHS have already done this body of work and it should be examined for applicability to be adapted statewide
 - encouragement for the vocational sector to develop short training courses for cleaning, which could be included as a desirable criterion in employment for cleaners
 - raising the profile of cleaning in facilities by having supervisors, minimum language requirements for cleaners and minimising use of casual/agency staff
 - a requirement for feedback on cleaning outcomes and environmental monitoring to cleaning staff
 - stipulation that audits for compliance with above processes are undertaken, which would be presented to health boards.
3. That an Antimicrobial Stewardship Program is embedded within a safety and quality framework, that feeds agreed indicators to area Health Service Boards in addition to a central state committee.
 4. WA Health should provide recurrent funding for, the Infection Control Automated Surveillance Technology (AST) system, support its implementation, and be responsible for its maintenance.
 5. WA Health to develop, area health services to adopt, and hospital executive to promote a statewide framework for standardised training and education to ensure antimicrobial stewardship is everyone's business.

Essential to this is the need to:

- involve key end-users in program (re)design to ensure education is fit for purpose
 - target poor-performing disciplines and clinical areas
 - include prevention education i.e. IV cannulation, aseptic technique and hand hygiene.
6. WA Health mandates each hospital undertake periodic antibiotic usage audits (e.g. National Antibiotic Prescribing Survey (NAPS) and results should be fed to area health services, boards and quality and safety committees for review. Comparative data for similar hospitals should be made publicly available after a three year implementation process.

7. WA Health must write to non-hospital health system managers (e.g. Aboriginal medical services, WA Primary Health Alliance (WAPHA), residential aged care facilities, General Practitioners) and ask them to ensure they have guidelines for antibiotic stewardship that includes consideration of surveillance activities and ability to feedback to their clinicians.
8. WA Health ensures all 'clinicians' involved in invasive procedures demonstrate competence in aseptic technique. This could be facilitated by the Director General of Health writing to all WA University Vice Chancellors requesting them to ensure students in healthcare-related disciplines are assessed for competency in the practical demonstration of aseptic techniques. Within healthcare facilities, this could be facilitated through staff training.
9. That a communication and health promotion strategy to promote infection prevention and control and appropriate antibiotic usage be developed and implemented by consumer agencies and key WA Health experts. The strategy should use all contemporary messaging channels, and align with the National Safety and Quality Health Service Standards (NSQHSS). It should include elements to address vulnerable groups such as people living in residential aged care facilities, Aboriginals, prisoners and individuals at risk for transitioning in and out of hospital.

Presenters and Expert Witness

- Ms Marie Taylor, Nyungar Elder
- Professor Julie Quinlivan, Chair, Clinical Senate of WA
- Dr David Russell-Weisz, Director General , WA Health
- Dr Paul Armstrong, Director, Communicable Disease Control Directorate, Department of Health WA
- Dr David Speers, Infectious Disease Physician, Head of Microbiology at QEII PathWest Laboratory Medicine, Sir Charles Gairdner Hospital
- A/Prof Owen Robinson, Infectious Diseases Consultant, Royal Perth Hospital and Fiona Stanley Hospital, PathWest Laboratory Medicine WA
- Professor M. Lindsay Grayson, Infectious Disease & Microbiology Department, Austin Health and Department of Medicine, University of Melbourne, Australia
- Professor Tarun Weeramanthri, Chief Public Health Officer and Assistant Director General, Public Health, WA Health
- Professor Gary Geelhoed, Chief Medical Officer and Assistant Director General, Clinical Services and Research, WA Health
- Dr Christopher Etherton-Beer, Associate Professor in Geriatric Medicine, the University of Western Australia and Geriatrician and Clinical Pharmacologist at Royal Perth Hospital
- Dr Andrew Robertson, Deputy Chief Health Officer and Director, Disaster Management, Regulation and Planning, WA Health
- Ms Rebecca McCann, Program Manager, Health Care Associated Infection Unit, WA Health
- Dr James Flexman, Head of Department Microbiology & Infectious Diseases, Royal Perth Hospital and Clinical Lead, Infections and Immunology Network
- Ms Dallas Widmer, Clinical Nurse Consultant, Infection Prevention & Control, Princess Margaret Hospital
- Ms Lisa Nicolaou, Clinical Nurse Consultant, Infection Prevention & Control, Womens and Newborn Health Service
- Ms Mary Willimann, Manager, Infection Prevention & Control, St John of God Hospital , Subiaco WA
- Associate Professor Susan Benson, Clinical Microbiologist, Fiona Stanley Hospital and Infectious Diseases Physician and Clinical Academic
- Dr Paul Ingram, Infectious Disease Physician and Clinical Microbiologist, Royal Perth Hospital and Fiona Stanley Hospital
- Mr Jason Seet, Clinical Infectious Diseases and Critical Care Pharmacist, Sir Charles Gairdner Hospital
- Dr David McGeachie, Consultant Microbiologist & Director, Infection, Prevention and Management, PathWest Laboratory Medicine, Fiona Stanley and Fremantle Hospitals
- Dr Tim Inglis, Medical Microbiologist, PathWest, QEII Medical Centre
- Ms Ann Whitfield, A/Coordinator, Infection, Prevention and Management, Fiona Stanley Hospital



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