

A SELECTION OF TEN CURRENT READINGS ON TOPICS RELATED TO VACCINATION IN ADULTS

Some available as free full-text and some requiring payment

Selection of readings made by A/Prof Goh Lee Gan

READING 1 – UPTAKE OF PNEUMOCOCCAL VACCINE AMONG OLDER ADULTS LIVING IN THE COMMUNITY IN SINGAPORE

Ang LW, Cutter J, James L, Goh KT. Epidemiological characteristics associated with uptake of pneumococcal vaccine among older adults living in the community in Singapore: Results from the National Health Surveillance Survey 2013. Scand J Public Health. 2018 Mar;46(2):175–81.

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ABSTRACT

AIMS: In Singapore, pneumococcal vaccination is recommended for the elderly (i.e. those ≥ 65 years of age) and people with chronic medical conditions. We investigated epidemiological characteristics associated with the uptake of pneumococcal vaccine based on a nationally representative cross-sectional sample of community-living adults aged ≥ 50 years.

METHODS: The data were obtained from the National Health Surveillance Survey (NHSS) 2013. Associations between pneumococcal vaccination and sociodemographic and health-related variables were analysed using univariable and multivariable logistic regression models.

RESULTS: Among 3672 respondents aged ≥ 50 years in the NHSS, 7.8% had taken the pneumococcal vaccination. A higher level of education and higher monthly household income were sociodemographic characteristics independently associated with pneumococcal vaccine uptake. Health-related characteristics predictive of pneumococcal vaccine uptake were better self-rated health and having a regular family doctor/general practitioner. Among those who responded to the two questions on vaccinations, 3.9% had been vaccinated against both seasonal influenza and pneumococcal infection, while 11.1% had taken only seasonal influenza vaccination in the past year.

CONCLUSIONS: There is a need to boost pneumococcal vaccination coverage among community-dwelling older adults. These findings provide insights into reviewing and tailoring public-health strategies and programmes to increase vaccine uptake in at-risk population groups.

READING 2 – RESEARCH GUIDED INTERVENTION IN INFLUENZA AND PNEUMOCOCCAL VACCINATIONS

Ho HJ, Chan YY, Ibrahim MAB, Wagle AA, Wong CM, Chow A. A formative research-guided educational intervention to improve the knowledge and attitudes of seniors towards influenza and pneumococcal vaccinations. Vaccine. 2017 Nov 7;35(47):6367–74.

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ABSTRACT

BACKGROUND: Adult influenza and pneumococcal vaccination rates in Singapore are low, and factors influencing knowledge and attitudes of seniors towards influenza, pneumonia and their respective vaccines are not well-known. Our study aims to understand the barriers and facilitators towards getting influenza and pneumococcal vaccinations among seniors in Singapore, and subsequently inform the conduct of a relevant community-based educational intervention, as well as evaluate the intervention outcomes.

METHODS: We performed a mixed methods study with two components: Firstly, formative research was conducted among community-dwelling seniors, using focus group discussions (FGDs), to understand their knowledge and attitudes towards influenza, pneumonia and their respective vaccines. Next, a quantitative study was conducted to evaluate knowledge of seniors and the effectiveness of an educational intervention.

RESULTS: Four FGDs were organised with 32 participants, who were predominantly female, of lower educational background, and residing in government rental flats. Participants had varying levels of knowledge and many misconceptions about influenza, pneumonia and their respective vaccinations, with concerns about side effects and vaccine effectiveness. The formative research results were used to inform a community-based educational intervention for seniors. Our subsequent evaluation included 604 elderly participants, mainly from lower educational and socio-economic strata, who initially demonstrated poor knowledge scores (median score 5 out of 9, IQR 4–5). Following our intervention, median knowledge score improved to 7 (IQR 6–8) ($p < .0001$). Significant improvements in knowledge scores were observed across genders, age strata, education levels, and housing types.

CONCLUSIONS: Our formative research identified knowledge gaps among community-dwelling seniors which affected their attitudes towards vaccination uptake. Our community-based intervention was effective in improving knowledge and attitudes, and could be used as a cue to action for short-term behaviour changes.

READING 3 – TRAVELLERS AND INFLUENZA: RISKS AND PREVENTION

Goeijenbier M, van Genderen P, Ward BJ, Wilder-Smith A, Steffen R, Osterhaus AD. Travellers and influenza: risks and prevention. J Travel Med. 2017 Jan 11;24(1).

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ABSTRACT

BACKGROUND: Influenza viruses are among the major causes of serious human respiratory tract infection worldwide. In line with the high disease burden attributable to influenza, these viruses play an important, but often neglected, role in travel medicine. Guidelines and recommendations regarding prevention and management of influenza in travellers are scarce. Of special interest for travel medicine are risk populations and also circumstances that facilitate influenza virus transmission and spread, like travel by airplane or cruise ship and mass gatherings.

METHODS: We conducted a PUBMED/MEDLINE search for a combination of the MeSH terms Influenza virus, travel, mass gathering, large scale events and cruise ship. In addition we gathered guidelines and recommendations from selected countries and regarding influenza prevention and management in travellers. By reviewing these search results in the light of published knowledge in the fields of influenza prevention and management, we present best practice advice for the prevention and management of influenza in travel medicine.

RESULTS: Seasonal influenza is among the most prevalent infectious diseases in travellers. Known host-associated risk factors include extremes of age and being immune-compromised, while the most relevant environmental factors are associated with holiday cruises and mass gatherings.

CONCLUSIONS: Pre-travel advice should address influenza and its prevention for travellers, whenever appropriate on the basis of the epidemiological situation concerned. Preventative measures should be strongly recommended for travellers at high-risk for developing complications. In addition, seasonal influenza vaccination should be considered for any traveller wishing to reduce the risk of incapacitation, particularly cruise ship crew and passengers, as well as those participating in mass gatherings. Besides advice concerning preventive measures and vaccination, advice on the use of antivirals may be considered for some travellers.

READING 4 – PREVENTION OF MENINGOCOCCAL DISEASE DURING THE HAJJ AND UMRAH MASS GATHERINGS

Yezli S, Bin Saeed AA, Assiri AM, Alhakeem RF, Yunus MA, Turkistani AM, Booy R, Alotaibi BM. Prevention of meningococcal disease during the Hajj and Umrah mass gatherings: past and current measures and future prospects. *Int J Infect Dis.* 2016 Jun;47:71–8.

doi: 10.1016/j.ijid.2015.12.010. Epub 2015 Dec 18. Review. PubMed PMID: 26707071. [Free Full Text]

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ABSTRACT

The Kingdom of Saudi Arabia (KSA) has a long history of instituting preventative measures against meningococcal disease (MD). KSA is at risk of outbreaks of MD due to its geographic location, demography, and especially because it hosts the annual Hajj and Umrah mass gatherings.

Preventative measures for Hajj and Umrah include vaccination, targeted chemoprophylaxis, health awareness and educational campaigns, as well as an active disease surveillance and response system.

Preventative measures have been introduced and updated in accordance with changes in the epidemiology of MD and available preventative tools. The mandatory meningococcal vaccination policy for pilgrims has possibly been the major factor in preventing outbreaks during the pilgrimages. The policy of chemoprophylaxis for all pilgrims arriving from the African meningitis belt has also probably been important in reducing the carriage and transmission of *Neisseria meningitidis* in KSA and beyond.

The preventative measures for Hajj and Umrah are likely to continue to focus on vaccination, but to favour the conjugate vaccine for its extra benefits over the polysaccharide vaccines. Additionally, the surveillance system will continue to be strengthened to ensure early detection and response to cases and outbreaks; ongoing disease awareness campaigns for pilgrims will continue, as will chemoprophylaxis for target groups. Local and worldwide surveillance of the disease and drug-resistant *N. meningitidis* are crucial in informing future recommendations for vaccination, chemoprophylaxis, and treatment. Preventative measures should be reviewed regularly and updated accordingly, and compliance with these measures should be monitored and enhanced to prevent MD during Hajj and Umrah, as well as local and international outbreaks.

READING 5 – HEPATITIS B VACCINATION IN ADULTS WITH AND WITHOUT TYPE-2 DIABETES MELLITUS

Van Der Meeren O, Peterson JT, Dionne M, Beasley R, Ebeling PR, Ferguson M, Nissen MD, Rheault P, Simpson RW, De Ridder M, Crasta PD, Miller JM, Trofa AF. Prospective clinical trial of hepatitis B vaccination in adults with and without type-2 diabetes mellitus. Hum Vaccin Immunother. 2016 Aug 2;12(8):2197–203.

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ABSTRACT

OBJECTIVE: Patients with diabetes mellitus are at increased risk for hepatitis B virus (HBV) infection and its complications. HBV vaccination is recommended for adults with diabetes in the United States and other countries. However, few studies have assessed safety and immunogenicity of hepatitis B vaccine in such patients. We assessed the safety and immunogenicity of recombinant hepatitis B vaccine in subjects with and without diabetes mellitus.

METHODS: Prospective, multi-country controlled study in 21 centers (www.clinicaltrials.gov NCT01627340). Four hundred and sixteen participants with Type-2 diabetes and 258 controls matched for age and body mass index (BMI) (2:1 ratio) received 3-doses of HBV vaccine (Engerix-B™, GSK Vaccines, Belgium) according to a 0, 1, 6 months schedule. Antibodies were measured against HBV surface antigen and expressed as seroprotection rates (anti-HBs ≥10mIU/mL) and geometric mean concentration (GMC).

RESULTS: The median age and BMI in patients with diabetes and controls (according-to-protocol cohort) were 54 y and 32.1 kg/m², and 53 y and 30.8 kg/m², respectively. Seroprotection rates (GMCs) one month post-dose-3 were 75.4% (147.6 mIU/mL) and 82.0% (384.2 mIU/mL) in patients with diabetes and controls, respectively. Age-stratified seroprotection rates for patients with diabetes were 88.5% (20–39 years), 81.2% (40–49 years), 83.2% (50–59 years), and 58.2% (≥60 years). The overall safety profile of hepatitis B vaccine was similar between groups.

CONCLUSIONS: Hepatitis B vaccine is immunogenic in patients with diabetes and has a similar safety profile to vaccination in healthy controls. Because increasing age was generally associated with a reduction in seroprotection rates, hepatitis B vaccine should be administered as soon as possible after the diagnosis of diabetes.

READING 6 - IMPACT OF QUADRIVALENT INFLUENZA VACCINE ON PUBLIC HEALTH IN AUSTRALIA

Jamotte A, Chong CF, Manton A, Macabeo B, Toumi M. Impact of quadrivalent influenza vaccine on public health and influenza-related costs in Australia. BMC Public Health. 2016 Jul 22;16:630.

doi: 10.1186/s12889-016-3297-1. PubMed PMID: 27449665; PubMed Central PMCID: PMC4957923. [Free Full Text]

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ABSTRACT

BACKGROUND: Annual trivalent influenza vaccines (TIV) containing three influenza strains (A/H1N1, A/H3N2, and one B) have been recommended for the prevention of influenza. However, worldwide co-circulation of two distinct B lineages (Victoria and Yamagata) and difficulties in predicting which lineage will predominate each season have led to the development of quadrivalent influenza vaccines (QIV), which include both B lineages. Our analysis evaluates the public health benefit and associated influenza-related costs avoided which would have been obtained by using QIV rather than TIV in Australia over the period 2002–2012.

METHODS: A static model stratified by age group was used, focusing on people at increased risk of influenza as defined by the Australian vaccination recommendations. B-lineage cross-protection was accounted for. We calculated the potential impact of QIV compared with TIV over the seasons 2002–2012 (2009 pandemic year excluded) using Australian data on influenza circulation, vaccine coverage, hospitalisation and mortality rates as well as unit costs, and international data on vaccine effectiveness, influenza attack rate, GP consultation rate and working days lost. Third-party payer and societal influenza-related costs were estimated in 2014 Australian dollars. Sensitivity analyses were conducted.

RESULTS: Using QIV instead of TIV over the period 2002–2012 would have prevented an estimated 68,271 additional influenza cases, 47,537 GP consultations, 3,522 hospitalisations and 683 deaths in the population at risk of influenza. These results translate into influenza-related societal costs avoided of \$46.5 million. The estimated impact of QIV was higher for young children and the elderly. The overall impact of QIV depended mainly on vaccine effectiveness and the influenza attack rate attributable to the mismatched B lineage.

CONCLUSION: The broader protection offered by QIV would have reduced the number of influenza infections and its related complications, leading to substantial influenza-related costs avoided.

READING 7 - HUMAN PAPILLOMAVIRUS VACCINATION AMONG YOUNG WOMEN ATTENDING A TERTIARY INSTITUTION IN SINGAPORE

Zhuang QY, Wong RX, Chen WM, Guo XX. Knowledge, attitudes and practices regarding human papillomavirus vaccination among young women attending a tertiary institution in Singapore. Singapore Med J. 2016 Jun;57(6):329–33.

doi: 10.11622/smedj.2016108. PubMed PMID: 27353611; PubMed Central PMCID: PMC4971453. [Free Full Text]

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ABSTRACT

INTRODUCTION: This study aimed to describe the knowledge, attitudes and practices of young women regarding human papillomavirus (HPV) vaccination.

METHODS: We conducted a descriptive, cross-sectional, questionnaire-based study among female students at a tertiary institute in Singapore.

RESULTS: A total of 255 questionnaires were completed and formed the basis of the analysis. 244 (95.7%) of the total participants were of the age group 15–22 years. 252 (98.8%) participants were unmarried and 240 (94.1%) had never had sexual intercourse. Only 25 (9.8%) women had received vaccination. Among the unvaccinated participants, 96 (41.7%) had no intention to receive HPV vaccination and 62 of them cited lack of information as a major barrier to HPV vaccination. Knowledge of cervical cancer and HPV vaccination was also assessed and graded via a point system, with a maximum score of 14. Knowledge was found to be low, with a median score of 7. There was a significant association between HPV vaccination uptake and the source from which they first heard about the vaccine ($p = 0.007$). Vaccinated respondents tended to first hear about it from their relatives and friends, as compared to unvaccinated respondents (60.0% vs. 27.0%).

CONCLUSION: There is poor uptake of HPV vaccination amongst Singapore's susceptible youth as well as poor knowledge of cervical cancer and HPV vaccination. Public health education regarding cervical cancer and HPV vaccination is still needed and has to be targeted at not only respondents, but also their family and friends.

READING 8 - PREVALENCE OF DIPHTHERIA AND TETANUS ANTIBODIES AMONG ADULTS IN SINGAPORE

Ang LW, James L, Goh KT. Prevalence of diphtheria and tetanus antibodies among adults in Singapore: a national serological study to identify most susceptible population groups. J Public Health (Oxf). 2016 Mar;38(1):99–105.

doi: 10.1093/pubmed/fdv011. Epub 2015 Feb 11. PubMed PMID: 25678536.

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ABSTRACT

BACKGROUND: In view of waning antitoxin titres over time after the last vaccine dose against diphtheria and tetanus, we determined the immunity levels in adults to identify most susceptible groups for protection in Singapore.

METHODS: Our study involved residual sera from 3293 adults aged 18–79 who had participated in a national health survey in 2010. IgG antibody levels were determined using commercial enzyme-linked immunosorbent assay.

RESULTS: Overall, 92.0% (95% confidence interval [CI]: 91.1–92.9%) had at least basic protection against diphtheria (antibody levels ≥ 0.01 IU/ml), while 71.4% (95% CI: 69.8–72.9%) had at least short-term protection against tetanus (antibody levels > 0.1 IU/ml). The seroprevalence declined significantly with age for both diseases; the drop was most marked in the 50- to 59-year age group for diphtheria and 60- to 69-year age group for tetanus. There was a significant difference in

seroprevalence by residency for diphtheria (92.8% among Singapore citizens versus 87.1% among permanent residents; $P = 0.001$). The seroprevalence for tetanus was significantly higher among males (83.2%) than females (62.4%) ($P < 0.0005$).

CONCLUSIONS: It may be of value to consider additional vaccination efforts to protect older adults at higher risk for exposure against diphtheria and tetanus, particularly those travelling to areas where diphtheria is endemic or epidemic.

READING 9 - SAFETY OVERVIEW OF A RECOMBINANT LIVE ATTENUATED TETRAVALENT DENGUE VACCINE

Gailhardou S, Skipetrova A, Dayan GH, Jezowski J, Saville M, Van der Vliet D, Wartel TA. Safety Overview of a Recombinant Live-Attenuated Tetravalent Dengue Vaccine: Pooled Analysis of Data from 18 Clinical Trials. PLoS Negl Trop Dis. 2016 Jul 14;10(7):e0004821.

doi: 10.1371/journal.pntd.0004821. eCollection 2016 Jul. PubMed PMID: 27414655; PubMed Central PMCID: PMC4945086. [Free Full Text]

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ABSTRACT

A recombinant live attenuated tetravalent dengue vaccine (CYD-TDV) has been shown to be efficacious in preventing virologically-confirmed dengue disease, severe dengue disease and dengue hospitalization in children aged 2-16 years in Asia and Latin America.

We analyzed pooled safety data from 18 phase I, II and III clinical trials in which the dengue vaccine was administered to participants aged 2-60 years, including long-term safety follow-up in three efficacy trials. The participants were analyzed according to their age at enrollment.

The percentage of participants aged 2-60 years reporting ≥ 1 solicited injection-site or systemic reactions was slightly higher in the CYD-TDV group than in the placebo group. The most common solicited injection-site reactions were pain. Headache and malaise were the most common solicited systemic reactions. In both groups 0.3% of participants discontinued for safety reasons. The most common unsolicited adverse events were injection-site reactions, gastrointestinal disorders, and infections. Reactogenicity did not increase with successive doses of CYD-TDV. The frequency and nature of SAEs occurring within 28 days of any dose were similar in the CYD-TDV and placebo groups and were common medical conditions that could be expected as a function of age. Baseline dengue virus serostatus did not appear to influence the safety profile. No vaccine-related anaphylactic reactions, neurotropic events or viscerotropic events were reported. In year 3 after dose 1, an imbalance for dengue hospitalization, including for severe dengue, observed in participants aged < 9 years in the CYD-TDV group compared with the placebo group was not observed for participants aged ≥ 9 years. In Year 4, this imbalance in participants aged < 9 years was less marked, giving an overall lower risk of dengue hospitalization or severe dengue from dose 1 to Year 4 in the CYD-TDV group.

These results have contributed to the definition of the target population for vaccination (≥ 9 years old) for which CYD-TDV has a satisfactory safety profile. Long-term safety will continue to be monitored in the ongoing follow-up of efficacy trials. Safety and effectiveness in real-life settings will be assessed through post-licensure studies.

READING 10 - EPIDEMIOLOGICAL RISK FACTORS FOR ADULT DENGUE IN SINGAPORE

Yung CF, Chan SP, Thein TL, Chai SC, Leo YS. Epidemiological risk factors for adult dengue in Singapore: an 8-year nested test negative case control study. BMC Infect Dis. 2016 Jul 8;16:323.

doi: 10.1186/s12879-016-1662-4. PubMed PMID: 27390842; PubMed Central PMCID: PMC4938976.

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ABSTRACT

BACKGROUND: Understanding changes in the ecology and epidemiology of dengue is important to ensure resource intensive control programmes are targeted effectively as well as to inform future dengue vaccination strategies.

METHODS: We analysed data from a multicentre longitudinal prospective study of fever in adults using a nested test negative case control approach to identify epidemiological risk factors for dengue disease in Singapore. From April 2005 to February 2013, adult patients presenting with fever within 72 h at selected public primary healthcare clinics and a tertiary hospital in Singapore were recruited. Acute and convalescent blood samples were collected and used to diagnose dengue using both PCR and serology methods. A dengue case was defined as having a positive RT-PCR result for DENV OR evidence of serological conversion between acute and convalescent blood samples. Similarly, controls were chosen from patients in the cohort who tested negative for dengue using the same laboratory methods.

RESULTS: The host epidemiological factors which increased the likelihood of dengue disease amongst adults in Singapore were those aged between 21 and 40 years old (2-fold increase) while in contrast, Malay ethnicity was protective (OR 0.57, 95%CI 0.35 to 0.91) against dengue disease. Spatial factors which increased the odds of acquiring dengue was residing at a foreign workers dormitory or hostel (OR 3.25, 95 % CI 1.84 to 5.73) while individuals living in the North-West region of the country were less likely to get dengue (OR 0.50, 95%CI 0.29 to 0.86). Other factors such as gender, whether one primarily works indoors or outdoors, general dwelling type or floor, the type of transportation one uses to work, travel history, as well as self-reported history of mosquito bite or household dengue/fever were not useful in helping to inform a diagnosis of dengue.

CONCLUSIONS: We have demonstrated a test negative study design to better understand the epidemiological risk factors of adult dengue over multiple seasons. We were able to discount other previously speculated factors such as gender, whether one primarily works indoors or outdoors, dwelling floor in a building and the use of public transportation as having no effect on one's risk of getting dengue.