



Public Health Association
AUSTRALIA



ABSTRACT BOOK

16TH NATIONAL IMMUNISATION CONFERENCE 2018

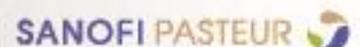
**Immunisation for all:
Gains, gaps and goals**

Tuesday 5 to Thursday 7 June 2018

Adelaide Convention Centre

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Tuesday 5 June 2018

1A – Vaccine Safety

Hall C, 11:00am - 12:30pm

Perinatal outcomes following influenza and pertussis vaccinations in pregnancy, 2012-2015: FluMum study.

Authors: Ms Lisa Mchugh¹, Professor Helen Marshall², Dr Kirsten Perrett³, Professor Terry Nolan³, A/Professor Nicholas Wood⁴, A/Professor Stephen Lambert⁵, Professor Peter Richmond⁶, Professor Robert Ware⁷, Professor Sue Kildea^{8,9}, Ms Paula Binks¹, Dr Michael Binks¹, Professor Ross Andrews^{1,10}

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Abstract:

Background: In Australia, influenza vaccination is recommended for all women who will be pregnant during the influenza season and a pertussis-containing vaccine is recommended in the third trimester of every pregnancy. Limited data on perinatal outcomes exist for pregnant women who receive both vaccines during pregnancy using appropriate and consistent methodologies. We assessed adverse perinatal outcomes post influenza and pertussis vaccinations during pregnancy compared with unvaccinated pregnant women.

Methods: Cohort analyses of 'FluMum' participants (2012-2015). Exposures included influenza and pertussis vaccination during pregnancy by trimester. Outcomes included; preterm birth, low birthweight, small for gestational age (SGA), congenital anomalies, infant respiratory illnesses and hospitalisations. Logistic regression models are presented as risk ratios and adjusted odds-ratios. Time-at risk analyses between vaccinated and unvaccinated pregnant women using Cox-regression models, presented as cox-proportional hazard ratios (HRs) with 95% confidence intervals (95%CI).

Results: Of 8,859 mother-infant pairs enrolled in our study, median gestation at infant birth=39 weeks in all groups and mean birthweight=3373 grams. Compared to unvaccinated pregnant women, there were no significant differences in women who received influenza and pertussis vaccines in pregnancy for; preterm births (HR 1.03, 95%CI 0.76-1.32, p=0.84), low birthweight infants (HR 1.16, 95%CI 0.81-1.67, p=0.42), or SGA (HR 0.97, 95%CI 0.76-1.24, p=0.81). Regression analyses showed no statistically significant differences in adverse perinatal outcomes between vaccinated and unvaccinated participants.

Conclusion: We found no significant associations between maternal vaccination and adverse birth outcomes, although larger numbers of participants are required to further evaluate low birthweight and assess rarer adverse perinatal outcomes.

Surveillance of adverse events following immunisation in Australia, 2016

Authors: Dr Aditi Dey¹, Ms Han Wang¹, Dr Helen Quinn¹, Dr Jane Cook², Professor Kristine Macartney¹

Affiliations: ¹National Centre for Immunisation Research and Surveillance (NCIRS), Westmead, Australia, ²Pharmacovigilance and Special Access Branch, Therapeutic Goods Administration, Department of Health, Woden, Australia

Abstract:

Background: Vaccine safety surveillance is an important aspect of the National Immunisation Program in Australia for monitoring adverse events following immunisation (AEFI) in the post licensure phase. The aims were to describe reporting of AEFI in 2016 and trends over the 17-year period, 1 January 2000 to 31 December 2016, including any possible signals of unexpected AEFIs.

Methods: Australian surveillance AEFI data reported to the Australian Adverse Drug Reactions System (ARDS) database of the Therapeutic Goods Administration were analysed. Reporting rates were calculated by vaccine type, age and jurisdiction.

Results: There were 3407 AEFI reports for vaccines administered in 2016; an annual AEFI reporting rate of 14.1 per 100,000 population. There was a 14% increase in the overall AEFI reporting rate in 2016 compared with 2015. This increase in reported adverse events in 2016 compared to the previous year was mainly attributable to introduction of the booster dose of the diphtheria, tetanus, and acellular pertussis-containing vaccine at 18 months of age in March 2016 and the zoster vaccine for those aged 70- 79 years in November 2016.

The most commonly reported reactions were injection site reaction (29%), pyrexia (19%), rash (17%), vomiting (8%) and headache (7%). Ninety per cent of reports were not serious and a 24% decline in serious events was observed in 2016 compared to 2015.

Conclusion: The reporting rate of AEFI highlights the safety of vaccines in Australia and demonstrates the value of the national ADRS database as a surveillance tool for monitoring AEFIs nationally.

Afluria® Quadrivalent Influenza Vaccine Clinical Program Immunogenicity and Safety data

Authors: **Dr Jane Leong**¹, Dr Daphne Sawlwin¹, Dr Alison Graves-Jones¹, Dr Vince Matassa¹, Dr Neil Formica², Dr Steve Rockman¹, Dr Frank Albano¹

Affiliations: ¹Seqirus Australia, Parkville, Australia, ²Formative Health, Gold Coast, Australia

Abstract:

Background: In 2010, Fluvax® TIV was associated with a significant increase in postmarketing reports of fever and febrile seizures, predominantly in children under 5 years of age. Increased reports of fever were also reported in children 5 through 8 years (Department of Health and Ageing 2010).

Seqirus conducted extensive scientific investigations which showed that the delivery of RNA by lipids led to the induction of the cytokine/chemokine signal in vitro assays (Maraskovsky et al. 2012; Rockman et al 2014a and 2014b), and that increased concentration of detergent sodium taurodeoxycholate (TDOC) (within approved manufacturing conditions) reduced the RNA fragment delivery into cells, decreasing cytokine production.

Afluria QIV Clinical Development Program: Findings of the scientific investigations were implemented into a phased clinical development program for the Afluria (previously known as Fluvax) Quadrivalent Influenza Vaccine for all ages including paediatric subjects 6 months and above.

Immunogenicity and safety results: Afluria QIV has demonstrated non-inferior immune responses to US-licensed influenza vaccines with comparable local and systemic tolerability including fever rates, in three consecutive influenza seasons, and across age groups from 6 months of age (Treanor et al 2016, Airey et al 2016).

Conclusion: The completed Afluria QIV clinical program in subjects from 6 months and above, has shown that Afluria QIV met primary non-inferiority immunogenicity endpoints; has a comparable safety and tolerability profile with comparator vaccines, and therefore a positive risk-benefit profile. These data demonstrate the use of increased TDOC concentration has attenuated the fever response previously observed in young children with Fluvax TIV.

New tools to detect adverse events following immunisation

Authors: **Dr Evelyn Tay**^{1,2}, Dr Parveen Fathima¹, Mr Peter Jacoby¹, Dr Alan Leeb³, Professor Kristine Macartney^{4,5,6}, Dr Thomas Snelling^{1,7,8}, Dr Julie Marsh^{1,9}

Affiliations: ¹Wesfarmers Centre of Vaccines & Infectious Diseases, Telethon Kids Institute, Subiaco, Australia, ²University of Western Australia, School of Population and Global Health, Crawley, Australia, ³Illawarra Medical Centre, Perth, Australia, ⁴National Centre for Immunisation Research and Surveillance, Sydney, Australia, ⁵University of Sydney, School of Child and Adolescent Health, Sydney, Australia, ⁶The Children's Hospital at Westmead, Sydney, Australia, ⁷Princess Margaret Hospital for Children, Perth, Australia, ⁸Curtin University, School of Public Health, Bentley, Perth, Australia, ⁹University of Western Australia, School Mathematics & Statistics, Crawley, Australia

Abstract:

Background: Seasonal influenza vaccination proceeds annually before mature safety data are available on each year's new vaccines. In 2010 a specific brand of influenza vaccine was associated with a high rate of febrile convulsions among children under five years old. Active vaccine surveillance and sensitive safety signal detection methods are needed for the timely identification of adverse events following immunisation (AEFI).

Methods: We evaluated a Bayesian signal detection method using simulation and applied this method to parent-reported data on fever following influenza vaccination in children under five years old. All data were obtained via the AusVaxSafety active vaccine safety surveillance system. We also applied these methods to retrospective reports of febrile convulsion from 2010.

Results: For seasonal increasing vaccine coverage, a Bayesian analysis with a prior informed by the underlying adverse event rate from the previous season was more likely to identify an AEFI signal in a shorter timeframe from commencement of vaccination season than with weak or non-informative priors. Applying this method to the AusVaxSafety surveillance data for fever in children under five years, no signals were detected between 2015-17. Analyses are ongoing for the retrospective 2010 data.

Conclusion: Implementing Bayesian methods using recalibrated priors may lead to more sensitive and timely signal detection of common AEFI (like fever) as vaccine programs are rolled out. To detect rare AEFI, while Bayesian tools offer benefits over traditional analyses, existing active surveillance systems, such as AusVaxSafety, need to be supplemented with additional data sources.

The reactogenicity of MenB and 4vMenCV when administered concomitantly

Authors: Dr Alan Leeb¹

Affiliations: ¹Smartvax, Perth, Australia

Abstract:

Context: Invasive meningococcal disease causes significant morbidity and mortality, particularly in infants and young adults. A serogroup B vaccine, 4CMenB (Bexsero[®]) and three quadrivalent (A,C,W135,Y) conjugate (4vMenCV) vaccines - (Menactra[®], Menveo[®], and Nimenrix[®]) are currently licensed for use in Australia. The recent emergence of strain W as a dominant strain over the frequent B strain, has prompted mass ACWY vaccination programs in highly susceptible cohorts. Concomitant vaccination of multiple vaccines improves compliance with potential for increased reactogenicity. Safety data are limited.

Process: SmartVax is an active surveillance platform for adverse events following immunisation (AEFI) installed in over 200 immunisation sites across Australia. Patients are invited to respond to SMS three days post-vaccination reporting any AEFI experienced. Potentially serious AEFI are flagged for follow-up.

Analysis: As of January 2018, 36,201 immunisation encounters with meningococcal vaccines were followed up by SmartVax (MenB: 11,633; 4vMenCV: 22,754), 1,824 of which were administered concomitantly. AEFI were more common following MenB vaccination, either administered exclusively (23.4%) or concomitantly with 4vMenCV (24.2%) or other vaccines (19.1%), as compared to exclusive 4vMenCV vaccination (7.9%). Most commonly patients reported local reactions or fever. A total of 1.3% of patients who received MenB exclusively, 0.5% who receive 4vMenCV exclusively and 1.7% of those who received vaccines concomitantly reported seeking medical attention for an AEFI.

Outcomes: Our data show that although AEFI are more common following MenB compared to 4vMenCV vaccines, even when given concomitantly; potentially severe AEFIs were uncommon. These data support the safety of concomitant administration of meningococcal vaccines.

Safety of HPV and Meningococcal ACWY vaccines in adolescents, using active surveillance

Authors: Dr Lauren Bloomfield^{1,2}, Mr Darren Westphal¹, Ms Chloe Thomson¹, Dr Alan Leeb³, Professor Paul Effler¹

Affiliations: ¹Communicable Disease Control Directorate, WA Department of Health, Shenton Park, Australia, ²Edith Cowan University, Joondalup, Australia, ³Illawarra Medical Centre, Ballajura, Australia

Abstract:

Background: Active follow-up of adverse events following immunisation (AEFI) has been demonstrated to be an effective method of monitoring vaccine safety. In Western Australia, the SmartVax system is currently used to monitor vaccine safety for routine and special vaccination programs administered in adolescents. This study reports the safety profile of Human Papillomavirus (HPV) and Meningococcal ACWY (MenACWY) vaccines given to adolescents between 2015 and 2017.

Methods: Three days after vaccination, an SMS was sent to the parent/guardian of a vaccinee, asking if an AEFI had occurred. If an AEFI was reported, information was elicited to determine if the event was medically attended, and a survey was sent asking for further details of the event.

Results: A total of 59,128 SMS were sent following vaccination encounters in adolescents (age 10 – 19 years) between 27 Feb 2015 and 25 Nov 2017. Of these, 33,441 received HPV vaccines, and 12,736 received Meningococcal ACWY vaccines, either alone or in combination with other vaccines. The SMS response rate was 63%. The reaction rate among those receiving HPV vaccines and MenACWY vaccines was 8.5% for both vaccines. The proportion of medically attended events was <0.6% for both vaccines. Survey response rate was ~50%. The majority of reactions were mild and self-limiting, headache, swelling at the injection site and rash were most commonly reported.

Conclusion: SMS is an effective tool to actively monitor vaccine safety. Such programs are particularly relevant when a new vaccine program is being implemented, e.g. the MenACWY program for adolescents in 2017.

1B – Clinical Practice

Room E1, 11:00am - 12:30pm

The role of the Immunisation Nurse Practitioner

Authors: Ms Sonja Elia¹, Dr Kirsten Perrett¹

Affiliations: ¹Royal Children's Hospital Melbourne, Parkville, Australia

Abstract:

Context: Special risk patients (solid organ transplant recipients [SOTR], inflammatory bowel disease [IBD], oncology) often require vaccines not licensed for Nurse Immunisers to administer without a medication order. This is a challenge and often results in suboptimal uptake of special risk vaccines. A Nurse Practitioner (NP) in immunisation at the Royal Children's Hospital (RCH) Melbourne was introduced to address the deficiencies in the current management of Special risk patients.

Process: Endorsement as an NP requires successful completion of an approved Masters level program of study, plus the equivalent of three years (5,000) hours full-time experience in an advanced clinical nursing practice level, within the past 6 years. This paper will describe the outcomes of employing an NP in the specialised field of paediatric immunisation at the RCH Melbourne.

Analysis: Departmental and organisational support for an NP role in immunisation was confirmed. The Australian Health Professional Registration Agency (AHPRA) endorsed the NP on May 22nd 2017. Since that time, the Immunisation service at RCH has recorded a 150% increase in uptake of Meningococcal B vaccine as well as improved care in the delivery of immunisations in special risk patients at the RCH.

Outcomes: The endorsement of an NP in immunisation at RCH has demonstrated growth in service delivery, ensuring that specialised health care is consumer focussed and of a high quality standard. Future improvements in service delivery may include the use of sedation when immunising children with needle phobia as well as an increase in specialised immunisation consultations within the service.

The new national Primary Health Network Immunisation Support Program (PHN-ISP)

Authors: Ms Aine Heaney¹, Ms Lauren Dalton², Ms Katrina Clarke², Ms Aine Cadden¹, Dr Pradnya Naikpanvelkar¹, A/Prof Nick Wood², Prof Kristine Macartney²

Affiliations: ¹NPS Medicinewise, Surry Hills, Australia, ²National Centre for Immunisation Research & Surveillance (NCIRS), Westmead, Australia

Abstract:

NCIRS and NPS MedicineWise have partnered to develop the national Primary Health Network Immunisation Support Program (PHN-ISP) on behalf of the Commonwealth Department of Health (DoH). The aim is to better coordinate efforts across Australia to improve implementation of the National Immunisation Program.

In designing the program, extensive consultation was undertaken. Comprehensive desktop research and a review of the literature was conducted to understand the current landscape and explore challenges and opportunities associated with establishing an effective and efficient program. In addition, semi-structured qualitative interviews were conducted with twenty eight PHN nominees and eight Jurisdictional Immunisation Coordinators (JICs). Three interactive workshops were also held across the country plus a fourth human-centred design forum with stakeholders to co-design key components of the program. In total, the consultation involved 84 stakeholders identified above and others including Public Health Units (PHUs).

A number of challenges were identified including the delivery of education, ensuring immunisation was a priority, complexity of the Australian Immunisation Register, communication amongst key stakeholders, lack of consistent resources and the changes experienced within PHN's.

The themes and opportunities that emerged from the research which included the need for improved sharing of resources and communication will see the ISP focus on building a community of practice. This will include the development of a web-based platform for PHNs, PHU's, JICs, DoH and Department of Human Services to share information, resources and education materials, facilitation of networking opportunities, development of resources and education where gaps are identified and central co-ordination of program activities.

National Cold Chain Audit –Monitoring the cold chain of national schedule vaccines

Authors: Ms Loretta Roberts¹

Affiliations: ¹Immunisation Advisory Centre, New Plymouth, New Zealand

Abstract:

National Cold Chain Audit -Monitoring and managing the cold chain of national schedule vaccines.

Context: The NCCA monitors the cold chain of NZ National Immunisation Schedule vaccines via a temperature logger attached to vaccines in delivery. The aim is to monitor 10% of vaccine orders.

Process: The NCCA full audit started May 2017. The temperature is logged from dispatch at the regional vaccine store until immunisation providers have administered all doses in the vaccine box or up to two weeks, whichever occurs first.

On arrival at the provider the temperature status of the logger is checked and recorded. Loggers are then returned to IMAC where the data is downloaded and an analysis of the data is undertaken.

Outcomes: Preliminary results are for a 6 month period. Regionally the percentage of vaccines that were monitored ranged from 9% to 28%.The cold chain breaches during transit from the warehouse to the provider ranged from 0% to 16 %, and 8% required follow up by a regional immunisation advisor.

Thirty one % of the vaccine deliveries resulted in the logger going out of range at or after unpacking the vaccines at the provider. Failing to follow instructions provided resulted in 9% of the loggers not making it into the provider's fridge.

There is still a significant amount of vaccines out of range in the immunisation delivery process. The NCCA demonstrates the ability to monitor the cold chain in a timely manner and offer remedial action directed at the point at which it fails.

Novel Nurse Practitioner role in State-wide Specialist Immunisation Service

Authors: Miss Leanne Philips^{1,2}, Ms Juliana Buys², Dr Julia Clark², Dr Sophie Wen^{1,2}

Affiliations: ¹Queensland Specialist Immunisation Service, Brisbane, Australia, ²Lady Cilento Children's Hospital, Brisbane, Australia

Abstract:

Clear context: In 2016, the Queensland Specialist Immunisation Service (QIS), located at the Lady Cilento Children's Hospital, Brisbane, Queensland became a state-wide service. During the planning phase, a needs analysis identified a full time Nurse Practitioner (NP) position would add value and enhance the services ability to meet the needs of children with complex immunisation needs.

Process: The evolving NP model of care within QIS encompasses autonomous and collaborative advanced practice nursing across inpatient and outpatient services; aimed at improving health outcomes of children. As a nursing lead in QIS, the NP contributes to strategic planning, policy/guideline development, education and research.

Analysis: Noteworthy NP outcomes will be presented for the 2017 period. The NP conducted over 300 consultations (48% of total QIS medical/NP consultations); almost 75% occurred in specialist outpatient clinics and 54% for an initial consultation. The NP provided specialist immunisation advice for 223 (17%) occasions of service. The NP conducted over 13 educational presentations to multidisciplinary health professions, both internal and external to the hospital. The NP contributed to both local and national clinical guideline development, research activities and specialist immunisation groups. An outline of leadership roles and challenges of the position will also be presented.

Outcomes: The outcomes support a fulltime NP position in a specialist immunisation service and that the role is a cost effective strategy to meet the needs of children with complex immunisation needs. The position also aligns itself excellently within the domains of the NP scope of practice (clinical, leadership, education and research).

Using thermostability data to reduce vaccine wastage in NSW

Authors: Ms Sonya Nicholl¹, Dr Sonya Nicholl¹, Ms Kara Clarke¹

Affiliations: ¹NSW Health, North Sydney, Australia

Abstract:

Context: The National Vaccine Storage Guidelines Strive for 5 recommend that vaccines are to be stored between +2°C and +8°C. Vaccine thermostability data could be used to reduce vaccine wastage due to cold chain breaches.

Process: A vaccine wastage cold chain pilot was conducted in NSW between December 2017 and March 2018 to test the feasibility of adopting new cold chain management procedures using vaccine thermostability data to reduce vaccine wastage. Vaccine thermostability data were obtained from vaccine manufactures for vaccines exposed to temperatures outside the recommended +2°C and +8°C, and validated by an expert group. Prior to the commencement of the pilot, the new criteria were applied to vaccines reported exposed to cold chain breaches during one month, and wastage was reduced by 68% compared to stringent application of the +2°C and +8°C criteria.

Analysis: Analysis of the pilot will include an assessment of the reduction of vaccine wastage and how well frontline staff managed each cold chain breach and associated implementation issues such as applying labels to affected vaccines that are still potent and discarding specified vaccines that breached thermostability criteria. The observable achievements of the pilot and potential state-wide benefits of reduced vaccine wastage and consistent approach to cold chain management will also be assessed.

Outcomes: Results of the pilot will be presented at the conference which will include survey results with frontline staff and NSW public health units and data on vaccine wastage reductions. Recommendations will be made based on the outcomes of the pilot.

South Australian vaccine storage breach following the 2016 state-wide power failure

Authors: Ms Colleen Granfield¹

Affiliations: ¹SA Health, Adelaide, Australia

Abstract:

Context: Storm activity in South Australia on 28 September 2016 initiated a sequence of events that led to an unprecedented state-wide power failure.

Amid the disruption that this caused to essential services and communication networks, South Australian healthcare settings that store vaccines and provide immunisation services experienced loss of power to their vaccine fridges.

Vaccines need to be transported and stored at +2o to +8o degrees Celsius to ensure vaccine stability. Exposure to temperatures outside of this range can result in a cold chain breach and affected vaccines may need to be discarded.

Process: South Australian immunisation providers are required to report exposures outside of this narrow temperature range to the Immunisation Section, Communicable Disease Control Branch (CDCB). Vaccine specific stability data are used by Immunisation Section staff to assess each reported temperature excursion, provide advice on management of the vaccines and in many cases, prevent significant vaccine wastage.

Analysis: Calls to the Immunisation Section in the days following this event drove the workload above capacity, and although vaccine losses were very high, a significant amount of State and Commonwealth Government vaccine stock was able to be saved by individual assessment of each cold chain breach.

Outcomes: A event provided information to assist with management of future vaccine storage cold chain breaches.

This presentation discusses this state wide disaster in terms of cold chain management at a provider and state level.

1C – Maternal Vaccination

Room E2, 11:00am - 12:30pm

Addressing gaps in maternal influenza vaccination coverage: A year-round maternal influenza campaign?

Authors: Dr. Priya Darshene Janagara¹, Dr. Pari Shanmuga Raman Gurusamy², Dr. Rosalind Webby¹

Affiliations: ¹Centre for Disease Control, Australia, ²Department of Obstetrics and Gynaecology, Royal Darwin Hospital, Australia

Abstract:

Introduction: Maternal influenza vaccination was introduced in 2010 due to the high morbidity and mortality associated with influenza in pregnancy.

Methods: Birth data from Northern Territory (NT) public hospitals obtained from the Perinatal Register for deliveries in 2016 was merged with vaccination records from the NT immunisation register. Statistical analysis was performed using Microsoft Excel and SPSS.

Results: There were 3392 viable pregnancies in 2016 with 45.6% vaccination coverage against influenza. There was a significant statistical difference in coverage with 68.5% in Indigenous vs 31.7% in non-Indigenous deliveries ($p < 0.001$). Influenza vaccination coverage for preterm births (<37 weeks) was low especially in non-Indigenous mothers at 27.2% vs 65.05% in Indigenous mothers ($p < 0.001$). Non-Indigenous infants born between September to December have the lowest coverage of protection against the circulating influenza strain at 10.5% compared to 75.6% in Indigenous infants delivered during the same period. Distinct immunisation administration pattern was noted with 58.9% of vaccination occurring between April to June regardless of Indigenous status and maternal gestational age. This reflects the timing of the annual national influenza vaccination campaign.

Conclusion: A year round maternal influenza vaccination campaign is crucial to avoid missed opportunities and increase vaccination protection for mother and baby. Antenatal influenza vaccination campaign with health care workers education and increasing patient awareness should continue throughout the year.

Pregnancy Vaccine Effectiveness Network (PREVENT): multi-country cohort study estimating influenza vaccine effectiveness

Authors: Dr Annette Regan¹, Dr Mark Thompson², Jeff Kwong³, Mark Katz⁴, Steven Drews⁵, Eduardo Azziz-Baumgartner², Nicola Klein⁶, Hannah Chung³, Paul Effler⁷, Becca Feldman⁴, Kimberley Simmonds⁸, Brandy Wyant⁹, Fatimah Dawood², Michael Jackson¹⁰, Deshayne Fell³, Avram Levy¹¹, Noam Barda⁴, Lawrence Svenson¹², Rebecca Fink⁹, Sarah Ball⁹, Allison Naleway¹³

Affiliations: ¹School Of Public Health, Curtin University, Bentley, Australia, ²Influenza Division, Centers for Disease Control and Prevention, Atlanta, United States, ³Institute for Clinical and Evaluative Sciences, Toronto, Canada, ⁴Clalit Research Institute, Tel Aviv, Israel, ⁵University of Alberta Hospital, Edmonton, Canada, ⁶Kaiser Permanente Vaccine Study Center, Kaiser Permanente Northern California, Oakland, United States, ⁷Department of Health Western Australia, Perth, Australia, ⁸Government of Alberta, Ministry of Health, Canada, ⁹Abt Associates, Cambridge, United States, ¹⁰Kaiser Permanente Washington Health Research Institute, Seattle, United States, ¹¹PathWest Laboratory Medicine WA, Crawley, Australia, ¹²Alberta Health, Edmonton, Canada, ¹³Kaiser Permanente, Center for Health Research, Portland, United States

Abstract:

Background: Pregnant women are believed to be at higher risk of severe complications following influenza infection compared to non-pregnant women. However, to date, no study has measured the effectiveness of inactivated influenza vaccines (IIV) against severe outcomes in pregnant women.

Methods: The PREVENT network was launched in April 2016 by the US Centers for Disease Control and Prevention to facilitate international research on IIV effectiveness in pregnancy. Seven sites from four countries provided data to the network, including Australia (WA), Canada (Ontario, Alberta), Israel and the United States (three Kaiser Permanente sites). Administrative data at each site were used to identify pregnant women who were: i) pregnant during influenza season (2010-2016), ii) admitted to hospital with an acute respiratory infection or febrile illness, and iii) tested for influenza by reverse-transcription polymerase chain reaction (RT-PCR). IIV effectiveness against influenza-associated hospitalisation was estimated using a test-negative design.

Results: A total of 1,030 women were hospitalised with an acute respiratory or febrile illness during influenza season, 16% of whom were immunised. Based on RT-PCR, 598 (58%) women tested positive for influenza virus; 13% of influenza positive cases and 22% of influenza negative controls were vaccinated, indicating IIV was 40% effective (95% CI 12-59%) against influenza-associated hospitalisation in pregnant women.

Conclusion: Based on the PREVENT network platform, between 2010 and 2016, IIV offered moderate protection against laboratory-confirmed influenza-associated hospitalisation among pregnant women. These results are useful for informing maternal influenza vaccination policies globally, particularly for countries considering implementing influenza vaccination programs for pregnant women.

Delivering maternal vaccination: standing orders, a hospital-based immunisation service and primary care

Authors: [Dr Sushena Krishnaswamy](#)^{1,2}, Professor Euan Wallace^{1,3}, Professor Jim Buttery^{4,5}, A/Professor Michelle Giles¹

Affiliations: ¹The Ritchie Centre, Department of Obstetrics and Gynaecology, Monash University, Clayton, Australia, ²Monash Infectious Diseases, Monash Health, Clayton, Australia, ³Safer Care Victoria, Victorian Department of Health and Human Services, Melbourne, Australia, ⁴Infection and Immunity, Monash Children's Hospital, Clayton, Australia, ⁵Monash Centre for Health Research and Implementation, Monash University, Clayton, Australia

Abstract:

Context: Maternal vaccination is currently the most effective strategy to reduce neonatal and maternal morbidity and mortality from pertussis and influenza. Despite a 2015 national recommendation for maternal pertussis vaccination, uptake remains suboptimal. Barriers to uptake include a lack of integration of vaccination into pregnancy care and access to vaccination services. Standing orders (administration of vaccines without need for physician review or prescription) is a novel implementation strategy to improve uptake in vaccination in a diverse range of maternity care settings.

Process: In June 2015 standing orders for midwife administration of antenatal pertussis vaccine were introduced at our healthcare network. From October 2016, step-wise implementation across the three geographically distinct maternity services within the network enabled comparison of standing orders (implemented in hospital B) to a nurse-led immunisation service (hospital A), and delivery by general practitioners in primary care (hospital C). Uptake was measured as recorded in the state-wide perinatal data collection tool and time series analysis was performed.

Analysis: Uptake improved significantly at all three hospitals over the study period; from 55% to 68% at hospital A (p=NS), 39% to 91% at hospital B (p<0.001), and 65% to 88% at hospital C (p=0.001).

Outcomes: During the study period, maternal immunisation rates improved in all centres despite varied immunisation models. However, the introduction of standing orders for midwife administration of vaccines was associated with the greatest increase as well as the highest overall uptake. We suggest that other maternity services consider such an approach.

Designing an intervention for midwife vaccine discussions in pregnancy: a qualitative study

Authors: Dr. Katie Atwell¹, [Dr. Jessica Kaufman](#)², Professor Saad Omer³, Associate Professor Julie Leask⁴, Dr. Penny Haora⁵, Associate Professor Helen Marshall⁶, Dr. Kerrie Wiley⁴, Dr. Tom Snelling⁷, Professor Yvonne Hauck⁸, [Dr. Margie Danchin](#)⁹

Affiliations: ¹School of Social Science, University of Western Australia / Telethon Kids Institute, Perth, Australia, ²Murdoch Children's Research Institute / University of Melbourne, Parkville, Australia, ³Emory University, Atlanta, USA, ⁴University of Sydney, Sydney, Australia, ⁵National Centre for Immunisation Research and Surveillance (NCIRS), Sydney, Australia, ⁶Vaccinology and Immunology Research Trials Unit, Women's and Children's Hospital, North Adelaide, Australia, ⁷Telethon Kids Institute, Perth, Australia, ⁸Curtin University / WA Health, Perth, Australia, ⁹Royal Children's Hospital / Murdoch Children's Research Institute, Parkville, Australia

Abstract:

Background: Pregnancy is a key vaccine decision-making period. Maternal flu and pertussis vaccines are recommended to protect expectant mothers and unborn infants, and evidence suggests that childhood vaccination decision-making also begins prenatally.

Midwives are the most highly-accessed source of vaccine information for expectant parents in Australia, are highly trusted, and ideally placed to engage in vaccination discussions. However, there are no evidence-based interventions incorporating communication strategies and resources for midwives to optimise their discussions and promote acceptance of maternal and childhood vaccines.

This study aimed to gather qualitative data from midwives to design a feasible, acceptable communication intervention package to assist communication with expectant parents about vaccination.

Methods: We conducted key informant interviews with midwives at two hospitals in Melbourne and Perth. We explored midwives' attitudes and values towards maternal and childhood vaccination, their perceptions about their role in vaccine advocacy and delivery, and barriers and enablers to their delivery of a communication intervention.

We thematically analysed interview transcripts and mapped themes against potential intervention features to develop a communication intervention, drawing on Motivational Interviewing principles. During focus groups at each site we presented intervention options to obtain feedback for design optimisation and feasibility.

Results: The 'MidVaxCom' midwife communication intervention will be presented, including the qualitative data shaping its design.

Conclusion: The MidVaxCom intervention will now be incorporated into an innovative, multi-component intervention package that includes strategies implemented at the practice, provider and patient level. The package will be piloted in 2018 and subsequently evaluated in a national RCT.

A systematic review of the safety of influenza vaccines in pregnancy

Authors: Assoc Professor Michelle Giles^{1,2}, Dr Sushena Krishnaswamy^{1,3}, Dr Clayton Chiu⁴, Professor Allen Cheng^{1,2}

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Abstract:

Introduction: Influenza infection has well-described adverse effects on pregnant women and pregnancy outcomes. In 2012 The WHO recommended pregnant women as the most important risk group for influenza vaccination (IIV). However uptake of IIV amongst pregnant women in Australia remains suboptimal. The current categorization of IIV (B1 or B2) and product information may be a barrier to endorsement by healthcare providers. We were commissioned to perform a systematic review of pregnancy outcomes following IIV.

Methods: We conducted a systematic review of studies examining pregnancy outcomes following IIV.

Results: We identified 40 studies; 25 retrospective cohort, 9 prospective, 3 case control, 2 cross sectional and one randomized controlled trial. We found high quality evidence that the use of IIV is associated with a reduction in low birth weight (adjusted odds 0.82, 0.76-0.89), and no significant difference in the incidence of stillbirth (adjusted odds 0.84, 0.65-1.08). We found moderate quality evidence that the use of IIV is associated with no significant difference in preterm births (adjusted odds 0.87, 0.78-0.96) or congenital abnormalities (adjusted odds 1.03, 0.99-1.07). There was low quality evidence on the effect of IIV on spontaneous abortion, which suggested a protective effect (crude odds 0.27, 0.14-0.52), and on small for gestational age births (adjusted odds 0.99, 0.94-1.04), which suggested no difference.

Conclusion: Studies including more than 100,000 women suggest there is no increase, and for some outcomes, a decrease, in adverse pregnancy outcomes following IIV. The results of this review should prompt a re-assessment of the pregnancy categorization of IIV.

Effectiveness of maternal vaccination among infants aged <6 months hospitalised with pertussis

Authors: Dr Helen Quinn^{1,2}, Dr Jeannette Comeau¹, Prof. Helen Marshall^{3,4}, Prof. Elizabeth Elliot^{2,5}, Dr Nigel Crawford^{6,7}, Dr Chris Blyth^{8,9}, Dr Anne Kynaston¹⁰, Dr Tom Snelling^{8,9}, Prof. Peter Richmond^{8,9}, Prof. Kristine Macartney^{1,2,5}, Prof. Peter McIntyre^{1,2,5}, Assoc. Prof. Nick Wood^{1,2,5}

Affiliations: ¹NCIRS, Westmead, Australia, ²Discipline of Child and Adolescent Health, University of Sydney, Westmead, Australia, ³Vaccinology and Immunology Research Trials Unit, Women's and Children's Health Network, Adelaide, Australia, ⁴Robinson Research Institute and School of Medicine, University of Adelaide, Adelaide, Australia, ⁵The Children's Hospital at Westmead, Westmead, Australia, ⁶Murdoch Children's Research Institute, Parkville, Australia, ⁷The Royal Children's Hospital, Melbourne, Australia, ⁸Wesfarmer's Centre for Vaccines and Infectious Diseases, Telethon Kids Institute, Perth, Australia, ⁹Princess Margaret Hospital, Perth, Australia, ¹⁰Lady Cilento Children's Hospital, Brisbane, Australia

Abstract:

Background: Pertussis remains one of the most challenging vaccine preventable diseases to control; the burden of severe disease and mortality lies with unimmunised infants. Maternal vaccination is the lead strategy for current pertussis control in this group. This study aimed to report the first nationally representative estimation of maternal vaccine effectiveness (VE) against pertussis hospitalisation in infants using a test-negative design and data collected using the Paediatric Active Enhanced Disease Surveillance (PAEDS) hospital-based surveillance program.

Methods: Each infant case aged <6 months, hospitalised between July 2016 and December 2018 was matched to 1–3 controls by date of birth +/- 2 weeks and date of laboratory testing +/- 6 weeks. Maternal vaccination status was verified. Conditional logistic regression was used to estimate VE.

Results: Of 44 hospitalised cases in infants aged <6 months during the surveillance period, 26 (59%) had a mother with a known vaccination status and could be included in the analysis, with 123 controls. The unadjusted VE against hospitalised pertussis in infants aged <6 months was 69.0% (95% CI: 6.4–89.7%). Further case ascertainment will allow for adjustment of confounders and for more detailed analysis in sub-groups such as infants <2 months and those requiring ICU admission.

Conclusion: Our result is comparable to a recent Australian VE estimate in children aged <6 months, collected using a different surveillance method. VE of maternal vaccination is known to be higher in younger infants and will be presented in additional analysis. This data supports efforts to encourage maternal vaccination uptake.

1D – Vaccine Coverage

Room E3, 11:00am - 12:30pm

Uptake of adolescent immunisations in specialist schools in Victoria, Australia

Authors: Ms Jenny O'Neill^{1,4,8}, Prof Fiona Newall^{1,2,5,6,9}, Dr Giuliana Antolovich^{1,4,8}, Dr Sally Lima^{2,6,11}, Dr Margie Danchin^{1,3,7,10}

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Abstract:

Background: In Australia, young people aged 12-13 years are eligible to receive DTP, HPV and varicella immunisations through the School Immunisation Program. In Victoria uptake is calculated using Year 7 enrolment, with 90% of eligible students receiving DTP, and 79% of females and 72% of males receiving three doses of HPV. However, students with disabilities enrolled in specialist schools are usually ungraded, with immunisation uptake not consistently recorded or included in Victorian figures. The aim of this study was to determine DTP and HPV immunisation uptake in specialist schools in Victoria.

Methods: In 2017 a prospective cohort study was conducted. School immunisation coordinators in consenting specialist schools entered receipt of HPV and DTP online on each immunisation day for eligible students. Reasons for non-receipt were also recorded. Data were analysed in Excel.

Results: Of 74 specialist schools, 27 (36%) participated, with data from 375 students included. DTP coverage was 67% (251/375). Uptake of one dose of HPV was 66% (76/114) in females and 67% (176/261) in males. Only 25% (28/114) of females and 28% (72/261) males received three doses of HPV. Main reasons for non-receipt of immunisations were absence from school and lack of consent.

Conclusions: This study is the first to report uptake of adolescent immunisation in specialist schools in Australia and illustrates a significant disparity between specialist schools and mainstream schools. Further exploration of reasons for immunisation non-receipt and systems underpinning immunisation delivery will enable targeted policies to increase uptake of adolescent immunisations in young people with disabilities.

Western Sydney Follow-up of Children Overdue for Immunisation without an Immunisation Provider

Authors: Ms Stacey Kane¹, Mr Zilong (Roland) Ma², Mrs Salwa Gabriel³, Mrs Julie McLean³, Mr Leendert Moerkerken⁴, Mrs Helen Achat⁴, Dr Shopna Bag³

Affiliations: ¹NSW Ministry of Health, North Sydney, Australia, ²The University of Sydney, Sydney, Australia, ³Western Sydney Public Health Unit, Western Sydney Local Health District, North Parramatta, Australia, ⁴Western Sydney Epidemiology and Health Analytics, Western Sydney Local Health District, North Parramatta, Australia

Abstract:

Context: The Western Sydney Local Health District Public Health Unit (WSPHU) commenced the Follow-up of Children Overdue for Immunisation program in 2016. Within each quarterly report download from the Australian Immunisation Register (AIR) staff observed a consistent number of children aged 0-5 years without any records of vaccination or immunisation provider visits.

In a recent change, AIR reports now contain additional contact information for parents/guardians including telephone number and email address.

Process: WSPHU commenced a follow-up program to understand each child's situation and provide assistance for parents to access an immunisation provider, or add immunisation records from Australia or overseas onto AIR. Staff administered a short questionnaire asking about country of birth, records of vaccinations and details of their local doctor.

Contact method was based upon the contact information available. Emails, letters and telephone calls were used.

Analysis: The program will be completed by March 2018. Preliminary results show a large proportion of the children have received vaccinations, either in Australia or overseas, or currently live overseas.

Outcomes: WSPHU has been able to update AIR records for a large number of children. The responses will assist WSPHU to improve immunisation services in the future. The insights gained will also enable WSPHU to provide targeted education for medical practices, as well as identify opportunities to improve community awareness of the National Immunisation Program (NIP) and acceptance of immunisation as a safe and effective method of reducing the risk of vaccine preventable diseases.

Timely vaccination coverage in population subgroups from 1.9 million Australian births

Authors: [Dr Hannah C Moore](#)¹, Dr Parveen Fathima¹, A/Prof Heather Gidding^{2,3}, Prof Nicholas de Klerk¹, A/Prof Bette Liu², Dr Vicky Sheppard⁴, Prof Paul Effler⁵, Dr Thomas Snelling^{1,6,7}, Prof Peter McIntyre³, A/Prof Christopher Blyth^{1,6,8,9}

Affiliations: ¹*Wesfarmers Centre for Vaccines and Infectious Diseases, Telethon Kids Institute, West Perth, Australia*, ²*School of Public Health and Community Medicine, University of New South Wales, Sydney, Australia*, ³*National Centre for Immunisation Research and Surveillance, Westmead, Australia*, ⁴*Communicable Diseases Branch, NSW Health, Sydney, Australia*, ⁵*Communicable Diseases Control Directorate, WA Department of Health, Perth, Australia*, ⁶*Princess Margaret Hospital for Children, Perth, Australia*, ⁷*Curtin University School of Public Health, Perth, Australia*, ⁸*Department of Medicine, University of Western Australia, Perth, Australia*, ⁹*PathWest Laboratory Medicine WA, QEII Medical Centre, Perth, Australia*

Abstract:

Background: Reported infant vaccination coverage at age 12 months in Australia is >90%. On-time coverage of the 2-4-6 month schedule and coverage in specific populations is rarely reported.

Methods: Population-based cohort study of 1.9 million Australian births, 1996-2012, combining individual birth and perinatal records with immunisation records through probabilistic linkage. We assessed on-time coverage across 13 demographic and perinatal characteristics of diphtheria-tetanus-pertussis vaccines (DTP) defined as vaccination 14 days prior to the scheduled due date, to 30 days afterwards.

Results: On-time DTP vaccination coverage in non-Aboriginal infants was 88.1% for the 2-month dose, 82.0% for 4-month dose, and 76.7% for 6-month dose; 3-dose coverage was 91.3% when assessed at 12 months. On-time DTP coverage for Aboriginal infants was 77.0%, 66.5%, and 61.0%; 3-dose coverage at 12 months was 79.3%. Appreciable differences in on-time coverage were observed across population subgroups. On-time coverage in non-Aboriginal infants born to mothers with ≥3 previous pregnancies was 62.5% for the 6-month dose (47.9% for Aboriginal infants); up to 23.5% lower than for first-borns. Infants born to mothers who smoked during pregnancy had coverage 8.7-10.3% lower than infants born to non-smoking mothers for the 4- and 6-month dose. A linear relationship was apparent with increasing socio-economic disadvantage and decreasing on-time coverage.

Conclusions: On-time coverage of the 2-4-6 month schedule is only 50-60% across specific population subgroups representing a significant avoidable public health risk. Aboriginal infants, multiparous mothers, and those who are socio-economically disadvantaged are key groups most likely to benefit from targeted programs addressing vaccine timeliness.

Translating research to improve childhood immunisation coverage in Maitland, NSW

Authors: [Dr Susan Thomas](#)¹, [Mr Patrick Cashman](#)²

Affiliations: ¹*University of Newcastle, Callaghan, Australia*, ²*Hunter New England Local Health District-Population Health, Wallsend, Australia*

Abstract:

Context: Pockets of low childhood immunisation coverage persist in Australia. A study in 2016, using World Health Organization's Tailored Immunization Programmes (TIP), identified that Maitland, NSW had a relatively large number of one year olds not fully immunised. Some parents were struggling with social disadvantage and were not engaging with health services while others were recent arrivals without ready access to general practice.

Process: A working party met regularly to implement the study findings. Terms of reference, guiding principles and a 'no-blame' atmosphere were adopted. A 3-stepped approach was developed; issuing personalised reminders, then targeted outreach at a neighborhood centre and finally home visiting, reserved for those remaining under immunised. Opportunistic immunisation was always encouraged.

Analysis: Strengths included; adopting a social science approach, early engagement with key stakeholders including a neighborhood centre, service delivery managers and general practices that helped to re-orient immunisation service delivery, extension of the community child health nurses' role and strengthening community partnerships. Challenges included; avoiding falling back to service-centred rather than family-centred practice, building immunisation skills and confidence of child and family nurses and fully applying behaviour change theory.

Outcomes: In 2017, fewer one year olds were not fully immunised (201, 27%) compared to 2016 (281, 38%), 2015 (253, 34%), 2014 (246, 33%) and 2013 (331, 42%). The TIP guide has been useful in identifying gaps and providing tools to develop effective strategies. Sustained effort will be need to ensure knowledge is fully translated into practice.

Adolescent and child vaccination catch-up activity post “No Jab No Pay”

Authors: Mr Brynley Hull¹, Dr Alexandra Hendry¹, Dr Aditi Dey¹, Dr Frank Beard¹

Affiliations: ¹*National Centre for Immunisation Research and Surveillance, Westmead, Australia*

Abstract:

Background: From 1 January 2016, Australian Government “No Jab, No Pay” (NJNP) legislation has required that childcare rebate and other family assistance benefits are payable only to parents of children and adolescents who are fully immunised, have a medical exemption, or are on a recognised catch-up schedule. We assessed impact of this legislation on catch-up vaccination for the 2nd dose of measles-mumps-rubella vaccine (MMR2) in children and adolescents.

Methods: Using Australian Immunisation Register data as at 30 September 2017, we estimated MMR2 catch-up coverage in children and adolescents that occurred post-NJNP legislation (after 1 January 2016) for those children and adolescents who had not received this vaccine dose prior to NJNP legislation. We analysed MMR2 coverage by jurisdiction, Indigenous status, and socio-economic status.

Results: 129,065 children aged 5-9 years had not received MMR2 vaccine by 31 December 2015. Of these, 33.9% (43,731) went on to receive MMR2 vaccine during the post-NJNP period. 415,186 adolescents aged 10-19 years had not received MMR2 vaccine by 31 December 2015. Of these, 15.9% (65,788) went on to receive MMR2 vaccine during the post-NJNP period. The percentage of children that went on to receive MMR2 catch-up vaccination during the post-NJNP period was greater for Indigenous children and children from low socio-economic areas.

Conclusions: Almost 110,000 children and adolescents received MMR2 catch-up vaccination post-NJNP legislation. Many of these are likely to have received it due to NJNP legislation.

Infant, maternal and demographic predictors of timely vaccination: a population-based cohort study

Authors: Dr Heather Gidding^{1,2}, Mr Lloyd Flack¹, Dr Sarah Sheridan^{1,2}, Dr Bette Liu¹, Dr Peter Richmond^{3,4,5}, Mr Brynley Hull², Ms Parveen Fathima³, Dr Vicky Sheppard^{6,7}, Dr Christopher Blyth^{3,8,9,10}, Dr Ross Andrews¹¹, Dr Thomas Snelling^{3,11,12,13}, Dr Peter McIntyre^{2,14}, Dr Hannah Moore³

Affiliations: ¹*School of Public Health and Community Medicine, UNSW, Kensington, Australia*, ²*National Centre for Immunisation Research and Surveillance, Westmead, Australia*, ³*Wesfarmers Centre of Vaccines & Infectious Diseases, Telethon Kids Institute, Perth, Australia*, ⁴*School of Paediatrics and Child Health, University of Western Australia, Perth, Australia*, ⁵*Department of Child Health Research, Princess Margaret Hospital for Children, Perth, Australia*, ⁶*Communicable Diseases Branch, Health Protection NSW, North Sydney, Australia*, ⁷*School of Public Health, Sydney Medical School, University of Sydney, Sydney, Australia*, ⁸*Department of Infectious Diseases, Princess Margaret Hospital, Perth, Australia*, ⁹*School of Medicine, University of Western Australia, Perth, Australia*, ¹⁰*Department of Microbiology, PathWest Laboratory Medicine WA, Princess Margaret Hospital, Perth, Australia*, ¹¹*Menzies School of Health Research, Charles Darwin University, Darwin, Australia*, ¹²*Curtin University, School of Public Health, Perth, Australia*, ¹³*Princess Margaret Hospital for Children, Perth, Australia*, ¹⁴*Discipline of Adolescent and Child Health, Sydney Medical School, University of Sydney, Sydney, Australia*

Abstract:

Background: Vaccination timeliness is a key measure of program performance. We used ordinal logistic regression to identify factors associated with timeliness of infant diphtheria-tetanus-pertussis (DTP) vaccinations.

Methods: Perinatal, notification, death and immunisation databases were linked for 1.3 million births in Western Australia (WA) or New South Wales (NSW) in 2001-11. For modelling, we assumed most odds ratios (ORs) were proportional (OR comparing vaccinated ≤ 15 days versus later equals the OR comparing vaccinated ≤ 1 or ≤ 2 months versus later [< 2 years]), so one OR for ‘timeliness’ could be reported for each factor level.

Results: Among non-Aboriginal children the strongest predictor of dose 1 timeliness was parity: children with no older siblings were at least 5 times more likely to receive timely vaccinations than children with ≥ 3 older siblings. Gestational age, maternal age and maternal country of birth were also strongly associated with timeliness. These associations were observed for all doses, but strongest for dose 1. Children who were late receiving a dose were less likely to receive subsequent doses on-time; the odds of on-time vaccination halved for every week of delay past the due date for the previous dose. Results were similar for Aboriginal children, except births in WA (versus NSW) were 40% less likely to receive a timely dose 1 vaccination.

Conclusion: We identified dose and population-specific factors that can inform measures to improve vaccination timeliness. In particular, programs to improve dose 1 timeliness and strategies targeting young children of large families should increase on-time vaccination for all three doses.

1E – Vaccine Preventable Diseases

Riverbank Room 1, 11:00am - 12:30pm

Modelling potential impacts of pertactin-negative strains on recent pertussis epidemiology in NSW

Authors: Dr James Wood¹, Dr Duleepa Jayasundara¹, Dr Mark Tanaka², Dr Ruiting Lan², Dr Sophie Octavia^{2,3}

Affiliations: ¹*School of Public Health & Community Medicine, UNSW Sydney, Australia*, ²*School of Biotechnology and Biomolecular Sciences, UNSW Sydney, Australia*, ³*National Public Health Laboratory, Ministry of Health, Singapore*

Abstract:

Background: Australia has experienced increased pertussis incidence since 2008 despite consistently high levels of vaccine coverage. A variety of explanations have been proposed including increased incidence, more frequent testing and more sensitive tests. In this study we examine the potential role of non-expression of pertactin. Genomic data is consistent with pertactin-negative (PRN-) isolates emerging as the dominant *B. pertussis* strain in NSW during this period. In this study we aim to estimate changes in pathogen fitness and vaccine impact consistent with a replacement event of this type.

Methods: We developed a simplified pertussis transmission model differentiated into two strain types to capture PRN- and PRN+ transmission. The model was then fitted simultaneously to monthly NSW pertussis disease notification data from 2006-2017 and the quarterly proportion of isolates that were PRN- during the period 2008-2012 in NSW. Additional simulation studies were undertaken to assess robustness of findings.

Results: Our results support PRN- strains experiencing an advantage in infecting vaccinated individuals, while having a lower overall transmission fitness than PRN+ strains. Without further evolutionary change, our results would support both PRN- and PRN+ strains continuing to circulate in the Australian population.

Discussion: This study provides estimates of changes in pathogen fitness and vaccine protection against infection consistent with recent changes in the *B. pertussis* population in Australia. These results support co-existence of PRN- and PRN+ strains but with the potential for replacement with PRN- if fitness of these strains increases.

Q fever Vaccine Failure Rate and Associated Demographic Factors in Australia

Authors: Mr Solomon Woldeyohannes¹, Associate Professor Simon Reid¹, Professor Charles Gilks¹, Dr Peter Baker¹, Professor Nigel Perkins²

Affiliations: ¹*School of Public Health, Faculty of Medicine, University Of Queensland, Herston, Brisbane, Australia*, ²*School of Veterinary Science, Faculty of Science, University of Queensland, Gatton, Australia*

Abstract:

Since the Q fever vaccine was commercial availability in Australia in 1989, the vaccine is considered highly effective and long lasting in adults. However, there is limited understanding of the efficacy as a result of lack of well-designed follow up studies which utilize multiple source of data. In the current study, we presented a novel approach considering linked data from Q fever vaccination registry, Q fever notification and Q fever admission data reported and admitted between 1991 and 2016. The incidence in vaccinated and unvaccinated individuals, respectively, were 5.40 [95% CI: 3.65, 7.72] and 89.50 [95% CI: 70.50, 112.00] per 100,000 person years of follow up. The hazard rate of Q fever infection was found to be 0.07 (HR = 0.07, 95% CI: 0.04, 0.10) in vaccinated individuals compared to unvaccinated individuals providing 93% protective efficacy. The hazard was quite significant in those whose ages fall within the age range 45-54 years and working in a meat processing industry. The vaccine is highly effective in protecting from Q fever infection. Higher incidence was observed in unvaccinated individuals considered immune during the pre-vaccination screening. We pose questions on the effective implementations the Q fever vaccination program, especially, the pre-vaccination screening tests.

Investigation into high Q fever rates in Aboriginal people, Western NSW

Authors: Ms Charlee Law^{1,2}, Mrs Keira Glasgow¹, Ms Priscilla Stanley³, Dr Kirsty Hope¹, Dr Tambri Housen², Dr Vicky Sheppard¹

Affiliations: ¹*Communicable Disease Branch, Health Protection NSW, North Sydney, Australia*, ²*National Centre for Epidemiology and Population Health, Research School of Population Health, Acton, Australia*, ³*Far West and Western NSW Local Health Districts, Dubbo, Australia*

Abstract:

Background: Higher rates of Q fever infection were notified in Aboriginal people relative to non-Aboriginal people in NSW in 2015-2016. We conducted an enhanced analysis of notification data to explain the disproportionate rate of infection.

Methods: Descriptive analyses of Q fever notification data for 2012-2017 was extracted from the NSW Notifiable Disease Information Management System. Analysis was conducted using STATA 15 and Microsoft Excel.

Results: Data completeness and exposure information was of variable quality. Analysis by population rate found an over-representation of Q fever cases notified in Aboriginal people living in Western NSW (WNSW) (56% of all Aboriginal Q fever cases).

The majority of WNSW Aboriginal notifications were in the <20 and 20-29 year age groups (66%), younger than the rest of NSW. The majority of non-Aboriginal notifications in WNSW were in the 40-49 and 50-59 age groups (44%), similar to the rest of NSW.

Farm animals were the most common animal risk exposure for both Aboriginal and non-Aboriginal people. The most common occupation group among Aboriginal people was shearing, compared to farming for non-Aboriginal people.

Primary reasons for non-vaccination in Aboriginal people included being too young (19%) and unawareness of the vaccine (19%), whereas primary reasons in non-Aboriginal people were unawareness of vaccine (21%) and personal choice (15%).

Conclusion: Higher rates of Q fever infection in Aboriginal people were found to be limited to WNSW LHD. While animal exposure risks were similar to non-Aboriginal people, occupational and age differences were noted. Further investigation into explanatory factors is required.

Boots on the Ground: an Initiative to Close the Gap in Immunisation

Authors: Mrs Christine Ruddell¹

Affiliations: ¹Townsville Hospital and Health Service, Townsville, Australia

Abstract:

Background: The closing the gap initiative aims to halve the gap in childhood mortality between Indigenous and non-Indigenous Australians. One approach to this is to improve the immunisation rates. Boots on the Ground is a state funded project for 2016-2018. The purpose of the project is to 'Close the Gap' in immunisation rates for Aboriginal and Torres Strait Islander Children in the Townsville Health and Hospital Service area. This is achieved by providing an outreach team that can vaccinate and/or reliably arrange vaccination for children who have been identified as hard to reach or overdue.

Body: Over 12 months, 321 children have been vaccinated with 99.9% identified as Indigenous. The age range was from 6 weeks to 19 years, the majority being under 5 years of age. A total of 771 vaccines were given as part of the core catch up vaccination activity. The main reasons for delayed vaccination were lack of appropriate services, bad experiences at services and reduced priority due to current life issues.

In addition the program was able to assist in timely vaccine responses to public health threats with 620 Men-ACWY vaccinations, 200 MMR vaccinations and 260 Influenza vaccinations.

Summary: Boots on the ground has improved immunisation uptake amongst Aboriginal and Torres Strait Islander children by providing a culturally sensitive outreach program. It has also helped to identify potential drivers for decreased rates of vaccination in this community.

Hepatitis A immunity gaps among men who have sex with men, NSW

Authors: Christine Harvey^{1,2}, Keira Glasgow¹, Neil Franklin¹, Dr Karen Chee^{1,2}

Affiliations: ¹Communicable Diseases Branch, Health Protection NSW, North Sydney, Australia, ²NSW Public Health Training Program, NSW Ministry of Health, North Sydney, Australia

Abstract:

Background: On average 10 cases of locally-acquired hepatitis A (HAV) are notified annually in NSW. Thirty-one cases of locally-acquired HAV were notified between July-December 2017; 52% reported male to male sex. Large ongoing outbreaks of HAV among men who have sex with men (MSM) have been reported worldwide since June 2016, particularly in Europe.

Methods: Three surveys were undertaken to assess HAV immunity among MSM in NSW and inform the outbreak response: i. sero-survey for anti-HAV IgG or anti-HAV total antibody in de-identified stored sera from males aged 16-69 years tested for syphilis; ii. survey of NSW sexual health clinics (SHCs) about HAV vaccination protocols; and iii. survey of men attending a sex-on-premises venue (SOPV) about HAV vaccine awareness and history.

Results: Anti-HAV antibody was detected in 257 (63%) sera. Rates of detection increased with age (51.5% ≤25 years to 83.3% ≥55 years). Seventeen of 18 SHCs (94%) routinely check HAV immunity of their MSM clients, and 15 (73%) provide at least one vaccine dose for free. Twenty-two of 50 SOPV attendees (44%) reported having received at least one dose of HAV vaccine. Men were significantly more likely to report having the HAV vaccine if their GP was aware of their sexual behaviour [OR=11.12 (1.26-5.99 95%CI); p<0.01].

Conclusion: The three surveys indicate many MSM in NSW have immunity to HAV, however gaps exist particularly among younger men. Clinicians have an important role in actively identifying and offering HAV vaccine to MSM patients to prevent infection and contain future HAV outbreaks.

The long-term impact of infant immunisation programs on hepatitis B prevalence

Authors: Ms Kate Whitford¹, Associate Professor Bette Liu², Dr Joanne Micallef¹, Dr Kevin Yin⁴, Professor Kristine Macartney^{3,5}, Professor Pierre Van Damme⁶, Professor John Kaldor¹

Affiliations: ¹The Kirby Institute, University of New South Wales, Australia, ²School of Public Health and Community Medicine, University of New South Wales, Australia, ³National Centre in Immunisation Research and Surveillance, and The Children's Hospital at Westmead, Westmead, Australia, ⁴Sydney School of Public Health, Sydney Medical School, The University of Sydney, Australia, ⁵Discipline of Paediatrics and Child Health, The University of Sydney, Australia, ⁶Centre for the Evaluation of Vaccination, Universiteit Antwerpen, Antwerpen, Belgium

Abstract:

Objective: Infant immunisation is the key component of global hepatitis B (HBV) elimination strategies. The vaccine is highly efficacious in clinical trials, with some ecological data showing substantial reductions in liver cancer incidence following implementation of vaccination programs. As elimination is the ultimate goal of vaccination, we undertook a meta-analysis of studies quantifying the long-term impact on HBV infection.

Methods: We selected papers reporting comparisons between population cohorts aged ≥ 15 years exposed and unexposed to infant HBV immunisation programs. Programs were either universal, offering vaccine to all newborns, or targeted to infants of hepatitis B surface antigen (HBsAg)-positive mothers. We evaluated methodological aspects of studies and estimated the relative reduction in prevalence of infection associated with programs.

Findings: Of 26 reports meeting inclusion criteria, most were from Taiwan (14/26) and Mainland China (6/26). HBV prevalences in unvaccinated and universally vaccinated cohorts ranged from 0.6% to 16.3%, and 0.3% to 8.5%, respectively. Comparing cohorts with universal vaccination to those without vaccination, relative prevalences were 0.24 (95% CI 0.16-0.35) for HBsAg and 0.23 (0.17-0.32) for hepatitis B core antigen (HBcAb). For populations with targeted vaccination, relative prevalences were 0.32 (0.24-0.43) and 0.33 (0.23-0.45), respectively.

Conclusion: Published evidence showed an almost 5-fold reduction in HBV prevalence associated with universal vaccination, and 3-fold reduction from targeted programs. However, evidence of residual infection in cohorts offered vaccination suggests that more efforts are needed to maximise coverage. Longer-term evaluations are needed as HBV-vaccinated infant cohorts reach adulthood, to ensure that elimination efforts are on track.

Modelling the decline and potential elimination of endemic hepatitis A in Australia

Authors: Dr Duleepa Jayasundara¹, Dr Ben B. Hui², Dr Anita E. Heywood¹, A/Prof David G. Regan², Prof C. Raina MacIntyre¹, A/Prof James G. Wood¹

Affiliations: ¹School of Public Health and Community Medicine, University Of New South Wales, Randwick, Australia, ²Kirby Institute, University of New South Wales, Randwick, Australia

Abstract:

Background: Through several preventive measures, including the availability of an effective vaccine, hepatitis A infection rates have declined in most parts of the world, particularly in developed countries. In Australia, this is further supported by the inflow of seropositive migrants which has helped maintain a high level of population immunity. Here, we quantified the effects of those measures on hepatitis A transmission and the potential for long-term elimination of endemic transmission.

Methods: An age-structured hepatitis A transmission model incorporating demographic changes was fitted to seroprevalence and disease notification data to estimate the trend in the effective reproduction ratio (R) for hepatitis A in Australia. This was then used to project incidence trends until 2060 and to project transmission potential for hepatitis A in the general population. Robustness of findings was assessed through pessimistic scenarios regarding vaccine uptake, migration and the duration of immunity.

Results: We estimate for hepatitis A, $R < 1$ in the general population of Australia since the early 1990s, declining more rapidly after the introduction of the hepatitis A vaccine in 1994. Projections to 2060 support R remaining < 1 with continued low incidence in the general population.

Conclusion: Our results suggest that there is potential for elimination of endemic hepatitis A infection in Australia. Within the general population, our results suggest sustained endemic transmission is no longer possible. However, for local elimination to be claimed, clear elimination criteria would need to be developed and adopted and then confirmed through verification of these criteria, supported by multiple lines of evidence.

NSW Meningococcal Serogroup W Response Program

Authors: Dr Nectarios Rose¹, Ms Sonya Nicholl¹, Mr Dennis Meijer¹, **Meredith Charman**

Affiliations: ¹Health Protection NSW, North Sydney, Australia

Abstract:

Context: Australia has seen a rise in serogroup W Meningococcal disease (MenW) since 2013, becoming the predominant serogroup nationally in 2016 and prompting the Chief Medical Officer (CMO) to declare MenW a potential communicable disease incident of national significance. In NSW, there were 25 cases of Men W in 2016, up from an average of 10 across the previous 5 years.

Process: NSW Health made the meningococcal ACWY vaccine available to all adolescents in Years 11 and 12 through the NSW School-based Vaccination Program. The program commenced on 1 May 2017 during school terms 2 to 4, reaching all NSW high schools, including public, private and Catholic schools. The intervention strategy was based on expert advice, recommending programs target older adolescents primarily to interrupt transmission as well as protecting individuals.

Analysis: Approval was granted for \$9 million in the first year and \$4.5 million in subsequent years to implement the program. Approximately 72% of Year 11 students and 76% of Year 12 students were vaccinated in 2017.

Outcomes: There were 19 cases of MenW notified in NSW in 2017, fewer than the 25 cases in 2016, however it is too early to assess the outcomes of the intervention. The program will continue in 2018.

A COMPARISON OF METHODS FOR EVALUATING THE IMPACT OF PNEUMOCOCCAL CONJUGATE VACCINES

Authors: Dr Cattram Nguyen^{1,2}, Ms Rita Reyburn¹, Dr Evelyn Tuivaga³, **A/Prof Fiona Russell^{1,4}**

Affiliations: ¹Murdoch Children's Research Institute, Melbourne, Australia, ²Department of Paediatrics, University of Melbourne, Parkville, Australia, ³Ministry of Health and Medical Services, Suva, Fiji, ⁴Centre for International Child Health, Department of Paediatrics, The University of Melbourne, Parkville, Australia

Abstract:

Background: The World Health Organization has recommended worldwide introduction of pneumococcal conjugate vaccines (PCV) into immunisation programs to prevent childhood pneumonia. Observational post-licensure studies have shown reductions in hospitalised all-cause childhood pneumonia following PCV introduction. However, estimates of vaccine impact vary widely due to factors including case definitions, hospital admission criteria, baseline disease incidence and PCV coverage. Importantly, the methods used to assess vaccine impact vary across studies. The aim of this study is to compare statistical methods for evaluating PCV impact on hospitalised pneumonia in Fiji.

Methods: This study used administrative hospitalisation data from 2007-2015 from Fiji, which introduced PCV10 in 2012. The outcome variable was hospitalisation for all-cause pneumonia in children <2years, as determined by primary discharge diagnoses using ICD-10-AM codes. Data were analysed using common methods from the PCV impact literature, including pre-post analyses and interrupted time series (ITS) analyses.

Results: Pre-post comparisons indicated a 28% relative reduction (95% CI: 23%-32%) in incidence rates, or a 40% reduction (34%-44%) if the year of vaccine introduction was excluded. ITS analyses showed a 0.5% (0.3%-0.6%) relative rate reduction if PCV introduction was expressed as a level change, or an annual decrease of 20% (15%-20%) if a change in slope was assumed. These analyses illustrated the sensitivity of results to the analysis method, definitions of pre-and post-PCV periods, and the measures of vaccine impact used.

Conclusions: To enable comparison across studies and to inform policy-makers considering vaccine introduction, clearer guidelines are needed for the analysis and reporting of vaccine impact.

Human papillomavirus vaccine uptake among young gay and bisexual men in Victoria

Authors: Mr Launcelot McGrath^{1,2}, Mr Eoin Cleere^{1,2}, A/Prof Catriona Bradshaw^{1,3}, A/Prof Marcus Chen^{1,3}, Prof Christopher Fairley^{1,3}, **Dr Eric Chow^{1,3}**

Affiliations: ¹Melbourne Sexual Health Centre, Alfred Health, Melbourne, Australia, ²Royal College of Surgeons in Ireland, Dublin, Ireland, ³Central Clinical School, Monash University, Melbourne, Australia

Abstract:

Context: In mid-2017, the Victorian Government funded a free human papillomavirus (HPV) vaccination catch-up program for men aged ≤26 who have sex with men (MSM) through sexual health clinics or other immunisation centres. We aimed to examine the HPV vaccine uptake rate among young MSM attending the Melbourne Sexual Health Clinic (MSHC)

Process: MSM aged ≤26 attending MSHC between 27-April-2017 and 31-December-2017 were included in analysis. HPV vaccine uptake rate was calculated based on the first consultation of each client during the period. Multivariable logistic regression was performed to examine the association between vaccine uptake and client factors.

Analysis: 2108 MSM aged ≤26 attended MSHC over the study period, 7.6% (n=161) reported being previously vaccinated against HPV. Of the 1947 eligible men, 1134 (58.2%) were offered the vaccine, with 830 (42.1%) receiving the vaccine on the day. Men with past genital warts (aOR=3.06, p=0.007) and those who had >4 male partners in last 12 months (aOR=1.50, p=0.044) had a higher odds of accepting the HPV vaccine. 304 declined the vaccine, most men did not specify the reason (31.3%, n=95), 27.3% needed time to think (n=83).

Outcomes: Although the uptake rate was 73.2% among those offered, the actual coverage in those eligible remained unsatisfactory (42.1%) particularly in a large sexual health service in Victoria. This highlights a clinic-based targeted MSM program is not sufficient to reach the vaccination coverage, and therefore should be implemented in conjunction with the school-based boys program.

Vaccination status of oncology patients in a tertiary hospital long-term follow-up program

Authors: Mrs Nadine Henare¹, Mrs Sonja Elia, Dr Kirsten Perrett

Affiliations: ¹The Royal Children's Hospital, Parkville, Australia

Abstract:

Background: The long term follow up program (LTFU) at the Royal Children's Hospital (RCH) Melbourne, facilitates the transition from completion of curative treatment to the 'survivorship' phase of the cancer journey. These patients are a minimum of 2 years post treatment and should have received additional vaccines in their initial 6-12 months post treatment including booster doses of scheduled vaccines as well as special risk vaccines. However, this has not always occurred, and the vaccine recommendations have also changed considerably over these years.

Methods: The LTFU clinic is conducted weekly and focuses on health promotion and awareness. On average, 50 patients are reviewed each month. The RCH Immunisation nurses review the Australian Immunisation Register (AIR), the Electronic Medical Record (EMR) as well as patient unit records to determine immunisation status, including special risk vaccines. Due/overdue status is recorded in the EMR to flag the patient to attend the Immunisation centre. Six months after the clinic appointment, the AIR record will be reviewed again.

Results: From 01 August 2017 to 31 December 2017, a total of 186 patients were seen in the LTFU clinic. From 01 February 2018, the AIR records will be reviewed to determine the proportion of patients who presented to the Immunisation service or received vaccines following their appointment. This data will be presented.

Conclusion: Preliminary results suggest that recommended vaccines for Oncology patients are not always completed on time following treatment. The LTFU clinic and the Immunisation service are striving to improve immunisation status in this cohort.

2A – Meningococcal

Hall C, 2:00pm - 3:30pm

The lifetime healthcare costs of invasive meningococcal disease in Australia

Authors: Ms Bing Wang¹, Ms Renee Santoreneos², Dr Hossein Afzali¹, A/Prof Lynne Giles¹, Prof Helen Marshall¹

Affiliations: ¹University of Adelaide, North Adelaide, Australia, ²Royal Adelaide Hospital, Adelaide, Australia

Abstract:

Background: Although invasive meningococcal disease (IMD) is uncommon in Australia, severe complications and sequelae of IMD may result in death and long-term disabilities.

Objective: This is the first study aiming to estimate the lifetime costs associated with IMD in Australia.

Methods: A Markov model was developed taking a health care system perspective to estimate lifetime costs of IMD. The model structure, representing the natural history of IMD, was verified by clinical and public health experts using qualitative research methods. Relevant cost estimates were attached to states included in the model. A range of data including age-specific incidence and mortality rates, and probabilities for IMD-related sequelae (hearing loss, blindness, epilepsy, brain injuries, severe speech and communication problems, chronic migraine, generalised anxiety disorder, depression, amputation, arthritis, chronic renal failure, and skin grafting) were derived from a literature review and used to determine the mean time spent in each model state.

Results: Based on the number of persons born in 2016 (n=311,104), the estimated total national lifetime cost is AUD\$638,728,84 during the study time horizon (83 years) with an average lifetime cost of AUD\$157,711 per patient. The brain injuries cause the highest cost per patient.

Conclusions: Our study confirms IMD can result in substantial costs to the health system, despite the uncommon occurrence of this disease.

A cluster RCT to assess the impact of 4CMenB on meningococcal carriage

Authors: Professor Helen Marshall^{1,2}, Mr Mark McMillan^{1,2}, Associate Professor Ann Koehler³, Mr Andrew Lawrence⁴, Dr Jenny MacLennan⁵, Professor Martin Maiden⁵, Dr Mary Ramsey⁶, Dr Shamez Ladhani⁶, Dr Caroline Trotter^{6,7}, Professor Ray Borrow⁸, Professor Adam Finn⁹, Mr Thomas Sullivan¹⁰, Associate Professor Peter Richmond¹¹, Associate Professor Charlene Kahler¹², Ms Jane Whelan¹³, Mr Kumaran Vadivelu¹⁴

Affiliations: ¹Vaccinology and Immunology Research Trials Unit, Women's and Children's Health Network, North Adelaide, Australia, ²Robinson Research Institute and Adelaide Medical School, The University of Adelaide, Adelaide, Australia, ³Communicable Disease Control Branch, SA Health, Adelaide, Australia, ⁴SA Pathology, Adelaide, Australia, ⁵Department of Zoology, University of Oxford, Oxford, United Kingdom, ⁶Immunisation Department, Public Health England, London, United Kingdom, ⁷University of Cambridge, Cambridge, United Kingdom, ⁸Meningococcal Reference Unit, Public Health England, Manchester, United Kingdom, ⁹University of Bristol, Bristol, United Kingdom, ¹⁰School of Public Health, University of Adelaide, Adelaide, Australia, ¹¹Telethon Kids Institute University of Western Australia, Perth, Australia, ¹²Marshall Center for Infectious Disease Research and Training, School of Biomedical Science, Perth, Australia, ¹³GlaxoSmithKline Vaccines, Amsterdam, The Netherlands, ¹⁴GlaxoSmithKline Vaccines, Rockville, USA

Abstract:

Background: Protein-based meningococcal B vaccines have been introduced in several countries. Determining whether MenB vaccines impact on nasopharyngeal carriage acquisition, as demonstrated with conjugate vaccines, is important in considering target age groups for immunisation programs.

Objectives: The South Australian MenB vaccine herd immunity study "B Part of It" aims to determine the difference in carriage prevalence of all disease-causing N. meningitidis serogroups, in school students receiving two doses of 4CMenB compared to unvaccinated students at 12 months post-vaccination. Here we report carriage prevalence at baseline, pre-vaccination.

Methods: From April-June 2017, senior school students (years 10-12) were recruited to a cluster randomised controlled trial. All South Australian schools (metropolitan, rural, remote) were invited to participate and were randomised to intervention (2 doses 4CMenB at baseline) or control (vaccine at 12 months) school. Posterior oro-pharyngeal swabs were obtained from all students at the first school visit. Carriage was detected by porA real time PCR.

Results: Over 95% of schools participated (n=237) with consent forms distributed to approximately 58,000 students. 37,330 students consented with 34,477 participating at the first visit including 17,919 (52%) females. The majority were from metropolitan (74%), followed by rural (23%) and remote (3.0%) schools. 96% of intervention school students (17,600/18337) received both 4CMenB doses. Baseline carriage prevalence in year 12 students =4.9%, year 11 students =3.0% (p<0.001); in remote schools =6.1%, metropolitan schools=3.0% (p<0.001).

Conclusions: Carriage prevalence increases with student year level and living in remote compared to metropolitan regions in South Australia.

Meningococcal carriage in first year university students in South Australia

Authors: Mr Mark McMillan^{1,2,3}, Mr Luke Walters⁴, Mr Mark Turra⁴, Mr Andrew Lawrence⁴, Dr Thomas Sullivan⁵, Professor Ross Andrews⁶, Professor Helen Marshall^{1,2,3}

Affiliations: ¹The University of Adelaide, North Adelaide, Australia, ²Robinson Research Institute, The University of Adelaide, North Adelaide, Australia, ³Vaccinology and Immunology Research Trials Unit, Women's and Children's Hospital, North Adelaide, Australia, ⁴SA Pathology, Adelaide, Australia, ⁵Adelaide Health Technology Assessment, The University of Adelaide, Adelaide, Australia, ⁶Menzies School of Health Research, Brisbane, Australia

Abstract:

Background: Young adults have the highest carriage prevalence of *N. meningitidis*, yet no Australian data exist on carriage in this age group. This study aimed to estimate carriage prevalence and risk factors of *N. meningitidis* in South Australian university students aged 17 to 25 years.

Methods: Oropharyngeal swabs were taken from first year university students and subjected to real-time porA PCR detection. Participants were followed up after 3 months for a repeat swab, with questionnaires identifying risk factors completed at both visits. In an add-on study, saliva samples were additionally collected at the second visit.

Results: The study enrolled 421 individuals, with 259 returning at 3 months. At baseline, 56% of participants were female and 1.9% current smokers. Carriage of *N. meningitidis* at baseline was 6.2% (95% CI, 4.2% to 8.9%). Genogroup Y (2.9%) was most common, followed by B (1.7%), and W (0.7%). Going out to a bar more than one night a week (OR 9.07; 95% CI 2.44 to 33.72) and intimate kissing (OR 4.37; 1.45 to 13.14) were associated with carriage. After multiply imputing missing data, there was no significant difference in carriage between visits (6.2% vs. 8.6%, OR 1.42; 0.91 to 2.20). At visit 2, saliva testing identified an additional four participants with *N. meningitidis* carriage, one genogroup B and 3 non-groupable.

Conclusions: Carriage prevalence of *N. meningitidis* was lower than expected, likely due to low rates of smoking. Saliva sampling in addition to oropharyngeal swabs may improve sensitivity in meningococcal carriage studies.

The recent epidemiology of invasive meningococcal disease – implications for vaccination policy

Authors: Ms Cyra Patel¹, Dr Clayton Chiu¹, Professor Peter McIntyre¹, Dr Nigel Crawford²

Affiliations: ¹National Centre for Immunisation Research and Surveillance, Westmead, Australia, ²SAEFVIC, Murdoch Children's Research Institute, Parkville, Australia

Abstract:

Introduction: The incidence of invasive meningococcal disease (IMD) attributable to serogroups W (MenW) and Y (MenY) has been rising in Australia since 2015. We examined the recent epidemiology of IMD to inform vaccination strategies.

Methods: National Notifiable Diseases Surveillance System data on IMD was analysed, focusing on 2016 to 14 December 2017. Notification rates and case-fatality ratios (CFRs) by IMD serogroup, age and Aboriginal and/or Torres Strait Islander (Indigenous) status were calculated.

Results: IMD notification rates for MenW and MenY rose throughout 2016-2017 and were highest in infancy and adolescence (peaking at age 18 and 20 years for MenW and MenY, respectively), increasing again in adults aged ≥50 years. Among children aged <2 years, MenW rates were highest in infants aged 3-5 months (5.2 per 100,000). However, rates of MenB remained higher among infants overall (5.3 vs. 4.7 per 100,000 for MenB and MenW/Y). CFR was higher among MenW cases (9.1%) than MenB (4.4%) and MenY (3.7%). In 2017, Indigenous children aged <15 years were disproportionately affected by MenW compared with non-Indigenous children following an outbreak in Central Australia (15.75 vs. 0.25 per 100,000). MenB remained endemic among young Indigenous children over 2016-2017 (rates per 100,000: <12 months – 29.1; 12-23 months – 8.2; 2-4 years – 6.7), whereas Indigenous adolescents were largely unaffected.

Conclusion: Current epidemiology supports consideration of vaccination against MenW for young children and adolescents, and against MenB for young Indigenous children. Further detailed epidemiology information would be valuable for extending national vaccination strategies for Indigenous children.

Ceduna region meningococcal vaccination program

Authors: Ms Melissa Fidock¹, Mr Andrew Lane², Ms Luda Molchanoff MPH³

Affiliations: ¹SA Health, Adelaide, Australia, ²Ceduna District Health Services, Eyre Far North Rural Region, Country Health SA Local Health Network, Ceduna, Australia, ³Country Health SA Local Health Network, Government of South Australia, Adelaide, Australia

Abstract:

Context: In Australia, cases of *Neisseria meningitidis* serotype W experienced a fivefold increase between 2014 and 2016. In late 2016 and early 2017 there was an increase of serotype W cases in the Ceduna region with all cases reported in Aboriginal children. The Ceduna region is remote, with approximately one quarter of the population identifying as Aboriginal. In response to the notified cases a “community outbreak” was declared and a community wide vaccination program was recommended.

Process: The community wide vaccination program was offered to over 4000 people. The Communicable Disease Control Branch, SA Health, Ceduna Koonibba Aboriginal Health Services and Country Health SA collaborated to plan, implement and deliver mass vaccination clinics. Additional workforce was facilitated through the engagement and participation of partner agencies from both government and non-government sectors.

Analysis: A collaborative environment, alongside the engagement and willingness of services to support a community outbreak response, enabled more than 3400 individuals to be vaccinated over a three week period in geographically remote areas and with minimal resources. A successful media campaign with tight budget constraints used social media to reach a total of 6717 people, with the total cost of communications averaging 56 cents per person.

Outcomes: The program has established a successful model for planning future clinics in remote locations with limited resources. This would be of significant benefit to rural communities during disease outbreaks as a single agency would not have been able to deliver a mass vaccination program over such a short period of time.

Management of a meningococcal ACWY vaccination program using an incident management system

Authors: **Dr Robyn Gibbs**¹, Ms Claire Woollacott³, Dr Clare Huppatz³, Dr Donna Mak¹, Ms Jenny Vo¹, Ms Margaret Abernethy², Mr Tony Spicer², Professor Paul Effler¹, Dr Paul Armstrong¹

Affiliations: ¹Communicable Disease Control Directorate, WA Health, Perth, Australia, ²WA Country Health Service, Perth, Australia, ³WA Country Health Service, Kalgoorlie, Australia

Abstract:

Context: An Incident Command System (ICS) was used to manage a time-limited vaccination program implemented in Western Australia (WA) in response to a meningococcal serogroup W (MenW) outbreak.

Process: The vaccination program involved government (Communicable Disease Control Directorate, Disaster Management and Preparedness Unit, WA Country Health Service, Communications Directorate) and non-government (Aboriginal Health Council of WA) organisations across the state. Command, Operations, Planning/Finance, Communications and Logistics teams were established and a crisis information management system (WebEOC) utilised to capture and share information. Briefings were held daily initially, reducing in frequency as the incident progressed. In Stage 1 of the program, meningococcal ACWY vaccination was provided to people living in remote Aboriginal communities in eastern parts of WA. Following notification of MenW cases outside the initial target area, the program expanded to Stage 2, covering a wider geographical area.

Outcomes: Use of ICS was beneficial for this program, providing a clear command structure that assisted with rapid, coordinated decision making and implementation. WebEOC brought workflow efficiencies and allowed for consistency in communication. Stage 1 of the program (target population 3,300 people) achieved 96% vaccination coverage. Stage 2 (population 3,700) is ongoing; current coverage is approximately 60%. A formal debrief will be undertaken to assist in further clarifying roles and responsibilities during outbreak responses.

Analysis: Using ICS to respond to complex communicable disease incidents has clear benefits, yet it is underutilised. Stronger emphasis on training of public health staff in emergency management principles, including the use of ICS-type systems, is required.

2B – Influenza & Respiratory Syncytial Virus

Room E1, 2:00pm - 3:30pm

Annual influenza vaccine effectiveness and antigenic distance: consequences of repeated vaccination

Authors: Dr Sheena Sullivan^{1,2,3}, Dr James Fielding^{2,3}, Ms Monique Chilver⁴

Affiliations: ¹WHO Collaborating Centre For Reference And Research On Influenza, Melbourne, Australia, ²School of Global and Population Health, University of Melbourne, Melbourne, Australia, ³Australian Sentinel Practices Research Network, University of Adelaide, Adelaide, Australia, ⁴Victorian Sentinel Practices Influenza Network, Victorian Infectious Diseases Reference Laboratory, Melbourne, Australia

Abstract:

Background: Interim influenza vaccine effectiveness estimates for Australia in October 2017 were poor, particularly for those repeatedly vaccinated. Influenza vaccines are recommended annually, with their formulation updated each September. Although they largely remain unchanged, the A(H3N2) component has been updated 5 times since 2012. Repeated administration of the vaccine is hypothesized to result in poorer vaccine effectiveness (VE) with greater antigenic distance between successive circulating influenza viruses but limited distance between vaccine strains.

Methods: Sentinel practice surveillance data were used to estimate A(H3N2) VE for 2012-2017 in the context of antigenic distance between the prior and current vaccines, and, where possible, by prior year's vaccination status and genetic subgroup. VE was estimated using the test-negative design. Antigenic data were compared, where available, in hemagglutination inhibition assay using ferret antisera raised against both egg-grown (i.e. vaccine) and cell-grown (i.e. wild-type) A(H3N2) strains, or by genetic distance.

Results: VE estimates among adults aged 15-64 were as low as 18% (95%CI:-6,37) in 2017, and were lowest in years when the antigenic distance was low or 0; i.e. 2012, 2014, 2017. Estimates were poorest for those vaccinated in successive years and better for virus subgroups genetically similar to the vaccine strain.

Conclusion: Repeated administration of the influenza vaccine appears to result in poorer effectiveness in the long term, particularly in years when the vaccine's formulation is not updated. Antibody focussing directed towards epitopes conserved among successively encountered vaccine strains may explain some of these effects, the long-term implication of which will be discussed.

Influenza in Australian infants 2017; Epidemiology and effectiveness of maternal vaccination.

Authors: Ms Jocelyne McRae¹, Associate Professor Christopher Blyth^{2,3,4,6}, Professor Allen Cheng⁵, Doctor Helen Quinn^{1,7}, Associate Professor Nicholas Wood^{1,7}, Professor Kristine Macartney^{1,7}

Affiliations: ¹National Centre For Immunisation Research And Surveillance, Kids Research Institute, The Children's Hospital at Westmead, Westmead, Australia, ²Wesfarmers Centre for Vaccines and Infectious Diseases, Telethon Kids Institute, University of Western Australia, Perth, Australia, ³Department of Microbiology, Pathwest Laboratory Medicine WA, Princess Margaret Hospital for Children, Perth, Australia, ⁴Department of Infectious Diseases, Princess Margaret Hospital for Children, Perth, Australia, ⁵Alfred Health; Monash University, Melbourne, Australia, ⁶School of Paediatrics and Child Health, University of Western Australia, Perth, Australia, ⁷Discipline of Child and Adolescent Health, University of Sydney, Sydney, Australia

Abstract:

Background: The Paediatric Active Enhanced Disease Surveillance (PAEDS) and Influenza Complications Alert Network (FluCAN) are sentinel hospital-based surveillance programs operating across Australia that collaborate to assess influenza burden. This report provides a preliminary summary of the epidemiology of infants hospitalised with influenza in 2017 and the first nationally representative estimation of maternal vaccine effectiveness (VE) against influenza hospitalisation in infants.

Methods: In this study, cases were defined as infants aged < 6 months admitted to 11 sentinel hospitals with an acute respiratory illness (ARI) and PCR-confirmed influenza. Controls were hospitalised infants with ARI who tested negative for influenza. Recruitment occurred prospectively from April through October. Maternal VE estimates were calculated using conditional logistic regression.

Results: In total, 154 infants (<6 months) were admitted with PCR-confirmed influenza. Of these, 68% were aged <3 months, 14% were Indigenous, 36% had underlying conditions predisposing them to severe influenza. Influenza A was diagnosed in 73%. The median length of stay was 2 days (IQR1:5) with 21% admitted to intensive care units (ICU). Treatment with neuraminidase inhibitors was uncommon (17%). Preliminary maternal vaccine effectiveness against infant disease up to age 6 months was estimated at 26% (95% CI: -48%; 63%).

Conclusions: The high influenza disease burden in infants in 2017 was consistent with that seen in other age groups in that record year. Disease in infants is often severe, requiring ICU admission more often than in adults. Preliminary maternal vaccine effectiveness estimation against infant disease was low but needs to be viewed in comparison to overall vaccine performance.

Cell-based human influenza vaccines may provide greater protection against A/H3N2 influenza viruses

Authors: Ms Heidi Peck¹, Mr Cleve Rynehart¹, Ms Hilda Lau¹, Mrs Sally Soppe¹, Dr Avishek Nandi², Dr Christopher Gully², A/Prof Sheena Sullivan¹, Prof Ian Barr¹

Affiliations: ¹WHO Influenza Centre, Melbourne, Australia, ²Seqirus, Holly Springs, USA

Abstract:

Introduction: Since the 1940s, human influenza vaccines have mostly been isolated and manufactured in embryonated hen's eggs. The HA protein of the influenza virus can acquire unwanted egg-adaptions when grown in eggs, which can alter antigenicity and potentially lower the vaccine effectiveness. Cell isolated and grown influenza vaccines do not have these adaptations and may provide improved vaccine protection, particularly against A(H3N2) viruses.

Methods: Human influenza A/H3N2 viruses from 2008 to 2018 were inoculated into embryonated hen's eggs and a qualified cell line (MDCK 33016PF). HA genes of isolates were sequenced and screened for amino acid substitutions that may alter antibody binding. In addition viruses were also assessed antigenically using post-infection ferret sera and post-vaccination human sera.

Results: Isolation of 392 A/H3N2 viruses was attempted. Overall isolation rates were 85% in the MDCK 33016PF cell-line and 34% in eggs. Sequencing indicated that most cell-isolated viruses retained the genetic sequence of the original clinical samples. In contrast, most egg-isolated viruses acquired substitutions in potential glycosylation or antigenic sites of the HA gene that altered the antigenicity of the virus.

Conclusion: Compared with eggs, MDCK 33016PF cells were a superior vaccine substrate for isolating influenza A/H3N2 viruses. These isolates maintained the same HA sequence and antigenic properties of the virus present in the original clinical sample. As the VE for the A/H3N2 component of the Australian influenza vaccine was particularly poor in 2017 (approximately 10%), the use of a cell-based vaccine may improve protection levels against A(H3N2) viruses.

Active surveillance verifies the safety of 2017 influenza vaccines in Australia

Authors: Ms Alexis Pillsbury¹, Ms Catherine Glover¹, Associate Professor Peter Jacoby², Dr Helen Quinn^{1,3}, Dr Parveen Fathima², Mr Patrick Cashman⁴, Dr Alan Leeb⁵, Dr Christopher Blyth^{2,6}, Associate Professor Tom Snelling^{2,7}, **Professor Kristine Macartney^{1,3,8}**

Affiliations: ¹NCIRS, Westmead, Australia, ²Telethon Kids Institute, Perth, Australia, ³Discipline of Paediatrics and Child Health, University of Sydney, Australia, ⁴Hunter New England Local Health District, Wallsend, Australia, ⁵Illawarra Medical Centre, Ballajura, Australia, ⁶University of Western Australia, Perth, Australia, ⁷Princess Margaret Hospital, Perth, Australia, ⁸Department of Microbiology and Infectious Diseases, Children's Hospital Westmead, Westmead, Australia

Abstract:

Background: Post-marketing surveillance of influenza vaccine safety is required to support the use of multiple brands of ever-changing vaccine formulations in hundreds of millions of people worldwide annually. AusVaxSafety active, automated surveillance relies on patient-reported adverse events to provide near real-time safety data on influenza vaccines used in Australia.

Methods: Individuals aged ≥6 months who received one of four quadrivalent inactivated influenza vaccines (QIIVs) at >200 participating immunisation sites and responded to an SMS or email-based survey about adverse events within 3 days post-immunisation were included. Signal detection methods were employed weekly and rates of any event, fever or medical attendance were calculated by age group, pregnancy status, brand and concomitant vaccination received.

Results: Fast initial response cumulative sum (FIR CUSUM) and Bayesian analyses of weekly event rates did not demonstrate a safety signal throughout 2017 in 73,892 vaccinated participants. Children aged 6 months–4 years had higher event rates (522/6,180; 8.4%) compared to older age groups, such as those aged ≥65 years (1,695/28,154; 6.0%). There were no differences in safety between vaccine brands, including by age or in pregnant women. Concomitant vaccination was associated with an increased risk of reporting fever (4.8% versus 1.7%) and medical attendance (only in those aged ≥40 years; 0.8% versus 0.3%).

Conclusions: AusVaxSafety vaccine safety surveillance demonstrated comparable, low and expected adverse event rates for the 2017 QIIV brands used in Australia. Underpinned by patient-reported outcome data, AusVaxSafety's ability to generate near real-time information is ideal for expansion and adaptation to include new vaccines.

Influenza epidemiology, vaccine coverage and effectiveness in hospitalised children in Australia: 2017

Authors: A/Prof Christopher Blyth^{1,4,5}, Ms Jocelyne McRae^{2,4,5}, Professor Kristine Macartney^{2,4,5}, Professor Allen Cheng^{3,4,5}

Affiliations: ¹University Of Western Australia / Telethon Kids Institute, Perth, Australia, ²National Centre for Immunisation Research & Surveillance, Westmead, Australia, ³Monash University, Melbourne, Australia, ⁴Paediatric Active Enhanced Disease Surveillance Network, ⁵FluCAN Network

Abstract:

Background: The Influenza Complications Alert Network (FluCAN) is a sentinel hospital-based surveillance program operating in all states and territories in Australia. This report summarises the epidemiology of children hospitalised with laboratory-confirmed influenza in 2017.

Methods: In this observational study, cases were defined as children admitted to sentinel hospitals with an acute respiratory illness (ARI) with polymerase chain reaction (PCR)-confirmed influenza. Controls were hospitalised children with ARI who tested negative for influenza. Cases and controls were prospectively recruited from April until October. Preliminary vaccine estimates (VE) were calculated using conditional logistic regression.

Results: From April until October, 1300 children (<18 years) were admitted with confirmed influenza. Of these, 30% were <1 year, 8% were Indigenous, and 46% had underlying conditions predisposing to severe influenza. In those with laboratory-confirmed influenza, Influenza A/H3N2 was detected in 65% with influenza B the next most frequent subtype (34%). Only 17% of children with influenza received a neuraminidase inhibitor. The median length of stay was 2 days (IQR1:4) with 12% admitted to intensive care. Only 18% of flu-negative controls were vaccinated (28% with risk factors; 9% without). The adjusted VE of TIV for preventing hospitalised influenza was estimated at 27% [95%CI -6;49%].

Conclusions: Influenza A/H3N2 was responsible for the majority of paediatric influenza-related hospitalisations in 2017. Most hospitalised children had no underlying conditions predisposing to severe influenza. Uptake of influenza vaccine and use of antivirals for laboratory-proven influenza remained low. Preliminary analyses suggest that the 2017 southern hemisphere TIV had limited efficacy against severe influenza.

Effectiveness of High-Dose Influenza Vaccination for Older Adults: Systematic Review and Meta-analysis

Authors: Mr Jason Lee^{1,2}, Dr Gary Lam^{1,2}, Mr. Thomas Shin^{1,3}, Dr David Greenberg^{4,5}, Dr Ayman Chit^{2,4}

Affiliations: ¹Sanofi Pasteur, Toronto, Canada, ²Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Canada, ³Department of Mathematics and Statistics, York University, Toronto, Canada, ⁴Sanofi Pasteur, Swiftwater, USA, ⁵Department of Paediatrics, University of Pittsburgh School of Medicine, Pittsburgh, USA

Abstract:

Background: Seasonal influenza epidemics are responsible for significant disease burden each year, especially in older adults. While annual vaccinations are recommended for older adults, only recently have there been vaccines that are formulated specifically for individuals 65 years of age and older. This study reviewed the evidence of efficacy and effectiveness of high-dose inactivated trivalent influenza vaccine (HD-TIV; Fluzone® High-Dose) compared to standard-dose influenza vaccine (TIV) in individuals aged 65 years of age and older against influenza-associated clinical outcomes.

Methods: A systematic review was conducted for randomized and observational studies assessing relative vaccine efficacy/effectiveness (rVE) of HD-TIV against influenza-associated clinical outcomes such as influenza-like illness, hospital admissions, and death in adults 65 years of age and older. Study results were meta-analyzed and the pooled rVE against each clinical outcome was estimated using random-effects models.

Results: 7 eligible studies were identified following the screening of 950 studies. HD-TIV demonstrated improved protection compared to TIV against influenza-like illness (rVE=18.3%, 95% CI:7.0-28.3%); hospital admissions due to influenza illness (rVE=18.0%, 95% CI:9.5-25.6%), pneumonia (rVE=25.1%, 95% CI:10.5-37.3%), and cardiorespiratory events (rVE=18.2%, 95% CI:6.8-28.1%); as well as all-cause hospital admissions (rVE=9.5%, 95% CI:1.1-15.9%). The rVE of HD-TIV compared to TIV was 22.2% (95% CI:-18.2-48.8%) against death following an influenza-related admission, and 2.5% (95% CI:-5.2-9.5%) against all-cause death.

Conclusions: Available evidence suggests that HD-TIV is more effective than standard-dose influenza vaccine at reducing the clinical outcomes typically associated with influenza infection in older adults.

This study was funded by Sanofi Pasteur

2C – Aboriginal and Torres Strait Islander Immunisations

Room E2, 2:00pm - 3:30pm

Pertussis vaccine effectiveness among Aboriginal and non-Aboriginal children in a population-based cohort

Authors: **Dr Sarah Sheridan**^{1,2}, Professor Peter McIntyre^{2,3,4}, Associate Professor Christopher Blyth^{5,6,7,8}, Associate Professor Bette Liu¹, Professor Nicholas de Klerk⁵, Dr Thomas Snelling^{5,9,10,11}, Dr Parveen Fathima⁵, Dr Robert Menzies¹, Associate Professor Peter Richmond^{5,12,13}, Dr Hannah Moore⁵, Associate Professor Heather Gidding^{1,2}

Affiliations: ¹School of Public Health and Community Medicine, UNSW Medicine, University of New South Wales, Sydney, Australia, ²National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases, The Children's Hospital at Westmead, Sydney, Australia, ³School of Public Health, Medical School, University of Sydney, Sydney, Australia, ⁴Discipline of Adolescent and Child Health, Medical School, University of Sydney, Sydney, Australia, ⁵Wesfarmers Centre for Vaccines and Infectious Diseases, Telethon Kids Institute, The University of Western Australia, Perth, Australia, ⁶Department of Infectious Diseases, Princess Margaret Hospital, Perth, Australia, ⁷School of Medicine, University of Western Australia, Perth, Australia, ⁸Department of Microbiology, PathWest Laboratory Medicine WA, Princess Margaret Hospital, Perth, Australia, ⁹Curtin University, School of Public Health, Perth, Australia, ¹⁰Princess Margaret Hospital for Children, Perth, Australia, ¹¹Menzies School of Health Research and Charles Darwin University, Darwin, Australia, ¹²School of Paediatrics and Child health, Perth, Australia, ¹³Department of Child Health Research, Princess Margaret Hospital for Children, Perth, Australia

Abstract:

Background: Previous Australian pertussis vaccine effectiveness (VE) estimates have come from case-control and screening studies with limited ability to control for confounding. Moreover, estimates for Aboriginal children are lacking. We calculated acellular pertussis VE against notified and hospitalised pertussis in Aboriginal and non-Aboriginal children using a large population-based cohort.

Methods: Pertussis notifications, hospitalisations with an International Classification of Disease code of A37 (pertussis) recorded in any: diagnostic field, and vaccination records from the Australian Immunisation Register were linked to birth records in Western Australia and New South Wales for 1998-2012 (notified pertussis) and mid-2001-2012 (hospitalised pertussis). Notification and hospitalisation rates in vaccinated and unvaccinated children aged <18 months were compared using Cox regression adjusted for infant, maternal and demographic factors. VE was calculated as (1-hazard ratio)*100.

Results: There were 392 pertussis notifications in ~100,000 person-years in Aboriginal children and 3,573 notifications in ~2 million person-years among non-Aboriginal children, born 1998-2012. Three-dose VE against notification was 55.4% (95% confidence interval [CI]: 33.3-70.2) in Aboriginal and 71.3% (95%CI: 67.4-74.8) in non-Aboriginal children.

Among children born July 2001- December 2012, 42.6% of Aboriginal and 30.3% non-Aboriginal children were hospitalised in the week prior or month following the recorded onset date. Three-dose VE against hospitalisation was 76.9% (95%CI: 42.1-90.8) in Aboriginal and 79.6% (95%CI: 69.7-86.2) in non-Aboriginal children.

Conclusions: The first VE estimates for Aboriginal children indicate similar effectiveness against severe pertussis to non-Aboriginal children. The cohort approach provided lower VE estimates against notification and similar hospitalisation estimates to a previous Australian case-control study.

Implementing the Meningitis ACWY vaccination in remote Aboriginal communities; challenges and successes

Authors: **Dr Lea Merone**¹, Valmay Fisher², Ann Richards²

Affiliations: ¹Apunipima, James Cook University, Australia, ²Torres and Cape Hospital and Health Service, Australia

Abstract:

Introduction: In response to an outbreak of bacterial meningitis in the Northern Territory a vaccination program for Aboriginal and Torres Strait Islander 1-19 year olds was commenced throughout the Far North Queensland remote communities. The aim was to achieve 90% vaccination coverage by the end of January 2019. Implementation was challenging as it commenced only 3 weeks before the Christmas break.

Methods: A collaborative effort between organisations; we identified communities that required high immunisation coverage owing to known connections with communities in Northern Territory. Representatives from relevant organisations held regular teleconferences to discuss strategy, using the same template of action for each community. Challenges included the use of different electronic data systems between organisations resulting in errors in data-recording and difficulties around ordering vaccinations in specific communities. We developed culturally appropriate health-promotion materials to spread the message within each community. We regularly shared and requested information and updates about the program with communities.

Results: Of the 11 communities with electronically recorded data: 5 achieved over 90% and 4 achieved over 80% coverage by the deadline. One community suffered significant challenges with staffing and thus required extra time to achieve the target rates.

Conclusion: This was a collaborative effort between different organisations to ensure a swift and successful vaccination program at a challenging time of the year. There were many successes within the program but also some significant learning points such as centralising electronic databases and strengthening collaborative links between organisations.

Seasonal influenza vaccination coverage in Indigenous children: room for improvement

Authors: Dr Alexandra Hendry¹, Mr Brynley Hull¹, Ms Katrina Clark¹, Dr Aditi Dey^{1,2}, Dr Frank Beard^{1,2}

Affiliations: ¹National Centre for Immunisation Research and Surveillance, Westmead, Australia, ²The University of Sydney, Australia

Abstract:

Background: Aboriginal and Torres Strait Islander (Indigenous) people have significantly increased burden of influenza disease, with the hospitalisation rate particularly high in young Indigenous children. Annual influenza vaccination for Indigenous people aged ≥15 years has been funded under the National Immunisation Program since 2010. Following the program's expansion in 2015, to include Indigenous children aged 6 months - <5 years, we examined changes in influenza vaccination coverage in this population over time.

Methods: Annual influenza vaccination coverage estimates were calculated between 2014 and 2017 for Indigenous children aged 6 months - <5 years using Australian Immunisation Register data. Analysis was done by calendar year, jurisdiction, and age subgroup.

Results: Influenza vaccination coverage in Indigenous children aged 6 months - <5 years rose from 3.3% in 2014 to 13.1% in 2017. Coverage varied substantially between jurisdictions – it was consistently highest in the Northern Territory (>50% in 2015-2017). Coverage at the national level was highest in the youngest age subgroup (6 months - <1 year; 16.3%) and lowest in the oldest age subgroup (4 - <5 years; 9.2%). Of the Indigenous children aged 6 months - <5 years reported to have received the influenza vaccine in 2016, 44% were recorded as having received another dose in 2017.

Conclusions: Despite being funded since 2015, recorded influenza vaccine coverage in Indigenous children aged 6 months - <5 years remains low. Although underreporting may contribute to underestimation of true coverage, improved coverage is required to prevent severe morbidity and mortality in this vulnerable population.

Why is flu vaccination coverage so low in Indigenous adults?

Authors: Mr Jalil Aqel¹, Ms Telpia Joseph¹, Dr Sally Nathan¹, Dr Holly Seale¹, Dr Rob Menzies¹

Affiliations: ¹University of NSW, Sydney, Australia

Abstract:

Background: Influenza is responsible for a much larger disease burden in Indigenous compared to non-Indigenous adults. For this reason influenza vaccine is available free to all Indigenous adults, but only around 30% are vaccinated each year. By comparison vaccine is free for non-Indigenous adults from ≥65 years, and around 75% are vaccinated each year.

Methods: In order to find ways of improving coverage, we conducted a survey of Indigenous community members aged ≥18 years at the 2017 NSW Koori Knockout (29th of September – 2nd October), the largest annual gathering of Indigenous people in Australia.

Results: The survey sample of 273 was younger, more urban, and more highly educated compared to the total Australian Indigenous population. The proportion that reported receiving an influenza vaccine in 2017 (38%) was slightly more than population estimates. A substantial minority (30%) were unaware of their eligibility for free influenza vaccination and 53% reported not receiving a reminder from a health professional. Over half (52%) believed the vaccine could cause influenza, roughly 40% reported there were better ways than vaccination for avoiding infection, and 30% said they would not have the vaccine if it was offered to them. Difficulty in accessing a health service was a barrier reported by only 17%, and feeling uncomfortable or discriminated against were also infrequently reported (15% and 8% respectively).

Conclusions: These results suggest that more aggressive promotion of the importance of influenza vaccination of (especially young) Indigenous adults is needed, aimed at Indigenous adults and their providers.

Rapid implementation of the meningococcal ACWY vaccine program in Central Australia

Authors: Dr Rosalind Webby¹, Dr Belinda Greenwood-Smith, Ms Jayne Porter, Dr Priya Janagaraj, Dr Vicki Krause, Dr Charles Douglas

Affiliations: ¹NT Health, Casuarina, Australia

Abstract:

Context: An increase in cases of meningococcal W disease occurred in Alice Springs, Barkly and Katherine regions (including SA/WA border cases) in 2017. All cases (33) occurred in Aboriginal people and 94% were under 15 years of age.

Process: Due to the rapid increase in cases of meningococcal W disease despite clearance antibiotics of close contacts and vaccination of affected communities, the NT launched a meningococcal ACWY vaccine program for Aboriginal 1-19 year olds in

Alice Springs, Barkly and Katherine regions in October 2017 which was then extended to non-Aboriginal people in these areas from 1 November 2017 as an outbreak control measure.

Analysis: Vaccination campaigns in response to public health threats require large logistic efforts to implement rapidly and often take place in an atmosphere of public anxiety. Risk communication and stakeholder engagement with clear communication for both affected and non-affected populations is critical.

Distribution of vaccine, guidelines, resources and authorisation for nurses and Aboriginal health practitioners to administer vaccines occurred within a month of the initial NT Government funding approval. Challenges related to the high mobility of the population with social links across borders, great distances between population groups and workforce capacity were addressed.

Outcome: An estimated 13 000 Aboriginal 1-19 years olds and 7800 non Aboriginal 1-19 years olds were eligible for vaccination in the target region. 80% of Aboriginal 1-19 year olds in the target region were vaccinated within 2 months. A marked decrease in cases was achieved in that time frame and sustained.

Expanded influenza vaccination programs have reduced burden of disease in Indigenous Territorians

Authors: Dr Peter Markey¹, Dr Rosalind Webby¹, Ms Heather Cook¹

Affiliations: ¹Centre for Disease Control, Casuarina,

Abstract:

Background: Influenza disproportionately affects Indigenous people compared to non-Indigenous. Since 2010, Indigenous Australians aged 15 years and over have been eligible for free flu vaccine and from 2015 the program was expanded to include Indigenous infants aged 6 months to less than 5 years.

Methods: Using data from the notifiable diseases register, we assessed the impact on the adult Indigenous population by comparing annual Indigenous and non-Indigenous rates in 15-49 year old people since 2010. The impact of the infant program was assessed by calculating vaccine effectiveness using the screening method and data from the immunisation register. We also performed before and after comparisons on both the rates of flu in Indigenous infants and the proportion of all infant flu cases who were Indigenous.

Results: There has been a downward trend in the rate ratio of Indigenous vs non-Indigenous in 15-49 year old age-group since 2010. It peaked at 5.5 in 2011 and was 2.6 in 2017. The vaccine effectiveness for lab-confirmed influenza in the 6 month to 5 year age group from 2015-17 was 50.2% (26.8-66.0%; $p=0.0001$). The rate of influenza in vaccine-eligible Indigenous infants fell from 761 per 100000 in the years 2010-14 to 603 in 2015-17. The proportion of infant cases of influenza which were Indigenous fell from 73.5% in 2010-14 to 50.6% in 2015-17 (difference 22.9%; CI 15.3 – 30.6; $p<10^{-4}$).

Conclusion: The expanded influenza vaccination programs for Indigenous people in the Northern Territory have been effective in reducing the relative burden of disease.

2D – Rapid Fire – Vaccines Clinical Practice

Riverbank Room 1, 2:00pm - 3:30pm

Caregiver attitudes and practices towards influenza vaccination of their medically at-risk children

Authors: Mr Daniel Norman^{1,2}, Dr Margie Danchin^{5,6,7}, Associate Professor Christopher Blyth^{1,2,3,4}, Dr Hannah Moore¹, Professor Paul Van Buynder^{9,10}, Dr Holly Seale¹¹

Affiliations: ¹Wesfarmers Centre of Vaccines and Infectious Diseases, Telethon Kids Institute, The University of Western Australia, Booragoon, Australia, ²Medical School, University of Western Australia, Crawley, Australia, ³Department of Infectious Diseases, Princess Margaret Hospital for Children, Perth, Australia, ⁴Department of Microbiology, PathWest Laboratory Medicine, Perth, Australia, ⁵Vaccine and Immunisation Research Group, Murdoch Children's Research Institute, Melbourne, Australia, ⁶Department of General Medicine, Royal Children's Hospital Melbourne, Melbourne, Australia, ⁷Department of Paediatrics and School of Population and Global Health, The University of Melbourne, Melbourne, Australia, ⁸Department of Infectious Diseases, Princess Margaret Hospital, Perth, Australia, ⁹Immunisation Coalition, Melbourne, Australia, ¹⁰Griffith University, Nathan, Australia, ¹¹School of Public Health and Community Medicine, UNSW Sydney, Kensington, Australia

Abstract:

Background: Despite strong recommendation and public funding for Australian children with medical conditions increasing influenza risks, influenza vaccine coverage remains low. We aimed to evaluate caregivers' (parents/guardians) attitudes and practices in addition to recommendations for influenza vaccination of medically at-risk children.

Methods: Cross-sectional surveys were conducted with caregivers of children with increased influenza-related risks due to medical conditions attending sub-speciality outpatient clinics at the Royal Children's Hospital, Melbourne (RCH) and Princess Margaret Hospital, Perth (PMH). Caregivers at Gold Coast University Hospital (GCUH) completed an online survey.

Results: 609 surveys were completed: RCH, 350 (57%), PMH, 158 (26%) and GCUH, 102 (17%). 2017 Influenza vaccine uptake was 49% overall (42% at PMH to 55% at RCH). Increased immunisation uptake was reported in children who reported receiving either a GP or hospital physician recommendation (67% and 79% respectively), compared to children who were not recommended immunisation (20%). Hospital physicians were also caregivers' most common source of trusted immunisation information (63.5%). Despite 80% of respondents stating they are happy for vaccination during hospitalisation, only 35% were offered vaccination during previous admissions. Caregivers concerned about influenza infection were more likely to vaccinate (Odds ratio [OR]: 1.56 [95%CI:1.30-2.16]), compared with caregivers concerned about side effects who were less likely to vaccinate (OR: 0.29 [95%CI:0.20-0.43]).

Conclusions: Physician influenza vaccine recommendation is a key vaccine uptake determinant. Previous emphasis has been placed on GPs' recommendation, however hospital physician recommendation appears to strongly influence uptake. Future interventions should be tailored to the hospital setting for medically at-risk children.

Impact of timing of influenza vaccination in preventing influenza cases

Authors: Ms Valentina Costantino¹, Professor Raina MacIntyre¹

Affiliations: ¹School of Public Health and Community Medicine, Faculty of Medicine, University of New South Wales, UNSW Sydney, Australia, Sydney, Australia

Abstract:

Background: Influenza transmission is highest in the winter season. In Australia the season goes from April to October with an average peak in mid August. However these results vary widely in each season, the vaccine is ready in March each year. Studies show that vaccine effectiveness is age-dependent and may wane over the course of an influenza season, leading to suboptimal vaccine effectiveness during late influenza seasons. This raises questions about the optimal time for influenza vaccination.

Methods: A deterministic age-structured model has been constructed to simulate the transmission of influenza infection. The model accounts for age-specific transmission and disease risk rates. Furthermore it accounts for different immunity levels in the population, like vaccinated and immunocompromised estimates. Disease parameters are drawn from literature. In order to estimate age-specific risk of infection and transmission, the model is calibrated to influenza notification, hospitalisation and mortality data collected in Australia between 2001-2014. Sensitivity analysis is conducted around vaccine effectiveness and its wane over time.

Results: The main output is the number of influenza cases prevented at different vaccination time points from March to August, and the impact of vaccine effectiveness waning on influenza epidemiology.

Conclusion: This study will provide important evidence on the timing related effectiveness of influenza vaccination in preventing influenza infection. Our results will contribute to inform policy for further recommendation on influenza vaccine schedule.

It's not just about immunisation: The case for nurse immunisers

Authors: Dr Sandra Miles¹

Affiliations: ¹*Australian Catholic University, Banyo, Australia*

Abstract:

Immunisation is of great significance to public health. Being vaccinated places each child or adult in the hands of a health care professional. In some contexts, this provides opportunity for a well-child or general health check. When nurses perform a vaccinating role, they are able to also quickly assess health and socio-family status, as well as utilise their well-honed communication and interpersonal skills. In the GP setting, both GP and nurse immuniser are able to encourage further health care assessment and appointments, improving health care in general; not limited to just immunisation. Moves to use other vaccine providers in commercial settings, including pharmacies, means some children may not be presented to traditional health care settings, such as GP or child health clinics for broader health checks.

Courses for Nurse Immunisers recognise the expertise of nurses in providing health care across a variety of settings and encourage the wider public health perspective. An evaluation study of graduates from one such course reveals nurses use their immunisation expertise across a variety of clinical settings. Course outcomes influence the clinical practice of nurses, enhancing health for children and adults. There is evidence that introducing the nurse immuniser role increased vaccination rates significantly. It is contended that eroding the role of nurse immuniser within the GP setting and introducing other less health focused providers will affect overall health of children. Governments need to take more notice of the significant contribution of nurses to immunisation rates and health care when planning health policy and vaccination funding.

Inaugural pharmacist role in the delivery of a state-wide specialist immunisation service

Authors: Mrs Renee Quirk¹, Mr Thomas Clayton¹, Ms Leanne Philips¹, Dr Sophie Wen¹, Dr Julia Clark², Dr Sonya Stacey²

Affiliations: ¹*Qld Specialist Immunisation Service (QSIS), South Brisbane, Australia*, ²*The Lady Cilento Children's Hospital, South Brisbane, Australia*

Abstract:

Context: The role of a pharmacist within a specialist immunisation service is a novel concept in Australia. Established in 2016, the Queensland Specialist Immunisation Service (QSIS) offers a multidisciplinary statewide paediatric immunisation service that provides immunisation consultations, advice, research and education. QSIS' inception was a key action for Queensland Health's immunisation strategy, with a particular focus on addressing the immunisation needs of medically complex children.

Process: This diverse advanced practice pharmacist role provides direct and indirect patient care across inpatient and outpatient services; aimed at improving health outcomes of children. The full time senior pharmacist plays a pivotal role in the team, bringing a unique skill set to the service model. In addition to the clinical role of undertaking consultations and providing immunisation advice, they contribute significantly to vaccine management, medication safety, education, research, policy/guideline development and service delivery improvements.

Analysis: The pharmacist was involved in responding to 43% of enquires (September 2016 to August 2017) through the advice service, primarily regarding general and medically at risk immunisation. Since 2016, the immunisation pharmacist has delivered over 40 interactive education sessions to various audiences locally and nationally. The pharmacist has contributed to the development and review of numerous clinical guidelines, research projects and leads the clinical audit and error management component of QSIS.

Outcomes: The pharmacist valuably contributes to QSIS and proves to be a cost effective solution for addressing the needs of children with complex immunisation requirements. Continued development of this position will improve service delivery and effectiveness.

Exploring vaccine cold chain integrity in remote Australia

Authors: Ms Amanda Peters¹, Dr Mary Bushell¹, Mr Tobias Speare², Ms Angela Young³

Affiliations: ¹*Charles Darwin University, Darwin, Australia*, ²*Centre for Remote Health, Alice Springs, Australia*, ³*Alice Springs Hospital, Alice Springs, Australia*

Abstract:

Background: The geographical isolation of health centres in remote Australia presents significant challenges to medicine supply chains, particularly for temperature-sensitive products such as vaccines. This has led to concerns regarding the integrity of the vaccine cold chain. This research aims to explore the knowledge, perceptions and potential issues with cold chain management in Central Australia.

Method: Mixed-method study involving qualitative interviews with authorised immunisers, and measurement of temperature exposure for individual vaccines from supply centre to point of administration. This presentation will address the qualitative arm of the research.

Results: 10 registered nurses participated in phone interviews (45% response rate). Nearly half of respondents had experienced a cold chain breach within the last year. Only 3 respondents defined the correct temperature range for cold chain. Freezing was not commonly reported as a threat to vaccine viability.

Participants reported concerns about the integrity of the whole supply chain, including the long distances travelled to reach remote clinics, unreliable power supply and the limited availability of authorised immunisers at remote clinics. Unnecessary wastage due to poor communication was identified as an issue. Individual cold chain monitors was a suggested improvement to the current system. All participants completed vaccine-related training within the previous 2 years.

Summary: Improvements could be made in health care professionals' knowledge of cold chain management. Further research is required to determine whether the perceptions of remoteness, power supply, staffing and type of monitors actually impact the integrity of the cold chain system.

COOL PROJECT – maintaining the cold chain with offsite immunisations

Authors: Barbara McArdle¹

Affiliations: ¹The Immunisation Advisory Centre, Private Bag 92019 Victoria Street West Auckland 1142, New Zealand

Abstract:

Context: Some immunisation settings require vaccine to be transported and stored in vaccine cold boxes to maintain the cold chain. In New Zealand these situations are regulated by the National Standards for Vaccine Storage and Transportation for Immunisation Providers 2017.

The Immunisation Advisory Centre, funded by the Ministry of Health, investigated the best options for safety, reliability and cost effectiveness of vaccine transport for offsite vaccination programmes in New Zealand and developed a 'best practice' precooling, packing and monitoring protocol for three recommended cold boxes and associated equipment.

Three School Based Immunisation Providers participated, providing expert advice and testing of equipment and protocols.

Process: The project consisted of a nationwide survey of School Based Immunisation Providers, a document review, field and controlled testing of equipment, development of a cool box packing and monitoring protocol and field testing of the protocol.

During the controlled testing the cold boxes containing vaccine were subjected to prolonged periods of hot and cold temperatures and opened at set times.

Analysis: The stability of the internal temperatures of the cold boxes during testing was analysed using datalogger software allowing the superior cool boxes to be identified.

Outcomes: Cold boxes, a cooling product, a datalogger and an insulating product to protect the vaccine were identified based on both performance and cost effectiveness.

A protocol was produced detailing recommended actions from initial preparation of the cold box until unpacking the cold box on return to the immunisation provider's base.

Subcutaneous Nodules following immunisation in childhood

Authors: Dr Rowena Silcock^{1,2}, Dr Nigel Crawford^{1,2}, Ms Gowri Selvaraj², Ms Alissa McMinn², Dr Margie Danchin^{1,2}, Dr Teresa Lazzaro^{1,2}, Dr Kirsten Perrett^{1,2}

Affiliations: ¹Department of General Medicine, Royal Children's Hospital, Parkville, Australia, ²SAEFVIC (Surveillance of Adverse Events Following Vaccination in the Community), Murdoch Children's Research Institute, Parkville, Australia

Abstract:

Background: Subcutaneous nodules are a rare adverse event following immunisation (AEFI). We aimed to describe nodules at the injection site reported to SAEFVIC (Surveillance of Adverse Events Following Vaccination in the Community) using the Brighton Collaboration Case Definition (BCCD), recurrence following subsequent vaccines and immunisation status.

Method: All paediatric cases (<18 years) of 'nodule at injection site' reported to SAEFVIC, Melbourne, Australia, between May 2007 and June 2016 were assessed. Case details were analysed from records and phone interview follow-up. The Australian Immunisation Registry was reviewed for immunisation status.

Results: 70.7% (41/58) of cases were consistent with the BCCD for subcutaneous nodule, 13.8% (8/58) 'possible subcutaneous nodules', 10.3% (6/58) nodules associated with BCG vaccination and 5.2% (3/58) alternative diagnosis. The median age at vaccination was 12 months, (range 1 month-12 years); 53.7% male. 17.1% (7/41) had multiple nodules. Most nodules were associated with vaccines containing aluminum (73.5%), followed by no aluminum (8.1%) and unknown (18.4%). Most 1st developed symptoms <24 hours post-vaccination (75.6%) and in the thigh (59.2%). Pruritus was associated in 41.5%. Around 1/3 (34.1%) of nodules resolved by 6 months, 2/3 (68.2%) by 12 months however 1/4 (24.4%) remained persistent >24 months. 5 cases had prior nodules and 1 case had recurrence with subsequent vaccination. 82.9% were fully immunised at follow-up.

Conclusion: Subcutaneous nodules at the injection site may occur following a wide range of vaccines, including those without aluminium. All cases should be carefully reviewed and offered Immunisation specialist review for counselling and to support subsequent vaccinations.

A 2-year follow-up of overdue children in low coverage areas

Authors: Ms Nina Ni¹, Ms Thi Thuy Linh Nguyen², Mr Mark Ferson³

Affiliations: ¹Central And Eastern Sydney PHN, Ashfield, Australia, ²Maroubra Medical Centre, Maroubra, Australia, ³Public Health Unit, South Eastern Sydney Local Health District, Randwick, Australia

Abstract:

Objective: Central and Eastern Sydney PHN liaise with General Practices in areas where childhood immunisation coverage is low to determine why children are overdue and assist them to provide intervention (recall patients, correct immunisation records on AIR) where possible.

Methods: CESPHN uses the AIR 11A report and published LGA coverage data to identify practices with large numbers of overdue children in low coverage areas. A general practice with a large number of overdue children (N>100) in Sydney's eastern suburbs was identified for follow-up. From December 2015 to July 2017, CESPHN provided the practice with monthly reports of overdue children who were last vaccinated at the practice. The practice reviewed the immunisation records at the practice and provided intervention where possible. The practice recorded reasons children were overdue and for failure of follow-up. Each month the practice provided CESPHN with status of the overdue children at the practice and CESPHN removed children from subsequent reports who had been followed up.

Results: In total, 315 overdue children were followed up, of whom 73(23.2%) were fully vaccinated but had not been recorded on AIR for various reasons. 192(61%) were unable to be recalled and 5(1.6%) were vaccine objectors. There was a significant decline in the likelihood of intervention as the time since last vaccination increased: 46% if <6 months, 34% if 6-11 months and 10% if >12 months.

Discussion: In a General Practice setting where resources are limited, priority should be given to overdue children last vaccinated at the practice within the last 12 months.

Vaccine Allergy? Skin testing and vaccine challenge at a tertiary paediatric hospital

Authors: Dr Abigail Cheung⁴, Dr Sharon Choo¹, Dr Kirsten Perrett^{1,2,3}

Affiliations: ¹Royal Children's Hospital Melbourne, Parkville, Australia, ²Murdoch Children's Research Institute, Parkville, Australia, ³University of Melbourne, Australia, ⁴Women's and Children's Hospital, Adelaide, Australia

Abstract:

Background: The rate of true vaccine allergy is unknown. Patients with potential IgE-mediated adverse events following immunisation (AEFI) (e.g.: anaphylaxis or immediate angioedema or urticaria) should undergo allergy specialist review and investigation, which may include skin testing or vaccine challenge. Published protocols for investigation of possible vaccine allergy tend to be highly conservative and often suggest invasive skin testing for all; a practice not evidence based, technically difficult and unpleasant.

We aimed to describe the outcome of vaccine skin testing and challenge in children referred to a tertiary paediatric hospital with a potential IgE-mediated AEFI.

Methods: We reviewed all children (< 18 years), who underwent skin testing (skin prick test or intradermal test (IDT)) or vaccine challenge over a 5-year period (May 1, 2011 to April 30, 2016) at the Royal Children's Hospital Melbourne.

Results: There were 109 admissions in 74 children. 8% (6/74) of children had positive skin testing or challenge to the index vaccination. Two had positive IDT to the index vaccine but challenge negative to alternative brand vaccine. Two had negative IDT but subsequent positive challenge (anaphylaxis managed with adrenaline) and two had immediate urticaria on challenge without prior skin testing. All patients with true vaccine allergy either had; potential IgE-mediated symptoms <15 minutes of index vaccine immunisation, or anaphylaxis as their incident reaction.

Conclusion: The vast majority of children presenting with a potential IgE-mediated AEFI are able to tolerate challenge to the index vaccine without subsequent reaction, however cautious supervised testing and challenge are paramount.

Development of a National Photo-video Website of Vaccine Reactions for Patient Use

Authors: Dr Harrison Edwards¹

Affiliations: ¹Flinders Medical Centre, Brighton, Australia

Abstract:

Background: Vaccination is one of the most common and effective medical interventions preventing disease, and is estimated to save three million lives annually worldwide. However, the health care worker administering the vaccine may not counsel the patient regarding adverse effects prior to administration of a vaccine, and patients may not understand and recall the information regarding minor or major reactions.

Body: Any vaccine component including the antigen, antibiotic, adjuvant, preservative, stabiliser or trace components can cause reactions. Some reactions are local, others generalised; some are common, others rare; some are mild, others life-threatening. Post-vaccination symptoms may arise in up to 80% of patients, depending on the vaccine used. It is a valuable skill for the patient to quickly recognise these reactions.

A national patient-friendly photo-video website of vaccination reactions indexed alphabetically by symptoms such as blistering, breathing difficulty, hardness, itching, pain, redness, rash and swelling would provide quick information on seriousness, initial treatment and the next steps to take. The vaccine administrator could provide this web address to patients in addition to the usual verbal counselling about adverse effects.

Summary: A photo-video website would address the uncertainties of those patients who are hesitant to seek medical attention when symptoms arise, either urging them to seek medical attention or reassuring them of a benign reaction, as appropriate. The visual and immediate aspects of this service are not available in the current setting of the usual delayed phone response from the health care provider back to the patient following their post-vaccination query.

No Jab No Pay: its impact on vaccine uptake in disadvantaged children

Authors: Miss Michelle Kaus¹, Dr Kerry-Ann O'Grady¹

Affiliations: ¹*Institute of Health and Biomedical Innovation, Queensland University Of Technology, Brisbane, Australia*

Abstract:

Background: “No Jab No Pay” was enacted with the aim of increasing childhood immunisation coverage by restricting parents from accessing subsidised childcare and family benefits, unless their children are age-appropriately immunised. In the global context, it is the first of its kind and little is known about its impact on Aboriginal and Torres Strait Islander children. This study aimed to determine the policy’s influence on immunisation uptake in disadvantaged, Queensland children.

Methods: Participants included children <7 years old, enrolled into one of two prospective cohort studies. Children were allocated into a pre- vs post-intervention cohort. Demographics, household characteristics, socioeconomic status and immunisation data were compared. Age-appropriately immunised children were defined by receipt of vaccinations listed in the National Immunisation Program. Chi-square analysis was conducted to detect significance.

Results: In total, there were 87 (48.33%) and 93 (51.67%) children in the pre- and post-intervention cohort, respectively. Of these children, 87.77% identified as Indigenous. Significant differences ($p < 0.05$) were observed in welfare receipt, and its interaction with childcare use. In the post-intervention cohort only 26.44% ($P < 0.05$) of children were considered age-appropriately immunised. Vaccine coverage was further reduced when accounting for an Indigenous-specific immunisation.

Conclusions: The policy is not producing its intended impact in this study population. Results indicate that the policy has been effective in improving vaccine uptake in primary-series immunisations, but not in those scheduled for children >12 months old. Parents may still be experiencing other barriers in timely access to immunisations that are not addressed by the policy.

2E – Table Tops

Room E3, 2:00pm - 3:30pm

Implementing Multiple Immunisation Initiatives for a Risk Group – Outbreaks and Opportunities

Authors: Dr Finn Romanes¹, Ms Joy Gregory¹, Ms Lucinda Franklin¹, Ms Helen Pitcher¹, Ms Becs Saxton¹, Dr Annaliese Van Diemen¹

Affiliations: ¹Department of Health and Human Services, Melbourne, Australia

Abstract:

Vaccination is a vital control measure against established and emerging infectious disease threats. In late 2017, the Victorian Department of Health and Human Services responded to four different vaccine-preventable disease threats in men who have sex with men (MSM), by initiating a multi-pronged campaign offering free vaccines to this at-risk MSM population.

Victoria has offered free hepatitis B vaccination to MSM for several years. After only three notified cases of serogroup C invasive meningococcal disease (MenC) were notified throughout the whole of Australia in 2016, Victoria experienced an outbreak of eight cases of MenC in MSM between May and November 2017. Simultaneously, an outbreak of hepatitis A was identified in predominantly MSM but also in persons who inject drugs, with cases rising rapidly towards the end of 2017. As at 29 January 2018, 37 confirmed outbreak cases have been identified and it is suspected that case numbers are yet to peak. With vaccination known to be an important control measure for these outbreaks, it was also considered that this was a timely opportunity to offer human papillomavirus vaccine to MSM to prevent future HPV-related cancers.

This presentation will describe the overlapping threat and opportunity landscape that required detailed assessment and pragmatic decision-making about the method of access, timing of provision and effective promotion of these four free vaccines to MSM. It will also reiterate the importance of effective collaboration between key stakeholders and colleagues with expertise in communicable disease control, vaccine program and delivery, sexual health and media/communications.

Closing a 22.4% Aboriginal and Torres Strait Islander childhood immunisation coverage gap

Authors: Ms Christine Haydon¹

Affiliations: ¹SA Health, Adelaide, Australia

Abstract:

Context: In March 2013, the immunisation coverage rate for South Australian (SA) Aboriginal and Torres Strait Islander children aged 12-15 months was 71.2%. This rate was nearly 15% below the national average and the gap between SA Aboriginal and non-Aboriginal children was nearly 21%.

Low and/or delayed immunisation uptake leave children vulnerable to vaccine preventable diseases at periods when they are most at risk.

Process: The Aboriginal Immunisation Coordination Project commenced in August 2013 in response to the ongoing issue of low immunisation coverage amongst Aboriginal children in SA.

This Project engaged a Clinical Nurse with significant experience in both Aboriginal health and immunisation to develop, coordinate and implement a strategy that would improve immunisation rates.

The strategy developed was multi-faceted and involved: data cleaning of immunisation records from the Australian Immunisation Register; the implementation of a pre call /recall system which notifies parents of an upcoming schedule point as the child becomes due and enables follow up of overdue children; training and education of service providers including Aboriginal Health Workers and Practitioners; and the development of collaborative partnerships to enhance the delivery and sustainability of the Aboriginal Immunisation Program.

Analysis: In September 2017, immunisation coverage rates for SA Aboriginal and Torres Strait Islander children aged 12-15 months was 93.6%, a gain of 22.4%. These rates were 1.1% above the national Aboriginal average and a 0.8% gap existed between the non-Aboriginal children.

Outcomes: An external review concluded the program has significantly contributed to improved immunisation rates for SA Aboriginal children.

Immunisation delivery using Community Health Action plan in a socially disadvantaged community

Authors: Ms Mary Barnett¹, Ms Amanda Hicks²

Affiliations: ¹Children's Health Queensland, Child and Youth Community Health Service, Logan Central, Australia, ²The Health Contact Centre, Health Support Queensland, Mt Gravatt, Australia

Abstract:

Context: Queensland Department of Health identified Immunisation as one of the six priority areas in the Logan Community Health Action Plan. A number of children aged 0-5 years of age residing in this geographical area were found to be not up to date with their childhood immunisations on the Australian Immunisation Register (AIR).

Logistical and health literacy barriers exist in this socially disadvantaged community. To target these barriers, evidence based interventions were implemented with the goal of improving timeliness and uptake by the fifth birthday.

Process: The Health Contact Centre (HCC), Health Support Queensland and Children's Health Queensland Hospital and Health Service/Child and Youth Community Health Service (CYCHS) worked collaboratively together on a new program. Using multidisciplinary teams, families were contacted; confidential health assessments were conducted; counselling and health coaching provided using phone and online platforms.

Service model interventions from the Health Contact Centre included exhaustive data cleansing of AIR records. Confirmation of immunisation histories was verified with vaccination service providers (VSP'S) via phone and fax.

Parents/caregivers received phone contact, emails, letters and SMS reminders regarding overdue immunisations. Families were then linked to either a VSP or offered an in-home immunisation visit. CYCHS delivered the in-home immunisation service.

Analysis/Outcomes: An analysis and outcomes of this collaborative service will be described in conjunction with identified gaps in the delivery of immunisation, timeliness and vaccine confidence. Proposed strategies to address gaps and make gains in immunisation especially for this socially disadvantaged and culturally linguistic diverse communities will be discussed.

Increased Immunisation Health Target: Lessons Learnt from a Review of Immunisation Services

Authors: Mrs Louise Lewis¹

Affiliations: ¹Compass Health Primary Healthcare Organisation, Wellington, New Zealand

Abstract:

Context: In 2014, an independent review commenced of National Immunisation Register (NIR) administration, immunisation coordination and outreach immunisation services for the Greater Wellington Region, to reconfigure immunisation service delivery to align more clearly with the Government's policy direction and reduce the number of providers, with the aim of improved service integration.

Process: Delayed impact on immunisation coverage of the implemented changes and unforeseen challenges have necessitated smarter ways of working and greater collaborative effort, to achieve the increased immunisation health target (95% for all eight-month old's) and health equity for Maori and Pacifica. This includes:

- Immunisation value stream mapping workshop
- Weekly provider portal overdue and unimmunised reports
- Monthly overdue reports from NIR
- Babies with no provider referred directly to outreach
- Practices with unimmunised high-needs children identified
- Shifting the focus from eight to six months coverage
- National Enrolment Service live and Healthcare Homes
- Closer collaboration with child and maternal health services

Analysis: Prior to the review, Capital & Coast District Health Board area consistently achieved immunisation rates at or around the 8-month old target; maintained good coverage immediately after the changes, but then reduced overall; particularly for Maori babies. However, good systems, processes and connected communities, have resulted in a general upwards trend of increased immunisation coverage for 8-month old's and equitable health outcomes.

Outcomes: This overview will provide an insight into the 'gains, gaps and goals'; experienced; identified and implemented 2015-2017, with future work to maintain and improve Maori and Pacifica coverage.

Immunise to 95 - what have we learnt?

Authors: Ms Jane Sanders¹, Ms Allison Mackie¹

Affiliations: ¹Queensland Department Of Health Immunisation Program, Brisbane, Australia

Abstract:

Context: Immunise to 95 – a Queensland initiative to improve immunisation coverage commenced in October 2015 and has followed up more than 85,000 children identified as overdue for immunisation. It uses call centre technology and dedicated resources at Queensland's Health Contact Centre to telephone, SMS, email or send letters to either the child's last known immunisation provider or their parent. Children are identified for follow up using the Australian Immunisation Register's (AIR) coverage assessment criteria and follow up activity is conducted prior to AIR coverage calculation dates. Results from the follow up activity are captured in a purpose-designed database.

Process: An evaluation using a cross-sectional study design with a cohort of approximately 5,500 children exposed to Immunise to 95 was used to assess the effectiveness of the intervention. A subset of immunisation providers and parents were surveyed by telephone to gather feedback and further assess the helpfulness of the intervention.

Analysis: The study population was stratified according to age (1 year, 2 years or 5 years) and Indigenous status. Analysis and comparisons were based on the recorded results of the follow up activity and immunisation status.

The survey results were quantified and analysed based on participant's responses.

Outcomes: Results from the evaluation (undertaken from January to April 2018) will be presented.

The Champion Nurse Immunisation Program – Walk the Talk

Authors: Mrs Angela Newbound¹, Mrs Alexandra Stevens¹

Affiliations: ¹Adelaide PHN, Mile End, Australia

Abstract:

Concept background: The SA PHN Immunisation Hub is a joint concept between the Adelaide and Country SA PHN's. The aim of the Hub is to develop and implement strategies to increase immunisation coverage across South Australia, raise awareness of the importance of vaccination, provide timely immunisation program support, clinical advice, education, information and networking opportunities and develop required resources. To ensure appropriate support is delivered at practice and community level, the SA PHN Immunisation Hub has commissioned the Champion Nurse Immunisation Program (CNIP), one of the five domains of the Hub to Health and Immunisation Management Services (HAIMS), a nurse-led immunisation service provider.

Service Delivery: The CNIP, currently limited to the Adelaide PHN region, provides education, mentoring for new immunisation providers (including to Pharmacists conducting their first vaccination clinic), clinical support to immunisation providers, advocacy and resources for the community and undertakes targeted activities to improve immunisation coverage in low coverage areas. Opportunities to expand the CNIP to the Country SA PHN region are being examined.

The CNIP provides counsel to vaccine hesitant parents (referred from other providers or self-referred) and facilitates immunisation opportunities where requested.

Outcome: It is anticipated the CNIP activities will increase awareness and confidence in the immunisation program, improve access to immunisation services for those with social, economic, and geographic disadvantage and meet the ongoing demand for clinical support at practice level, resulting in increased childhood immunisation rates, increased seasonal influenza uptake and decreased vaccine preventable disease related hospital presentations and admissions.

Using Midwives Notification data to monitor antenatal influenza and pertussis vaccination uptake

Authors: Dr Annette Regan^{1,2}, Professor Paul Effler^{3,4}, Ms Chloe Thomson^{3,4}, Professor Donna Mak^{3,5}

Affiliations: ¹School Of Public Health, Curtin University, Bentley, Australia, ²Telethon Kids Institute, Subiaco, Australia, ³Communicable Disease Control Directorate, Department of Health Western Australia, Perth, Australia, ⁴School of Pathology and Laboratory Medicine, University of Western Australia, Crawley, Australia, ⁵School of Medicine, University of Notre Dame, Fremantle, Australia

Abstract:

Background: Australia does not have a national system for routine monitoring of antenatal vaccination uptake. On 1st July 2016, mandatory reporting of antenatal influenza and pertussis vaccination was added to Western Australia's Midwives Notification System (MNS). We evaluated the completeness and accuracy of these routinely collected data for estimating state-wide antenatal vaccine coverage.

Methods: We conducted a telephone survey of women who had given birth to a live infant between 1 August and 31 October 2016 and verified self-reported antenatal influenza and pertussis vaccination status against medical records. For women who self-reported vaccination, we compared vaccination status in the medical record against their vaccination status recorded in the MNS.

Results: Influenza and pertussis vaccination status in the MNS was complete (i.e. recorded as vaccinated or not vaccinated) for 66% and 63%, respectively, of the 272 participants. The positive and negative predictive values of the MNS were 91.8% (95% CI 84.0%-96.0%) and 88.0% (95% CI 77.2%-94.1%) for influenza vaccination, and 90.9% (95% CI 84.1%-95.0%) and 82.6% (95% CI 64.0%-92.7%) for pertussis vaccination. There was no significant difference in the self-reported prevalence of influenza and pertussis vaccination between women with complete vaccination information in the MNS and those documented as vaccination status 'unknown' or 'missing data'.

Conclusion: The positive and negative predictive values of complete MNS vaccination data are high. Analysis of complete vaccination information in the MNS can be used to estimate antenatal vaccine coverage in WA. Nevertheless, completeness antenatal vaccination information in the MNS needs improvement.

Online vaccination skills training for paediatricians may optimise vaccine discussions with parents

Authors: Dr Margie Danchin^{1,2,3}, Dr Harold Willaby⁴, A/Prof Nicholas Wood^{4,5}, Prof Helen Marshall^{6,7}, Dr Jessica Costa-pinto²

Affiliations: ¹Murdoch Childrens Research Institute, Melbourne, Australia, ²Department of General Medicine, The Royal Children's Hospital, Melbourne, Australia, ³University of Melbourne, Melbourne, Australia, ⁴University of Sydney, Sydney Medical School, School of Public Health, Sydney, Sydney, Australia, ⁵Paediatrics & Child Health, Children's Hospital, Westmead, Sydney, Australia, ⁶Women's and Children's Hospital, North Adelaide, Adelaide, Australia, ⁷The University of Adelaide, Adelaide, Australia

Abstract:

Background: Health Care Providers (HCPs) are crucial in maintaining parental confidence in vaccination and are highly trusted. The paediatrician's role in supporting childhood vaccination, self-efficacy in vaccine discussions and training needs are not well understood. We investigated Paediatricians': i) frequency of vaccine discussions; ii) vaccine-related topics discussed; iii) perceived role in childhood vaccination; iv) challenges faced when having discussions; v) confidence in vaccine-related knowledge and communication skills and vi) interest in online education and training.

Methods: We invited members of the Australian Paediatric Research Network (APRN) to complete an online REDCap survey in 2015-16.

Results: Of 383 active APRN members, 165 (43%) completed the online survey. Sixty-one percent reported 'frequently' or 'almost always' having vaccine-related discussions, with 15% 'rarely' having them. 'Lack of time' was the most commonly reported barrier to having vaccine discussions (54%). Vaccine necessity was most commonly discussed (33%), followed by vaccine safety (24%), general vaccine concerns (23%) and catch-up schedules (23%). While only 25% of paediatricians lacked confidence in their vaccine-related knowledge and 11% in their communication skills, most expressed interest in online training to improve vaccine knowledge (62%) and communication skills (53%).

Conclusion: Paediatricians play a key role in maintaining public confidence in vaccination. However, opportunities to address concerns are not being maximised by Australian paediatricians. There is a need and desire for training and resources to increase vaccine knowledge and communication skills for paediatricians to optimise the frequency and effectiveness of parental vaccine discussions and to ensure ongoing high immunisation coverage rates in Australia.

Poster Presentations – P1

Hall G, 12:30pm - 1:30pm

**P1.001 - Increasing immunisation in resistant areas: a case study from the Blue Mountains **

Authors: Dr Jane Frawley¹, Dr Kirsty McKenzie¹, Dr Kerrie Wiley², Associate Professor Bradley Forssman³, Dr Jackie Janosi⁴

Affiliations: ¹University of Technology Sydney, Ultimo, Australia, ²University of Sydney, Camperdown, Australia, ³Nepean Blue Mountains Local Health District, Penrith, Australia, ⁴Nepean Blue Mountains PHN, Katomba, Australia

Abstract:

Background: The upper Blue Mountains, New South Wales has lower than average uptake of childhood vaccines. No Jab No Pay has made little impact in this area. Complementary medicine (CM) is well-represented in this alternative lifestyle community, but little is known about interactions between CM practitioners and parents about vaccination.

Methods: A pilot survey was administered at a local event in the upper Blue Mountains. Responses from 80 parents informed interviews that were subsequently conducted with 18 local parents (who had not vaccinated their children) and CM practitioners.

Results: Parents had similar concerns and beliefs to those found in other geographical areas including a perceived lack of safety and efficacy. Parents wanted access to information that addressed risks as well as benefits of immunisation and expressed difficulty in finding this information. Parents were sceptical about whether the GP was a good source of information about vaccination and most trusted CM practitioners with their family's general health care needs. While some CM practitioners had concerns, most had positive views overall about childhood immunisation. Many felt they required additional training to answer parent's questions adequately.

Conclusion: Due to a lack of training many CM practitioners advised parents to speak to their GP (they did not go), or to do their own research, compounding the problem. Further training and the development of culturally appropriate resources could facilitate evidence-based conversations between CM practitioners and vaccine-hesitant parents which may help to increase vaccination rates in alternative lifestyle communities.

P1.002 - A novel pharmacist's role in delivering a state-wide specialist immunisation advice service.

Authors: Mr Thomas Clayton¹, Mrs Renee Quirk¹, Ms Nicolette Graham², Ms Leanne Philips¹, Dr Sophie Wen¹, Dr Julia Clark¹, Dr Sonya Stacey²

Affiliations: ¹Queensland Specialist Immunisation Service, Brisbane, Australia, ²The Lady Cilento Children Hospital, Brisbane, Australia

Abstract:

Context: The Queensland Specialist Immunisation Service (QIS) offers a state-wide paediatric immunisation service, with a focus on addressing the immunisation needs of medically complex children. Within the QIS model is an immunisation advice service that provides clinical and referral information to clinicians and parents. The advice service is delivered by the multidisciplinary QIS staff that includes a novel role of a senior pharmacist. All enquiries are recorded.

Process: This retrospective audit was conducted to explore the pharmacist's role in delivering the immunisation advice service for a 12 month period (September 2016 - August 2017). Audit data included; patient details, consulted by, type of enquiry, requested information and advice provided. To evaluate the impact of the pharmacist's role in the advice service, a cohort of patients were followed up to identify if medically-at-risk catch up advice given by the pharmacist was acted upon.

Analysis: A total of 1143 occasions of service were audited. The pharmacist was involved in responding to 43% (494) of enquiries. Advice provided by the pharmacist included, general immunisation advice and complex catch-up 35% (133), immunisation guidance for medically-at-risk patients 30% (116) and vaccine management 11% (40). A medically-at-risk cohort of 99 patients were followed up and 71% had received the vaccines recommended by the pharmacist through the advice service.

Outcomes: The Immunisation pharmacist has played an important role in the successful delivery of the immunisation advice service. This expanded scope of practice for a pharmacist is unique in Australia and improves immunisation uptake, especially for medically-at-risk children.

P1.003 - Effectiveness of Live Zoster Vaccine in Preventing Postherpetic Neuralgia (PHN)

Authors: Dr. Eddy Bresnitz¹, Mr. Morgan Marks¹, Dr. Patricia Saddier¹, Dr. Yong Chen¹, Dr. Bruce Fireman², Dr. Joan Bartlett², Dr. John Hansen², Dr. Edwin Lewis², Dr. Laurie Aukes², Dr. Nicola Klein²

Affiliations: ¹Pharmacoepidemiology Department, Merck & Co., Inc., Kenilworth, United States, ²Kaiser Permanente Vaccine Study Center, Oakland, United States

Abstract:

Background: A single dose, live attenuated zoster vaccine, is licensed in >50 countries for the prevention of herpes zoster and PHN. Duration of protection is evaluated in a long-term observational study. We previously reported that vaccine effectiveness (VE) to prevent zoster tended to decline over time and was on average ~45-50% over 5 years in people ≥60 (60+) years. We present here the results of VE against PHN.

Methods: The study is conducted in a US healthcare plan as an open cohort that members enter unvaccinated when they become age-eligible for vaccination. PHN cases among vaccinated and unvaccinated zoster cases were identified as having a PHN-specific diagnosis code ≥90 days after first zoster code. VE against PHN was estimated using Cox regression adjusting for sex, birth year, race/ethnicity, healthcare use, comorbidities and immunocompromise status.

Results: In 2007-2014, ~400,000 subjects were vaccinated (coverage >50% in 60+) and ~50,000 zoster episodes with >3000 PHN cases occurred. VE against PHN was 82% (95% CI 76-87) in the first year, decreased in the second year, and then remained relatively stable through year 5, with an average VE over the first 5 years following vaccination of 72%, 69% and 61% in people vaccinated at age 60-69, 70-79, and 80+ years, respectively.

Conclusions: Average VE against PHN over 5 years was ~60-70% in all 60+ age groups, including in people vaccinated at 80+ years, supporting vaccination of all eligible people, including the elderly who are at increased risk of zoster and PHN.

P1.004 - A serotype 1 invasive pneumococcal disease outbreak in the Australian Indigenous population

Authors: Ms Heather Cook¹, Ms Carolien Giele², Dr Sanjay Jayasinghe^{3,4}, Ms Cindy Toms⁵, Ms Angela Wakefield⁶, Dr Vicki Krause¹

Affiliations: ¹Centre for Disease Control, Department of Health, Darwin, Australia, ²Communicable Disease Control Directorate, Department of Health, Perth, Australia, ³National Centre for Immunisation Research and Surveillance, Westmead, Australia, ⁴Discipline of Child and Adolescent Health, Sydney Medical School, University of Sydney, Sydney, Australia, ⁵Department of Health, Canberra, Australia, ⁶Disease Surveillance, Prevention and Control Communicable Diseases Unit, Queensland Health, Brisbane, Australia

Abstract:

Background: Serotype 1 (ST1) invasive pneumococcal disease (IPD) is rare in Australia. An outbreak of ST1 IPD occurred between 2010-2013 primarily in remote locations of Northern and Central Australia. Jurisdictional recommended conjugate and polysaccharide pneumococcal vaccine programs were in place for Indigenous people during the outbreak period. Programs changed over time and differed among the affected jurisdictions.

Methods: Descriptive analysis using nationwide surveillance data for 2003-2014 and more detailed state-based data for determining the outbreak. Real-time multijurisdictional teleconferences were conducted to formulate and adopt outbreak response vaccination strategies.

Results: ST1 increased from 2% of IPD to 18% in the outbreak regions (Western Australia, Northern Territory and parts of Queensland) during 2010-2013. During 2011, the ST1 incidence rate ratio was 30.7 in the outbreak regions compared to the remainder of Australia. 76% of outbreak cases were Indigenous with a median age of 15 years. The most common presentation was pneumonia and overall mortality was low. Polysaccharide vaccine within the previous 5 years was recorded for 26% of cases. No children fully vaccinated with ST1-containing conjugate vaccine developed ST1 IPD.

Conclusions: The ST1 IPD outbreak primarily affected a vulnerable Australian Indigenous population. Real-time interjurisdictional collaboration was useful in monitoring the natural outbreak progression and guiding interventions. ST1-containing conjugate vaccines provided protection against ST1 IPD in children in this setting with the benefit of polysaccharide vaccines being less clear. Having specific outbreak vaccine recommendations and capacity to apply them would improve future management of such outbreaks along with early surveillance and jurisdictional communication.

P1.005 - Optimising Immunisation of HIV infected children

Authors: Dr Sophie Wen^{1,2}, Leanne Philips¹, Dr Vanil Varghese¹, Dr Julia Clark^{1,2,3}, Dr Clare Nourse^{2,3}

Affiliations: ¹Queensland Specialist Immunisation Service, Lady Cilento Children's Hospital, Brisbane, Australia, ²Infection Management and Prevention Service, Lady Cilento Children's Hospital, Brisbane, Australia, ³University of Queensland, Brisbane, Australia

Abstract:

Context: Immunisation is an important disease preventative measure for HIV infected children. Vaccine responses are impaired in this group of children and long term persistence of protection following immunisation has been poorly documented. There are also significant variations in vaccination practices for this patient cohort.

Process: Queensland Specialist Immunisation Service (QSIS) developed a collaborative model of care with Paediatric Infection Management HIV service of Lady Cilento Children's Hospital in October 2016. Recommendations for vaccinations and vaccine response monitoring were developed. Vaccination status and immunisation response was assessed at 3 monthly clinic visits by QSIS and if appropriate, further vaccines were recommended and administered on the same day.

Analysis: From October 2016 to September 2017, QSI participated in 4 combined paediatric HIV clinics and 142 vaccines were administered. Vaccine coverage increased in September 2017 compared with October 2016: 67% (from 19%) were up to date with National Immunisation Program vaccinations, 89% (from 63%) completed a course of MMR vaccines and 61% (from 19%) for VZV vaccines. Almost 90% (from less than 50%) had received recommended additional pneumococcal, meningococcal and influenza vaccinations. Despite increased rates of vaccination, immunity to hepatitis B, MMR and VZV remained suboptimal (less than 50%).

Conclusion: Immunisation of HIV infected children may be significantly optimised if children attend a specialist immunisation service. This patient cohort demonstrated reduced immune responses following vaccination. Ongoing monitoring of vaccine response and further understanding of optimal vaccination strategy is warranted.

P1.006 - The Aboriginal gap in online active vaccine safety surveillance

Authors: Mr Patrick Cashman¹, Ms Sally Munnoch¹, Ms Katrina Clark², Ms Natalie Allan¹, Mr Stephen Clarke³, Professor Kristine Macartney², Professor David Durrheim¹

Affiliations: ¹Hunter New England Local Health District, Newcastle, Australia, ²National Centre for Immunisation Research and Surveillance, Sydney, Australia, ³Chordwizard Software, Newcastle, Australia

Abstract:

Background: Online participant-centred active Adverse Event Following Immunisation (AEFI) monitoring is an efficient method for conducting post-marketing vaccine safety surveillance. Aboriginal involvement in active AEFI surveillance is important to build trust in vaccines, potentially improving immunisation rates in Aboriginal communities.

Methods: In 2016, we used Vaxtracker, an online vaccine surveillance tool, to monitor the safety of the seasonal Influenza and DTPa vaccines. Aboriginal Immunisation Officers attempted to interview all parents/carers of children, Aboriginal and non-Indigenous, who did not respond to the survey link sent via SMS or email.

Results: There were 218 influenza vaccine recipients, including 63 Aboriginal children and 583 DTPa vaccine recipients, including 79 Aboriginal children enrolled in Vaxtracker. There was a differential response rate between Aboriginal and non-Indigenous enrollees; 57.5% vs 75.5% ($p=0.007$) and 59.5% vs 79.4% ($p<0.001$) for the seasonal influenza and DTPa vaccines, respectively.

Aboriginal immunisation officers interviewed the parents/carers of 25 of the 55 Aboriginal children (45.5%) who did not respond to the online Vaxtracker survey and 32 of the 88 non-Indigenous children (36.4%).

The most common reason provided by both Aboriginal and non-Indigenous parent/carers for not completing the survey was being “too busy” (44.0% and 68.7% respectively). Technical service issues were more common barriers for Aboriginal parents.

Conclusion: The response rates to the online AEFI surveillance were generally pleasing but lower among Aboriginal families. Future developments in active online surveillance will need to better engage with Aboriginal services and communities to explore strategies to ensure that a new health gap is not opened.

P1.007 - A Review of Real-World Effectiveness Studies on the Live Zoster Vaccine

Authors: Dr. Eddy Bresnitz¹, Dr. Kelly Johnson², Dr. Thomas Weiss², Dr. Patricia Saddier²

Affiliations: ¹Merck & Co., Inc., Global Vaccines Medical Affairs, Kenilworth, United States, ²Merck & Co., Inc., Center for Observational and Real-World Evidence, Kenilworth, United States

Abstract:

Background: Several studies have been published on the real-world effectiveness of the live zoster vaccine (ZVL). The objective of this review is to summarize available evidence on ZVL effectiveness against herpes zoster (HZ) and post-herpetic neuralgia (PHN) in the general population.

Methods: A targeted search was performed for the period January 2006-December 2017. Publications eligible for review included peer-reviewed, original study manuscripts and conference abstracts. In all studies, HZ cases were identified from HZ diagnosis codes, with only two studies also requiring HZ-specific antiviral use. For PHN, studies used different case definitions, usually without chart review validation.

Results: Seven original effectiveness studies were identified (5 from the United States and 1 each from the United Kingdom and Canada) that assessed HZ effectiveness in the general population. Five of these studies also assessed PHN effectiveness. Vaccine effectiveness (VE) to prevent HZ was similar across studies in the early years following vaccination, but tended to diverge in the later years (overall VE against HZ ranged from 33% to 62%, clustering around ~50% across studies providing this information). Overall VE against PHN ranged from 55% to 88%, clustering around ~65%.

Conclusion: Overall, generally similar real-world effectiveness of ZVL in preventing HZ and PHN was reported across studies in the general population. Effectiveness was higher for PHN than for HZ. Differences in results across studies were likely due to differences in methods, including sample size, length of follow-up, adjustment for confounders and case definition.

P1.008 - Adverse events reported in first year of the National Shingles Vaccination Program

Authors: Doctor Rona Hiam¹, Doctor Claire Behm¹

Affiliations: ¹*Therapeutic Goods Administration, Canberra, Australia*

Abstract:

Aim: To summarise adverse events following immunisation (AEFIs) reported to the TGA over the first year of the National Shingles Vaccination Program with live varicella zoster vaccine (ZV).

Methods: A search of the Australian Adverse Drug Reaction Reporting System for AEFIs following ZV administration in adults aged 70-79 years from 1 November 2016 to 1 November 2017 was undertaken. The most frequently reported AEFIs and any serious AEFIs were analysed in detail.

Results: As at 1 November 2017, almost a million doses of the Zoster vaccine had been distributed in Australia. In the first year following inclusion on the National Immunisation Program, the TGA received 496 AEFI reports, of which 433 were in the 70-79 age group. The commonest AEFI reported in this age group was herpes zoster (125), followed by injection site reaction (109), rash (80), varicella test positive (42) and vaccination error (34). There were nine reports of ophthalmic herpes zoster and a small number of serious AEFI reports where causality has not been determined.

Conclusion: Herpes zoster and/or varicella zoster-like rash were frequently reported after ZV administration. Serious AE reports following immunisation were rare however vaccination errors, in particular, vaccination of immunocompromised persons, were associated with a small number of serious and life-threatening events including one death. Use of live varicella zoster vaccine is contraindicated in people who are immunocompromised.

P1.009 - Acute flaccid paralysis surveillance for polio: challenges of stool collection in Australia

Authors: Ms Nicole Dinsmore¹, Ms Jocelyne McRae¹, Ms Gemma Saravanos¹, Ms Laura Rost¹, Ms Kathryn Meredith¹, Ms Sonia Dougherty², Ms Rebecca Doyle², Ms Christine Heath³, Ms McMinn Alissa⁴, Ms Donna Lee⁴, Ms Carolyn Finucane⁵, Dr Philip Britton^{6,7,8}

Affiliations: ¹*National Centre For Immunisation Research And Surveillance, The Children's Hospital Westmead, Westmead, Australia*, ²*Centre for Children's Health Research, The Lady Cilento Children's Hospital, Brisbane, Australia*, ³*Vaccinology and Immunology Research Trials Unit, Women's and Children's Hospital, Adelaide, Australia*, ⁴*SAEFVIC, Murdoch Children's Research Institute, Parkville, Australia*, ⁵*Telethon Kids Institute, Perth, Australia*, ⁶*Sydney Medical School, University of Sydney, Sydney, Australia*, ⁷*The Children's Hospital at Westmead, Westmead, Australia*, ⁸*Marie Bashir Institute of Infectious Diseases and Biosecurity, University of Sydney, Sydney, Australia*

Abstract:

Context: The World Health Organisation (WHO) requires surveillance of acute flaccid paralysis (AFP) to monitor for potential poliomyelitis. The Paediatric Active Enhanced Disease Surveillance (PAEDS) network makes a key contribution to national AFP surveillance. Timely stool collection in $\geq 80\%$ of AFP cases is a mandated performance target. As Australia has not met this target since commencement of AFP surveillance, we aimed to identify specific reasons for underperformance.

Process: A reason for inadequate stool sample collection is sought by PAEDS surveillance nurses as part of standard operating procedures. We analysed sample collection rates and reasons for non-collection or delayed collection for 2016-2017 from the 5 PAEDS sites.

Analysis: 106 AFP cases were identified by PAEDS, with an adequate stool collection rate of only 45%. Adequate stools were collected in 69% of children ≤ 3 years of age and only 31% in children > 3 years. Collection rates varied among different diagnoses; 69% in transverse myelitis, 50% in ADEM, 48% in Guillain-Barre syndrome and 15% with other conditions. Leading reasons for inadequate sample collection included: presentation late in illness (23%), discharged prior to collection (15%) and delay because of constipation (15%). Other reasons involved lack of clinician and laboratory coordination in sampling and processing of specimens.

Outcomes: There are ongoing challenges in meeting stool collection requirements for AFP surveillance. Factors such as constipation or delayed presentation are often unavoidable. We are developing new strategies to address sample collection in older children and coordination of the sampling/processing pathway.

P1.010 - Utilising overdue dose reports to improve Human Papillomavirus (HPV) vaccine coverage.

Authors: Narelle Jenkins, Mrs Rebecca Feore¹, Ms Sonja Elia¹

Affiliations: ¹*Royal Children's Hospital, Melbourne, Parkville, Australia*

Abstract:

Context: The National Human Papillomavirus (HPV) Vaccination Program Register annually releases overdue dose reports, on a state-by-state basis (to most states). These overdue dose reports list consumers for whom the HPV Register has less than 3 doses recorded and who are overdue. The Immunisation Service at the Royal Children's Hospital (RCH) Melbourne, utilises this report to provide catch up doses of HPV vaccine to these consumers.

Process: All consumers identified in the May 2017 overdue report were contacted by telephone and informed of their HPV vaccine overdue status. Those consumers who had received further doses that had not been recorded, then the HPV register was updated. For those who were still overdue, a plan was made for catch up vaccination, either at the RCH or in the community.

Analysis: From the report, 79% (74/94) of consumers were able to be contacted. Of those contacted, 43% (32/74) required the HPV register to be updated with vaccine doses already given. Of the 42 patients who still required catch up doses, 64% (27) were immunised at RCH, 5% (2) vaccinated in the community and 31% (13) are still overdue. In total, 65% (61/94) of consumers listed in the overdue report are now up to date.

Outcomes: Every effort should be made by providers to ensure completion of the HPV vaccine schedule for effective protection against disease. This data highlights the value in utilising the HPV overdue reports to catch up vaccine doses.

P1.011 - long-term effectiveness of Gardasil™ among adult women in Colombia

Authors: Dr Jane Leong¹, Dr Rituparna Das, V503 investigators

Affiliations: ¹Seqirus Australia, Parkville, Australia, ²Merck Research Laboratories, West Point, USA, ³Various, Various

Abstract:

Objective: The Future III base study was a 48-month randomized, placebo controlled, multinational study evaluating the prophylactic administration of GARDASIL™ in 24-45 year old women. The long-term follow-up (LTFU) study was conducted in Colombia to observationally describe the safety of quadrivalent HPV vaccine (qHPV vaccine), its immunogenicity and effectiveness in preventing HPV 6-,11-,16-,18-related cervical intraepithelial neoplasia (CIN) or condyloma for up to 10 years. We present the final study data.

Methods: The LTFU study enrolled 685 of 805 Colombian subjects who received qHPV vaccine during the base study (early vaccination group, EVG). Study visits were conducted at Year 6, 8 and 10 and included history taking, pelvic exams with Pap tests, and biopsy of cervical/external genital lesions if present. Endpoint adjudication was performed by an independent panel. Immunogenicity was measured for each vaccine HPV type. Primary analyses were performed per-protocol.

Results: There was no case of HPV 6-,11-,16-,18-related CIN or condyloma in the EVG during the LTFU study. The cumulative incidence probabilities from Year 4 to Year 8 and Year 6 to Year 10 of the LTFU study were 0.0, respectively, compared to 0.0006 (95% confidence interval 0.0001; 0.0045) for the 4-year interval of the base study, indicating no waning of vaccine effectiveness. Vaccine induced HPV type-specific antibody responses were durable. No serious adverse events related to qHPV vaccine or study procedure were reported.

Conclusion: The prophylactic administration of qHPV vaccine to mid-adult women is effective and generally safe through 10 years post Dose 1 and induces durable immune responses.

P1.012 - Impact of Service Delivery on Aboriginal and Torres Strait Islander Childhood Coverage Rates in Metropolitan Perth

Authors: Mrs Rebecca Carman¹

Affiliations: ¹Edith Cowan University, Perth, Australia

Abstract:

Background: Childhood immunisation programs have been one of the greatest healthcare achievements of the twentieth century. Collectively, Australia has achieved high childhood immunisation coverage, with rates of 0-4 year olds, above 90%. However, such levels mask some population areas of under coverage. In Australia, sub-optimal levels of coverage exist resulting in a high public health toll from vaccine preventable disease. This is particularly true for Aboriginal and Torres Strait Islander (ATSI) children living in metropolitan Perth.

Methods: The proposed study utilises mixed methods research to explore and explain the impact of service delivery on these rates. Phase one aims to explore the attitudes, societal influences and self-efficacy of providers who administer immunisation services to this population through quantitative survey. Phase 2 will employ qualitative interview to further interpret and explain the findings found in the surveys and potentially identify barriers to an efficient service.

The mixed methods research will draw upon theory to help determine the possible reasons for low levels of ATSI childhood immunisation rates evident in Perth.

Results: It is proposed that from these explanatory sequential methods, we are able to compare the attitudes and abilities of the various providers, identify barriers to delivery, and offer solutions to address the low coverage rates which uniquely exist in metropolitan Perth.

Conclusion: The study aims to address the gaps in knowledge and provide vital public health information regarding an area of service delivery that has potential to be demonstrably effective as a means of closing the gap in Aboriginal life expectancy.

P1.013 - Post-hoc analysis assessing severe injection site adverse events following ZOSTAVAX™ administration

Authors: **PhD Debra Bourke**¹, MD, MS Zoran Popmihajlov², PhD Lei Pang², MS Elizabeth Brown², PhD Shu-Chih Su², MD, MHS Susan S Kaplan², MD English D Willis²

Affiliations: ¹Seqirus, Parkville, Australia, ²Merck & Co., Inc., Kenilworth, USA

Abstract:

Background: ZOSTAVAX™, is a single dose live attenuated vaccine licensed in >50 countries for the prevention of herpes zoster (HZ) and postherpetic neuralgia (PHN) in adults ≥50 years-of-age. The objective of this post-hoc analysis was to determine the rates of severe injection-site and systemic adverse events (AEs) within 7 days postvaccination in two pivotal trials, Shingles Prevention Study (SPS) and ZOSTAVAX™ Efficacy and Safety Trial (ZEST), utilizing current FDA Toxicity Grading Scale.

Methods: Injection-site (erythema, swelling, pain) and systemic AEs were reported by the subject via vaccination report card; SPS n=6,608; ZEST n=22,210. Injection-site erythema and swelling were reported by size and/or with an intensity category. Severe injection-site and systemic AEs were defined as incapacitating with inability to work or do usual activity. The FDA Toxicity Grading Scale was not used in SPS and ZEST which defined severe injection-site (erythema, swelling) and fever using different scale.

Results: Utilizing FDA Toxicity Grading Scale, severe injection site AEs (swelling, erythema, pain) occurred in <1.2% of recipients of ZOSTAVAX™ within 7 days postvaccination in SPS and ZEST. Higher rates were observed in recipients of ZOSTAVAX™ compared to placebo and in subjects 50-59 years-of-age. The most frequently reported severe systemic AE within 7 days postvaccination was headache in both ZOSTAVAX™ and placebo groups (SPS 0.18% vs 0.18%; ZEST 0.48% vs 0.38%, respectively). Other severe systemic AEs occurred in <0.2% of subjects after ZOSTAVAX™ administration.

Conclusions: Severe injection-site and systemic AEs were reported infrequently within 7 days postvaccination with ZOSTAVAX™ in SPS and ZEST.

P1.014 - The Long-term Impact of Invasive Meningococcal Disease (IMD) in Australian Adolescents

Authors: **Mr Mark McMillan**^{1,2,3}, Dr Philippa Rokkas^{1,2,3}, Ms Bing Wang^{1,2,3}, Ms Margaret Angliss⁴, Dr Helen Marshall^{1,2,3}

Affiliations: ¹University Of Adelaide, Adelaide, Australia, ²Robinson Research Institute, University of Adelaide, North Adelaide, Australia, ³Vaccinology and Immunology Research Trials Unit, Women's and Children's Hospital, North Adelaide, Australia, ⁴Paediatric Infectious Diseases, Monash Immunisation, Clayton, Australia

Abstract:

Background: Invasive meningococcal disease (IMD) is an acute life threatening illness, with permanent sequelae occurring in 20-40% of survivors. Despite severity of the illness, little is known about the experiences of adolescents and young adults who have been hospitalised with IMD. This study explores the experience of adolescents during their hospital presentation, admission, and recovery from IMD.

Methods: Adolescents in Adelaide and Melbourne were recruited for a national study investigating the long-term outcomes of IMD in Australian adolescents. Eligibility included confirmed IMD and being aged 15-25 years at time of hospitalisation. Participants were hospitalised between 2006 and 2016. Semi-structured interviews were conducted with participants between 2-10 years post hospitalisation. Interviews were transcribed verbatim and analysed using thematic analysis.

Results: Seventeen participants were interviewed. Results suggest that overwhelmingly participant's experience of their illness was a life-changing event, regardless of any ongoing physical sequelae, with several participants describing how close their illness came to ending their life. Most participants felt fatigued for months post hospital discharge, with ongoing forgetfulness and difficulty concentrating. Participants described struggling for a period after their illness at school, university, or their work. Participants also described the fear and trauma their families endured during their illness. At the time of the interview, most felt that they had fully recovered, although several felt it had an ongoing impact on their daily lives.

Discussion: This research suggests a need for psychosocial assessment and support in the months following hospital discharge, even if adolescents with IMD appear clinically recovered.

P1.015 - multi-component interventions delivered during pregnancy may improve childhood and maternal vaccine uptake

Authors: **Dr Margie Danchin**^{1,2,3}, Dr Jessica Costa-Pinto², Dr Katie Attwell⁴, Hal Willaby⁵, Monsurul Hoq⁶, Julie Leask^{7,5}, Kerrie Wiley⁵, Dr Kirsten Perrett^{1,2,3}, A/Prof Michelle Giles⁸, Prof Helen Marshall⁹

Affiliations: ¹Murdoch Children's Research Institute, Melbourne, Australia, ²Department of General Medicine, The Royal Children's Hospital, Melbourne, Australia, ³University of Melbourne, Melbourne, Australia, ⁴Wesfarmers Centre of Vaccines and Infectious Diseases, Telethon Kids Institute, Perth, Australia, ⁵Sydney School of Public Health, Sydney Medical School, University of Sydney, Sydney, Australia, ⁶Centre for Epidemiology and Biostatistics, Murdoch Childrens Research Institute, Melbourne, Australia, ⁷National Centre for Immunisation Research and Surveillance, Sydney, Australia, ⁸The Alfred Hospital, Royal Women's Hospital and Monash Health, Melbourne, Australia, ⁹Women's and Children's Hospital and The University of Adelaide, Adelaide, Australia

Abstract:

Introduction: Maternal and childhood vaccine decision-making begins prenatally. Amongst pregnant Australian women we aimed to ascertain vaccine information received, maternal vaccine uptake and attitudes and concerns regarding childhood vaccination. We also aimed to determine any correlation between a) intentions for childhood vaccination, (b) pregnancy vaccination concerns and (c) uptake of influenza and pertussis vaccines during pregnancy and routine vaccines during childhood.

Methods: Women attending public antenatal clinics were recruited in three Australian states. Surveys were completed on iPads. Follow-up phone surveys were completed three to six months post delivery and infant vaccination status obtained via the Australian Childhood Immunisation Register (ACIR).

Results: 975 (82%) of 1184 mothers consented and 406 (42%) agreed to follow up post delivery. First-time mothers were more vaccine hesitant and only 73% had decided about childhood vaccination compared to 89% of mothers with existing children (p-value <0.001). Only 66% of pregnant women reported receiving enough vaccine information, with midwives the most highly accessed (66%) and trusted resource (96%) and highly supportive of vaccination (94%), and 46% and 82% reported receiving influenza and pertussis vaccines respectively. Vaccine intentions and some vaccine concerns correlated with vaccine uptake post delivery and there was no association between reported maternal and childhood vaccine uptake.

Conclusion: First time mothers are more vaccine hesitant and undecided about childhood vaccination. New multi-component interventions aimed at the practice, provider and parent levels, including education and communication on vaccines delivered by midwives in public antenatal care, may improve uptake of maternal and childhood vaccines in Australia.

Wednesday 6 June 2018

3A – Short Orals – Special Populations

Hall C, 1:30pm - 3:00pm

Whole cell pertussis vaccination protects against food allergy; a case-control study

Authors: Dr Marie J Estcourt^{1,2}, Dr Julie A Marsh^{1,3}, Professor Dianne E Campbell^{4,5}, Dr Michael S Gold⁶, Professor Katrina J Allen^{7,8}, Doctor Peter Richmond^{1,9}, Professor Patrick G Holt¹, Dr Claire S Waddington^{1,9}, Dr Thomas L Snelling^{1,10}

Affiliations: ¹Wesfarmers Centre of Vaccine & Infectious Disease, Telethon Kids Institute, Subiaco, Australia, ²University of Western Australia, School of Population and Global Health, Crawley, Australia, ³University of Western Australia, Centre for Applied Statistics, Crawley, Australia, ⁴Department of Allergy and Immunology, The Children's Hospital at Westmead, Westmead, Australia, ⁵Sydney Medical School, University of Sydney, Camperdown, Australia, ⁶School of Medicine, University of Adelaide, Women's and Children's Health Network, North Adelaide, Australia, ⁷Centre for Food and Allergy Research, Murdoch Children's Research Institute, Parkville, Australia, ⁸University of Melbourne Department of Paediatrics, Royal Children's Hospital, Parkville, Australia, ⁹Princess Margaret Hospital for Children, Subiaco, Australia, ¹⁰School of Public Health, Curtin University, Bentley, Australia

Abstract:

Background: In Australia, an abrupt rise in food allergies in the late 1990s appeared to coincide with the replacement of whole-cell pertussis vaccine (wP) with subunit acellular pertussis vaccine (aP). Compared to infants who receive aP, those who receive wP appear protected against developing the Th2-skewed immune phenotype characteristic of atopy. We therefore speculate that removal of wP from the vaccine schedule contributed to the observed rise in food allergy among Australian infants.

Methods: Retrospective case-control study among Australian children born from 1997 to 1999. Up to 500 children diagnosed as having IgE-mediated food allergy will be compared to children sampled from the immunisation register and individually matched by date and jurisdiction of birth, and a proxy for socioeconomic disadvantage. Conditional logistic regression will be used to estimate the odds ratio ($\pm 95\%$ CI) of a diagnosis of food allergy in those who received wP compared to aP as the first vaccine dose. We have undertaken an unplanned preliminary analysis comparing all 500 food allergy cases with unmatched controls, stratified by jurisdiction and date of vaccination (3 month intervals).

Results: The preliminary analysis suggests children born in the late 1990s who received wP as their first dose were 38% (95%CI:24-49%; $p < 0.0001$) less likely to be diagnosed with food allergy than those who received aP.

Conclusion: Replacing the first dose of aP with wP might significantly decrease the risk of food allergy and other atopic diseases. A prospective randomised controlled trial evaluating this hypothesis among contemporary Australian children is warranted.

Trial Registration: NCT02490007

Factors associated with uptake of influenza and pertussis vaccines among pregnant women

Authors: Mr Hassen Mohammed^{1,2,3}, Dr. Michelle Clarke^{1,2}, Prof Ann Koehler⁴, Ms Maureen Watson⁴, Prof Helen Marshall^{1,2,3,5}

Affiliations: ¹Vaccinology And Immunology Research Trials Unit (virtu), Adelaide, Australia, ²The Robinson Research Institute, University of Adelaide, Adelaide, Australia, ³Adelaide Medical School, University of Adelaide, Adelaide, Australia, ⁴The Communicable Disease Control Branch (CDCB), Adelaide, Australia, ⁵School of Public Health, University of Adelaide, Adelaide, Australia

Abstract:

Background: Maternal immunization is an effective strategy to protect pregnant women and their infants from vaccine-preventable diseases. Despite the recommendation of maternal influenza and more recently pertussis immunization in Australia, uptake of these vaccines has been suboptimal. Monitoring the uptake of the current funded vaccine programs for pregnant women is limited. The study aimed to estimate maternal vaccine uptake and assess factors associated with influenza and pertussis vaccine uptake among pregnant women.

Methods: This prospective study was undertaken between November 2014 and July 2016 at the Women's and Children's Hospital. A standardised self-reported survey was completed during pregnancy with a follow up telephone interview at 8-10 weeks post-delivery.

Results: Of the 205 women consented, 180 pregnant women completed the study and received 76% and 81% maternal influenza and pertussis vaccines respectively. The adjusted odds of women receiving maternal vaccines during pregnancy were significantly higher for women delivering after the implementation of the midwife delivered program compared with women who delivered babies prior to the program for both pertussis vaccination (AOR 21.1, 95% CI 6.14-72.9; $p < 0.001$) and influenza vaccination (AOR 5.95, 95% CI 2.13-16.6, $p < 0.001$). Women receiving a recommendation from a health care provider and first time mothers were significantly more likely to receive influenza vaccination during pregnancy.

Conclusions: High uptake of vaccines during pregnancy can be attained with health care provider recommendation and inclusion of maternal immunization as part of standard antenatal care. A midwife delivered maternal immunization program is a promising approach to improve maternal vaccine uptake by pregnant women.

Immunogenicity of Flud vaccine against antigenically drifted influenza strains in older adults

Authors: Carmen Somers¹, Dr James Mansi¹, **Maureen Tham¹**

Affiliations: ¹Seqirus - A CSL Company, Kirkland, Canada

Abstract:

Background: Influenza vaccines are most effective when antigens in the vaccine match those of circulating (homologous) strains. Given the low estimated vaccine effectiveness in the 2014/15 NH season (~23%), partly attributed to seasonal drift variants, there is a need for vaccines that elicit greater coverage. The immunogenicity of FLUAD against heterologous strains was evaluated in older adults.

Body: Antibody responses by hemagglutination inhibition were examined against antigenically drifted strains using sera from subjects immunized with either FLUAD or a non-adjuvanted TIV in four clinical trials in older adults. To specifically examine the heterologous antibody response against the antigenically drifted H3N2 strain during the 2014-2015 season we used sera from two 2013/14 NH seasonal licensure Phase II trials.

FLUAD seroconversion rates were significantly higher than TIV in 9 of 10 heterologous strains tested. Similarly, geometric mean titers amongst subjects vaccinated with FLUAD were significantly greater than TIV in 7 of 10 strains tested. In the study analyzing the 2014/15 seasonal mismatch, 32% of subjects vaccinated with FLUAD showed seroconversion measured by ≥ 4 fold increase in antibody titers over prevaccination titers against the A/Texas strain, representing a strain circulating at that time, versus 13 percent of those vaccinated with TIV. The A/Hong Kong strain represents an antigenically drifted H3N2 strain that predominated in the 2014-2015 season, significantly antigenically different from A/Texas. Seroconversion rates against A/Hong Kong were 40% for FLUAD versus 13% for TIV vaccinees.

Summary: FLUAD demonstrated increased breadth of antibody responses in comparison to non-adjuvanted comparators against significantly drifted strains.

Improving immunisation coverage for newly arrived refugees through co-location and partnership

Authors: **Meryl Jones¹**

Affiliations: ¹Mater Refugee Health Service, South Brisbane, Australia

Abstract:

Context: Mater refugee health service (MRHS) has a co-location model: our specialist refugee health nurses (RHN) co-locate in GP practices in areas of high settlement to assist practice staff with comprehensive refugee health assessment and catch up immunisation. RHNs play a key role in capacity building with practice staff to improve outcomes for patients of refugee background.

Process: MRHS partners with external agencies and has built capacity in primary care to improve refugees' access to quality primary care including immunisation.

MRHS in conjunction with partners has collated, produced and published a suite of resources to assist primary care providers with immunisation for refugees, e.g. best practice guidelines, refugee ready checklist.

Through co-location RHNs develop individualised catch up schedules for each patient, and work with GPs and practice nurses to complete the schedules and build cultural competency. They also provide additional support, e.g. engaging with interpreters, recording on the Australian Immunisation Register.

Analysis: Review of 6 months of data from 2 practices in areas of high settlement shows that the majority of patients who were provided with immunisation by a co-located RHN completed their immunisation catch up schedule.

Outcomes: Through partnership with Refugee Health Network Queensland, MRHS builds capacity at the systems-level for immunisation providers across Queensland. The work of Mater RHNs provided on the ground support to primary care clinicians to provide improved levels of immunisation coverage to a traditionally hard-to-reach population.

Predictors of severe childhood pneumonia in the highlands of Papua New Guinea

Authors: **Ms Kate Britton¹**, Dr William Pomat^{1,2}, Dr Deborah Lehmann^{1,2}, Dr Rebecca Ford², Ms Joycelyn Sapura², Mr John Kave², Mr Lapule Yuasi², Dr Ilomo Hwaihwanje³, Dr Christopher Blyth^{1,4,5}

Affiliations: ¹Wesfarmers Centre for Vaccines and Infectious Diseases, Telethon Kids Institute, Perth, Australia, ²Papua New Guinea Institute of Medical Research, Goroka, Papua New Guinea, ³Eastern Highlands Provincial Hospital, Goroka, Papua New Guinea, ⁴School of Paediatrics and Child Health, The University of Western Australia, Princess Margaret Hospital for Children, Perth, Australia, ⁵Department of Infectious Diseases and PathWest Department of Microbiology, Princess Margaret Hospital for Children, Perth, Australia

Abstract:

Background: Papua New Guinean infants are colonised with a range of pneumococcal serotypes within weeks of birth, resulting in high morbidity and mortality in the first two years of life. Despite this, conjugate 13-valent *Streptococcus pneumoniae* vaccine (13vPCV) was only introduced into the national vaccination schedule in 2014. We investigated predictors of pneumonia to determine which children are at greatest risk of severe disease.

Methods: From a prospective case-control study enrolling children <5 years of age presenting to healthcare facilities in the Eastern Highlands Province, clinical history and physical examination findings from 971 patients with pneumonia were analysed. Binary logistic regression modelling was used to identify predictive factors for death and severe illness.

Results: Prevalence of hypoxaemia (SpO₂ <90%) on admission was 28.8%. Central cyanosis (OR 9.38; 95% CI 5.63-15.64), reduced breath sounds (OR 2.58; 95% CI 1.68-3.96) and apnoea (OR 2.28; 95% CI 1.41-3.70) independently predicted hypoxaemia. Difficulty feeding/drinking (OR 2.78; 95% CI 1.28-6.00) and nasal flaring/grunting (OR 2.91; 95% CI 1.30-6.51) independently predicted bacteraemia, of which there were 35 cases. The in-hospital case fatality was 2.3%. Drowsiness (OR 5.64; 95% CI 1.21-26.29) and dehydration (OR 42.94; 95% CI 5.17-356.58) independently predicted death. Despite low numbers vaccinated (6%), effectiveness of ≥2 doses of 13vPCV was estimated to be 61% (95% CI 17-82%) against hypoxaemic pneumonia.

Conclusion: Children presenting with pneumonia and difficulty drinking/feeding, drowsiness or dehydration require urgent hospitalisation. Parents require support and reinforcement of the benefits of routine childhood immunisation in protecting children against severe disease

Risk of herpes zoster following a cancer diagnosis and cancer treatment

Authors: Miss Jiahui Qian¹, Surendra Karki¹, Anita Elizabeth Heywood¹, Bette Liu¹

Affiliations: ¹School of Public Health and Community Medicine, UNSW, Sydney, Australia

Abstract:

Background: Herpes zoster (HZ) has been associated with a prior diagnosis of cancer but there is limited information on risk after cancer treatment. We examined the impact of cancer diagnosis and treatment on HZ risk.

Methods: Using data from 214,497 eligible adults in the 45 and Up Study (mean age 62.0 (±10.9) years) linked to pharmaceutical, hospital and Medicare data (2006-2016), the association between a cancer diagnosis, cancer treatment, and subsequent HZ risk were analysed using Cox proportional hazards models, adjusting for demographic, behavioural, and health-related factors. Age, cancer diagnosis and treatment were treated as time-varying covariates in analyses.

Results: Over 1,761,321 person-years, there were 20,900 new cancer diagnoses and 16,374 incident HZ events. Participants with cancer had a greater risk of developing HZ compared with non-cancer individuals (adjusted hazard ratio (aHR) 1.39; 95%CI 1.23-1.56), with the relative risk higher in participants with haematological cancers (aHR 3.30; 95%CI 2.40-4.54) than those with solid organ cancers (aHR 1.27; 95%CI 1.12-1.44). After classifying cancer patients according to receipt of chemotherapy, compared to patients without cancer, the risk of HZ among cancer patients receiving chemotherapy was 2.32 (95%CI 1.93-2.79); there was no increase in risk for cancer patients not receiving chemotherapy (aHR 1.11 (95%CI 0.96-1.28)). These findings were consistent for haematological and solid organ cancers.

Conclusions: The increased risk of HZ associated with cancer appears to be primarily related to receipt of chemotherapy. The new HZ subunit vaccine has the potential to reduce HZ risk in cancer patients for whom chemotherapy is planned.

AusVaxSafety goes to school: monitoring 9-valent HPV vaccine safety via school-based immunisation

Authors: Ms Alexis Pillsbury¹, Ms Catherine Glover¹, Dr Helen Quinn^{1,2}, Ms Chloe Damon¹, Dr Alan Leeb³, Professor Kristine Macartney^{1,2,4}

Affiliations: ¹NCIRS, Westmead, Australia, ²Discipline of Paediatrics and Child Health, University of Sydney, Australia, ³Illawarra Medical Centre, Ballajura, Australia, ⁴Department of Microbiology and Infectious Diseases, Children's Hospital at Westmead, Australia

Abstract:

Background: HPV vaccine safety has received extensive publicity. Gardasil9, the 9-valent vaccine that has been documented in clinical trials to be more reactogenic, will replace the quadrivalent vaccine (Gardasil) from 2018. For the first time, AusVaxSafety will utilise school-based immunisation programs to report safety data.

Methods: De-identified data from 1 February–30 April 2017 were sourced from SmartVax, a computer-based reporting tool that captures SMS reports of adverse events within 3 days of vaccination. Participants included adolescents aged 10–15 years receiving Gardasil funded under the NIP. Adverse event rates were summarised. We will compare adverse event rates for Gardasil9 for the same period in 2018.

Results: Data from 3,117 participants receiving Gardasil in 2017 were compiled. Eighty-seven percent of participants were vaccinated in school-based programs. Among participants, 256 (8.2%) reported an adverse event and 19 (0.6%) reported seeking medical attention for an event. The most commonly reported events were injection site reactions (2.5%), tiredness (1.7%) and headache (1.4%). There was no difference in event rates by sex (female: 8.9%; male: 7.5%; $p=0.155$). Eighty-one percent of participants received concomitant vaccines, of which 91.1% received dTpa vaccine. Sixteen percent of adverse events occurred in those receiving concomitant dTpa vaccines.

Conclusions: For the first time, we present actively-solicited adverse events associated with HPV vaccines via school-based immunisation programs. For Gardasil, event rates, including medical attendance, were low. This analysis provides a baseline for comparing event rates associated with Gardasil9 when it is introduced from February 2018.

Estimating Efficacy of Adjuvanted vs Standard Influenza Vaccine Using Anti-Haemagglutinin Antibody Titres

Authors: Jane Leong, Dr James Mansi¹

Affiliations: ¹*Seqirus, Kirkland, Canada*

Abstract:

Background: Influenza vaccine-induced haemagglutination(HA)-specific antibody titres are routinely measured by haemagglutination inhibition (HI) assay to assess vaccine immunogenicity. Here we predict vaccine efficacy (VE) of adjuvanted influenza vaccine (aTIV) versus standard vaccine (TIV) using a bayesian random-effects model.

Body: A meta-analytical approach was used to create an HI protection curve describing estimated levels of protection against influenza by specific HI antibody titres. Using values from this curve, predicted VEs for aTIV and TIV were generated by inputting data from a pivotal Phase III study assessing homologous and heterologous HI antibody responses to aTIV and TIV in adults ≥ 65 years. The model was validated by comparing the predicted VEs generated to the results of published clinical trial VE data.

Based on aTIV- and TIV-induced homologous and heterologous HI antibody titres, the model predicted the VE of aTIV to be greater than that of TIV in older adults. For homologous strains, relative VE for aTIV was 30.24% against A/H1N1, 40.39% against A/H3N2, and 11.59% against B strain. With respect to heterologous strains, aTIV was predicted to provide a relative VE of 31.29% against A/H1N1, 39.74% against A/H3N2, and 16.45% against B strain.

Summary: The results predict the heightened HA-specific antibody titres observed in response to aTIV against both homologous and heterologous strains would result in a VE greater than that of TIV, suggesting immunization of older adults with aTIV rather than standard TIV would result in a significant reduction in the annual number of cases of influenza disease within this age group.

Influenza amongst global Indigenous populations; a systematic review and meta-analysis

Authors: Dr Juliana Betts^{1,2}, Mr Aaron Weinman², Mr Matthew Nguyen², A/Prof Steven Tong², Dr Katherine Gibney²

Affiliations: ¹*Victorian Public Health Medical Training Scheme, Monash University, Melbourne, Australia*, ²*The Peter Doherty Institute for Infection and Immunity, the University of Melbourne, Parkville, Australia*

Abstract:

Background: Indigenous populations endure higher influenza-associated disease burden than non-Indigenous populations. We compared influenza-associated hospitalisation and mortality rates between Indigenous and corresponding benchmark populations, globally.

Methods: We undertook a systematic review and meta-analysis, assessing observational studies that compared influenza-associated hospitalisation or mortality rates amongst Indigenous populations to the corresponding benchmark populations. Pubmed, Medline, Embase, Cochrane Central Register of Controlled Trials and CINAHL were searched. We included published studies, in English, where influenza was laboratory-confirmed and a hospitalisation rate ratio (HRR) or mortality rate ratio (MRR) for Indigenous vs. benchmark populations could be extracted or calculated. Where multiple studies originated from a given country, a random-effects model was used to calculate a pooled estimate for that country.

Results: The search identified 886 studies, of which 31 were eligible for data extraction, comprising 67,529 hospitalisations and 2,548 deaths attributable to influenza from Australia, New Zealand, USA, Canada and Brazil. We consistently observed higher influenza-associated hospitalisation and mortality for Indigenous populations. Pooled HRRs were 4.5 (95% CI: 3.4-5.9, I^2 : 98.2%) amongst Australian studies and 6.3 (95% CI: 2.1-19.1, I^2 : 98.9%) for Canadian studies. Pooled MRRs were 3.3 (95% CI: 2.7 - 4.1, I^2 : 0.0%) for USA studies and 4.2 (95% CI: 2.5 - 7.0, I^2 : 54.6%) amongst Australian studies. The pooled HRR and MRR were higher during the 2009 H1N1 pandemic than other times in Australia.

Conclusion: Indigenous populations should be a priority group for influenza vaccination. Data were lacking for low- and middle-income countries, demonstrating an important information gap.

Implementation of pharmacist delivered vaccination in Australia: the pharmacist's experience

Authors: Dr Sushena Krishnaswamy¹, Mr Bill Suen^{2,4}, Professor Euan Wallace^{1,5}, Prof Jim Buttery^{3,6}, A/Prof Michelle Giles^{1,6}

Affiliations: ¹The Ritchie Centre, Department of Obstetrics and Gynaecology, Monash University, Clayton, Australia, ²Faculty of Pharmacy and Pharmaceutical Sciences, Monash University, Parkville, Australia, ³Monash Centre for Health Research and Implementation, Department of Epidemiology and Preventive Medicine, Monash University, Clayton, Australia, ⁴Pharmaceutical Society of Australia, Victorian branch, Parkville, Australia, ⁵Safer Care Victoria, Department of Health and Human Services, Melbourne, Australia, ⁶Monash Immunisation, Monash Health, Clayton, Australia

Abstract:

Background: Uptake of adult vaccination remains suboptimal. Increasing access through non-traditional immunisers, such as pharmacists, has been shown to improve uptake internationally but has only recently been introduced in Australia. We explored the attitudes and practices of pharmacists across Australia with a focus on perceived barriers to implementation and maternal vaccination.

Methods: Members of the Pharmaceutical Society of Australia and Eastern Melbourne Primary Health Network were invited to complete a questionnaire between April and June 2017.

Results: Of 156 respondents (27 owners, 26 managers, 82 employees, 19 students, 2 other), 42% practiced in rural regions and were significantly more likely to offer influenza vaccination than those in metropolitan areas (90.5% vs 71%, $p=0.01$). 64% had completed an approved immuniser-training course and 71% reported having a trained pharmacist-immuniser on staff. Pharmacists reported being frequently asked for advice on maternal vaccination (119/153, 78% at least once per week) but importantly they felt less comfortable discussing vaccinations with pregnant women compared with non-pregnant adults (77% vs 87%, $p=0.005$) They also reported being less comfortable administering vaccinations to pregnant women (55% vs 77%, $p<0.001$). In addition vaccination services were less frequently offered to pregnant women (42% influenza, 27% pertussis), although one third of those who did not offer maternal vaccinations reported an intention to in the future.

Conclusions: Our study highlights disparities in pharmacists' comfort and provision of maternal vaccination compared to for other adults. Further education and support, particularly in maternal vaccination, will be important in supporting pharmacists in this emerging role.

Evaluation of the 4vMenC school-based immunisation program in South Western Sydney, 2017

Authors: Dr Stephanie Fletcher-Laherty¹, Dr Katherine Todd¹, Ms Janice Kitson¹, Dr Kate Alexander¹

Affiliations: ¹South Western Sydney Local Health District, Liverpool, Australia

Abstract:

In February 2017, in response to meningococcal W emerging as a significant cause of invasive meningococcal disease, the NSW government funded a school-based meningococcal vaccination (4vMenC) program targeting Year 11 and 12 students to commence in April 2017.

South Western Sydney Local Health District (SWSLHD) conducted an evaluation to assess the effectiveness of the planning and implementation processes and to identify barriers and enablers to implementation of the 2017 4vMenC school immunisation program.

Vaccination rates were calculated, and program reach and stakeholder communication was assessed. In-depth interviews were carried out with eight members of the SWSLHD immunisation team. Inductive and deductive thematic analyses were conducted.

Within SWSLHD, 123 schools enrolling 21,976 senior students were eligible for the 2017 4vMenC program. Vaccination coverage of 75.1% was achieved. Challenges to implementation included the extra time needed to draw up the vaccine, difficulties accommodating the clinic within the senior student timetable, the short preparation time prior to program implementation, limited education about the program and its rationale among students and parents, and delays in the availability of educational resources. Key enablers to the program's success included strong leadership, building on existing relationships, a motivated and flexible workforce, and the relative maturity of the students and their compliance with the vaccination process. In addition considerably higher vaccination rates were achieved at schools with teachers that attached a high importance to the school vaccination program. Despite the short timeframe for implementation, these key enablers facilitated a successful rollout in SWSLHD with high coverage achieved.

3B – Short Orals – Advocacy, Social Science

Room E1, 1:30pm - 3:00pm

Addressing vaccine information needs: Updating 'Myths and Realities' to reflect new evidence

Authors: Dr Sally Ioannides^{1,2}, Dr Frank Beard^{1,2}, Professor Peter McIntyre^{1,2}, Professor Kristine Macartney^{1,2}

Affiliations: ¹NCIRS, Sydney, Australia, ²University of Sydney, Sydney, Australia

Abstract:

Context: Myths and Realities: Responding to Arguments against Immunisation' (5th edition 2013) was a booklet available online and in hard copy, aimed principally for use by immunisation providers to answer complex questions asked by patients/parents about vaccination, and to provide information about the benefits of immunisation. Evidence from market research suggested that this resource was highly valued by providers. We aimed to update the resource to focus on current user needs.

Process: Redevelopment was undertaken over 6 months using recent evidence on effective myth debunking, and consultation with key stakeholders and content experts to identify user needs and topic areas for update. Literature review on all relevant topics areas was conducted and other guidelines consulted. Input from communications experts was provided into visual display and presentation.

Outcomes: Stakeholder input emphasised the importance of the inclusion of current topical issues and highlighted the key role of communication. Content has been changed from a 'myth versus reality' to a 'question and answer' format, and a new title selected. New topic areas were added including specific conditions around which questions arise. The vaccine preventable disease impact section has been updated by using more appealing infographics. Key examples of new content and format will be presented.

Conclusion: The information needs of vaccine providers are complex. It is expected that the new format and content of this valued resource will better support providers to answer questions and support decision-making around vaccination. It will be important to evaluate the new resource to ensure its effectiveness.

Using influenza notifications to inform immunisation policy – should we vaccinate kids?

Authors: Dr Marlena Kaczmarek¹

Affiliations: ¹ACT Health, Canberra, Australia

Abstract:

Background: Influenza immunisation is currently funded under the National Immunisation Program (NIP) for individuals at increased risk of complications from influenza infection and those aged ≥ 65 years. Influenza immunisation is recommended (but not funded) for children aged ≥ 6 months to < 5 years. To prevent a season of similar magnitude to 2017, should funded influenza immunisation be expanded to other groups?

Methods: All laboratory-confirmed influenza notifications (that met the national case definition) recorded between 01 January and 31 December 2017 were analysed by age group. Immunisation data were obtained from the Australian Immunisation Register (AIR) for ACT residents who had been recorded as being immunised against influenza in 2017.

Results: There were 3,094 cases of influenza notified to ACT Health during 2017, of which 49.9% were aged 20-49 years. The rates of influenza notifications per 100,000 age-specific population were highest among children < 5 years and adults aged ≥ 65 years (1,134 and 1,541 per 100,000 population, respectively). During 2017, influenza immunisation coverage among these age groups (as recorded AIR) was 5.2% and 35.6%, respectively.

Conclusion: Although effectiveness of influenza vaccines vary from year to year, immunisation can prevent infection in a proportion of individuals. Although AIR data likely underestimate influenza immunisation coverage, efforts to improve coverage among adults aged ≥ 65 years should be explored. Expanding funded groups to include children aged ≥ 6 months to < 5 years may lessen the community impact of future influenza seasons.

Strengthening immunisation enrolment requirements in child care – the NSW experience

Authors: Mr Dennis Meijer¹

Affiliations: ¹Health Protection NSW, North Sydney, Australia

Abstract:

Context: Childhood immunisation coverage is high in NSW with over 94% of children recorded as fully immunised at 1 and 5 years of age. In recent years, the Australian Government has removed conscientious objection as an approved exemption for family assistance payments (No Jab, No Pay), and the Prime Minister requested a national approach to immunisation and child care. A scheduled review of the NSW Public Health Act 2010 presented an opportunity to consider immunisation enrolment requirements in child care.

Process: From 1 January 2018, children who are unvaccinated due to their parents' conscientious objection can no longer be enrolled in child care and associated offences have been created. NSW Health has worked closely with the NSW Department of Education and child care peak bodies to support compliance with these new requirements.

Analysis: The vast majority of children will be unaffected by the amendment as only 1.15% of children aged 0-7 years in NSW were recorded as being unvaccinated due to a registered personal belief of their parent as of 31 December 2015. This number is likely to have decreased further with the introduction of the No Jab, No Pay measure on 1 January 2016.

Outcomes: It is anticipated that the change will complement other strategies to promote the timely immunisation of children. Immunisation coverage data from the Australian Immunisation Register and compliance data from the NSW Department of Education will be analysed and presented at the conference to assess early outcomes.

Sharing Knowledge About Immunisation (SKAI): a communication support package for primary care

Authors: A Prof Julie Leask¹, **Dr Nina Berry**¹, Dr Margie Danchin², Prof Lyndal Trevena¹, Dr Penelope Robinson¹, Prof Paul Kinnersley³, A Prof Holly Witteman⁴

Affiliations: ¹University Of Sydney, University Of Sydney, Australia, ²Murdoch Children's Research Institute, Parkville, Australia, ³Cardiff University, Cardiff, Wales, ⁴Laval University, Quebec, Canada

Abstract:

Background: Many providers find encounters with concerned parents difficult and unsatisfying. Early, formative research indicated consultations with concerned parents can be more satisfying when clinicians (1) identify parental position on vaccination (2) develop flexible goals and (3) employ sound strategies, and select content tailored to the parent's information and communication needs. This study aimed to develop a system of consultation support tools that can be incorporated into the range of primary care workflows and tailored to meet parents' communication needs.

Methods: The Medical Research Council's Guidance on developing complex interventions informed the process. In Phase 1 we developed the system concept and supporting resources during three investigator workshops and twenty-six in-depth-interviews with GPs and RNs. We assessed acceptability and face-validity using 11 focus groups with parents. During Phase 2 we observed Paediatricians using SKAI during specialist immunisation clinics; in Phase 3 we assessed feasibility of integration into primary care clinic processes and training.

Results: The SKAI System includes a set of communication pathways stemming from the identification of parental position and includes a referral option for highly hesitant parents. The SKAI system also includes 'resources' such as a consent tool, knowledge tools, immunisation concern Q&A sheets guided by debunking literature, and communication skills and tasks for providers. A training program will involve an online or face-to-face module with simulate and feedback.

Conclusion: The SKAI system is an innovative and supportive package for providers and parents navigating the increasingly complex process of immunisation, built on an extensive body of knowledge and thorough formative testing.

Reliability of interim estimates of influenza vaccine effectiveness, 2012-2017

Authors: **Dr Ximena Tolosa**^{1,2}, Ms Monique Chilver³, Ms Vivian Leung², Prof Nigel Stocks³, A/Prof Sheena Sullivan^{2,3,4}

Affiliations: ¹WHO Collaborating Centre For Reference And Research On Influenza, Melbourne, Australia, ²Australian National University, Canberra, Australia, ³Australian Sentinel Practices Research Network, University of Adelaide, Adelaide, Australia, ⁴Doherty Institute, University of Melbourne, Melbourne, Australia

Abstract:

Background: Early estimates of influenza vaccine effectiveness are useful for real-time assessment of seasonal severity and for informing influenza vaccine strain selection.

Methods: Data from the Australian Sentinel Practices Research Network was used to estimate the interim and final vaccine effectiveness (VE) estimates against influenza A and B in Australia, for the period 2012 to 2017. The interim period was defined as weeks 18-36, which coincides with the WHO vaccine composition meeting, while the final period included the entire season. We used the case test-negative design to estimate vaccine effectiveness from the odds ratio comparing the odds of vaccination among test-positive patients divided by the odds of vaccination among test-negative patients.

Results: Overall, preliminary interim and final VE pairs adjusted for age and time were closest for 2014 [43% (95% CI 24-57; n=1490) and 43% (95% CI 26-56; n=1499)] and 2017 [39% (95% CI 24-51; n=1645) and 40% (95% CI 28-50; n=2212)]. The level of concordance between VE pairs was the lowest for 2013 [44% (95% CI 17-63) and 56% (95% CI 37-70)]. Concordance between interim and final VE estimates were highest when interim VE was estimated after the peak of the season. The larger number of participants available for final estimation also resulted in more precise estimates.

Conclusion: VE estimates for the last six influenza seasons in Australia were moderate. Our results lend support the expansion of national ILI surveillance to increase the reliability of VE estimates.

The attitudes and practices of early childcare staff towards immunisation

Authors: Dr Holly Seale¹

Affiliations: ¹University of New South Wales, Sydney, Australia

Abstract:

Introduction: While there has been recent attention paid to the immunisation of children, there has been little attention paid to the level of coverage amongst early childhood educators. This is despite the fact that the Australian Immunisation Handbook identifies early childhood educators as a risk occupation for acquiring or transmitting vaccine preventable diseases. This study aimed to gain an understanding of the immunisation status, attitudes and barriers to vaccination and to pinpoint whether a vaccination gap exists among ECECs.

Methods: An electronic survey was undertaken with members of the Australian Childcare Alliance (ACA). The ACA is the national peak body that represents childcare providers across Australia, and this approach enabled the greatest possible reach to childcare providers. In addition the study was advertised via the Early Childhood Australia magazine. The study was undertaken 12 months after the introduction of the “no jab no pay” immunisation strategy.

Results: 577 surveys were completed. A positive response was received from participants towards the rationale for staff immunisation. While most indicated that they were up to date for tetanus, pertussis and hepatitis A/B, less than half had received an influenza vaccine. Not all centres appeared to have a policy/program encouraging staff immunisation. Very few centres offered on-site immunisation services.

Conclusion: Children attending childcare, whilst age appropriately vaccinated, may remain too young to be fully vaccinated. Under-immunised or unimmunised ECECs make themselves and the children they care for vulnerable to VPDs. It appears more needs to be done to promote occupational vaccination to this group.

Knowledge, attitudes, values and practices of parents of children hospitalised for influenza

Authors: Ms Samantha Carlson^{1,2}, Dr Camilla Scanlan^{1,2}, Professor Helen Marshall^{3,4}, Professor Kristine Macartney^{1,2}, Associate Professor Julie Leask^{1,2}

Affiliations: ¹National Centre for Immunisation Research and Surveillance, The Sydney Children's Hospital Network, Sydney, Australia, ²The University of Sydney, Sydney, Australia, ³Vaccinology and Immunology Research Trials Unit, Women's and Children's Health Network, Adelaide, Australia, ⁴The University of Adelaide, Adelaide, Australia

Abstract:

Background: More children are hospitalised in Australia for influenza than any other vaccine-preventable disease. Rates of influenza vaccination in children are low, and coverage of antenatal influenza vaccination, which provides protection to infants up to 6 months of age, is unknown. We explored barriers and facilitators of influenza vaccination with families of children who experienced severe influenza.

Methods: We interviewed 27 parents of children who were hospitalised in Sydney and Adelaide with influenza between May and October 2017. Interviews explored parents' knowledge, attitudes, values, practices and intentions regarding influenza vaccination. Transcripts were thematically analysed with the social-ecological model guiding analysis.

Results: Sixteen of the twenty children aged between 6 months – 18 years were not vaccinated for influenza in 2017. Ten of these children had medical conditions predisposing them to severe influenza and were eligible for government-funded influenza vaccine, nevertheless six were not vaccinated. Mothers of four of seven infants aged <6 months did not receive a government-funded influenza vaccine during their pregnancy. Despite current policies and programs, the majority of parents were unaware that their child could be protected from influenza through vaccination. Of those who were aware, some held concerns about the safety or efficacy of the vaccine. However, most parents intended for their family to be vaccinated in following influenza seasons.

Conclusions: The complexity of reasons for not vaccinating against influenza affirms that multifactorial approaches are needed. Improving access, awareness, recommendations and opportunities for children and pregnant women to be vaccinated is essential to improve coverage.

Factors impacting maternal immunisation coverage

Authors: Professor Paul Van Buynder¹, Mrs Jan Van Buynder², Mrs Sara Drew³, Mr Ian Hunter², A / Professor Jing Sun¹

Affiliations: ¹Griffith University, Southport, Australia, ²Gold Coast Health Service, Southport, Australia, ³Benchmark, Melbourne, Australia

Abstract:

Background: Pregnant women in Australia are recommended to have a pertussis containing vaccine in the third trimester and an influenza vaccine at any stage of pregnancy. Uptake levels, while improving, remain disappointing despite the implementation of many local dedicated reminder enhancements and targeted vaccine services.

Methods: We interviewed 1028 post-partum women about their pregnancy vaccine experience, vaccine recommendations from their carers, their own view of vaccines, and the determinants of vaccine decision making. We also considered confounders including time of year, and previous vaccination history.

Results: Over 85% of respondents had received a pertussis containing vaccine largely at the recommended time in pregnancy. Care providers strongly recommended vaccine, independently of carer category, and key messages about infant protection were widely held.

Conversely, only 35% of pregnant women had accessed influenza vaccination. Identified barriers to vaccination included safety concerns, a lack of provider recommendation, inadequate knowledge about the risk benefit equation and confusion about timing of vaccine.

Conclusion: Improvements in coverage of pregnancy influenza vaccine will require targeted campaigns for care providers as well as antenates themselves and some change in the general community view of the benefit of influenza vaccine.

Exploring Vaccine-Hesitancy in Higher-Socioeconomic Parents in Perth, Western Australia

Authors: Ms Sharon Swaney¹, Associate Professor Sharyn Burns

Affiliations: ¹*Curtin University, Como, Australia*

Abstract:

Background: Vaccine-hesitancy and refusal among higher-socioeconomic parents is an increasing trend in developed nations, including Australia. No data from this demographic in Perth, Western Australia, has previously been collected; this research interviews parents and Health Care Professionals (HCPs) to explore their views.

Methods: Eighteen one-on-one interviews were conducted; (n=11) parents who earned >A\$125,000pa and expressed concerns surrounding vaccination, and (n=7) HCPs, who provided clinical services. Using Grounded Theory methodology, data were analysed and a model outlining factors contributing to vaccine-hesitancy within this demographic created.

Results: Five areas leading to vaccine-hesitancy were identified; We are Educated; We Control our Health; Safe in Perth; Government Policies; and What We Want. Vaccine-hesitant parents of higher-socioeconomic status questioned more; adopted Healthism beliefs and thought lifestyle factors could control vaccine-preventable diseases; constantly sought information and reassurance on vaccine-safety. Some relied on herd immunity in Perth yet vaccinated if travelling overseas, demonstrating a reduced understanding of risk. According to HCPs, recently introduced government policies has increased vaccination rates, yet loss of civil liberties concerned some HCPs and parents alike. Parents received information about how, when and where to vaccinate, but not why. Higher-level, more emotive information, made available at critical time points, was requested.

Conclusion: This qualitative research study provides new insights into vaccine-hesitancy among higher-socioeconomic parents in Perth, Western Australia, to more accurately address health promotion interventions among this demographic in the future.

Keywords: Vaccination, Vaccine-hesitancy, Higher-socioeconomic (Higher-SES), Qualitative research, Healthism, Government Policies, Herd Immunity

Vaccine Hesitancy and Refusal – It's Social!

Authors: Dr Katie Attwell¹, **Professor Paul Ward**², Dr Samantha Meyer³, Dr Philippa Rokkas⁴, Associate Professor Julie Leask⁵

Affiliations: ¹*University Of Western Australia, Crawley, Australia*, ²*Flinders University, Adelaide, Australia*, ³*University of Waterloo, Ontario, Canada*, ⁴*Adelaide University, Adelaide, Australia*, ⁵*University of Sydney, Sydney, Australia*

Abstract:

Background: While 92% of Australian children are vaccinated on time, there are pockets of high refusal throughout the country, some as low as 50%. Evidently, while many studies focus on individuals' views, vaccination is something we (dis)engage in as members of communities, with particular ways of seeing the world.

Methods: Targeting areas with lower vaccination coverage rates, we interviewed 29 parents in Fremantle, WA (September 2013-April 2014) and Adelaide, SA (October-December 2015), who rejected some or all vaccines for their children. Our qualitative analysis explores how community membership informs vaccination beliefs and behaviours. We consider how vaccine rejection is prized as appropriate behaviour within some social groups.

Results: Amongst the Fremantle participants, there were discussions of the social pressures to refuse vaccines, and emergence of an awkward space for those who accepted some or all vaccines. The South Australian participants, many of whom were more strident in their rejection, depicted like-minded communities within which their decisions were validated. Parents in both sites presented vaccine questioning and refusal as a 'given' identity marker, crossing over with birth experiences and ideologies, alternative schooling and natural living.

Conclusion: This study demonstrates that parental expertise is not uniformly valued. One's own views may be discredited by others who set the agenda for 'appropriate' behaviour. This denies those who value vaccines a platform to share their views within their social networks. Understanding how vaccine hesitant beliefs are socially acquired and reinforced will enable us to develop communication strategies to intervene in group dynamics.

Adolescent and parent knowledge about males and HPV vaccination

Authors: Ms Cristyn Davies^{1,2}, Associate Professor Spring Cooper³, Dr Tanya Stoney⁴, Professor Helen Marshall^{5,6}, Ms Jane Jones⁴, Dr Joanne Collins^{5,7}, Ms Heidi Hutton⁴, Dr Adriana Parrella^{5,7}, Professor Gregory Zimet⁹, Associate Professor Julia ML Brotherton⁸, Dr Peter Richmond^{4,10,11}, Professor Kirsten McCaffery¹², Associate Professor David G Regan¹³, Professor Suzanne M Garland^{14,15,16}, Associate Professor Julie Leask¹⁸, Professor John Kaldor¹³, Professor Annette Braunack-Mayer⁷, Associate Professor Melissa Kang¹⁷, Dr Kevin McGeechan¹², Professor S. Rachel Skinner^{1,2}

Affiliations: ¹Discipline of Child and Adolescent Health, Sydney Medical School, University Of Sydney, Australia and The Children's Hospital Westmead, Sydney, Australia, ²The Children's Hospital Westmead, Sydney, Australia, ³City University of New York, New York, USA, ⁴Telethon Kids Institute, Perth, Australia, ⁵Women's and Children's Hospital, Adelaide, Australia, ⁶Robinson Research Institute, The University of Adelaide, Adelaide, Australia, ⁷The University of Adelaide, Adelaide, Australia, ⁸National HPV Vaccination Program Register, Melbourne, Australia, ⁹Indiana University, Indianapolis, USA, ¹⁰Princess Margaret Hospital, Perth, Australia, ¹¹The University of Western Australia, Perth, Australia, ¹²School of Public Health, Sydney Medical School, University of Sydney, Sydney, Australia, ¹³The Kirby Institute, UNSW, Sydney, Australia, ¹⁴The Royal Women's Hospital, Melbourne, Australia, ¹⁵The University of Melbourne, Melbourne, Australia, ¹⁶Murdoch Children's Research Institute, Melbourne, Australia, ¹⁷University of Technology, Sydney, Australia, ¹⁸Sydney Nursing School, The University of Sydney, Sydney, Australia

Abstract:

Background: We evaluated a multi-component intervention to improve student knowledge, vaccine-related psycho-social outcomes and HPV vaccine uptake in schools. Here we present data regarding knowledge about HPV and vaccination specifically pertaining to males.

Methods: We randomly sampled 40 schools (6,967 students) from two Australian states, and randomly allocated schools to intervention (21) or control (19). Intervention schools implemented HPV education. Student knowledge about HPV was evaluated by questionnaire pre-HPV doses 1 and 3. We conducted focus groups with students and interviews with parents regarding males and HPV vaccination in 6 intervention and 6 control schools. Qualitative data were analysed using thematic and discourse analysis.

Results: The mean percent increase in knowledge questions answered correctly was higher in intervention schools than control for girls (34 (95%CI:28,39)) and boys (30 (25,34)) at pre-dose 1. There was no differential effect between the sexes at pre-dose 1 (P=0.14 for interaction). Similar results were observed pre-dose 3. Qualitative data demonstrated students in intervention schools understood both sexes could acquire and transmit HPV, and have HPV-related cancers and genital warts. Students in control schools were largely unclear as to why males receive the HPV vaccine. Parents in both intervention and control schools had limited understanding about males and HPV vaccination.

Conclusions: All students in intervention schools had better understanding about HPV and HPV vaccination in general, as well as in relation to males, than control schools. Parents may benefit from targeted education about males and HPV vaccination to support vaccination decision-making.

3C – Short Orals – Vaccine Coverage & Clinical Practice

Room E2, 1:30pm - 3:00pm

NSW Immunisation Specialist Service- two years of clinical advice for immunisation providers

Authors: Miss Lucy Coles¹, Dr. Lucy Deng^{2,3}, Ms Deidre Brogan^{2,3}, Ms Rosemary Joyce^{2,3}, A/Prof Nicholas Wood^{1,2,3}

Affiliations: ¹University Of Sydney, Sydney, Australia, ²Sydney Children's Hospital Network, Sydney, Australia, ³National Centre for Immunisation Research and Surveillance, Westmead, Australia

Abstract:

Context: The NSW Immunisation Specialist Service (NSWISS) hotline opened in 2015, aiming to support clinical vaccination decision-making by providing telephone information to general practice, hospital staff and the public. In its first two years, the hotline received over 1600 calls.

Process: Calls are answered by specialist nurses and referred to NSWISS doctors, clinics, public health, and other services. Data including caller details, clinical question and advice given are recorded at the time of the call.

Analysis: This study investigated the hotline's role and outcomes in supporting clinical decision-making and management. The growth of the service was quantified, followed by the investigation of calls according to type of clinical query, vaccine concerned, and clinical recommendation.

Outcomes: Nearly half (n=708/1691 (42%)) calls asked for clinical advice on proceeding with vaccination. NSWISS staff advised that vaccination was safe in 58%, unsafe in 12%, and recommended specialist review in 19%. 100 calls (6%) regarded vaccine administration errors –incorrect vaccine, unnecessary additional doses, and administration when contra-indicated. Following a TGA Advisory (March 2017) on the use of Zostavax in immune-compromised patients, the number of Zostavax-related calls increased fourfold. Of 343 calls regarding Zostavax, 224 calls (65%) were related to safety for administration, of which 71 (32%) were considered contraindicated. 14 (4%) reported an inadvertent administration of a second dose and 11 (3%) administration when contraindicated, of which none had an adverse outcome.

Conclusion: This analysis demonstrates the NSWISS hotline is an essential service, providing clinicians with one-stop telephone advice, especially regarding contra-indications and new vaccines.

Catching on: An audit of vaccination catch-up schedules developed for general practice.

Authors: Ms Lisa Allchin¹, Ms Denise Glibons¹, Ms Amanda Robinson¹, A/Prof Bradley Forssman¹

Affiliations: ¹Nepean Blue Mountains LHD Public Health Unit, Penrith, Australia

Abstract:

Context: Commencing January 2016, the Australian Government's "No Jab, No Pay" legislation linked childhood immunisations to welfare payments, removed conscientious objection as an exemption, and permitted free catch-up vaccines. Subsequently, Nepean Blue Mountains Public Health Unit (NBMPHU) received increased requests from general practices (GPs) to develop catch-up vaccination schedules. We aimed to assess the effectiveness of this advice.

Process: From January to December 2016, GPs requested catch-up schedules by submitting forms with children's details and immunisation histories. Written catch-up schedules (using Australian Immunisation Handbook (AIH)) were provided. Once catch-up programs were completed, GPs were asked to return this form with details of administered vaccines. Returned schedules were compared to information in the Australian Immunisation Register (AIR), and assessed for accuracy and completeness.

Analysis: In 2016, 102 (23%) of 449 catch-up schedules were returned. Of these, 11% were incorrectly completed and 28% were incorrectly reported to AIR. In 32% of cases, GPs reduced the number of vaccines given at each visit. Clinically invalid doses were erroneously accepted by AIR for 11% of children, and 6% of children required revaccination.

Outcomes: Catch-up vaccination is difficult for some GP staff, despite comprehensive information available in the AIH, regular local education, and provision of specific, individualised, written instructions. Possible GP factors causing difficulties include: knowledge deficits; inadequate time/human resources; technological issues; inadequate remuneration. Comprehensibility of recommendations might also impact. Qualitative research would further characterise these. Development of targeted education and innovative systems would improve GPs skills in catch-up vaccination provision and adherence to recommendations.

An audit of immunisation and catch-up in a Western Australian paediatric hospital.

Authors: Dr Adrian Tarca¹, Dr Gloria Lau¹, Ms Filomena Mascaro¹, Dr Ellen Taylor¹

Affiliations: ¹Princess Margaret Hospital, Subiaco, Australia

Abstract:

Context: An admission to hospital represents an ideal opportunity to review immunisation status as part of holistic care. This audit explores the immunisation status of patients at a tertiary paediatric hospital, the consistency of immunisation history given by parents/caregivers and the rates of catch-up immunisation offered.

Process: The Australian Immunisation Registry (AIR) records of 300 admissions to Princess Margaret Hospital during August 2017, were retrospectively reviewed. Immunisation status was determined. Those not up-to-date were further evaluated via the medical record to elicit

- 1) Was the patient's immunisation status recorded?
- 2) If so, was this consistent with the AIR?
- 3) Was the need for catch-up immunisation documented?
- 4) Were catch-up immunisations offered?

The AIR was reassessed to evaluate the number of patients given catch-up immunisations in the following three months.

Analysis: AIR records showed that almost 23% (66/292) of patients were not up-to-date with immunisations. However, of these, only 15.7% (8/51) of medical records accurately reflected immunisation status.

In 8/51 cases it was recorded that immunisation was required, but subsequently only offered in 2/8.

Only 25% (16/64) of patients received catch-up immunisations in the three months following discharge.

Outcome: This audit was a follow-up to a 2015 study which showed similar results. One proposed solution is for the AIR record to be placed in the medical notes of every admission and reviewed by the treating medical team.

This data further supports the implementation of the first tertiary paediatric in-patient immunisation service in Western Australia, due to commence in 2018.

Impact of fever and antipyretic use on influenza vaccine immunogenicity in children

Authors: Dr Jean Li-Kim-Moy^{1,3}, Professor Cheryl Jones², Associate Professor Nicholas Wood^{1,3}, Professor Kristine Macartney^{1,3}, Professor Robert Booy^{1,3}

Affiliations: ¹National Centre For Immunisation Research And Surveillance, Westmead, Australia, ²University of Melbourne, Melbourne, Australia, ³University of Sydney, Sydney, Australia

Abstract:

Background: Fever is a common immunologically-mediated adverse event after influenza vaccination in children, and is frequently treated with antipyretic medications. However, the impact of vaccine-related fever and antipyretic use on trivalent influenza vaccine (TIV) immunogenicity in children is unclear.

Methods: In this pilot study, we examined individual-level data provided by GlaxoSmithKline (GSK) from three published paediatric clinical trials of GSK versus comparator TIV. We descriptively analysed fever in a primary study (NCT00764790), the largest trial involving young children (6-35 months, n=3317), and further explored the association between post-vaccination fever, antipyretic use and immunogenicity in a pooled analysis of subjects from the primary and other trials (3-17 years, NCT00980005; 6m-17y NCT00383123).

Results: In the primary study (6-35m), re-analysed vaccine-related fever rates ($\geq 38^{\circ}\text{C}$, by any route, reported after each dose) were 2.7-3.4% and 3.3-4.1% after first and second doses respectively; antipyretic use after any dose was 17% overall but 61% in those with fever. A pooled immunogenicity multivariable regression analysis combining the 3 studies (n=5902) revealed children with post-vaccination fever had significantly higher adjusted Geometric Mean Titres (GMT) than those without fever (ratio 1.21-1.39 depending on virus strain; $p \leq 0.01$). Conversely those with antipyretic use had significantly lower GMTs (ratio 0.80-0.87; $p < 0.0006$), adjusted for factors including fever.

Conclusions: Access to individual-level clinical trial data allows increased transparency of vaccine research and facilitates re-analysis of studies to answer outstanding clinical questions. Post-vaccination fever and antipyretic use may have important associations with influenza vaccine immunogenicity in children and would benefit from further prospective investigation.

Vaccination coverage among Indigenous adults – no improvement in 8 years

Authors: Ms Fleur Webster¹, A/Professor Heather Gidding^{1,2}, Dr Veronica Matthews³, Professor Richard Taylor¹, Dr Rob Menzies¹

Affiliations: ¹*School of Public Health and Community Medicine, University of NSW, Sydney, Australia*, ²*National Centre for Immunisation Research and Surveillance, Westmead, Australia*, ³*The University Centre for Rural Health, University of Sydney, Lismore, Australia*

Abstract:

Background: Coverage for vaccines aimed at Aboriginal and Torres Strait Islander (respectfully referred to as Indigenous) people is substantially lower than for the non-Indigenous population. This study compared coverage for influenza and pneumococcal vaccines among Indigenous adults between 2004-05 and 2012-13, especially the impact of funding of influenza vaccine for Indigenous aged ≥ 15 years from 2010.

Methods: Population coverage rates (by age-group and remoteness) for influenza and pneumococcal vaccination from the 2012-13 National Aboriginal and Torres Strait Islander Health survey (n=6,037) were compared to published results from the 2004-05 survey (n=5,757). A two proportion Z-test was used to compare estimates.

Results: Between 2004-05 and 2012-13, influenza vaccination coverage among Indigenous adults increased for those aged 18-49 years from 23% to 29% (p<0.001), remained unchanged for those aged 50-64 years and declined for those aged ≥ 65 years from 84% to 74% (p=0.008). Pneumococcal vaccination coverage declined over the same period (for example, 50-64 years: 30% to 23%, p<0.001). For remote areas, influenza vaccination coverage for those aged 50-64 years decreased from 76% to 66% (p<0.001), while pneumococcal coverage also declined for this age group from 52% to 32% (p<0.001). There was little change in coverage in non-remote areas for both vaccines.

Conclusion: In the eight years between surveys, declines were observed in pneumococcal vaccination coverage and there was little evidence of an increase in influenza coverage, despite national funding from 2010 for all Indigenous adults. More frequent national coverage data are urgently needed to monitor coverage and inform targeted delivery programs.

A Midpoint Evaluation of the Tasmanian Meningococcal W Vaccination Program

Authors: Dr Gabriela Willis^{1,2}, Ms Kerryn Lodo¹, Dr Faline Howes¹, Dr Stephanie Williams²

Affiliations: ¹*Public Health Services, Department Of Health And Human Services, Tasmania, Hobart, Australia*, ²*National Centre for Epidemiology and Population Health, Australian National University, Canberra, Australia*

Abstract:

Context: The Tasmanian Meningococcal W Vaccination Program is running from August 2017 until April 2018 in response to the emergence of meningococcal W disease. Tasmanians aged 15-19 years are eligible for a free quadrivalent meningococcal vaccine. The program is primarily being delivered to years 10, 11, and 12 through the school-based immunisation program (SBIP), which is delivered by local councils in Tasmania.

Process: A midpoint real-time evaluation was carried out to identify strengths and challenges in delivery of the program via the SBIP and identify areas for program modification that may improve uptake. It consisted of three main components i) Process evaluation through focus groups and an online survey; ii) Vaccination coverage estimate; and iii) Assessment of vaccine safety. Qualitative data was analysed using thematic content analysis, while coverage estimates and adverse events rates were calculated using quantitative data.

Analysis: The process evaluation identified many program strengths, including councils and schools attributing high importance to the program. Several challenges were identified which may have impacted uptake, including the short planning period, delivery at a busy time of year for schools, and concerns about mature minor consent. Coverage was estimated to be 62.5% in the school/college cohort. No vaccine safety concerns were identified.

Outcomes: This midpoint real-time evaluation is informing modifications to the program. Catch-up vaccinations, development of a school/college toolkit to support student education, and a new direction in the communication strategy have been implemented in 2018 and may be key to maximising uptake of meningococcal W vaccine in Tasmania.

Invasive pneumococcal disease in children, Victoria, Australia, 2001-2016: serotypes and vaccine failures.

Authors: Ms Kylie Carville¹, Ms Janet Strachan², Ms Lucinda Franklin²

Affiliations: ¹*VIDRL at the Doherty Institute, Melbourne, Australia*, ²*Health Protection Branch, Victorian Department of Health and Human Services, Melbourne, Australia*

Abstract:

Background and aims: The 7-valent pneumococcal conjugate vaccine (7vPCV) was introduced to the Australian National Immunisation Program for Aboriginal and Torres Strait Islander children in 2001, and for other children in 2005. 13vPCV was introduced in 2011. We examined changes in invasive pneumococcal disease (IPD) in Victoria over this time.

Methods: Cases of laboratory confirmed IPD in Victoria are notified to the Victorian Department of Health and Human Services. Enhanced surveillance data were collected consistently for children aged <5 years. Serotypes, manifestations and risk factors were analysed.

Results: There were 6,105 IPD notifications during 2001-2016, 1,043 in children <5 years. Post 2005 a substantial decline in IPD in children was seen, with less disease caused by vaccine serotypes, but an increase in 19A. Following introduction of 13vPCV, non-conjugate vaccine types (eg 6C, 23B) subsequently caused an increasing proportion of IPD, however 3, 19A, and 19F continued to cause disease. There were 50 vaccine failures in children <5 years, increasing from 3% (10/318) in 2005-2011 to 18% (39/222) in 2012-2016. Common vaccine failures were 19F (64%) with 7vPCV and 3 (44%), 19A (28%) and 19F (26%) with 13vPCV. Nearly 20% (8/43 with data) had a chronic condition, immunocompromise, or a congenital condition. During 2005-2016 the proportion of all IPD cases <5 years with pneumonia or bacteraemia was similar (~38%), but among vaccine failures there was more pneumonia (68%) than bacteraemia (20%).

Conclusions: Immunisation resulted in a sustained decrease in IPD among cases <5 years, vaccine failures were rare but have increased

Benefits of 13vPCV schedule switch from 3p+0 to 2p+1 in Australian children

Authors: Dr Sanjay Jayasinghe¹, Dr Clayton Chiu^{1,2}, Prof Peter McIntyre^{1,2}, **A/Prof Chris Blyth**^{3,4,5}, on behalf of the ATAGI Pneumococcal Working Party

Affiliations: ¹National Centre For Immunisation Research and Surveillance, Westmead, Australia, ²Discipline of Child and Adolescent Health, Sydney Medical School, University of Sydney, Sydney, Australia, ³Department of Infectious Diseases, Princess Margaret Hospital for Children, Subiaco, Australia, ⁴Division of Pediatric, School of Medicine, University of Western Australia, Perth, Australia, ⁵Wesfarmers Centre for Vaccines and Infectious Diseases, Telethon Kids Institute, West Perth, Australia

Abstract:

Background: In 2011, 13vPCV replaced 7vPCV in the National Immunisation Program. Considering available evidence, '3p+0' schedule (3 primary doses, no booster) was maintained with continued monitoring of invasive pneumococcal disease (IPD) cases. An increase in vaccine failures (VFs) in children aged >12 months prompted comparative assessment of '2p+1' schedule (two primary doses plus a booster).

Methods: We transposed UK IPD surveillance data in similar 13vPCV-use period to Australian population denominators to estimate VFs (vaccine type [VT] IPD after 3doses) and population IPD incidence, assuming use of 2p+1 schedule to be responsible for differences observed. Expected and observed VFs were compared by age group and clinical category. Expected population IPD incidence was calculated by applying UK pre-/post-13vPCV use incidence rate ratios to Australian pre-13vPCV incidence rates.

Results: There were 108 VFs in first 4 years of 13vPCV use in Australia; 94% aged >12 months. If 2p+1 schedule was used in Australia 89 fewer VFs (16 being meningitis/pneumonia with empyema) would have occurred in children aged ≥12 months. This was offset by additional 11 VFs in infants aged 6-12 months, an overall reduction of 78 VFs in children. UK also experienced greater indirect benefit for 13v-non7v IPD. Overall, with 2p+1 schedule 270 fewer cases of VT IPD would have occurred in fifth post-13vPCV year in Australia.

Conclusion: While 3p+0 schedule has led to substantial reductions in IPD in Australia, a 2p+1 schedule might have provided additional direct protection in toddlers and indirect impact in older individuals with the same number of doses.

WHO Pilot RSV Surveillance 2017-2018 at Royal Children's Hospital, Melbourne

Authors: **Dr Jeremy Pratt**^{1,2}, Ms Alissa McMinn^{1,2}, Prof Kim Mulholland^{1,2}, A/Prof Andrew Daley^{1,2}, Prof Ian Barr^{2,3}, Dr Nigel Crawford^{1,2}

Affiliations: ¹Royal Children's Hospital, Melbourne, Parkville, Australia, ²Monash Children's Research Institute, Parkville, Australia, ³WHO Collaborating Centre for Reference and Research on Influenza, Melbourne, Australia

Abstract:

Background: The current lack of global Respiratory Syncytial Virus (RSV) epidemiological data, led WHO to establish an RSV pilot network, utilising the influenza surveillance system in 14 countries. In Australia, we undertook to determine what proportion of severe acute respiratory infection (SARI) cases were RSV-positive at a single tertiary paediatric hospital. Secondary aims included refining case definitions, describing RSV seasonality and the impact of RSV infection on high-risk groups.

Methods: 12-month prospective active hospital surveillance of SARI at the Royal Children's Hospital, Melbourne. Detailed review of all RSV-positive cases, including a two-month retrospective enrolment in our target groups, admitted with SARI under general medicine (short stay/general wards) and PICU/NICU. Eligible children had respiratory specimens sent for respiratory virus multiplex PCR, with RSV subtyping (A and B). Data included demographics, clinical parameters and risk factors, uploaded to REDCap (TN, US).

Results: To date (eight months from 01/07/2017), the project has enrolled 711 patients. 104 were RSV-positive (15%). Of the RSV-positive patients, 43% were <6mo, 49% 6mo-5yo and 8% >5yo. Other clinical features included fever (25%), difficulty breathing (62%) and poor feeding (52%). In those RSV-positive infants <6mo, 19% had apnoea and 19% had clinical sepsis. The median length of stay was 2 days (range 0-31), 63% required some form of respiratory support (45% low flow, 35% high flow, 8% CPAP, 2% ventilation), and 32% had ICU involvement.

Conclusion: The RSV pilot will continue throughout 2018 and will contribute to national and global evidence base around RSV health policy and vaccine development.

Providing influenza vaccine for egg anaphylactic patients at RCH Melbourne

Authors: Ms Sonja Elia¹, Dr Sharon Choo¹, Dr Joanne Smart¹, Ms Lilley Healey¹, Dr Kirsten Perrett¹

Affiliations: ¹Royal Children's Hospital Melbourne, Parkville, Australia

Abstract:

Background: In the past 10 years, numerous studies have shown no increased risk of influenza vaccine allergy in those with or without a history of egg allergy/anaphylaxis. However, significant parent and health professional anxiety still exists and these children are often referred to Allergy or Immunisation specialists for administration under supervision. We developed a protocol for supervised administration of influenza vaccine in children with egg allergy/anaphylaxis at the Royal Children's Hospital (RCH) Melbourne and monitored for vaccine hypersensitivity post vaccination.

Methods: All children with egg allergy referred or presenting to RCH for influenza vaccine were triaged. Children with egg sensitisation (i.e. positive skin prick or specific IgE, but not eaten egg) or egg allergy (non-anaphylaxis) received the quadrivalent influenza vaccine (QIV) in the Immunisation centre. Children with egg anaphylaxis and no prior influenza vaccine received QIV in the Allergy Day Medical Unit. All were observed for 30 minutes.

Results: From 12 April 2017 to 20 October 2017, 67 children with egg allergy/anaphylaxis were immunised with QIV. Of these, 75% (50/67) were immunised in the Immunisation centre and 25% (17/67) in Allergy. There were no immediate adverse events following immunisation in either setting.

Conclusion: This data adds to the evidence and builds patient and provider confidence that influenza vaccine is safe for children with egg allergy/anaphylaxis. In 2018, all children with egg allergy/anaphylaxis at RCH will be administered influenza vaccine in the Immunisation Centre with 15 minutes observation as per the updated Australasian Society of Clinical Immunology and Allergy (ASCIA) guidelines.

Low seropositivity to measles among a cohort of university students

Authors: Dr Anita Heywood¹, Dr Amit Saha¹, Dr Abela Mahimbo¹, Dr Bill Kefalas², Professor Nicholas Zwar³, Professor C Raina Macintyre¹, Dr Holly Seale¹, Professor William Rawlinson⁴

Affiliations: ¹School Of Public Health And Community Medicine, UNSW Sydney, Sydney, Australia, ²UNSW Health Service, UNSW Sydney, Sydney, Australia, ³School of Medicine, University of Wollongong, Wollongong, Australia, ⁴SEALS Pathology, Prince of Wales Hospital, NSW Health, Randwick, Australia

Abstract:

Background: Young adults are a key source of imported measles infections in countries with measles control such as Australia. They may have missed childhood vaccinations and uptake of pre-travel health advice is low. The congregation of students at university campuses may amplify infectious disease outbreaks. Data are limited on differences in susceptibility of domestic and international students and there are no existing Australian university immunisation entry requirements. We determined population immunity to measles among a cohort of Australian university students from differing backgrounds.

Methods: A cross-sectional survey of UNSW Sydney students aged 18-27 years assessed vaccination and disease history and pre-travel health seeking practices. Eligible consenting students provided serum for measles, mumps, rubella, varicella, hepatitis A and hepatitis B antibody testing using standard commercial assays.

Results: In 2016-17, 420/745 (56%) participants were domestic students, of whom 297/420 (71%) were Australian-born; and 119/325, (37%). of international students were from China. Overall, 561/745 (75%) were positive, 49 (6.6%) were equivocal and 135 (18%) were negative for measles. Domestic students were less likely to be measles antibody positive (291/420, 69%) than international students (270/325, 83%; p<0.0001). Of students aged 18-22 years, 276/382 (72%) were seropositive compared to 285/363 (79%; p=0.05) of student aged 23-27 years.

Conclusions: Population immunity to measles was lower than expected in this cohort of students. This has implications for future outbreak potential and maintenance of measles elimination. Specific vaccination recommendations for commencing university students should be considered to reduce the gap in young adult measles susceptibility.

3D – Short Orals – Vaccine Safety

Room E3, 1:30pm - 3:00pm

'Shingles' temporally associated with Zostavax[®] vaccine in Victoria, Australia

Abstract: Authors: **Dr Nigel Crawford**^{1,2,3}, Ms Annette Alafaci¹, Ms Adele Harris¹, Ms Georgie Lewis¹, Professor Jim Buttery^{1,4}, Ms Rosemary Morey⁵, Ms Janet Stachan⁵

Affiliations: ¹MCRI, Parkville, Australia, ²RCH, Parkville, Australia, ³The University of Melbourne, Parkville, Australia, ⁴Monash Children's & University, Clayton, Australia, ⁵Victorian Department Health and Human Services, Melbourne, Australia

Background: The National Zostavax[®] Immunisation program commenced on the 1st November 2016, for adults 70-79 years. In the phase 3 trials, clinical 'shingles' cases were temporally associated with vaccination, at an equivalent rate to placebo.

Methods: SAEFVIC is the Victoria vaccine safety service and receives passive AEFI reports from healthcare workers and the community. We reviewed all cases coded as 'shingles' between 1st November 2016, to 31st October 2017. In addition, we reviewed 'shingles' reports in the Victorian DHHS notifiable disease database, including clinical and laboratory confirmed.

Results: In the 1st year of the Zostavax[®] program, 46 'shingles' cases have been reported: SAEFVIC 31 (67%); Victorian DHHS 15 (33%). Laboratory testing was undertaken in 50% [n=23 (SAEFVIC (16); DHHS(7))], all were varicella zoster virus NAT positive, one case confirmed as wild-type strain, nil OKA strain to date. Detailed clinical data was available on the SAEFVIC cases (n=31): 52% male, median age 75 years (range 71-86 yrs). Time of 1st symptoms post vaccine: median 6 days (range 0- 120 days), 74% received an anti-viral medication. Three cases had a past history of cancer, nil on active therapy. In the study period, Victoria distributed 242,625 Zostavax[®] doses, vaccine coverage ~ 56% (242,625/435,143 [target population])

Conclusion: To date, nil 'shingles' cases reported in Victoria have been OKA positive, with the short time to onset (majority < 6-days) making coincidental 'wild type' reactivation the likely diagnosis. It is important to increase the proportion laboratory tested, including differentiation between wild-type and OKA (vaccine) strain.

Building AusVaxSafety - Australia's active vaccine safety surveillance system

Authors: **Ms Chloe Damon**¹, Dr Helen Quinn^{1,2}, Ms Alexis Pillsbury¹, Ms Catherine Glover¹, Professor Kristine Macartney^{1,2,3}

Affiliations: ¹National Centre for Immunisation Research & Surveillance (NCIRS), The Children's Hospital at Westmead, Australia, ²Discipline of Paediatrics and Child Health, University of Sydney, Australia, ³Department of Microbiology and Infectious Diseases, The Children's Hospital at Westmead, Australia

Abstract:

Context: A serious vaccine safety event in 2010 was the impetus for the creation of AusVaxSafety, the multi-component active vaccine safety system built on the expertise of many collaborators from diverse organisations across Australia.

Process: Initially implemented in 2013 as an Australian Government Department of Health (Health) funded pilot for active surveillance of seasonal influenza vaccines in children, AusVaxSafety has grown rapidly to monitor several vaccines in a variety of populations. In addition to active surveillance using consumer feedback (via SMS survey post vaccination), it has two new components: nationally collaborative clinical investigation and management of complex adverse events following immunisation (AEFI) via the AEFI Clinical Assessment Network (AEFI-CAN), and novel zoster vaccine safety analysis using National Prescribing Service (NPS) MedicinesInsight data.

Analysis: Several factors have contributed to AusVaxSafety's growth, including a shared purpose amongst sectors to strengthen active vaccine safety surveillance to compliment and extend passive reporting; dedicated funding and engagement from Health; the ability to facilitate and leverage multi-disciplinary input; and engagement of consumers in providing patient reported outcomes.

Outcomes: AusVaxSafety is continuing to expand into a dynamic and nationally representative network to support better understanding of vaccine safety and the quality use of vaccines in the field. This includes an ability to rapidly interrogate consumer feedback and detect vaccine safety signals in near real-time. Expansion to monitor additional vaccines in 2018, including new novel surveillance site types, and better integration with passive surveillance mechanisms nationally, will further bolster monitoring of vaccine safety in Australia and globally.

Long-term Immunogenicity, Safety, and Efficacy of 9-valent HPV Vaccine in Preadolescents/Adolescents

Authors: **Dr. Barbara Kuter**¹, Dr Sven-Eric Olsson², Dr. Alain Luxembourg¹

Affiliations: ¹Merck, West Point, PA, United States, ²Karolinska Institute, Stockholm, Sweden

Abstract:

Objectives: The 9vHPV vaccine was developed to prevent HPV infection and disease caused by HPV6/11/16/18/31/33/45/52/58. Efficacy of a 3-dose regimen was previously demonstrated in young women, 16-26 years old, and bridged to girls and boys, 9-15 years old, based on non-inferior HPV antibody responses compared to young women. The

study in girls and boys was extended to evaluate vaccine immunogenicity, efficacy and safety over 10 years; 3-year data are presented.

Methods: Girls and boys, 9-15 years old, received 3 doses of 9vHPV vaccine (day 1, month 2, month 6). Seropositivity rates and GMTs were assessed to each HPV vaccine type at month 7, 12, 24, and 36 using HPV-9 cLIA.

Results: Seropositivity rates to each of the 9 HPV types in girls and boys ranged from 99.9%-100% at month 7 and 93.8%-99.7% at month 36. GMTs peaked at month 7, and decreased to plateau between months 24 and 36. GMTs tended to be higher in 9-12 than in 13-15 year olds at all time points. Efficacy of the 9vHPV vaccine was established through 6 years of follow-up in 16-26 year olds young women. GMTs in girls and boys were higher than GMTs in young women, and remained higher throughout the study. Based on these results, efficacy in girls and boys through month 36 is inferred.

Conclusions: Administration of the 9vHPV vaccine in girls and boys, 9-15 years old, resulted in HPV antibody responses that persisted through 3 years. This immunogenicity profile supports widespread 9vHPV vaccination programs and early vaccination.

Use of Vaxtracker online AEFI surveillance tool in the AUSPICE vaccine clinical trial

Authors: Sally Munnoch¹, **Mr Patrick Cashman**^{1,3}, Sarah Moberley¹, Jody Stephenson, John Attia^{2,3}, Roseanne Peel², Alexis Hure², David Durrheim^{1,3}

Affiliations: ¹Hunter New England Population Health, ²Hunter Medical Research Institute, ³University of Newcastle

Abstract:

Background: Vaxtracker online active adverse event following immunisation (AEFI) surveillance tool was used to monitor AEFIs in participants in The Australian Study for the Prevention through Immunisation of Cardiovascular Events Trial (AUSPICE). In this randomised, placebo-controlled, double-blind trial participants are vaccinated with the pneumococcal polysaccharide vaccine (23vPPV) or placebo.

Methods: Study participants, aged 55-60 years, were sent an email and/or SMS by the fully automated Vaxtracker system seven days after vaccination. A hyperlink embedded in the message directed participants to a web-based survey. Participants were asked if they had any symptoms following vaccination and if so, whether medical attention was sought. A second message was sent 28 days following vaccination, exploring hospitalisation during this period, which may signify a rare severe adverse outcome. We reviewed Vaxtracker functionality for survey completion, accessibility and timeliness.

Results: The online main survey was completed by 4681 of 4720 (99.1%) of Auspice participants and the 28 day survey by 4845 (98.4%) of participants. The time from immunisation to the day 7 survey completion was 0 to 9 days (median 0.9 days) and 0 to 12 days (median 1.1 days) for the 28 day survey. 207 (8.8%) reported swelling at injection site and 13 (0.6%) reported extensive limb swelling.

Conclusion: Vaxtracker AEFI monitoring in the AUSPICE vaccine clinical trial was efficient and timely. The 23vPPV was shown to be well tolerated. Vaxtracker's utility to monitor the safety of a vaccine in a vaccine trial was pleasing.

SAEFVIC: Impact of implementing enhanced passive surveillance for adverse events following immunisation

Authors: **Ms Hazel Clothier**^{1,2,3}, Dr Nigel Crawford^{1,4}, Dr Melissa Russell³, Professor Heath Kelly⁴, Professor Jim Buttery^{1,2,5,6}

Affiliations: ¹SAEFVIC, Murdoch Children's Research Institute, Parkville, Australia, ²Monash Centre for Health Research and Implementation (MCHRI), Monash University, Clayton, Australia, ³School of Population & Global Health, University of Melbourne, Parkville, Australia, ⁴Department of Paediatrics, University of Melbourne, Carlton, Australia, ⁵Infection and Immunity, Monash Children's Hospital & Monash Immunisation, Monash Health, Clayton, Australia, ⁶Department of Paediatrics, Monash University, The Ritchie Centre, Hudson Institute, Clayton, Australia

Abstract:

Background: Following concerns regarding low reporting rates of adverse events following immunisation (AEFI) in Victoria, the Victorian DHHS funded a collaborative partnership to conduct enhanced passive AEFI surveillance system, integrated with clinical services, commencing 2007.

Objective: To evaluate "SAEFVIC" surveillance against its stated objectives at commencement: improve AEFI reporting; provide AEFI signal detection; and maintain consumer confidence in vaccination.

Methods: We conducted a retrospective structured desktop evaluation of AEFI reporting received by SAEFVIC from 2007–2014.

Results: AEFI reporting tripled since SAEFVIC commenced in 2007 (IRR 3.04; 95%CI 2.35, 3.93), raising Victoria to the lead jurisdiction by AEFI reports and rank third by reporting rate nationally. Data were utilised to investigate potential signal events and inform vaccine policy. Signal detection required clinical suspicion by surveillance nurses, or prior vaccine-specific concerns. A majority of patients experiencing AEFI continued with further vaccinations successfully, with vaccination post-AEFI documented for 56% (95%CI 54.1, 58.4) and the proportion of children due or overdue for vaccination only 2.3% higher for those reporting AEFI compared to the general population. No other metrics to measure the contribution of SAEFVIC to consumer confidence were identified.

Conclusion: SAEFVIC has improved AEFI surveillance, facilitated signal detection, investigation and validation, and supported revaccination after AEFI. Further work is needed to determine impact upon consumer confidence in immunisation. Expansion of

the system nationally through AusVaxSafety and the AEFI-Clinical Assessment Network will improve capacity and capability of vaccine pharmacovigilance, particularly through data consistency and linkage across jurisdictions and with the Therapeutic Goods Administration.

AusVaxSafety profiles of adverse events across the infant National Immunisation Program schedule

Authors: Ms Catherine Glover¹, Dr Helen Quinn^{1,2}, Ms Alexis Pillsbury¹, Ms Chloe Damon¹, Dr Alan Leeb³, Prof Kristine Macartney^{1,2,4}

Affiliations: ¹National Centre For Immunisation Research And Surveillance, Westmead, Australia, ²Discipline of Child and Adolescent Health, University of Sydney, Westmead, Australia, ³Illawarra Medical Centre, Ballajura, Australia, ⁴Department of Microbiology and Infectious Diseases, Children's Hospital at Westmead, Westmead, Australia

Abstract:

Background: AusVaxSafety conducts nationwide active vaccine safety surveillance of adverse events following immunisation (AEFI) to support post-marketing safety surveillance for vaccines on the National Immunisation Program. We analysed AEFI rates following infant immunisation with DTPa-hepB-IPV-Hib, 13-valent pneumococcal conjugate, and rotavirus vaccines.

Methods: De-identified, parent-reported AEFI were collected through text message solicitation by the data monitoring platform SmartVax. Data were analysed for the period 1 November 2016 to 31 December 2017 for infants aged 1–8 months. AEFI rates were calculated for each infant schedule point (2, 4, and 6 months) and overall.

Results: Of 24,957 participants, 2,759 (11.1%) had a reported AEFI and 234 (0.9%) had an AEFI for which medical attention was sought (were a medical attendance, 'MA'). The most commonly reported AEFI were irritability (4.0% overall and 65.1% of MAs) and fever (3.5% overall; 62.1% of MAs). Serious adverse events were rare: 1 infant (0.004%) had a seizure and 1 infant experienced non-responsiveness, though parents did not report seeking medical attention. 387 participants (1.6%) received another vaccine in addition to their scheduled vaccinations, most commonly meningococcal B (49.1%) or influenza (31.8%) vaccines. The AEFI rate in children receiving additional vaccine(s) was 16.5% (n=64); of these, 7 (1.8%) sought medical attention.

Conclusion: Parent-reported adverse event rates following routine infant immunisation were low and within expected ranges, which can reassure parents that immunisation of infants with multiple vaccines is safe. Further analysis will compare AEFI rates between schedule points and explore AEFI rates for participants across multiple schedule points.

Post vaccination febrile seizures: Clinical severity and outcome data is reassuring

Authors: Dr Lucy Deng^{1,2}, Professor Kristine Macartney^{1,2,3}, Dr Nigel Crawford^{4,5,6}, Dr Jim Buttery^{4,6}, Dr Michael Gold^{7,8}, Associate Professor Peter Richmond^{9,10}, Associate Professor Nicholas Wood^{1,2,3}

Affiliations: ¹National Centre for Immunisation Research and Surveillance, Westmead, Australia, ²The Children's Hospital at Westmead, Westmead, Australia, ³School of Child and Adolescent Health, University of Sydney, Sydney, Australia, ⁴Murdoch Children's Research Institute, Parkville, Australia, ⁵Royal Children's Hospital, Melbourne, Australia, ⁶Paediatrics Department, The University of Melbourne, Melbourne, Australia, ⁷Women's and Children's Hospital, Adelaide, Australia, ⁸Department of Paediatrics, University of Adelaide, Adelaide, Australia, ⁹Wesfarmer's Centre of Vaccines and Infectious Diseases, Telethon Kids Institute, University of Western Australia, Perth, Australia, ¹⁰School of Paediatrics and Child Health, University of Western Australia, Perth, Australia

Abstract:

Background: Febrile seizures (FS) are a common paediatric condition caused by sudden rise in temperature affecting 1 in 30 children aged <6 years. While vaccinations can cause FS, little is known on whether vaccine-proximate (VP-) FS differ clinically to non-vaccine proximate (NVP-) FS. We compared the clinical profile and outcomes of VP-FS to NVP-FS.

Methods: Prospective cohort study of children <6 years presenting with their first FS to paediatric hospitals in the Paediatric Active Enhanced Disease Surveillance (PAEDS) network between May 2013-June 2014. Clinical features, management and outcome data were compared between VP-FS and NVP-FS.

Results: Of 1095 first FS cases, 68 (6.2%) were VP-FS. Comparing VP-FS to NVP-FS, there was no increased risk of prolonged (>1 day) admission (OR 1.39, 95%CI 0.74-2.61), ICU admission (OR 0.60, 0.08-4.53), seizure duration >15 minutes (OR 1.39, 0.71-2.72), repeat FS within 24 hours (OR 0.80, 0.34-1.89) or requirements for antiepileptics (for inpatient management OR 1.75, 0.87-3.54 or on discharge: OR 1.03, 0.31-3.41). VP-FS cases with co-existing infective cause identified (11.8%) had an increased risk of prolonged admission (OR 22.7, 3.8-135.2) and seizure recurrence within 24 hours (OR 11.4, 1.8-72.0) compared to those without.

Conclusion: VP-FS accounted for a small proportion of FS presenting to paediatric hospitals. There was no difference in the clinical outcomes of VP-FS compared to NVP-FS, with the majority being simple febrile seizures requiring 1 day or less in hospital and no antiepileptic use. This is reassuring data for clinicians and parents of children who experience FS following vaccination.

An AusVaxSafety analysis of adverse events following receipt of pneumococcal polysaccharide vaccine

Authors: Dr Helen Quinn^{1,2}, Ms Catherine Glover¹, Ms Alexis Pillsbury¹, Ms Chloe Damon¹, Assoc. Prof. Kristine Macartney^{1,2}

Affiliations: ¹NCIRS, Westmead, Australia, ²Discipline of Child and Adolescent Health, University of Sydney, Westmead, Australia

Abstract:

Background: Local reactions are commonly reported following receipt of pneumococcal polysaccharide vaccine (PPV) and their frequency increases with revaccination. We explored the utility of AusVaxSafety to monitor adverse events following PPV in the elderly and in particular the rate of events in those receiving a first dose compared to a subsequent dose.

Methods: Data were sourced from a computer-based reporting tool, SmartVax, which captures patient reported outcomes via SMS within 3 days of vaccination. De-identified data were aggregated for analysis. Included individuals were those receiving PPV under the NIP schedule (aged ≥50 years if Aboriginal or Torres Strait Islander or else aged ≥65 years).

Results: Between 1 November 2016 and 31 December 2017, 2945 eligible people participated in surveillance, with 481 (16%) reporting an adverse event following immunisation and 31 (1%) reporting seeking medical attention for an adverse event. The most frequently reported adverse events were injection site reactions (8%). All participants received a concomitant vaccine at the time of receiving PPV; in the majority this was influenza vaccine (91%).

Conclusions: The percentage of participants reporting an adverse event was lower in our surveillance than in clinical trials where participants completed diary cards for solicited reactions. Very few adverse events were serious enough for participants to seek medical attention. Further analysis will explore whether adverse events are more common and serious following revaccination with PPV.

Enhanced passive surveillance of adverse events during an adolescent MenB vaccine program

Authors: Professor Helen Marshall^{1,2}, Associate Professor Ann Koehler^{3,4}, Associate Professor Nicole Pratt⁵, Dr Helen Quinn⁶, Ms Michele A'Houré³, Dr Nigel Crawford^{7,8}, Professor Kristine Macartney^{6,9}

Affiliations: ¹Vaccinology and Immunology Research Trials Unit, Women's & Children's Health Network, North Adelaide, Australia, ²Robinson Research Institute and Adelaide Medical School, The University of Adelaide, Adelaide, Australia, ³Communicable Disease Control Branch, SA Health, Government of South Australia, Adelaide, Australia, ⁴School of Population Health, The University of Adelaide, Adelaide, Australia, ⁵School of Pharmacy and Medical Sciences, University of South Australia, Adelaide, Australia, ⁶National Centre for Immunisation Research and Surveillance, Kids Research Institute, Sydney, Australia, ⁷Royal Children's Hospital, Melbourne, Australia, ⁸Murdoch Children's Research Institute, Melbourne, Australia, ⁹The University of Sydney, Sydney, Australia

Abstract:

Background: Clinical trials suggest 4CMenB is associated with increased reactogenicity in infants including increased rates of fever. Adolescents are another target group for meningococcal immunisation programs with limited safety data available. We assessed the safety of 4CMenB vaccine in the largest vaccinated adolescent cohort to date.

Methods: Cluster RCT of year 10-12 school students in South Australia with 237 participating schools randomised to intervention (4CMenB vaccine) or control (delayed vaccination). Vaccine safety was monitored by enhanced passive surveillance with reporting of any adverse events following immunisation (AEFI), by parents, students, teachers, and immunisation providers to a designated telephone line. All AEFI were reported to TGA and followed to resolution. Any unexpected serious AEFIs were referred to a Specialist Immunisation Service (SIS).

Results: A total of 34,600 students were enrolled in the study with 18,337 receiving vaccine from April-June 2017 and 96% receiving both doses (n=17,600). Median age was 16 years (range 13-58 years). Of a total of 139/35,937 (0.39%) AEFI reports in 138 students, 53 (including 6 serious AEFIs) underwent medical review with all able to be contacted (87%) fully recovered. One case of anaphylaxis was assessed as probably related to vaccine. Most common AEFIs reported were headache, injection site reaction and nausea. Eight students were reviewed at the SIS. AEFIs were reported less frequently following the second dose (53/17,600; 0.30%) compared to first dose (n=86/18,337; 0.47%;p=0.01)

Conclusion: Reporting of AEFI was low, with the expected AEFI profile of 4CMenB in adolescents and further reduced following the second dose.

Assessing the effect of swabbing practices on estimates of influenza vaccine effectiveness

Authors: Olivia Price¹, Sheena Sullivan¹, Kylie Carville²

Affiliations: ¹WHO Collaborating Centre For Reference And Research On Influenza, Melbourne, Australia, ²Victorian Infectious Diseases Reference Laboratory, Melbourne, Australia

Abstract:

Background: The precision of vaccine effectiveness (VE) estimates is dependent on total sample size and the method by which the participants of the study are sampled. In Victoria, participating general practitioners (GPs) swab as many patients with influenza-like illness (ILI) as feasible, while GPs in other states systematically swab 20% of ILI patients.

Methods: Following the test-negative design, patients presenting with ILI were recruited by GPs and tested for influenza. Descriptive analyses were conducted to assess potential selection bias introduced by GPs. VE was calculated using logistic regression as $[1 - \text{odds ratio}] \times 100\%$ and adjusted for week of presentation and age. Random 20% and 50% samples were selected without replacement to estimate the effect of swab rates on VE estimates.

Results: GPs swabbed a smaller proportion of patients ≥ 65 years (44.5%, n=520) than those aged < 5 years (74.3%, n=381), 5-17 years (64.5%, n=806) and 18-64 years (73.9%, n=3523). Decreasing the swab rate did not alter point VE estimates significantly. However, it did reduce the precision of the estimates and in some instances resulted in too small a sample size to estimate VE.

Conclusion: Imposing a 20% or 50% swabbing rate produces less robust VE estimates. The number of swabs required per year to produce precise estimates should be dictated by seasonal severity, rather than an arbitrary rate. It would be beneficial for GPs to swab patients systematically by age group to ensure there is sufficient data to investigate VE against a particular subtype in a given age group

Safety of Human Papillomavirus Vaccines: An Updated Review

Authors: Dr Anastasia Phillips¹, Ms Cyra Patel², Ms Alexis Pillsbury², A/Prof Julia Brotherton^{3,4}, Prof Kristine Macartney^{1,2}

Affiliations: ¹The University of Sydney, Sydney, Australia, ²National Centre for Immunisation Research and Surveillance, Sydney, Australia, ³National HPV Vaccination Program Register, Victorian Cytology Service, Melbourne, Australia, ⁴The University of Melbourne, Melbourne, Australia

Abstract:

Background: Human papillomavirus (HPV) vaccines are now included in immunisation programs in 71 countries. Unfortunately, uptake has been impacted in some countries by reduced confidence in the safety of the HPV vaccine. In 2013, we published an extensive review demonstrating a reassuring safety profile for bivalent (2vHPV) and quadrivalent (4vHPV) vaccines. A nonavalent (9vHPV) vaccine is now available and HPV immunisation programs have been extended to males in 11 countries.

Method: The aim of this updated narrative review was to examine the evidence on HPV vaccine safety, focusing on the 9vHPV vaccine, special populations and adverse events of special interest (AESI). The previous searches were replicated to identify studies to August 2016, including additional search terms for AESI.

Results: We identified 109 studies, including 15 population-based studies in over 2.5 million vaccinated individuals across six countries. All vaccines demonstrated an acceptable safety profile; injection-site reactions were slightly more common for 9vHPV vaccine than for 4vHPV vaccine. There was no consistent evidence of an increased risk of any AESI, including demyelinating syndromes or neurological conditions such as complex regional pain or postural orthostatic tachycardia syndromes.

Conclusion: The risk–benefit profile for HPV vaccines remains highly favourable. Communication regarding vaccine safety should be based on comprehensive review of the body of quality scientific evidence, as assumptions based on insufficient evidence may lead to unjustified loss of confidence in vaccine safety.

4A – Advocacy, Social Science & Special Populations

Hall C, 3:30pm - 5:00pm

Impact of 'No Jab' policies on parents and immunisation service, RCH, Melbourne

Authors: Dr Raffaella Armiento¹, Dr Nigel Crawford^{1,2}, Dr Kirsten Perrett^{1,2}, Ms Sonja Elia¹, **Dr Margie Danchin^{1,2}**

Affiliations: ¹Immunisation Service, Department of General Medicine, Royal Children's Hospital, Parkville, Australia, ²Murdoch Children's Research Institute, Parkville, Australia

Abstract:

Background: On 1st January 2016, policies were introduced in Victoria and nationally to target under and non-vaccination. There has been no formal evaluation of the policies to date. We aimed to ascertain the impact on parents, RCH immunisation service and vaccine uptake.

Methods: Parents/Guardians completed questionnaires between 1st October 2016-31st May 2017 in the nurse-led Drop in Centre (DIC) and clinician-led Specialist Immunisation Clinic (SIC). Clinicians completed post-consultation questionnaires and Australian Immunisation Register (AIR) data was accessed to ascertain vaccine uptake.

Results: Of 607 eligible patients, 393(87.1%) and 214(75.6%) were included from the DIC and SIC respectively. 11.5% and 15.4% of parents were motivated by the policies to attend the DIC and SIC respectively, with vaccine hesitant (VH) parents more motivated to attend than vaccine acceptors (38.1% vs 7.9%; difference 22.2%, CI 12-32.5%, p<0.01). Of the 10.7% (23/214) seeking medical exemptions, 65% (13/20) were motivated by policies but only 13.6% (3/22) were granted an exemption. More VH parents felt the policies forced/prompted them to vaccinate compared to vaccine acceptors (54.5% vs 7.8%; CI 36-57.4%, p<0.01). However only 8.3%(7/84), 20.2%(17/84) and 38.1%(32/84) of VH or refusing parents planned to fully, partially or refused to vaccinate respectively. Vaccine uptake one and seven months post attendance will be presented.

Conclusion: The policies have influenced hospital immunisation service attendance by VH parents, however more than a third continued to refuse vaccination despite the majority not receiving a medical exemption. In addition to vaccine uptake the social and financial impact of these policies on families and providers requires evaluation.

Vaccination hesitancy in the antenatal period: a cross-sectional survey

Authors: **Mr Paul Corben¹**, Associate-Professor Julie Leask^{2,3}

Affiliations: ¹Mid North Coast Local Health District, Port Macquarie, Australia, ²Sydney Nursing School, University of Sydney, Camperdown, Australia, ³School of Public Health, University of Sydney, Camperdown, Australia

Abstract:

Background: Better understanding of parents' vaccination attitudes and actions within the NSW North Coast, where regional immunisation coverage is the lowest nationally, may guide strategies to improve uptake. The antenatal period is when many parents explore and consolidate vaccination attitudes and so is pivotal for study.

Methods: Women attending antenatal clinics at six North Coast hospitals completed a 10-minute cross-sectional survey capturing vaccination hesitancy, attitudes, intentions and actions as well as stage of decision-making and decisional-conflict. For consented children, immunisation status was assessed at 8 months using the AIR.

Results: First-time mothers were 3 times more likely (OR =3.40, 95% CI 1.34-8.60) to identify as unsure, somewhat or very hesitant.

Most (92.2%) wanted their baby to receive all recommended vaccinations, yet many had high or moderate levels of concern about vaccine side effects (25.4%), safety (23.6%) and effectiveness (23.1%).

Increased hesitancy was associated with reduced confidence in the schedule (p<0.001), reduced trust in child's doctor (p<0.0001) reduced perceived protection from disease (p <0.05) and increased decisional conflict (p<0.0001). First-time mothers had higher decisional conflict on values clarity, support and uncertainty sub-scales.

By 8 months, 83.2% of infants were fully vaccinated. Those with none or few minor concerns were 8 times more likely to vaccinate on schedule (OR=8.7, 1.3-56.7)

Conclusions: Importantly this study provides further strong justification to talk with women about vaccination during pregnancy and to ensure that first-time mothers are offered assistance, where indicated. Further research should focus on optimising the timing, content and delivery style of perinatal interventions.

Supporting communication with vaccine-hesitant and declining parents attending two specialist immunisation clinics

Authors: Dr Susan Randall², **Dr Penelope Robinson**¹, Dr Holly Witteman³, Dr Nina Berry¹, Professor Paul Kinneresley⁴, Professor Lyndal Trevena⁵, Dr Margie Danchin⁶, Associate Professor Julie Leask²

Affiliations: ¹Sydney School Of Public Health, University Of Sydney, Sydney, Australia, ²Sydney Nursing School, University of Sydney, Sydney, Australia, ³Faculty of Medicine, Université Laval, Laval, Canada, ⁴School of Medicine Cardiff University, Cardiff, United Kingdom, ⁵Discipline of General Practice, Sydney Medical School, Sydney, Australia, ⁶Murdoch Children's Research Institute, Melbourne, Australia

Abstract:

Background: Health professionals are key in addressing parental hesitancy about vaccination, but they often find these consultations challenging. Although Australian health professionals employ a range of strategies during challenging vaccination consultations with parents, previous research suggests many would welcome tools to support these encounters. This study aimed to assess the utility of a package of communication support tools designed for use during consultations with vaccine-hesitant and declining parents.

Methods: We audio-recorded consultations between parents and clinicians before and after they attended "Sharing Knowledge About Immunisation" (SKAI) training. SKAI supports vaccination communication by offering training and tips for health professionals and parent-friendly resources, tailored to meet the needs of accepting, hesitant or declining parents. We analysed 8 pre- and 4 post-intervention paediatric consultations using a priori codes based on communication skills described in the Calgary-Cambridge and motivational interviewing literature.

Results: Clinicians demonstrated sophisticated rapport-building skills and listened carefully to parents' concerns but did not consistently elicit concerns to saturation. This affected subsequent agenda setting. Several opportunities to inform and recommend vaccination were missed, despite cues from parents. Clinicians found these encounters difficult to terminate, suggesting that closure is a communication task that could be enhanced. We did not observe significant changes in clinicians' behaviour and use of SKAI resources after attending training.

Conclusion: The pilot study indicates a need to strengthen skills-based specificity, practice, and feedback to ensure the SKAI training equips clinicians to meet the challenges of working with hesitant and declining parents.

The WHO Tailoring Immunization Programmes approach.

Authors: **Associate Professor Julie Leask**¹, Dr Ève Dubé², Ms Katrine Bach Habersaat³, Mr Robb Butler³

Affiliations: ¹University Of Sydney, Camperdown, Australia, ²Laval University, Québec, Canada, ³WHO Regional Office for Europe, Copenhagen, Denmark

Abstract:

Context: Epidemics of measles in the European region, along with declining or stagnating MMR and DTP coverage in some population groups prompted the WHO Regional Office for Europe to develop the Guide to Tailoring Immunization Programmes (TIP) in 2012. Using behavioural insights, TIP offers countries a process through which to diagnose barriers and motivators to vaccination in populations with low coverage and tailor the interventions.

Process: A review of TIP implementation was conducted by a 6-member expert committee in 2017. It focused on countries conducting a TIP project: Bulgaria, Lithuania, Sweden and the UK.

Analysis: The review identified strengths of the TIP approach to be the social science research, interdisciplinary approach and community engagement which together enhanced the understanding of perspectives. For example, in Sweden a process involving local stakeholders found that barriers to MMR vaccination in the Somali community included concerns about autism that needed to be more explicitly addressed. Change focused on the oral tradition of information provision, which was critical in the community. There were informational seminars; community stakeholder meetings; local professional engagement; and a building of local provider capacity to answer parental questions about autism.

Outcomes: In the future, TIP will include a stronger focus on the design of strategies and appropriate and effective interventions to ensure long-term change. Further work in 2017 refined the TIP process with a more explicit linkage to behavior change theory and moving more rapidly to intervention. The TIP process has also been used Australia with a project in Maitland NSW.

SMS Pre-Call Program to increase immunisation coverage and timeliness in Central Queensland

Authors: Mrs Dianne Krenske¹, Miss Jane Manderson¹

Affiliations: ¹*Central Queensland Public Health Unit, Rockhampton, Australia*

Abstract:

We tested an SMS Pre-call messaging program utilising HBCIS (Hospital Based Corporate Information System) to increase childhood immunisation coverage and timeliness in Central Queensland (CQ).

We used an experimental study design with before and after comparison and also comparison with a region with similar demographics to assess the change in immunisation coverage and timeliness. All children born between 01/10/2015 and 30/09/2016 in the Gladstone Region identified through monthly HBCIS (public) and child health referrals (private) were included in this study.

The HBCIS SMS tool for clinic appointments sent an SMS message 5 days prior to their 6 weeks and 4,6 and 12 months vaccination due dates prompting parents to make an appointment. AIR and VIVAS was used to determine the vaccination status for each child at 3, 6 and 12 months post vaccination due date.

880 children were included in the study. Immunisation coverage and timeliness improved in the intervention group. This was most marked in the indigenous group and particularly at the 6 month vaccination point with 24.8% improvement in vaccination coverage within 7 days of the due date and 22.6% within 31 days of the due date.

An evaluation survey conducted among the participating parents showed overwhelming support for the SMS reminders to continue.

We are now looking at implementing an ongoing SMS pre-call program for all Aboriginal and Torres Strait Islander children in the CQ Hospital and Health Service area.

Consumer knowledge, attitudes and behaviours regarding the national shingles vaccination program

Authors: Dr Jennifer O'Dea¹, Dr Aditi Dey¹, Dr Mohamed Tashani¹, Dr Frank Beard¹

Affiliations: ¹*The National Centre for Immunisation Research & Surveillance, Kids Research Institute, The Sydney Children's Hospitals Network, Westmead, Australia*

Abstract:

Background: From 1 November 2016, Zostavax[®] was provided free for people aged 70 years under the National Immunisation Program (NIP) with a five year catch-up for people aged 71 – 79 years. As the zoster program is a large new program for an age group not previously targeted under the NIP, our aims were to assess knowledge, attitudes and behaviours (KAB) of consumers on the zoster immunisation program and related issues.

Methods: A national survey of consumers aged 70 years and older was conducted using Computer Assisted Telephone Interviewing from 4 to 14 September 2017.

Results: Four hundred and three consumers (mean age 73.9 years, 53% female) participated in the survey. The majority had heard of shingles (96%); knew someone who had shingles (87%) were aware of the new vaccine (87%) and 26% had had shingles with 98% diagnosed by a doctor. Approximately 48% had been vaccinated; 50% intended to vaccinate and 47% had been recommended the vaccine by their doctor. Also, 82% knew shingles is caused by the same virus as chickenpox; causes a painful rash (90%); and the vaccine is free for 70-79 year olds (74%). Females generally had better knowledge than males. However, there was some uncertainty with some consumers answering that they "did not know" about vaccine side effects (42%), vaccine effectiveness (19%), vaccine safety (18%) and their risk of the disease (13%).

Conclusion: KAB of consumers on shingles was satisfactory almost a year after rollout. Ongoing consumer education on zoster vaccination is recommended.

4B – Vaccine Preventable Diseases

Room E1, 3:30pm - 5:00pm

Impact of Australian Rotavirus Vaccination Program in Infants

Authors: Simon Chun-yin Li¹, Dr Aditi Dey², Dr Helen Quinn², Dr Frank Beard², Professor Kristine Macartney²

Affiliations: ¹University Of Sydney, Camperdown, Australia, ²National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases, Westmead, Australia

Abstract:

Background: Rotavirus vaccine, introduced into the Australian National Immunisation Program in 2007, has had a major impact on disease in children. However, few studies have focused on infants (aged ≤ 12 months), particularly those in the first months of life. We examined vaccine program impact in this particularly vulnerable group.

Methods: Data on hospitalisations coded as rotavirus (A08.0 (ICD-10-AM)) in infants between 1999 and 2013 were sourced from the National Hospital Morbidity Database of Australian Institute of Health and Welfare. Data were analysed by 2-month age groups, jurisdiction, and Indigenous status. Age-specific incidence rate ratios (IRR) and 95% confidence intervals (CI) were calculated. A clinical chart review to validate coding and explore clinical features of hospitalisation was performed at three Australian hospitals.

Results: There was a 71% decline in rotavirus-coded hospitalisation rates in infants between the pre-vaccine (1999 to 2005) and post-vaccine (2008 to 2013) periods from 405 per 100 000 to 120 per 100 000 (IRR 0.71; 95% CI, 0.68-0.74). The decrease was significant across all ages, except those aged < 2 months. Reductions were greater in Indigenous compared to non-Indigenous children, particularly in the Northern Territory (48% vs. 79% reductions, respectively). An association was found between rotavirus infection and prematurity and congenital conditions, which was also seen in detailed review of 55 hospitalisations.

Conclusion: There has been a sustained reduction in rotavirus-coded hospitalisation rates in infants that is less evident in those aged < 2 months. A vaccine given at birth is in development, and could help address this persistent burden.

Impact of rotavirus vaccine among Australian Aboriginal and non-Aboriginal children

Authors: Dr Parveen Fathima¹, Dr Thomas Snelling^{1,2,3}, Associate Professor Heather Gidding^{4,5}, Professor Nicholas de Klerk¹, Associate Professor Christopher Blyth^{1,2,6,7}, Dr Sarah Sheridan⁴, Professor Peter McIntyre⁵, Associate Professor Bette Liu⁴, Dr Hannah Moore¹

Affiliations: ¹Wesfarmers Centre of Vaccines and Infectious Diseases, Telethon Kids Institute, Perth, Australia, ²Department of Infectious Diseases, Princess Margaret Hospital for Children, Perth, Australia, ³Menzies School of Health Research, Charles Darwin University, Darwin, Australia, ⁴School of Public Health and Community Medicine, UNSW Medicine, University of New South Wales, Sydney, Australia, ⁵National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases, The Children's Hospital at Westmead, Sydney, Australia, ⁶PathWest Laboratory Medicine WA, QEII Medical Centre, Perth, Australia, ⁷School of Paediatrics and Child Health, The University of Western Australia, Perth, Australia

Abstract:

Background: Marked declines in gastroenteritis hospitalisations have been demonstrated since the rotavirus vaccine program was implemented in Australia in mid-2007. Declines have occurred among both Aboriginal and non-Aboriginal children, but the proportional decline for Aboriginal children has been smaller. We compared the direct impact of rotavirus vaccine against notified rotavirus infection among Aboriginal and non-Aboriginal children.

Methods: Perinatal records for children born in NSW (2010-2012) and WA (2007-2012) were probabilistically linked to immunisation and rotavirus notification records up to 2013. The child was deemed to be fully vaccinated on receipt of two doses of Rotarix vaccine or three doses of RotaTeq vaccine. Cox models were used to estimate the adjusted hazard ratio (aHR) of notification among fully vaccinated compared with unvaccinated children < 2 years old, adjusting for remoteness, socio-economic status, mode of delivery and year of birth.

Results: Rotavirus notification rates were 3.5/1000 person-years (95% CI:3.0-4.1) among Aboriginal and 1.7/1000 person-years (95% CI: 1.6-1.8) among non-Aboriginal children. Compared to unvaccinated children, the aHR for notification was 0.38 (95%CI:0.23-0.61) for fully vaccinated Aboriginal children, and 0.79 (95% CI:0.64-0.98) for fully vaccinated non-Aboriginal children.

Conclusion: We showed a moderate direct benefit of vaccination among Aboriginal children. While crude rotavirus notification rates are low for non-Aboriginal children since introduction of the program, the direct benefit of vaccination appears, paradoxically, more modest in these children. We speculate that our lower-than-expected measured protection might be an artefact caused by falsely positive laboratory tests in the context of a very low true incidence of infection.

The state of school-based HPV-vaccination in three states: where are the gaps?

Authors: [Jana Sisnowski](#)^{1,2}, Rebecca Lorch¹, Julia Brotherton^{3,4}, Heather Frances Gidding^{5,6}, Rachel Skinner^{7,8}, Vicky Sheppard^{9,10}, Mark Veitch¹¹, Paul Effler¹², Sharyn Burns¹³, Karen Canfell^{7,14}, Jane Hocking⁴, Melissa Kang¹⁵, Michael Kidd^{16,17}, Lena Sanci¹⁸, Linda Selvey¹⁹, Meredith Temple-Smith¹⁸, Alison Venn²⁰, Handan Wand¹, Lisa Whop²¹, John Kaldor¹, Rebecca Guy¹, on behalf of the HPV Vaccination Partnership Project

Affiliations: ¹Kirby Institute, University of New South Wales, Australia, ²National Centre for Epidemiology and Population Health, Australian National University, Australia, ³Victorian Cytology Service, Australia, ⁴Melbourne School of Population and Global Health, University of Melbourne, Australia, ⁵School of Public Health and Community Medicine, UNSW Medicine, University of New South Wales, Australia, ⁶National Centre for Immunisation Research and Surveillance, Westmead, Australia, ⁷University of Sydney, Australia, ⁸Children's Hospital Westmead, Australia, ⁹Communicable Diseases Branch, Health Protection NSW, Australia, ¹⁰School of Public Health, University of Sydney, Australia, ¹¹Tasmanian Department of Health and Human Services, Australia, ¹²Communicable Disease Control Directorate, Department of Health, Western Australia, Australia, ¹³School of Public Health, Curtin University, Australia, ¹⁴Cancer Council NSW, Australia, ¹⁵University of Technology Sydney, Australia, ¹⁶Southgate Institute for Health, Society and Equity, Flinders University, Australia, ¹⁷Department of Family and Community Medicine, University of Toronto, Canada, ¹⁸Department of General Practice, University of Melbourne, , Australia, ¹⁹School of Public Health, University of Queensland, Australia, ²⁰Menzies Institute for Medical Research, University of Tasmania, Australia, ²¹Wellbeing and Preventable Chronic Disease Division, Menzies School of Health Research, Australia

Abstract:

Background: Australia has offered school-based HPV vaccination to adolescent females since 2007, and males since 2013. By international comparison, coverage is generally high. However, disparities persist and have not been examined at the school-level. Using data from NSW, Tasmania, and Western Australia, we identified schools and areas with low vaccination initiation.

Methods: We used National HPV Vaccination Program Register and school enrolment data to determine vaccination initiation rates (first doses/total enrolments) in 2016 for schools with available data and enrolments ≥ 10 . We calculated the proportion of schools with initiation rates of $< 80\%$ (low) and $< 70\%$ (very low), and the proportion of Statistical Areas (SA3) containing ≥ 2 schools in which $\geq 50\%$ of schools had initiation rates below these levels.

Results: 1,259 schools and 128 SA3s (90% of all SA3s) were included. For females, the median school initiation rate was 85% (interquartile range (IQR):75-91%); 34% of schools had low initiation rates; 17% very low rates. In 31% of SA3s, $\geq 50\%$ of schools had low initiation rates. For males, the median initiation rate was lower at 82% (IQR:71-89%); a greater proportion of schools had low (42%) and very low (23%) initiation rates; and more SA3s (40%) had $\geq 50\%$ of schools with low initiation rates. Outcomes varied by state.

Conclusion: Over one third of schools had low initiation rates and in over one third of SA3s, the majority of schools had low initiation rates. These data will guide further research to understand the drivers of variation, inform initiatives to address gaps, and evaluate cost-effectiveness.

Randomised controlled trial of a multi-component intervention to improve school-based HPV vaccination

Authors: [Dr Tanya Stoney](#)¹, Ms Cristyn Davies², Associate Professor Spring Cooper³, Professor Helen Marshall^{4,5,6}, Ms Jane Jones¹, Dr Joanne Collins^{4,6}, Mrs Heidi Hutton¹, Dr Adriana Parrella^{4,6}, Dr Kevin McGeechan², Professor Gregory Zimet⁷, Associate Professor David G Regan⁸, Ms Patricia Whyte⁹, Associate Professor Julia ML Brotherton¹⁰, Dr Peter Richmond^{1,11,12}, Professor Kirsten McCaffery², Professor Suzanne M Garland^{13,14,15}, Professor John Kaldor⁸, Professor Annette Braunack-Mayer⁶, Dr Melissa Kang², Professor S.Rachel Skinner²

Affiliations: ¹Wesfarmers Centre of Vaccines and Infectious Diseases, Telethon Kids Institute, Perth, Australia, ²The University of Sydney, Sydney, Australia, ³City University of New York, New York, United States of America, ⁴Women's and Children's Hospital, Adelaide, Australia, ⁵Robinson Research Institute, Adelaide, Australia, ⁶The University of Adelaide, Adelaide, Australia, ⁷Indiana University, Indianapolis, United States of America, ⁸The Kirby Institute, University of New South Wales, Sydney, Australia, ⁹Deakin University, Melbourne, Australia, ¹⁰National HPV Vaccination Program Register, Melbourne, Australia, ¹¹Princess Margaret Hospital for Children, Perth, Australia, ¹²The University of Western Australia, Perth, Australia, ¹³The Royal Women's Hospital, Melbourne, Australia, ¹⁴Murdoch Children's Research Institute, Melbourne, Australia, ¹⁵The University of Melbourne, Melbourne, Australia

Abstract:

Background: We evaluated a multi-component intervention to improve student knowledge, vaccine-related psycho-social outcomes and HPV vaccine uptake. We previously reported no vaccine coverage increase, but significant improvements in student knowledge, decisional involvement, and vaccine-related confidence and anxiety. Here we present process evaluation findings including implementation and impact of logistical components.

Methods: We recruited a stratified random sample of 40 schools (6,967 students) across two Australian states, and randomly allocated schools to intervention (21) or control (19) groups. Intervention schools implemented adolescent education and programmatic logistical strategies. Outcomes included vaccine uptake; student knowledge, decision-making involvement, vaccine-related confidence and anxiety; consent form return rates, time to vaccinate and a vaccination-room set up score, assessing compliance with best practice recommendations.

Results: In intervention schools, mean implementation score for vaccination room set-up was higher: 7.3 versus 5.8 (adjusted difference 1.5; 95%CI=0.2, 2.7) and average time to vaccinate 50 students was shorter: HPV dose 1 = 243 versus 354 minutes (adjusted difference -117; 95%CI=-244, 10), HPV dose 2 = 223 versus 281 minutes (adjusted difference -53; 95%CI=-179, 51), HPV dose 3 = 151 versus 271 minutes (adjusted difference -123; 95%CI=-208, 38). There was no significant difference in consent form return rates: 87.2% versus 87.9% (adjusted difference 3.2, 95%CI=-3.4, 9).

Conclusion: Education and effective logistic improvements can be successfully implemented in mass school-based vaccination. Our intervention improved adolescent HPV knowledge and vaccination experience and reduced time taken to vaccinate, suggesting an improved experience also for school and immunisation staff and a more efficient program.

Prospects of a new generation recombinant acellular pertussis vaccine in Australia

Authors: Dr Anita van den Biggelaar^{1,2,3}, Dr Punnee Pitisuttithum⁴, Dr Kulkanya Chokeyhaibulkit⁵, Dr Chukiat Sirivichayakul⁶, Dr Sirintip Sricharoenchai⁵, Dr Souad Mansouri^{1,2}, Laurent Dapremont^{1,2}, Dr Hong Thai Pham², Dr Simonetta Viviani²

Affiliations: ¹Technovalia, Australia, ²BioNet, Bangkok, Thailand, ³Telethon Kids Institute, Australia, ⁴Vaccine Trial Centre, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand, ⁵Department of Paediatrics, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand, ⁶Department of Tropical Paediatrics, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand

Abstract:

The effectiveness of acellular pertussis vaccines used in Australia is short-lived, which has contributed to a resurgence of pertussis.

A new generation recombinant acellular pertussis vaccine containing genetically-inactivated pertussis toxoid (PT) and filamentous hemagglutinin (FHA) has been developed and licensed for vaccination of adolescents and adults in Thailand as a monovalent vaccine (aP(PTgen/FHA), Pertagen®), or combined with diphtheria and tetanus (Tdap(PTgen/FHA), Boostagen®). In a phase II/III randomized controlled trial including 300 healthy Thai adolescents (12-17 years old), seroconversion rates (≥ 4-fold increase) for PT-IgG antibodies 28 days after vaccination were superior in subjects vaccinated with one dose of aP(PTgen/FHA) (96%) or Tdap(PTgen/FHA) (97%) compared to Tdap (55%) (P < 0.001). One year after vaccination 82% and 75% of participants vaccinated with aP(PTgen/FHA) or Tdap(PTgen/FHA) respectively, remained seroconverted for PT-IgG compared to 4% of participants vaccinated with the comparator (P < 0.001). Results for PT neutralizing antibodies were comparable to those for PT-IgG. Also seroconversion rates for FHA-IgG were significantly higher 28 days and 1 year after vaccination with aP(PTgen/FHA) (D28, 93%; Y1, 64%) or Tdap(PTgen/FHA) (D28, 83%, Y1, 56%) compared to Tdap (D28, 54%; Y1, 28%) (P < 0.001).

This new generation recombinant pertussis vaccine has the potential to increase immunity levels in the community and reduce disease; however, it is yet not available in Australia. Clinical trials in Australia shall provide insight the vaccine's performance and benefits under Australia's immunisation schedule and may lead to licensure for use in children, adolescents, and adults including pregnant women.

Respiratory syncytial virus burden in the Australian population, 2006-2015

Authors: Ms Gemma Saravanos^{1,2}, Professor Kristine Macartney^{1,2,3}, Dr Aditi Dey^{1,2}, Ms Han Wang¹, Meru Sheel^{1,2}, Associate Professor Nicholas Wood^{1,2,3}

Affiliations: ¹National Centre For Immunisation Research And Surveillance, Westmead, Australia, ²University of Sydney, Camperdown, Australia, ³The Children's Hospital at Westmead, Westmead, Australia

Abstract:

Background: National data on Respiratory Syncytial Virus (RSV) disease burden has not been reported in almost two decades. Meanwhile RSV vaccines have been in active development. This analysis aimed to describe the burden of RSV-associated hospitalisation in the Australian population, with a focus on aged-based high risk groups, to inform future immunisation strategies.

Methods: RSV associated ICD-10-AM coded hospitalisation data from the National Hospital Morbidity Database were sourced for 2006 to 2015 inclusive. Numbers, rates and trends by age, gender, Indigenous status and in-hospital deaths were analysed for principal and any diagnosis RSV-specific codes.

Results: There were 86,687 RSV coded hospitalisations including 63,814 where RSV was the principal diagnosis. Of these, 51.5% (32,855) were infants aged <6 months and 2.7% (1,742) were adults aged ≥65 years. Annual hospitalisation was 2223.8 and 5.7 per 100,000 for infants and adults respectively. Annual hospitalisation rates showed a trend of increasing over time in both groups. Hospitalisation rates peaked at 1 month of age (3567.4) with males more commonly hospitalised (IRR 1.2; 95% CI 1.2-1.3). Hospitalisation resulted in death in 0.2% (138), of these 82 (59.4%) were aged ≥65 years and 7 (5.1%) were aged <6 months.

Conclusion: This data emphasises the significant burden of RSV in these groups. Increasing hospitalisation over time likely reflects increased testing. Estimated in-hospital RSV-associated deaths likely underestimate true RSV-related mortality. This analysis may inform examination of the potential benefits of RSV vaccination in different age groups, however further research is needed to better understand RSV-associated deaths and testing practices.

4C – Special Populations

Room E2, 3:30pm - 5:00pm

Re-vaccination following Haematopoietic Stem Cell Transplant: review of a collaborative mode

Authors: Ms Leanne Philips¹, Doctor Chris Fraser², Mrs Courtney Sadleir¹, Mrs Jill Shergold², Doctor Julia Clark^{1,3,4}, Doctor Justyna Ostrowski², Doctor Sophie Wen^{1,3}

Affiliations: ¹Queensland Specialist Immunisation Service, Lady Cilento Children's Hospital, Brisbane, Australia, ²Children's Health Queensland Blood and Marrow Transplant Services, Brisbane, Australia, ³Infection Management and Prevention Service, Lady Cilento Children's Hospital, Brisbane, Australia, ⁴University of Queensland, Brisbane, Australia

Abstract:

Context: Children's Health Queensland Blood and Marrow Transplant Services and Queensland Specialist Immunisation Service (QIS) use a collaborative model to re-immunise patients following haematopoietic stem cell transplant (HSCT).

Process: This is a retrospective review of the immunisation status of children who received a HSCT during a 3-year period (2013-2015). Demographics, transplant details and vaccination history were obtained from hospital records, Australian Immunisation Register and Queensland immunisation register.

Analysis: Eighty-one patients were transplanted (67 allogenic and 14 autologous). Indications include: malignant (58) and non-malignant (23). Median transplant age: 8 years (range 0-17 years). There were 23 deaths.

Fifty (62%) children were referred to QIS; 86%(43/50) in line with recommendations and 92% (46/50) attended specialist immunisation clinics. Completion of vaccine course was delayed in 8 due to clinical contraindications. In those with no contraindications, 81% (34/42) completed a primary course of inactivated vaccines within the recommended time period. Seven patients' vaccinations were delayed due to social factors (failure to make appointment and vaccine refusal). At 2 years post-HSCT, live vaccines were contraindicated in 32% (16/50) and 70% (23/33) received on time. Again vaccine refusal and failure to make appointments contributed to non-compliance (10/33).

Outcomes: This collaborative model of care is an effective strategy to meet the needs of HSCT patients. Referrals are timely however vaccine refusal and appointment scheduling remain significant factors for non-compliance. Processes are required to support those failing to make appointments and further attention needed to address concerns of vaccine refusal families.

Exploring inequities for immunisation and vaccine-preventable diseases among migrant and refugee children

Authors: Dr Nadia Charania¹, Dr Janine Paynter², Dr Arier Lee², Ms Donna Watson², Dr Nikki Turner³

Affiliations: ¹Auckland University Of Technology, Auckland, New Zealand, ²University of Auckland, Auckland, New Zealand, ³Immunisation Advisory Centre, Auckland, New Zealand

Abstract:

Background: Migrants (including refugees) generally experience immunisation inequities and a higher burden of vaccine-preventable diseases (VPDs) compared to host populations. This study explored immunisation rates and VPD burden among migrant and non-migrant children in New Zealand (NZ).

Methods: A retrospective cohort study was conducted linking de-identified data collected between 2006-2015 from government sources using Statistic NZ's Integrated Data Infrastructure. Vaccination coverage and VPD-associated hospitalisations were compared between three cohorts of children up to 5 years old: (A) foreign-born who migrated to NZ (N=75,375); (B) NZ-born to recent migrant mothers (N=50,136); and (C) a comparator group, NZ-born to non-migrant mothers (N=567,408).

Results: A considerable proportion of children, particularly those foreign-born, had no record of enrolment or vaccination on the National Immunisation Register (NIR). Compared to NZ-born children, foreign-born children had lower vaccination rates. Among foreign-born children, those on refugee visas and of Pacific ethnicities had particularly low age-appropriate vaccination rates. VPD-related hospitalisations were generally higher for NZ-born children compared to foreign-born children. High VPD-associated hospitalisations were noted among children of Pacific ethnicities across all cohorts, and for migrant children (cohorts A & B), those with refugee backgrounds.

Conclusion: High rates of foreign-born migrant children lacking NIR records suggest recording issues and/or challenges around engagement with services. Targeted efforts are needed to reduce immunisation inequities and high burden of VPDs particularly for Pasifika children and children with refugee backgrounds. Our findings support monitoring immunisation and VPD rates by migrant background to inform improvements to policy and practice for wider population health benefits.

Barriers and facilitators of immunisation in East-African refugees and migrants in Australia.

Authors: Miss Ikran Abdi, Dr Holly Seale, Dr Rob Menzies

Affiliations: ¹University of New South Wales, Kensington, Australia

Abstract:

Background: Immunisation programs available in low and middle-income countries include fewer vaccines when compared to Australia's National Immunisation Program. As a result, refugees and migrants may be at heightened risk of being inadequately immunised and consequently, may have incomplete immunisation records upon arrival to Australia. Given the pivotal role immunisation plays in preventing the risk and spread of infectious diseases, under-immunisation of refugees and migrants is a major public health concern as it can lead to infectious disease outbreaks amongst the wider community. Several studies have suggested that East African immigrants have low vaccination coverage. As such, the aim of this study is to explore the underlying attitudes, barriers and facilitators to immunisation in east African communities in NSW.

Methods: Face-to-face, semi structured in-depth interviews are being undertaken with refugees and migrants from four key East African countries: Kenya, Somalia, Ethiopia and Eritrea. Thematic analysis will be undertaken to analyse and interpret the results.

Results: Based on the interviews conducted to date, language barriers and a lack of interpreters are the key barriers identified by participants. Key facilitators mentioned included resources in participants' languages and more health education.

Conclusions: Based on the current findings, it is apparent that further exploration is needed to examine how messages about immunisation are being disseminated to refugee and migrant communities. Current findings also support the need to improve the health literacy of refugees and migrants by providing culturally and linguistically appropriate resources in participants' respective languages.

Innovative hepatitis A outbreak response: outreach immunisation at a sex-on-premises venue

Authors: Mr Tom Rees¹, Mr Christian Peut¹

Affiliations: ¹SA Health, Adelaide, Australia

Abstract:

In late 2017, the South Australian (SA) Communicable Disease Control Branch (CDCB) noted an outbreak of locally acquired hepatitis A (HAV). HAV is not endemic in Australia. Sixteen cases of HAV were notified in November and December 2017, compared to an average of eight cases notified annually in SA from 2012 to 2016. Ten cases identified as men who have sex with men (MSM).

The epidemiology of the SA outbreak is similar to concurrent outbreaks in Europe, NSW, and Victoria. Casual, anonymous sex amongst gay men and other MSM facilitated by dating apps and sex on premise venues (SOPV) was identified as a driver of these outbreaks. The European Centre for Disease Control noted "the main prevention measure in the context of current outbreaks is HAV vaccination of MSM". Further, HAV vaccination of MSM is recommended in The Australian Immunisation Handbook.

In addition to standard outbreak response protocol, SA Health funded a targeted HAV vaccination program for gay men and other MSM, supported by the delivery of a community-led outreach immunisation clinic in an Adelaide SOPV.

Evaluation of the impact of SA's response to this outbreak (particularly, key successes and barriers to the implementation of a community-led outreach immunisation clinic in an Adelaide SOPV) is ongoing.

This presentation seeks to contribute to the evidence base for targeted, effective response to outbreaks of HAV amongst MSM, and novel methods to expedite vaccine uptake in this cohort. For example, through partnership with community-based organisations and venues accessed by the target population.

Medical Conditions as Risk Factors for Invasive Meningococcal Disease

Authors: Ms Cindy Peng¹, Dr Nigel Crawford², Ms Cyra Patel¹, Ms Catherine King¹, Dr Clayton Chiu¹, Dr Jean Li-Kim-Moy¹, Prof Peter McIntyre¹

Affiliations: ¹National Center for Immunisation Research and Surveillance, Sydney, Australia, ²Department of Paediatrics, University of Melbourne, Melbourne, Australia

Abstract:

Background: Invasive meningococcal disease (IMD) is a rare but serious infection caused by *Neisseria meningitidis*. Some medical conditions are considered to be risk factors for IMD, largely based on immunological principles. Empirical evidence is essential to inform clinical practice and vaccination policy.

Methods: We conducted a comprehensive literature search in Medline and Embase up to December 2017. Studies that investigated medical conditions as IMD risk factors and either quantified the magnitude of increased risk, or the immunogenicity of meningococcal vaccines, were included.

Results: We identified 51 relevant studies. The quality of evidence varied significantly for different risk factors. Large cohort studies consistently showed a 10-fold increased IMD risk in adults with HIV infection. Indirect evidence comparing IMD incidence in the general population with individuals that had a complement deficiency or receive eculizumab treatment suggested an elevated risk of up to several thousand times. Hematopoietic stem cell transplant and asplenia were shown to be associated with an increased risk for severe bacterial infection; however, *N. meningitidis* only accounted for 0-14% of such cases and the risk specific for IMD could not be determined. Immunogenicity findings from small case-control and case-series studies suggested an insufficient vaccine response in immunocompromised individuals and a potential need for multiple doses.

Conclusions: There is paucity of high-quality evidence that ascertains medical risk factors for IMD. Given the rarity of both IMD and some medical conditions, large population studies, particularly those utilising registry databases with the capacity to investigate comorbidities, would be informative.

Association of social contact, ethnicity, and pneumococcal carriage post-PCV10 introduction in Fiji

Authors: Ms Eleanor Neal¹, Dr Stefan Flasche², Ms Tupou Ratu³, Dr Eileen Dunne¹, Sr Lanieta Koyamaibole^{†3}, Ms Rita Reyburn¹, Dr Eric Rafai³, Dr Mike Kama³, Ms Belinda Ortika¹, Dr Joseph Kado⁴, Dr Lisi Tikoduadua³, Dr Rachel Devi³, Dr Evelyn Tuivaga³, Dr Catherine Satzke¹, Professor Edward Kim Mulholland¹, Dr Cattram Nguyen¹, Professor John Edmunds², Associate Professor Fiona Russell¹

Affiliations: ¹*Pneumococcal Research, Murdoch Children's Research Institute, Parkville, Australia*, ²*Department of Infectious Disease Epidemiology, London School of Hygiene and Tropical Medicine, London, United Kingdom*, ³*Ministry of Health and Medical Services, Suva, Fiji*, ⁴*Department of Public Health and Primary Care, Fiji National University, Suva, Fiji*, ⁵*Department of Paediatrics, The University of Melbourne, Parkville, Australia*, ⁶*Department of Microbiology and Immunology, The University of Melbourne at the Peter Doherty Institute for Infection and Immunity, Parkville, Australia*

Abstract:

Background: Indigenous Fijians (iTaukei) have greater pneumococcal nasopharyngeal (NP) carriage and density burdens than Fijians of Indian Descent (FID). We report the association between ethnicity, social contact, and pneumococcal NP carriage of 10-valent pneumococcal conjugate vaccine (PCV10) vaccine serotypes (VTs) and non-vaccine serotypes (NVTs) in Fiji, three years post-PCV10 introduction.

Methods: NP swabs were collected from infants (5-8 weeks) toddlers (12-23 months), young children (2-6 years), and caregivers (n=2,020). Risk factors and contacts were recorded by questionnaire. LytA qPCR determined carriage, with molecular serotyping by microarray. Potential risk factors were examined using generalised estimating equations.

Results: iTaukei had greater carriage prevalence, contacts, and household size compared with FID. VT carriage was associated with iTaukei ethnicity (aOR 1.70 [95%CI 1.05–2.75] p=0.031), physical contact with 7-14 year olds (aOR/additional contact 1.25 [95%CI 1.07–1.47] p=0.006), and acute respiratory infection (ARI) (aOR 1.51 [95%CI 1.00–2.28] p=0.051). NVT carriage was associated with iTaukei ethnicity (aOR 6.00 [95%CI 4.49–8.00] p<0.001), ARI (aOR 1.85 [95%CI 1.45–2.36] p<0.001) and physical contact with toddlers (aOR/additional contact 1.24 [95%CI 1.01–1.52] p=0.042) and young children (aOR 1.13 [95%CI 1.00–1.27] p=0.055). Adjusted mean increases in density (log₁₀GE/ml) were associated with being 2–6 years (0.57 [95%CI 0.25–0.89] p<0.001) and ARI (0.32 [95%CI 0.15–0.49] p<0.001).

Conclusion: Ethnicity and physical contact are positively associated with pneumococcal carriage, but not density. Post-PCV introduction, older children may contribute to VT transmission. Our results will aid development of pneumococcal transmission models to evaluate and predict PCV10 impact on pneumococcal disease.

4D – Pneumococcal & Vaccine Preventable Diseases

Room E3, 3:30pm - 5:00pm

Incidence of invasive pneumococcal disease higher among Victorians with hepatitis C

Authors: Dr Katherine Gibney^{1,2}, Rachel Coutts¹, Nasra Higgins¹, Janet Strachan¹

Affiliations: ¹DHHS Victoria, Melbourne, Australia, ²Doherty Institute, Melbourne, Australia

Abstract:

Background: In Australia, pneumococcal vaccination is recommended for people with chronic liver disease. Recent Canadian data suggest worse outcomes for invasive pneumococcal disease (IPD) cases co-infected with hepatitis C virus (HCV), although higher incidence of IPD among people with HCV has not been well documented.

Aim: To determine if IPD notification is higher among people notified with HCV than the general population.

Methods: IPD cases notified in Victoria, Australia from January 2007–June 2017 were matched with HCV cases notified from January 1991–June 2017. IPD incidence was calculated using Victorian population data and the estimated number of Victorians living with HCV.

Results: From January 2007–June 2017, 3,855 IPD cases were notified. HCV infection was notified in 231 (6.0%) of IPD cases overall, and 16.8% of IPD cases aged 30–59 years. Among those notified with HCV, 45% were serotypes included in the 13-valent pneumococcal conjugate vaccine and 76% in the 23-valent pneumococcal polysaccharide vaccine. Compared to IPD cases without HCV, IPD cases notified with HCV were younger (mean age 46.3 vs. 51.7 years, $p=0.004$) and more likely to be male (64% vs. 55%, $p=0.010$). IPD notification incidence was 5.6/100,000/year overall and 39.8/100,000/year among people with HCV (RR 7.13 [95%CI 6.24–8.14]).

Conclusion: IPD notification incidence was seven higher among people with HCV than the general population. Pneumococcal vaccination should be promoted for people with chronic liver disease. HCV testing should be considered among adults with IPD.

Invasive pneumococcal disease in children with underlying risk conditions

Authors: Dr Sanjay Jayasinghe^{1,2}, A/Prof Bette Liu³, A/Prof Heather Gidding³, Dr Amy Gibson⁴, Dr Clayton Chiu^{1,2}, Prof Peter McIntyre^{1,2}

Affiliations: ¹National Centre For Immunisation Research And Surveillance, Westmead, Australia, ²Discipline of Child and Adolescent Health, Sydney Medical School, University of Sydney, Sydney, Australia, ³School of Public Health and Community Medicine, University of New South Wales, Sydney, Australia, ⁴Centre for Big Data Research in Health, University of New South Wales, Sydney, Australia

Abstract:

Background: Children with risk factors (RFs) for invasive pneumococcal disease (IPD) are recommended additional doses of pneumococcal conjugate (PCV) and polysaccharide (PPV) vaccines. Little is known about the contribution of RFs to total IPD burden and whether risk of IPD in children with RFs changed from time of selective PCV vaccination (2001-2004) to universal PCV vaccination (post-2005).

Methods: Records of live births between 2001 and 2012 in New South Wales were linked to IPD notifications, hospitalisations and deaths. ICD codes in linked hospitalisations records identified presence of RFs. Cox models were used to estimate adjusted hazard ratios (aHR) for IPD for each RF. Together with population prevalence ascertained for RFs these aHRs enabled calculation of population attributable fractions for IPD for each RF. To determine vaccination impact IPD incidence rates were compared across birth cohorts of 2001-2004, 2005-2008 and 2009-2012.

Results: Among total cohort of 1,109,216 children, 75,069 (6.8%) had at least one identified RF. Chronic respiratory (4%) and cardiac (1.2%) diseases were most common. Immunosuppression, asplenia/splenic dysfunction or conditions resulting in breach in CSF barrier had highest aHRs for IPD (20-26). Overall ~20% of IPD cases in the population was attributable to RFs. Post-universal vaccination IPD incidence continued to drop in children without RF (by 80%) while in those with RFs it declined initially (by 63%) and then increased (by 21%).

Conclusion: Pneumococcal vaccines caused declines in IPD in all children, however, in those with RFs likely serotype replacement offset reductions. Overall, 80% of IPD had no attributable RFs.

Trends in serotype distribution of invasive pneumococcal disease in non-indigenous older Australians

Authors: Dr Alicia Stein¹, Prof Allan Cripps², Associate Professor John Litt³, Professor Robert Booy⁴, Dr Rob Menzies⁵

Affiliations: ¹Seqirus, Melbourne, Australia, ²School of Medicine and Menzies Health Institute Queensland, Griffith University, Gold Coast, Australia, ³Discipline of General Practice, Flinders University, Adelaide, Australia, ⁴National Centre for Immunisation Research and Surveillance, University of Sydney, Sydney, Australia., ⁵School of Public Health and Community Medicine, University of New South Wales, Sydney, Australia

Abstract:

Background: Australia introduced 7-valent pneumococcal conjugate vaccine (7vPCV) for non-indigenous infants in 2005, replaced by 13vPCV in 2011. Funding of the 23-valent pneumococcal polysaccharide vaccine (23vPPV) was expanded to all non-indigenous 65+ adults from 2005. We examined the impact of vaccination on serotype-specific incidence of invasive pneumococcal disease (IPD) in non-indigenous 65+ adults.

Methods: Analyses were performed on 8,117 IPD notifications (93% with known serotype) in 65+ adults classified as non-indigenous (94%) or with unknown indigenous status (6%) collected through National Notifiable Diseases Surveillance System from 2002 to 2016.

Results: IPD due to 7vPCV serotypes declined from 11.3/100,000 in 2005 to 1.4/100,000 in 2011 [IRR 0.13(0.9–0.18), $p < 0.0001$], remaining stable thereafter (1.2/100,000 in 2016). IPD due to the additional serotypes in 13vPCV excluding serotype 3 increased from 1.9/100,000 in 2005 to 5.0/100,000 in 2011 [IRR 2.6(1.9–3.7), $p < 0.0001$], declining thereafter to 1.3/100,000 in 2016 [IRR 0.27(0.19–0.37), $p < 0.0001$]. IPD due to serotype 3 remained stable and was the most common serotype in 2016 (1.8/100,000). IPD due to the 11 exclusive serotypes in 23vPPV increased from 2.3/100,000 in 2005 to 4.5/100,000 in 2016 [IRR 2.0(1.4–2.7), $p < 0.0001$]. IPD due to non-vaccine serotypes increased from 0.9/100,000 in 2005 to 6.9/100,000 in 2016 [IRR 7.8(5.1–12.5), $p < 0.0001$].

Conclusions: Herd immunity impact of the infant program is clear for PCV serotypes excluding 3. Direct impact of 23vPPV is evident in the significantly lower growth in IPD attributable to its exclusive serotypes compared to non-vaccine serotypes. An increasing proportion of IPD is due to non-vaccine serotypes.

Determining the vaccination coverage for indirect protection against invasive pneumococcal disease, Australia

Authors: Dr Jocelyn Chan^{1,2}, Dr Heather Gidding^{3,4}, Associate Professor Christopher Blyth⁵, Dr Parveen Fathima⁶, Dr Sanjay Jayasinghe⁴, Professor Peter McIntyre⁴, Dr Hannah Moore⁶, Professor Kim Mulholland^{1,2,7}, Dr Catram Nguyen^{1,2}, Professor Ross Andrews^{8,9}, Associate Professor Fiona Russell^{1,2,10}

Affiliations: ¹*Pneumococcal Research Group, Murdoch Children's Research Institute, Melbourne, Australia*, ²*Department of Paediatrics, University of Melbourne, Melbourne, Australia*, ³*School of Public Health and Community Medicine, UNSW Medicine, The University of New South Wales, Sydney, Australia*, ⁴*National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases, The Children's Hospital at Westmead, Sydney, Australia*, ⁵*School of Medicine, University of Western Australia, Perth, Australia*, ⁶*Telethon Kids Institute, University of Western Australia, Perth, Australia*, ⁷*Department of Infectious Disease Epidemiology, London School of Hygiene and Tropical Medicine, London, London, United Kingdom*, ⁸*Global & Tropical Health Division, Menzies School of Health Research, Charles Darwin University, Darwin, Australia*, ⁹*National Centre for Epidemiology & Population Health, Australian National University, Canberra, Australia*, ¹⁰*Centre for International Child Health-Dept. of Paediatrics, The University of Melbourne, Melbourne, Australia*

Abstract:

Background: Introduction of pneumococcal conjugate vaccines (PCV) in Australia resulted in significant declines in invasive pneumococcal disease (IPD) through direct and indirect effects. While the indirect effects of PCV vaccination are well described, the PCV coverage required to achieve these effects, using a 3+0 schedule, is unknown. We used linked health and vaccination data to investigate the relationship between PCV coverage and vaccine-type (VT) IPD among under-vaccinated children.

Methods: Vaccination records and IPD notifications were individually linked for a cohort of 1.37 million children born from 2001–2012, in two Australian states, and followed up to 2013. We calculated quarterly rates of IPD among under-vaccinated children up to 5 years of age. We defined a child as under-vaccinated, and therefore contributed person-time at-risk, up until the time they received 2 doses of PCV or one dose at ≥ 12 months of age. PCV coverage was calculated quarterly, among children 12–23 months of age.

Results: PCV7 coverage increased from 8% in December 2004 to 79% one year later. Over this period, PCV7-type IPD rates among under-vaccinated children <5 years of age (indirect effects) decreased from 83.0 to 27.8 cases per 100 000 in the third quarters of 2004 and 2005 respectively. Smaller absolute reductions in PCV13-non-PCV7 IPD occurred following the introduction of PCV13 in 2011.

Conclusion: There were rapid and substantial indirect effects following PCV vaccine introduction. Further analysis is planned to more precisely estimate a threshold for PCV coverage where substantial indirect effects of PCV are first seen.

Pneumococcal disease trends in Australia, 2002-2016.

Authors: Miss Kelley Meder^{1,2}, Dr Sanjay Jayasinghe¹, Dr Frank Beard^{1,3}, Dr Aditi Dey^{1,3}, Heather Cook⁴, Carolien Giele⁵, Professor Benjamin Howden⁶, Kate Pennington⁷, Dr Vicki Krause⁴, Associate Professor Vitali Sintchenko^{3,8}, Helen Smith⁹, Janet Strachan¹⁰

Affiliations: ¹National Centre For Immunisation Research And Surveillance, The Children's Hospital at Westmead, Sydney, Australia, ²National Centre for Epidemiology and Population Health, Australian National University, Canberra, Australia, ³The University of Sydney, Sydney, Australia, ⁴Centre for Disease Control, Northern Territory Department of Health, Darwin, Australia, ⁵Public Health Division, Department of Health Western Australia, Perth, Australia, ⁶Microbiological Diagnostic Unit. Public Health Laboratory, Department of Microbiology & Immunology, University of Melbourne, Melbourne, Australia, ⁷Communicable Diseases Epidemiology and Surveillance Section, Office of Health Protection, Australian Government Department of Health, Canberra, Australia, ⁸Centre for Infectious Diseases and Microbiology – Public Health, ICPMR, Westmead Hospital, Sydney, Australia, ⁹Public Health Microbiology, Forensic and Scientific Services, Queensland Department of Health, Coppers Plains, Australia, ¹⁰Communicable Disease Epidemiology and Surveillance, Department of Health and Human Services, Melbourne, Australia

Abstract:

Background: 7-valent pneumococcal conjugate vaccine (7vPCV) has been funded on the National Immunisation Program for all infants since 2005, replaced by 13-valent vaccine (13vPCV) mid-2011. We examined pneumococcal disease trends, with particular focus on pre- and post-13vPCV periods.

Methods: Data from National Notifiable Diseases Surveillance System for invasive pneumococcal disease (IPD) between 2002 and 2016 was examined, calculating notification rates by age and serotype. Rates for pneumococcal disease and community acquired pneumonia (CAP) were calculated from 2002/2003-2015/2016 National Hospital Morbidity Database hospitalisation data.

Results: Australian IPD notification rates decreased from 12.4 in 2002 to 6.9 per 100,000 in 2016, reflecting reductions in IPD post-2005 due to 7vPCV serotypes. Following 13vPCV introduction in 2011, overall IPD notification rates decreased in all age groups, although the rate in 1-4 year olds increased from 11.6 in 2015 to 13.9 per 100,000 in 2016. Notification rates for the additional six serotypes in 13vPCV decreased from 2011-2016, except for serotype 3 which increased from 0.55 to 0.75 per 100,000.

Overall hospitalisation rates for pneumococcal disease (IPD + CAP) declined from 2002/2003 to 2006/2007, but then increased until 2011/2012. Following 13vPCV introduction, rates resumed their decrease. In 2015/2016, the relative burden of non-invasive CAP was 6.7 times that of IPD.

Conclusion: IPD notification rates have declined or stabilised in all age groups in recent years, except for 1-4 year olds. The proposed 2+1 vaccine schedule change should lead to improved protection in this age group, however the rise in serotype 3 disease should be closely monitored.

Cumulative population prevalence of risk factors for invasive pneumococcal disease in Australia

Authors: Dr Clayton Chiu^{1,2}, Ms Cyra Patel¹, Dr Sanjay Jayasinghe¹

Affiliations: ¹National Centre for Immunisation Research & Surveillance (NCIRS), Westmead, Australia, ²Sydney Medical School, the University of Sydney, Camperdown, Australia

Abstract:

Background: Additional doses of pneumococcal vaccines are recommended for persons with medical and/or behavioural risk factors (RFs) for invasive pneumococcal disease (IPD). Cumulative population risk factor prevalence (CPRFP) estimates, which account for co-existing RFs, are useful for vaccination strategy development, program planning and evaluation.

Method: We designed customised data requests for IPD CPRFP from the National Health Survey 2011-2012 and National Aboriginal and Torres Strait Islander Health Survey 2012-2013 (Australian Bureau of Statistics), by age-groups, for all Australians, Aboriginal and/or Torres Islanders (Indigenous), and non-Indigenous Australians. We mapped coded self-reported conditions in the surveys to the established medical RFs for IPD. We additionally examined the incremental CPRFP of two behavioural RFs: tobacco smoking and 'alcoholism'.

Results: CPRFP of medical RFs increased with age, from 2.0% for age 0-17 year to 37.7% for ≥65 years. This was higher for all age-groups in Indigenous than in non-Indigenous adults (10.4% vs 3.5%, 25.7% vs 7.5%, 49.8% vs 18.8%, and 64.2% vs 37.6%, respectively, among 18-34, 35-49, 50-64 and ≥65 years-olds.) Among those aged 18-64 years, current tobacco smoking without medical RFs increased the CPRFP by 36.4% in Indigenous and 17.5% in non-Indigenous people, respectively; additionally, harmful use of alcohol (2009 NHMRC definitions) incrementally raised CPRFP by 6.3% and 12.9%, respectively. CPRFP of ≥1 medical and/or behavioural RFs was 76.1% among Indigenous and 51.5% among non-Indigenous Australians aged ≥65 years.

Conclusion: The high CPRFP in some populations and the substantial contribution of behavioural RFs are important considerations for developing RF-based vaccination strategies and programs.

Poster Presentations – P2

Hall G, 12:30pm - 1:30pm

P2.001 - Injection site abscess post infant vaccines - a rare but real complication.

Authors: Mrs Mel Addison^{1,2}, Mrs Georgina Lewis^{1,2}, Dr Nigel Crawford^{1,2,3}

Affiliations: ¹Murdoch Research Children's Institute, PARKVILLE, Australia, ²Royal Children's Hospital, Melbourne, PARKVILLE, Australia, ³Department of Paediatrics, University of Melbourne, Melbourne, Australia

Abstract:

Context: Abscess of infectious aetiology is rarely reported following infant immunisations. Abscess is defined as a collection of pus that accumulates within a tissue in response to an infectious agent or foreign material. Some abscesses heal spontaneously and others require medical or surgical intervention. Abscess at the injection site post immunisation is defined by 2 levels of diagnostic criteria as per the Brighton Collaboration. Abscess post immunisation is concerning for parents and providers. Adequate management and follow up is necessary to prevent recurrence of abscess with subsequent immunisations.

Process: The SAEFVIC (Surveillance of Adverse Events Following Vaccination in the Community) database was accessed using abscess as the search term.

AIR (Australian Immunisation Register) was accessed for immunisation status. EMR (Electronic Medical Record RCH) was accessed for medical management.

Analysis: 16 cases of injection site abscess post infant vaccines <12 months were reported to SAEFVIC over a 10 year period. 11 of the 16 cases required surgical intervention. Of those 11 cases 2 cases had active eczema at the time of immunisation. These 2 cases will be discussed in detail.

Outcomes: Cases were followed up in SAEFVIC clinic by an Immunisation specialist and most are up to date on AIR. There was no recurrence of abscess in subsequent immunisations with most vaccines given at the RCH Immunisation Clinic using sterile technique. Current recommendation on skin preparation prior to immunisation for infants with underlying eczema may need to be considered

P2.0012- Qualitative evaluation of a multi-component intervention to improve school-based HPV vaccination

Authors: Ms Cristyn Davies¹, Associate Professor Spring Cooper², Dr Tanya Stoney³, Professor Helen Marshall^{4,5,6}, Ms Jane Jones³, Dr Joanne Collins^{4,6}, Mrs Heidi Hutton³, Dr Adriana Parrella^{4,6}, Dr Kevin McGeechan¹, Professor Gregory Zimet⁷, Associate Professor David G Regan⁸, Ms Patricia Whyte⁹, Associate Professor Julia ML Brotherton¹⁰, Dr Peter Richmond^{3,11,12}, Professor Kirsten McCaffery¹, Professor Suzanne M Garland^{13,14,15}, Professor John Kaldor⁸, Professor Annette Braunack-Mayer⁶, Dr Melissa Kang¹, Professor S.Rachel Skinner¹

Affiliations: ¹The University of Sydney, Sydney, Australia, ²City University of New York, New York, United States of America, ³Wesfarmers Centre of Vaccines and Infectious Diseases, Telethon Kids Institute, Perth, Australia, ⁴Women's and Children's Hospital, Adelaide, Australia, ⁵Robinson Research Institute, Adelaide, Australia, ⁶The University of Adelaide, Adelaide, Australia, ⁷Indiana University, Indianapolis, United States of America, ⁸The Kirby Institute, University of New South Wales, Sydney, Australia, ⁹Deakin University, Melbourne, Australia, ¹⁰National HPV Vaccination Program Register, Melbourne, Australia, ¹¹Princess Margaret Hospital for Children, Subiaco, Australia, ¹²The University of Western Australia, Perth, Australia, ¹³The Royal Women's Hospital, Melbourne, Australia, ¹⁴The University Melbourne, Melbourne, Australia, ¹⁵Murdoch Children's Research Institute, Melbourne, Australia

Abstract:

Background: We evaluated a multi-component intervention to improve student knowledge, vaccine-related psycho-social outcomes and HPV vaccine uptake in 40 schools across two Australian states. Elsewhere we reported significant improvements in student knowledge, decisional involvement, vaccine-related confidence and anxiety and reduced time to vaccinate. Here we present data from a qualitative sub-study regarding vaccination day processes to help elucidate mechanisms for the observed effects.

Methods: We purposefully recruited 6 intervention and 6 control 'case study' schools (from study sample of 40 schools). In each school we conducted: focus groups with students, interviews with teachers, school nurses, immunisation nurses and parents, and observations of vaccination day processes. Qualitative data were analysed using thematic and discourse analysis.

Results: We undertook 17 focus groups with 111 students, and interviews with 22 parents, 11 school personnel, 10 immunisation staff, and 20 school observations over 12 vaccination days (minimum 1 per school). In schools where there was less compliance with best practice guidelines for school vaccination day set-up, data indicated increased student fear and anxiety. Lack of privacy made students feel uncomfortable, embarrassed, nervous or scared. Lack of separation of pre- and post-vaccinated students caused increased anxiety by rumour generation or direct observation of negative student experiences. Waiting times, supervision and distractions were secondary factors.

Conclusions: Careful implementation of best practice guidelines for school immunisation day set up can improve student experience with vaccination, by assisting in the reduction of needle related fear and anxiety, and increasing efficiency on vaccination day.

P2.003 - Parental use of immunisation information sourced on social media

Authors: Ms Madelaine Thorpe¹, Dr Jane Taylor², Dr Rachel Cole³

Affiliations: ¹*Business Analyst at Brisbane South Primary Health Network, Brisbane, Australia*, ²*Public Health Discipline Leader for Public Health at the University of the Sunshine Coast, Sunshine Coast, Australia*, ³*Lecturer in Health Promotion at the University of the Sunshine Coast, Sunshine Coast, Australia*

Abstract:

Background: Social media as a source of health information is a relatively new area of exploration in public health. Parents use the broader internet, including social media platforms, to source information to inform immunisation decisions for their young children. To effectively source, interpret and use such information parents require functional health literacy. This pilot study explored how parents of different immunisation positions obtained, understood and used immunisation information available through social media.

Methods: Purposive followed by snowball sampling was used to recruit participants across five immunisation positions (unquestioning acceptor, cautious acceptor, vaccine hesitant, late or selective vaccinator and vaccine refuser). Face-to-face interviews collected qualitative data from 14 parents between 18 and 40 years of age in South East Queensland. Thematic analysis was used to analyse data according to immunisation positions and functional health literacy components.

Results: The way participants obtained, understood and used immunisation information obtained through social media was consistent with that expected across the five parental immunisation positions. Whilst parents were exposed to and understood immunisation information they obtained on social media, they did not use this information to make immunisation decisions for their children, and relied on their healthcare professionals for credible information.

Conclusion: Social media may be a platform for healthcare professionals to utilise to provide credible childhood immunisation information and enhance functional immunisation literacy of parents. Primary Health Networks are well positioned to support healthcare professionals to provide evidence-based immunisation information to parents with young children.

P2.004 - Improving vaccination coverage through local marketing

Authors: Professor Paul Van Buynder¹, Mrs Jan Van Buynder², Mrs Linda Menton², Mrs Annie Hackett², Mrs Helen Clifford²

Affiliations: ¹*Griffith University, Labrador, Australia*, ²*Gold Coast Health Service, Southport, Australia*

Abstract:

Context: In 2016, the Gold Coast Public Health Unit (PHU) took over the conduct of community clinics and the school immunisation program from the City of Gold Coast. At the time coverage of infants was the worst in Queensland and school coverage rates the second worst in Australia. The hinterland had a recognised anti-vaxxer concentration.

Process: After surveying 1500 parents of school children and infants about attitudes to vaccines and desirable aspects of a vaccine service a comprehensive marketing strategy was developed. This included visual branding on vehicles and signage under the "immuniseGC" and "Immunisation made easy" banners, a number of targeted antigen specific videos, video rebuttals of hesitancy concerns, family friendly clinics with robotic seals, 'superheroes vaccinate' balloons, bubbles, free onesies at enrolment with the '#vaxme' branding, singing elephants and free flu vaccine in winter months. Education with GP and practice nurses was intensified and dedicated GP immunisation only clinics were set up. A specialist referral process was set up to deal with parents and GPs with concerns with easy access to vaccinology support. Links to Smartvax and desktop software enhanced recall processes for overdue children.

Analysis and Outcomes: Despite a continuing anti-vaxxer presence, over the last two years the infant vaccination rates on the Gold Coast have increased by 5% to 94% and the school program has seen a 15% increase in coverage.

P2.005 - Standardised medicines terminology for the accurate prescribing and recording of vaccines.

Authors: Mrs Jaymee Murdoch¹, Ms Linda Ang¹, Mr Michael Keary¹

Affiliations: ¹*Australian Digital Health Agency, Brisbane, Australia*

Abstract:

Context: The Australian Medicines Terminology (AMT) unambiguously identifies and describes commonly used medicines. It is integrated into clinical systems to facilitate the accurate transfer of information without loss of meaning and supports interoperability across the digital health domain. AMT contains generic concepts, and trade versions of them, with varying levels of granularity used to electronically prescribe, dispense, and record administration.

Process: Vaccines were identified as a complex subset of medicines which require dedicated rules governing the creation of standardised terminology. AMT sought advice from the Australian Technical Advisory Group on Immunisation (ATAGI) to ensure that any revisions to vaccines terminology satisfy the safety and usability requirements of clinicians.

Analysis: Feedback from users of AMT identified the current vaccines terminology to be long, complex and non-standardised, leading to difficulties in utilisation. Determining how to improve the vaccine terminology involved reviewing existing national terminologies, including the United Kingdom, America and Canada, in addition to reviewing published guidelines from Australian and international advisory bodies.

Outcomes: The outcome is a standardised vaccine terminology which is simple, consistent, and fulfils the requirements of a clinical terminology, while satisfying clinical expectations. The next step in development is to investigate linkages between AMT data and other relevant data sets to improve data analysis and surveillance.

P2.006 - B Part of It Study- Collaboration between Academia, Government, Education and Industry

Authors: **Ms Su-san Lee**¹, Dr Philippa Rokkas^{1,2}, Ms Sara Almond³, Mrs Maureen Watson³, Associate Professor Ann Koehler³, Mr Mark McMillan^{1,2}, Professor Helen Marshall^{1,2}

Affiliations: ¹*Vaccinology and Immunology Research Trials Unit, Women's and Children's Health Network, North Adelaide, Australia*, ²*Robinson Research Institute and Adelaide Medical School, The University of Adelaide, North Adelaide, Australia*, ³*Communicable Disease Control Branch, SA Health, Adelaide, Australia*

Abstract:

Context: Carriage studies are logistically challenging due to the large sample size required. We describe the processes of conducting a carriage study in school students in South Australia.

Process: A large cluster randomised controlled trial is being conducted in high school students (B Part of It) to assess the impact of a meningococcal B vaccine on carriage of *Neisseria meningitidis* in adolescents. Early high level engagement and intersectoral collaboration was established between The University of Adelaide, SA Health, Local Government and the three Education Sectors. Stakeholder engagement and communication were key to the successful roll out of the study. A creative media campaign was undertaken to engage with students and parents about the study including multimedia and extensive use of social media (Twitter, Facebook, Snapchat, YouTube, Instagram). A description of engagement and collaboration with key stakeholders and logistical challenges of implementing the study will be provided.

Analysis: South Australian students in Years 10, 11 and 12 were eligible to participate in the B Part of It study in 2017. A media campaign was launched in December 2016 with both traditional and social media strategies playing a vital role in communicating the study to the public.

Outcomes: Over 37,000 students consented to the study with 34,447 students across 237 schools currently participating in the B Part of It Study, representing the largest cohort of adolescents participating in an interventional carriage study. The study trained over 250 personnel across metropolitan, regional and remote communities, combining research with service delivery and clinical practice

P2.007 - Improving vaccine cold chain management through a self-audit tool

Authors: **Dr Robyn Gibbs**¹, Ms Sharon Gough¹, Ms Jane Gardiner², Ms Vimala Jegathesan², Ms Maree Hose²

Affiliations: ¹*Communicable Disease Control Directorate, WA Health, Perth, Australia*, ²*North Metropolitan Health Service, WA Health, Perth, Australia*

Abstract:

Context: Immunisation providers in WA that order government funded vaccines agree to report all vaccine wastage to WA Health, including expiry and cold chain wastage. However, in 2015, one quarter of metropolitan GP providers did not provide any wastage reports, which suggested they were not following WA cold chain management procedures.

Process: A vaccine storage self-audit tool was developed to educate GPs about vaccine management. In 2016, 121 GP practices that reported no vaccine wastage in the previous year were asked to complete and return the audit tool. In 2017 a further random selection of 125 GP practices were selected for self-audit. A follow-up phone call was made to practices that were assessed as not adequately following the National Vaccine Storage Guidelines Strive for 5.

Analysis: In 2016 and 2017, 204 of 246 (83%) selected practices returned the completed audit tool and all participants reported that the tool was useful. For 50% of GP practices, it was identified that vaccine management practices needed improvement. The most commonly identified areas for improvement were: fridge temperature monitoring (34% of practices), annual fridge servicing (30%), and having up-to-date vaccine management policies and procedures (14%). For practices that reported no vaccine wastage in 2015, and completed the audit in 2016, 63% reported wastage during the following year, which suggested they were more compliant with cold chain management procedures.

Outcomes: The self-audit tool identified GP vaccine management practices that should be improved. WA Health plans to continue annual audits of GPs using the self-audit tool.

P2.008 - Vaccine responses following influenza vaccination during pregnancy

Authors: **Mrs Michelle Clarke**^{1,2}, Dr Christopher Hope^{1,2}, Professor Ian Barr³, Associate Professor Sheena Sullivan³, Associate Professor Lynne Giles⁴, Dr Christina Boros^{1,2}, Professor Helen Marshall^{1,2}

Affiliations: ¹Women's And Children's Hospital, North Adelaide, Australia, ²Robinson Research Institute and Adelaide Medical School, The University of Adelaide, Adelaide, Australia, ³WHO Collaborating Centre for Reference and Research on Influenza, Melbourne, Australia, ⁴School of Public Health, The University of Adelaide, Adelaide, Australia

Abstract:

Background: Influenza vaccination is recommended for pregnant women, offering the dual benefit of protecting mothers and their newborn infants during the first few months of life. This study aimed to investigate the impact of obesity on vaccine responses following influenza vaccination during pregnancy.

Methods: Pregnant women attending antenatal clinics during 2014-2016 were enrolled. Participant's height, weight, age and gestation were recorded prior to administration of licensed seasonal influenza vaccination. Pre- and post-vaccination blood samples were used to measure antibody responses by Haemagglutination Inhibition (HI) assay. Responses were compared between obese and non-obese women in terms of seropositivity (HI titres ≥ 40), post-vaccination geometric mean titres (GMT), pre/post GMT ratios and seroconversion (≥ 4 -fold rise in titre). Variables associated with seropositivity were assessed.

Results: Most pregnant women (72/90, 80%) demonstrated seropositive antibody titres to all three influenza vaccine strains (H1N1, H3N2 and B) following vaccination. More participants were seropositive following vaccination in 2014 (39/43, 91%) compared with 2015 (19/29, 66%) and 2016 (14/18, 78%) ($p=0.03$). Seropositivity was comparable among obese vs non-obese women (22/24, 92% vs 50/66, 76%, $p=0.14$). Higher GMT and GMT-ratios were observed for obese compared with non-obese women (not statistically significant). More obese than non-obese women demonstrated H1N1 seroconversion (36/66, 55% vs 19/24, 79%, $p=0.03$). In regression models, gestation, age, prior vaccination and BMI were not associated with likelihood of achieving seropositive antibodies.

Conclusions: BMI does not appear to negatively impact on influenza vaccine responses in pregnancy and may be associated with improved seroconversion.

P2.009 - Non-inferiority Immunogenicity of Seqirus Quadrivalent Influenza Vaccine in Children Aged 6-59 Months.

Authors: **Dr Frank R. Albano**¹, Dr Victoria A. Statler², Dr Jolanta Airey¹, Dr Daphne C. Sawlwin⁵, Ms Alison Graves-Jones⁵, Dr Vince Matassa¹, Dr Esther Heijnen⁴, Dr Jonathan Edelman³, Dr Gary S. Marshall²

Affiliations: ¹Seqirus, Clinical Development, Parkville, Australia, ²Division of Pediatric Infectious Diseases, University of Louisville School of Medicine, Louisville, , USA, ³Seqirus, Clinical Development, Cambridge, USA, ⁴Seqirus, Clinical Development, Amsterdam, The Netherlands, ⁵Seqirus, Pharmacovigilance and Risk Management, Parkville, Australia

Abstract:

Background: In the Southern Hemisphere 2010 season Seqirus' trivalent, egg-derived, split-virion, inactivated influenza vaccine (IIV) was associated with increased fevers in young children. The company has completed development of a quadrivalent influenza vaccine (Seqirus IIV4; Afluria Quadrivalent) wherein each vaccine strain is split using a higher concentration of detergent, reducing the residual lipid content thought to be the cause of the previously observed high fevers.

Methods: Children 6-59 months of age were randomised 3:1 to receive Seqirus IIV4 ($n=1684$) or a US-licensed comparator IIV4 (Fluzone Quadrivalent) ($n=563$) during the 2016-17 Northern Hemisphere influenza season. Immunogenicity was assessed by haemagglutination-inhibition, with sera obtained before and 28-days after vaccination. Solicited, unsolicited and serious adverse events were assessed for 7-days, 28-days and 6-months post-vaccination, respectively. Adverse events were also analysed in 2 age cohorts, 6-35 months and 36-59 months (NCT02914275).

Results: Immunogenicity of Seqirus IIV4 was non-inferior to comparator IIV4 by geometric mean titres and seroconversion rates for all 4 strains. Solicited, unsolicited and serious adverse events in both age cohorts were similar for both vaccines. Fever rates and severe fever rates were the same or lower in the Seqirus IIV4 group compared to the comparator IIV4 group in both age cohorts and overall.

Conclusions: Seqirus IIV4 manufactured with higher concentration of detergent demonstrated non-inferior immunogenicity, with similar post-vaccination safety and tolerability, to the US-licensed comparator IIV4 in children 6-59 months of age. These data complete the program of studies demonstrating the benefit of Seqirus IIV4, in subjects aged 6 months and older.

P2.010 - Recurrence of Adverse Events Following Immunisation (AEFI) during supervised admission at SAEFVIC

Authors: Ms Georgina Lewis^{1,2}, Mrs Mel Addison^{1,2}, Mrs Rachael McGuire^{1,2}, Dr Nigel Crawford^{1,2,3}

Affiliations: ¹Murdoch Children's Research Institute, Parkville, Australia, ²The Royal Children's Hospital, Parkville, Australia, ³Department of Paediatrics, University of Melbourne, Parkville, Australia

Abstract:

Context: In an era of increasing vaccine hesitancy, parental concern around vaccine safety is heightened if their child experiences an Adverse Event Following Immunisation (AEFI). Fears that the AEFI may occur again can lead to avoidance or delay of future vaccines. Surveillance of Adverse Events Following Vaccination In the Community (SAEFVIC) offers a Specialised Immunisation Service (SIS) with expert review, and if needed, vaccination under supervision. Parental confidence with future vaccination is vital as noted in a recent systematic review on the topic (Zafack JG et al. Risk of Recurrence of Adverse Events Following Immunization: A Systematic Review. Pediatrics. 2017).

Process: A review was undertaken of patients (< 18 years) reporting AEFI to SAEFVIC and attending SIS with subsequent supervised hospital admission for vaccination over a 4-year period from January 2014 to December 2017. It included both day (< 8 hours observation) and overnight admissions. The Australian Immunisation Register (AIR) was reviewed for all cases.

Analysis: 246 admissions were identified. The most common reasons for admission were previous hypotonic hyporesponsive episode (HHE), apnoea, seizure and rash. Of these cases, 11/246 (4%) had a recurrence of the same AEFI with the most commonly reported recurrence being rash (n=4) and apnoea (n=3).

Outcomes: Overall AEFI recurrence rate was low. At preliminary follow up, the majority of children were up to date according to the AIR indicating parental confidence in vaccination. Vaccination of children in a SIS who have had a past history of an AEFI supports completion of the National Immunisation Program.

P2.011 - Missing preterm babies: A need for wider antenatal pertussis vaccination.

Authors: Dr. Priya Darshene Janagara¹, Dr. Pari Shanmuga Raman Gurusamy², Dr. Rosalind Webby¹

Affiliations: ¹Centre for Disease Control, Australia, ²Department of Obstetrics and Gynaecology, Royal Darwin Hospital, Australia

Abstract:

Introduction: Maternal pertussis vaccination was introduced in 2015 to protect infants from the morbidity and mortality associated with pertussis.

Methods: The perinatal data of births in the Northern Territory (NT) public hospital in 2016 was obtained from the Perinatal Register and merged with vaccination records from the NT immunisation register. Statistical analysis was performed using SPSS and Microsoft Excel.

Results: There were 3392 viable delivery episodes in 2016 with 48.9% coverage against pertussis based on current guidelines. A further 880 mothers (22.4%) received cocooning vaccination within 12 days postpartum. There was a significant statistical difference in coverage based on Indigenous status, 46.14% in Indigenous vs 50.56 % (p<0.001) in non-Indigenous deliveries. Pertussis vaccination coverage for preterm births was low at 0% for extreme, 18.86% very and 39.8% in moderate preterm deliveries.

Significant proportion (50.9%) of preterm babies are not benefiting from the current timing of pertussis vaccination from 28 weeks gestation. As timing of birth cannot be predetermined, a review of safety and acceptability of administration of pertussis vaccine from the second trimester is needed. Trans-placental antibody transfer starts at 13 weeks and peaks at 30 weeks gestation. Recent studies have demonstrated similar benefits of both second and third trimester maternal pertussis vaccination for trans-placental transfer of maternal antibodies to infants.

Conclusion: Implementation of pertussis vaccination from 20 weeks of gestation will provide a wider vaccination window allowing for better coverage and maximizing the likelihood of protecting all infants including pre-term infants from birth.

P2.012 - The attitudes of caregivers towards electronic health reminders for influenza vaccination

Authors: Dr Holly Seale¹, Dr Pamela Palasanthiran², Dr Rajneesh Kaur¹, Mr Sadek Jukmin¹

Affiliations: ¹University Of New South Wales, Sydney, Australia, ²Children's Hospital at Randwick, Randwick, Australia

Abstract:

Background: Influenza vaccination coverage amongst high risk children remains below the target worldwide, including Australia. While patient reminder systems have shown to effectively increase vaccination uptake they are not routinely used. This research explores the attitudes of parents/caregivers towards influenza vaccination and the use of text messages as a reminder system.

Methods: A self-administered anonymous survey was carried out at a paediatric hospital in Sydney, Australia in 2016. Significant predictors of the outcome variables were identified using logistic regression analysis.

Results: Influenza vaccine uptake for 2016 was 43% in high risk children and 14% in standard risk children. Perceiving that their child was at high risk of getting influenza (52% vs 25%, $P<0.001$), acknowledging the importance in getting their child vaccinated against influenza (77% vs 54%, $P<0.001$) and being willing to have their child vaccinated in the future (81% vs 61%, $P<0.001$) were significantly different between participants with high risk and those with standard risk children respectively. Perceived importance of getting their child vaccinated against influenza ($P=0.003$; OR:10; 95% CI= 1.2-44.4) and receiving recommendation from a healthcare worker ($P<0.001$; OR:8.1; 95% CI=2.6-25) were important predictors of influenza vaccination. Just under half of the participants had previously received a reminder (47%). The majority were happy to register for future messages.

Conclusion: Caregivers were receptive to the idea of receiving an e-health reminder. However, few had ever received any form of reminder; thus, the implementation of electronic reminders might help to improve the vaccine uptake.

P2.013 - Delayed Anaphylaxis following Immunisation in a 4 year old—a Case Study

Authors: Mrs Adele Harris¹, Dr Sharon Choo, Dr Kirsten Perrett

Affiliations: ¹SAEFVIC Murdoch Children's Research Institute, Parkville, Australia

Abstract:

Context: Anaphylaxis is a serious, but rare complication following immunisation. SAEFVIC (Surveillance of Adverse Events Following Vaccination in the Community) is the Victorian immunisation safety service combining enhanced passive surveillance with integrated clinical services. Patients are referred to the service for expert advice and individualised management for future vaccination/options.

Process: In April 2007, SAEFVIC received a report of anaphylaxis in a 4-year-old male following immunisation with DTP-IPV (Infanrix-IPV) and MMR (Priorix) vaccines. Nil history of atopy. Recent URTI on chlorpheniramine (Demazin) past 8 days. 18 hours following immunisation developed generalised urticaria. At 22 hours, perioral and periorbital angioedema- given antihistamine, oral steroid. At 24 hours, pallor, clamminess and respiratory difficulties- administered adrenaline, within 10 minutes began to improve.

Analysis: He was initially seen in RCH Immunisation clinic. MMR and tetanus serology were taken (rubella and tetanus equivocal) and referred to allergy. Skin-prick testing (SPT) and Intra-dermal testing (IDT) was positive for both brands of dTap (Boostrix and Adacel) and dT (ADT). MMR SPT and IDT were negative and challenge proceeded without reaction.

Monovalent Tetanus vaccine (Tetanol) was sourced (GSK, Germany). Following negative SPT and IDT, split dose (10%, 90%, 45min apart) was administered. He was monitored in hospital overnight. 14 hours post immunisation, he developed throat tightness without other signs or symptoms of allergy. He was administered antihistamine and had no further issues.

Conclusion: Anaphylaxis following immunisation should always be carefully assessed. True vaccine allergy is extremely rare. In most circumstances children can be safely re-vaccinated with the same antigens.

P2.014 - Examining the relationship between AEFI reporting and vaccine coverage

Authors: Ms Hazel Clothier^{1,2,3}, Dr Jock Lawrie^{1,2}, Dr Nigel Crawford^{1,4}, Professor Jim Buttery^{1,2,5,6}

Affiliations: ¹SAEFVIC, Murdoch Children's Research Institute, Parkville, Australia, ²Monash Centre for Health Research and Implementation (MCHRI), Monash University, Clayton, Australia, ³School of Population & Global Health, University of Melbourne, Carlton, Australia, ⁴Department of Paediatrics, University of Melbourne, Carlton, Australia, ⁵Infection and Immunity, Monash Children's Hospital & Monash Immunisation, Monash Health, Clayton, Australia, ⁶Department of Paediatrics, Monash University, The Ritchie Centre, Hudson Institute, Clayton, Australia

Abstract:

Background: Public and provider confidence in immunisations is impacted by their perception of adverse event risk and may be reflected in vaccination coverage. This has been described anecdotally at both local and national levels.

Methods: Spontaneous adverse event following immunisation (AEFI) reporting data from SAEFVIC will be examined with immunisation coverage data from the Australian Immunisation Register (ACIR/AIR) from 2007-2017 by specific immunisations and by region (SA2, SA3) level. Temporal and geo-temporal correlations will be performed using the SatScan statistic.

Results: This examination will describe the relationship between AEFI reporting and vaccination coverage at a statewide and local level.

Conclusion: These results will inform future strategies in local responses to AEFI and targeted immunisation coverage initiatives.

P2.0015 - Improved pyrogenicity profile of quadrivalent inactivated influenza virus vaccine in young children

Authors: Dr Daphne Sawlwin¹, Ms Alison Graves-Jones¹, Dr Frank Albano¹

Affiliations: ¹Seqirus, A CSL Company, Melbourne, Australia

Abstract:

Background: Seqirus conducted a paediatric clinical development programme for the split-virion quadrivalent inactivated influenza vaccine (IIV4) which included three clinical studies in participants aged 6 months to < 18 years. These included two IIV4 pivotal studies and one trivalent (IIV3) supportive study conducted in the 2014/15, 2015/16 and 2016/17 Northern Hemisphere (NH) seasons. These studies were conducted with IIV4 and IIV3 manufactured using higher concentrations of virus splitting agent sodium taurodeoxycholate (TDOC) compared with that used in pre-2010 vaccine formulations.

Methods: Any fever rates and severe fever rates were compared between IIV4 development studies and pre-2010 IIV3 studies in four paediatric age groups (6 months to < 3 years, 3 years to < 5 years, 5 years to < 9 years, and 9 years to < 18 years).

Results: In all age groups, any fever and severe fever rates were comparable to licensed QIV comparators and substantially lower in IIV4 development studies compared to the pre-2010 IIV3 studies, despite the addition of a fourth vaccine strain. No febrile seizures were observed in the 7 days after any vaccination in any of the studies.

Conclusions: IIV4, manufactured using a higher TDOC concentration compared with that used in pre-2010 vaccine formulations, is associated with less pyrogenicity than its historical pre-2010 IIV3 formulations. In addition, as these recent clinical studies were conducted over three NH influenza seasons during which A/H3N2 and B strain changes occurred, the findings lend support to the generalizability of the results to further vaccine formulations containing different virus strains.

Thursday 7 June 2018

Poster Presentations – P3

Hall G, 12:30pm - 1:30pm

P3.001 - Duration of Pertussis Immunity in Adults: A Study of Healthcare Workers

Authors: Miss Sonia McAlister^{1,2}, Miss Tabitha Woodman¹, Ms Heidi Hutton¹, Dr Ruth Thornton^{1,2}, Dr Anita van den Biggelaar¹, Dr Peter Richmond^{1,2}

Affiliations: ¹*Telethon Kids Institute, Subiaco, Australia*, ²*The University of Western Australia, Nedlands, Australia*

Abstract:

Background: Pertussis booster vaccinations are increasingly recommended in Australia for adolescents and adults, to address the resurgence of pertussis disease. However, the duration of protection after adult formulation diphtheria-tetanus-pertussis vaccines (dTap) is not well known.

Body: To evaluate the boosting and persistence of dTap antibody responses, we recruited healthcare workers (age 23-64 years) receiving dTap for the first time (naïve, n=75) OR as a subsequent dose within 10 years (boosted, n=75). IgG titres against pertussis toxin (PT), pertactin (PRN), filamentous hemagglutinin (FHA), tetanus toxin (TT) and diphtheria toxoid (DT) were measured pre- & 1 week, 1 month and 1 year post-vaccination using an in-house multiplexed fluorescent bead immunoassay.

Interim analysis of the first 87 subjects found pre-vaccination IgG titres to be significantly higher for all pertussis antigens in boosted (n=41) compared to naïve adults (p<0.05). One year post-vaccination anti-PRN titres remained significantly higher in the boosted group (p<0.05).

Before vaccination, 70% of naïve adults were seronegative for PT-IgG (<5 IU/mL) compared to 27% of boosted adults, and 35% of naïve and 27% of boosted participants, respectively, were not seroprotected for diphtheria (DT-IgG <0.1 IU/mL)

One year post-vaccination 96% of naïve and 98% of boosted adults remained seropositive for PT-IgG, and 91% of naïve and 93% of boosted adults remained seroprotected for DT-IgG.

All participants had protective anti-TT levels (≥0.1 IU/mL) at all timepoints.

Summary: More frequent dTap boosting of adults may be necessary to maintain high levels of immune protection against pertussis and diphtheria.

P3.002 - complexities of determining pneumococcal immunisation coverage in mongolia

Authors: Ms Chuluundorj Uranjargal², Dr Jocelyn Chan^{1,3}, Dr Otgonbayar Dashpagma², Dr Tuyaa Mungun², Dr Claire von Mollendorff^{1,3}, Associate Professor Fiona Russell^{1,4}

Affiliations: ¹*Pneumococcal Research Group, Murdoch Children's Research Institute, Parkville, Australia*, ²*National Center for Communicable Disease, Ulaanbaatar, Mongolia*, ³*Department of Paediatrics, The University of Melbourne, Parkville, Australia*, ⁴*Centre for International Child Health-Dept. of Paediatrics, The University of Melbourne, Parkville, Australia*

Abstract:

Context: Monitoring vaccination coverage is vital for the prevention and control of vaccine-preventable diseases. Administrative estimates of coverage can be unreliable due to incomplete recording of vaccinations or inaccurate population denominators. In Mongolia, each child is assigned to their neighbourhood health centre for vaccination but enumerating this catchment population is problematic due to a highly mobile population and use of paper-based health centre register. An electronic immunisation register (EIR) was introduced with the introduction of the 13-valent pneumococcal conjugate vaccine (PCV13) in Mongolia. We aimed to (1) assess the completeness of the EIR (numerator); and (2) determine the accuracy of the population denominator.

Process: To assess EIR completeness, we compared EIR data with: 1) a random sample of written health-centre record data (June 2016 to February 2017); and 2) a convenience sample of parent-held record data from children enrolled in pneumonia surveillance (January to September 2017).

The accuracy of the denominator (whether children were correctly registered) was determined for a random sample of health centres by: 1) phone interview on a random sample of children's parents registered at the health centre; and 2) determining whether the address of children enrolled within pneumonia surveillance matched the current health-centre register.

Analysis: Completeness of EIR data was 88.0% (95% CI 86.8-89.1) compared to written health-centre records; and 91.1% (95% CI 90.0-92.9) when compared to parent-held records. The denominator data will be available at the meeting.

Outcomes: The newly introduced EIR was reasonably complete. These results will help accurately determine PCV coverage in Mongolia.

P3.003 - Progress in HPV vaccination coverage in Aboriginal and Torres Strait Islander Australians

Authors: Asso Prof Julia Brotherton^{1,2}, Ms Karen Winch¹, Ms Carolyn Banks³, Mr Dennis Meijer⁴, Ms Sonya Nicholl⁴, Ms Karen Peterson⁵, Ms Rosalind Webby⁶

Affiliations: ¹National HPV Vaccination Program Register, VCS, East Melbourne, Australia, ²School of Population and Global Health, University of Melbourne, Australia, ³Health Protection Service, ACT Government, Holder, Australia, ⁴Immunisation Unit, Health Protection NSW, North Sydney, Australia, ⁵Communicable Diseases Branch, Department of Health, Queensland Health, Herston, Australia, ⁶Centre for Disease Control, Department of Health, Casuarina, Australia

Abstract:

Background: Aboriginal and Torres Strait Islander (respectfully hereafter, Indigenous) women have twice the incidence and four times the mortality rate from cervical cancer compared with other Australian women. HPV vaccination has the potential to close this gap but monitoring coverage has previously been impeded by inadequate reporting of Indigenous status to the National HPV Vaccination Program Register.

Methods: Completeness of reporting of Indigenous status (as indicated by the proportion of unknown/not stated) to the NHVPR has been monitored since 2007. The Register has worked closely with all jurisdictions to understand and address barriers to reporting. By the 2015 school vaccination year, four jurisdictions (NSW, ACT, NT, Queensland) had adequate reporting, as assessed by completeness and proportion of students identifying as Indigenous compared to census estimates, to estimate coverage for these students. The denominator used for coverage estimates is ABS Estimated Resident Population data.

Results: Results for both females and males, including dose 1, 2 and 3 coverage and the percentage of students completing the course, will be presented at the conference, following consultation with Indigenous peak bodies in each jurisdiction.

Conclusions: Improvements in staff training, consent forms, and data processes likely underpin the increases in reporting of Indigenous status. Ensuring completeness of HPV vaccination courses is an ongoing challenge, with the wider 6-12 month spacing between the two doses in the revised HPV vaccination schedule meaning this will likely remain an issue.

P3.004 - Different gaps in immunisation coverage for children versus adolescents: a geographical analysis

Authors: Assoc Professor Julia Brotherton², Professor John Glover¹

Affiliations: ¹PHIDU, Torrens University Australia, Adelaide, Australia, ²Victorian Cytology Service Registries, Melbourne, Australia

Abstract:

Background: This paper examines rates of childhood immunisation and HPV vaccination to describe variations in coverage and gaps between population groups and by geography.

Methods: Data were available by socioeconomic disadvantage of area (referred to as 'socioeconomic status' – SES) and by Remoteness Area (RA) from www.phidu.torrens.edu.au, presenting data from the Australian Childhood Immunisation Register, 2015 (children fully immunised at one, three and five years) and the National HPV Vaccination Program Register (females/males aged 12 to 13 years at 30 June 2013 who received Dose 3 of the HPV vaccine by 2016).

Results: Currently, around 90% of children at each age point are fully immunised, with generally little variation by SES, or RA. There are, however, relatively strong (inverse) correlations in the larger capital cities with proportions of people born overseas in non-English speaking countries and resident in Australia for less than five years. Rates for Aboriginal children are also around 90%, and consistent across RAs.

For HPV, there is greater variation. The largest inequality gap in the capital cities for females is in Adelaide (16% lower coverage for most disadvantaged areas compared to most advantaged); for males it is in Hobart (25% lower). Outside of the capital cities, the largest gaps are for females in the Northern Territory (23% lower) and for males in Tasmania (18%). An analysis by RA also shows substantial variations.

Conclusion: The results highlight areas for further policy development. Factors explaining pockets of lower coverage may be different for vaccinations given in childhood compared to adolescence.

P3.005 - Primary Reasons Why Healthcare Workers Voluntarily Receive Annual Vaccination for Seasonal Influenza

Authors: Mrs Catherine Watson¹, Mrs Carly Roberts¹

Affiliations: ¹Princess Alexandra Hospital, Woolloongabba, Australia

Abstract:

Background: Clinical staff in healthcare facilities who are not vaccinated are at risk of contracting influenza and transmitting it to patients who may be particularly susceptible to severe disease. Healthcare worker influenza vaccination programs therefore are an important initiative funded and delivered by many healthcare organisations worldwide; uptake by healthcare workers however is variable.

The Princess Alexandra Hospital (PAH) has a healthcare worker population of approximately 6500 staff. Based on 2016 data, the PAH Infection Control team in 2017 set out to identify the primary reason why health care workers received their annual influenza vaccine.

Methods: All staff who received their influenza vaccine in 2017 were asked to complete an anonymous survey. The survey asked staff to indicate the primary reason for receiving the vaccination from a possible seven options including an option of 'other' if a suitable primary reason was not listed.

Results: A total of 4480 surveys were returned from 5268 vaccines administered representing an 85% response rate. 48% of all staff indicated their primary reason was 'to protect my personal health'. The next highest reason was 'to protect my family's health'. Only 5% of staff surveyed indicated their primary reason as 'to protect my patient's health'.

Conclusions: Traditional healthcare flu campaign messages target staff protecting patients however from our survey most healthcare workers get vaccinated to either protect themselves or their family. By identifying factors why staff voluntarily receive annual flu vaccination, key messages can be used to help target future campaigns and potentially increase vaccination uptake.

P3.006 - Re-establishing a BCG program in south-east Queensland: challenges and successes.

Authors: Ms Catherine White¹, Dr Mark Stickley¹, Mr Paul Blair¹

Affiliations: ¹*Metro South Clinical Tuberculosis Service, Woolloongabba, Australia*

Abstract:

Context: Bacille Calmette-Guerin (BCG) vaccine is effective at reducing severe forms of tuberculosis in children aged less than five years. In Queensland, it is offered to children travelling to high tuberculosis incidence countries for more than three months and to Aboriginal and Torres Strait Islander children. The BCG vaccine produced by Statens Serum Institut (SSI), which was registered with the Therapeutic Goods Administration (TGA) has not been available since December 2015.

Process: The National Tuberculosis Advisory Committee and tuberculosis services around Australia identified two BCG vaccines that could be used in Australia. Neither is registered with the TGA. Queensland services decided to use a product produced by the Serum Institute of India (SII). In order to use an unregistered product, two medical officers at Metro South Clinical Tuberculosis Service successfully applied to become authorised prescribers of the SII vaccine. BCG vaccination is now only provided through our service in metropolitan Brisbane following individual review of recipients by an authorised prescriber.

Analysis: The regulatory requirements around the unregistered SII vaccine mean that capacity to provide BCG vaccine has been substantially reduced in south-east Queensland. The loss of capacity to provide vaccination services in a variety of locations raises concerns about equity of access to BCG in south-east Queensland.

Outcomes: From July to December 2017, 449 children received BCG vaccine through the Metro South Clinical Tuberculosis Service, reflecting a 72% reduction in capacity from the comparable period in 2015. One adverse event following vaccination has been recorded.

P3.007 - Vaccination of paediatric solid organ transplant recipients: Can we do better?

Authors: Miss Leanne Philips^{1,2}, Dr Julia Clark², Dr Peter Trnka², Dr Sophie Wen^{1,2}

Affiliations: ¹*Queensland Specialist Immunisation Service, South Brisbane, Australia*, ²*Lady Cilento Children's Hospital, Brisbane, Australia*

Abstract:

Context: Kidney transplant recipients are at an increased risk of infections and vaccination is an important disease preventative strategy. This patient cohort is also at risk of impaired vaccine response due to underlying disease and life-long immune suppression. Immunisation is therefore a priority in the care of these patients.

Process: This was a retrospective chart review of patients who received a kidney transplant during a 14-year period (2003 to 2016), under the care of the Queensland Child and Adolescent Renal Service in Brisbane. Demographics, transplant data and vaccination history was obtained from medical records, Australian Immunisation Register and Queensland Immunisation register. Immunisation recommendations were guided by the National Immunisation Program (NIP) which also included additional pneumococcal vaccines due to high risk of invasive pneumococcal disease.

Analysis: Sixty-two patients were included in the audit of which 50 (80%) were > 2 years post-transplant. Age ranged from 4 to 19 years (median 14 years). A complete immunisation history was unavailable on 6 patients. Of the remaining 56 patients, 53 (95%) were overdue NIP vaccine/s. Half of these patients (28/56) were overdue a dose of tetanus containing vaccine, most commonly a 12 year booster dose. While 50/56 (89%) of patients had received meningococcal C vaccine, 51/56 (91%) were overdue for additional pneumococcal vaccine/s.

Outcomes: Vaccination rates for paediatric kidney transplant recipients are suboptimal. A collaborative model of care with a specialist immunisation services is an identified strategy to meet the needs of this at risk population.

P3.008 - Proportion of adult cap cases attributable to streptococcus pneumoniae among hajj pilgrims

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Abstract:

Background and aims: The Islamic pilgrimage to Mecca, the Hajj, is the largest annual mass gathering. Many pilgrims arrive with risk factors, then worship under conditions that promote pneumococcal transmission. This study evaluated the proportion of adult community-acquired pneumonia (CAP) cases attributable to *S. pneumoniae* among Hajj pilgrims in AH1437 (2016). To add sensitivity to etiologic attribution, the study used the BinaxNow[®] Spn urine-antigen test, in addition to culture-based methods.

Methods: All general hospitals designated to treat Hajj pilgrims in Mecca and Medina were included in the study. Adults 18+ years hospitalized with x-ray confirmed CAP at these hospitals were prospectively enrolled, treated according to local standard of care, and administered the urine-antigen test. Patient demographics and clinical history were abstracted from medical charts.

Results: From 23 Aug-23 Sep 2016, 266 patients with x-ray confirmed CAP met the case definition. Patients originated from 43 countries. Mean age was 65.3 years, 10% smoked cigarettes and 36.4% had diabetes. 45.4% of cases were treated in ICU. The number of cases increased towards the end of the study period, with most cases occurring after the Hajj. The proportion of CAP cases positive for *S. pneumoniae*, based on culture or urine antigen test, was 17.0% [95% CI: 13.9-23.1].

Conclusions: 17% of CAP cases among Hajj pilgrims were attributable to *S. pneumoniae*, a pathogen for which vaccines are available. Additional studies to determine the serotypes causing pneumococcal disease could inform vaccine policy during the Hajj, and for the health of pilgrims after their return home.

P3.009 - Immunise Seniors - a reminder about shingles vaccination

Authors: **Mr Scott Brown**¹

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Abstract:

Context: In November 2016, a vaccine to prevent varicella zoster (shingles) infection in older Australians was included on the National Immunisation Program for people aged 70 years. In January 2018, Immunise Seniors – a statewide reminder service was initiated to contact all eligible individuals who did not have zoster vaccination recorded on the Australian Immunisation Register (AIR). A preliminary check of AIR showed that more than 11,000 eligible individuals had not received zoster vaccine.

Process: Using the call centre technology and dedicated resources at Queensland's Health Contact Centre, each quarter a list of individuals assessed as overdue for zoster vaccination by at least 6 months is extracted from AIR. A letter from Queensland's Chief Health Officer is mailed to each addressee notifying them that their AIR record shows they have not had their shingles vaccination and recommends they seek further advice from their doctor. Data are captured on the number of overdue individuals, number of letters sent, number of letters returned and is broken down by gender, Indigenous status and location.

Analysis: Data are analysed to examine trends or patterns in overdue numbers by gender, Indigenous status and location. Each quarter a second overdue list is drawn from AIR and used to correlate with the previous quarter's list to measure impact of the reminder letter, i.e. number of individuals no longer overdue for zoster vaccination.

Outcomes: Results from the period of activity between January to May 2018 will be presented.

P3.010 - Contain the Cough - Managing Pertussis Exposure within the Healthcare Facility

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Abstract:

Context: In 2015 it became evident that the system for pertussis management at Lismore Base Hospital (LBH) was inadequate. There was no formal process in place to proactively manage pertussis exposures. Management of pertussis exposures was reactionary, time consuming with potential ineffective containment of pertussis. The Contain the Cough package is a comprehensive toolkit designed to streamline management of pertussis exposure and contact tracing. A crucial adjunct to this system was to update the staff pertussis immunisation.

Process: The toolkit utilized existing staff and service resources and did not require additional funding or service investment. Staff clinics, mobile immunisation teams and opportunistic immunisation in conjunction with the flu vaccination was instrumental in updating pertussis immunisation.

Analysis: Since February 2016 the toolkit has been used four times at LBH and resulted in a 60% reduction in time taken to manage each exposure from 80 hours to 32 hours.

The immunisation program has resulted in a 660% increase in the number of staff re-immunised against pertussis, with the ongoing benefits of reduced likelihood of disease contraction and transmission. This is critical in containing the spread of disease.

Outcome: Since implementation of Contain the Cough toolkit there has been an 86% reduction in the number of staff exposed and a 16% reduction in the number of patients exposed to pertussis within LBH. This reduction in exposures can be attributed to the 60% reduction in time from notification of index case to managing at risk contacts and increased Healthcare Worker herd immunity.

P3.011 - Nurse led immunisation service targets pneumococcal immunisations in paediatric respiratory patients

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Affiliations: ¹Lady Cilento Children's Hospital, South Brisbane, Australia

Abstract:

Context: Some of the highest incidences of invasive pneumococcal disease (IPD) are seen in children, particularly those with underlying chronic lung disease. For this cohort, additional doses of pneumococcal vaccines are recommended on the National Immunisation Program (medically at risk). An Immunisation Centre was opened in 2016 at Lady Cilento Children's Hospital (LCCH) with the aim of targeting medical at risk patients. This is an advanced nurse-led service which provides immunisation expertise without appointments. .

Process: Outpatients under the care of the respiratory team who presented to the immunisation centre for seasonal influenza vaccination were assessed for their eligibility for medical at risk pneumococcal vaccinations and whether they have received them.

Analysis: Fifty-nine paediatric respiratory patients presented to the Immunisation Centre for annual influenza vaccination who were identified as medically at risk for IPD. Of this cohort 51% (30/59) were identified as being overdue for medically at risk pneumococcal vaccine. The majority (93%, 28/30) of the patients identified as overdue, consented to pneumococcal vaccination on the recommendation of the immunisation centre nursing staff. With the exception of two patients, all had received influenza vaccinations previously.

Outcome: These findings demonstrate that medical at risk patients are failing to receive the recommended additional pneumococcal vaccines and opportunistic vaccinations are important. The results also highlight the benefits of having specialist immunisation nursing staff assess medical at risk patient's immunisation status and provide opportunistic catch-up immunisations.

P3.012 - Diagnostic accuracy of the Q fever screening tests: Bayesian latent class analysis

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Abstract:

There is lack of data on the diagnostic accuracy of the Q fever pre-vaccination screening tests used in Australia. We assessed the diagnostic accuracy of the Q fever pre-vaccination screening tests (blood and skin tests) using Bayesian latent class analysis used in Australia. We used Q fever pre-vaccination screening tests data from 1991 to 2016 on 79,414 individuals aged 15 years and above in Queensland. We employed models for conditionally independent and dependent tests situations to estimate the sensitivity, specificity and the extent of the underlying latent variable. The posterior means of the sensitivity of blood and skin test, respectively, were 67.3% (95% CI: 0.54, 0.81) and 77.0% (95% CI: 0.69, 0.86). In addition, the posterior means of the specificity of blood and skin test, respectively, were 99.0% (95% CI: 0.984, 0.997) and 95.6% (95% CI: 0.95, 97). The posterior mean of the extent of the true latent Q fever exposure prevalence was 7.9% (95% CI: 0.62, 0.10). The false positive rate was high (33% for blood test and 23% for skin test). The positive predictive value of the skin test was very low (59.7%) showing lower benefit of the skin test for ruling out previous immunity for Q fever. Moreover, up to 92% of new entrants in high-risk workplaces will be susceptible to Q fever and require vaccination.

Keywords: Blood Test, Skin Test, Sensitivity, Specificity, Prevalence, Bayesian Latent Class Analysis

P3.013 - Public health response to mumps outbreak in an Indigenous community

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Abstract:

There have been ongoing outbreaks of mumps in Northern and North-Western Queensland since early 2017. We share our experience of a mumps outbreak in an Indigenous community in Central Queensland (CQ) and subsequent public health response.

An epidemiological analysis of cases and persons vaccinated was conducted. On observation of the first case, standard outbreak investigation guidelines were followed and all suspected cases were tested using viral throat swab for mumps PCR.

There were 55 cases of mumps (all Aboriginal Australians, 55% female, 91% from one local Aboriginal community) in CQ between 25th October 2017 and 9th January 2018. 18% of cases were aged between 8 and 14 years, 18% were aged between 15 and 19 years and 55% were aged between 20 and 52 years.

A mass vaccination program was instigated between 21st and 29th November 2017. Persons aged between 8 and 52 years irrespective of their previously immunisation status were offered a third dose of a mumps virus-containing vaccine to improve protection against mumps disease and related complications. 329 individuals were vaccinated in total. 73% of people residing in the community and aged between 8 and 14 years were vaccinated.

A prompt response from public health unit helped reduce the spread of mumps outbreak beyond that Indigenous community. Our outbreak response is in line with the most recent recommendation of the Advisory Committee on Immunization Practices for use of a third dose of mumps virus-containing vaccine in persons at increased risk for mumps during an outbreak.

P3.014 - The impact of legislative change on a School Immunisation Program

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Abstract:

Background: The Public Health Act 2005 was amended in Queensland in late 2016 to require principals to disclose student information to the approved vaccine service provider (VSP), enabling reconciliation of returned consent forms against eligible students, and further follow-up with parents. This study examined the impact of the legislation change on consent form return and program immunisation rates in our public health unit area.

Methodology: We used a controlled before and after design to compare the change in rates of consent forms returned and vaccination between schools where a student list was provided to the VSP and schools where student lists were not provided. Adjusted rate differences and 95% confidence intervals were calculated using STATA. We liaised with the VSP to gain an understanding of the follow up undertaken with parents.

Results: Schools who provided student details achieved a greater positive change in consent form return and vaccination rates than schools where student details were not provided. These changes were statistically significant for 3 of 4 vaccines administered and ranged from 4.06 to 5.20% and 1.45 to 4.36% respectively. The VSP indicated restricted implementation of follow up of parents, totalling 20 students in four schools. Of these, 10 subsequently returned consent forms and were vaccinated.

Conclusions: Preliminary results demonstrate promising change in school immunisation program coverage. Further investment in parental follow up by the VSP should provide ongoing improvement in consent form return and vaccination rates in the coming years.

P3.015 - Western Sydney Follow-up of Children Overdue for Immunisation with an Immunisation Provider

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Abstract:

Context: In 2016 Western Sydney Public Health Unit (WSPHU) commenced a follow-up program to improve immunisations in children aged 0-2 years who were overdue on the Australian Immunisation Register (AIR) records. Program data was analysed to identify areas for improvement in immunisation services including AIR reporting.

Process: Four AIR reports of overdue Western Sydney Local Health District (WSLHD) children were downloaded between May 2016 and May 2017. Practices with ≥15 overdue children were contacted to participate. Accepting practices received a list of overdue children and were asked to compare practice records against AIR, ascertain immunisation status, recall and organise catch-up plans, identify reasons for being overdue, and return the information to the WSPHU. The WSPHU assisted with catch-up planning and rectifying children's data on AIR.

Analysis: Descriptive data analyses (n = 9,703 child episodes) were performed. Of 1,857 targeted child episodes, WSPHU received information for 1,381(74%). Of these, 616(45%) were overdue for vaccination and 178(13%) were undetermined. The remaining 587(43%) were not truly overdue as: previously reported vaccinations to AIR had failed to show (472, 34%); vaccines given by another provider were not reported to AIR (57, 4%); or child was duplicated in AIR (58, 4%).

Outcomes: The program has resulted in updated AIR records for children who have already received vaccinations and upskilled practice staff on catch-up planning and AIR reporting. Most importantly the data highlighted a large percentage of children incorrectly reported as overdue on AIR leading to under-reporting of immunisation rates at local, state and national levels.

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