Preventing transmission of methicillin resistant Staphylococcus aureus (MRSA)

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Prevention and control of hospital infections is both a patient safety and a public health issue and a major area of research for CIDM-Public Health (CIDM-PH). For the past 3 years CIDM-PH has been working on a project aiming at protecting new patients from becoming colonised with methicillin resistant Staphylococcus aureus (MRSA) and other pathogens – with all of the risks, costs and personal inconvenience that entails.

To do this novel strategies are needed to improve detection of MRSA infection and potential transmission events. CIDM-PH developed a highly sensitive MRSA strain typing system that is rapid and inexpensive enough to be used routinely for all MRSA isolates in clinical settings. This was achieved by Dr Matthew O’Sullivan and Professor Lyn Gilbert and is in routine use. CIDM-PH postdoctoral fellow Dr Rosie Sadsad is also well on the way to implementing an electronic alert system that draws on patient and laboratory information systems and strain typing results to rapidly identify and automatically report MRSA transmission events to clinicians. This will allow timely intervention to prevent further spread. The system has been piloted in surgical wards and shown to be effective for early detection and description of several outbreaks of MRSA. It has informed timely and targeted infection control interventions to achieve a reduction in infection rates. Dr Sadsad delivered a keynote speech on infection control innovation at the Health Roundtable in Brisbane in 2014 involving 149 health service facilities from Australia and New Zealand.

This project will pioneer the complimentary use of molecular typing and whole genome sequencing (WGS) in routine and automated surveillance of nosocomial infections and set a precedent for the use of “big data” in a clinical setting. Already these systems have had a major impact on transmission and colonisation rates in several wards where MRSA is endemic or outbreaks have occurred, including the neonatal (NICU) and adult (ICU) intensive care units and general surgical wards.

Among other things, this project has demonstrated the important role of environmental contamination in transmission of MRSA from patient to patient, which has been underestimated until now. This first became apparent – with confirmatory evidence from MRSA strain typing – during an outbreak of infection and colonisation with a particularly virulent strain of MRSA in the NICU. This incident led to the purchase of a system to deliver vapourised hydrogen peroxide (VHP), which is now recognised as safer and more effective agent than bleach for terminal cleaning. Its use in the NICU and subsequently in surgical wards significantly reduced environmental contamination and contributed to reductions in MRSA transmission. Reports by the Infection Control Unit on the incorporation of VHP environmental disinfection and MRSA strain typing into a bundle of enhanced infection control measures won the 2013 NSW Health Innovations Harry Collins award. The project has also reached the finals of the National Lead Clinicians Group 2014 Awards for Excellence.