

**A SELECTION OF TEN CURRENT READINGS ON TOPICS RELATED TO
LIFE COURSE IMMUNISATION – VACCINATE FOR LIFE SERIES**

Some available as free full-text and some requiring payment

Selection of readings made by A/Prof Goh Lee Gan

READING 1 – LIFE COURSE VACCINATION

Philip RK(1), Attwell K(2), Breuer T(3), Di Pasquale A(3), Lopalco PL(4). Life-course immunization as a gateway to health. Expert Rev Vaccines. 2018 Oct;17(10):851-864.

URL: doi: 10.1080/14760584.2018.1527690 [Payment required].

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ABSTRACT

INTRODUCTION: Extending the benefits of vaccination against infectious diseases from childhood throughout the entire life-span is becoming an increasingly urgent priority in view of the world's aging population, emergence and reemergence of infectious diseases, and the necessity to invest more on prevention versus cure in global healthcare. Areas covered: This perspective discusses how life-course immunization could benefit human health at all stages of life. To achieve this, the current vaccination paradigm should be changed and all stakeholders have a role to play.

EXPERT COMMENTARY: To enhance immunization confidence in the population, it is essential that stakeholders eliminate complacency toward infectious diseases, improve vaccination convenience, remove barriers among different healthcare specialties, and address prevention as a single entity. They must also consider societal and cultural mindsets by understanding and including public viewpoints. A new "4Cs" model encompassing convenience, confidence, complacency, and cultural acceptance is proposed to convert 'vaccine availability' to 'vaccination acceptance' throughout life.

CONCLUSIONS: Life-course vaccination should become the new social norm of a healthy life-style, along with a healthy diet, adequate physical exercise, and not smoking. We are 'all in' to make life-course immunization a gateway for all people to lead longer, healthier lives.

READING 2 – VACCINATION IN THE ELDERLY

Ciabattini A(1), Nardini C(2), Santoro F(1), Garagnani P(3), Franceschi C(4), Medaglini D(5). Vaccination in the elderly: The challenge of immune changes with aging. Semin Immunol. 2018 Dec;40:83-94.

URL: doi: 10.1016/j.smim.2018.10.010. PMID: 30501873 [Free full text]

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ABSTRACT

The unprecedented increase of life expectancy challenges society to protect the elderly from morbidity and mortality making vaccination a crucial mean to safeguard this population. Indeed, infectious diseases, such as influenza and pneumonia, are among the top killers of elderly people in the world.

Elderly individuals are more prone to severe infections and less responsive to vaccination prevention, due to immunosenescence combined with the progressive increase of a proinflammatory status characteristic of the aging process (inflammaging).

These factors are responsible for most age-related diseases and correlate with poor response to vaccination. Therefore, it is of utmost interest to deepen the knowledge regarding the role of inflammaging in vaccination responsiveness to support the development of effective vaccination strategies designed for elderly.

In this review we analyse the impact of age-associated factors such as inflammaging, immunosenescence and immunobiography on immune response to vaccination in the elderly, and we consider systems biology approaches as a mean for integrating a multitude of data in order to rationally design vaccination approaches specifically tailored for the elderly.

READING 3 – ADULT VACCINATION AS HEALTHY LIFE STYLE

Mark Doherty T(1), Del Giudice G(2), Maggi S(3). Adult vaccination as part of a healthy lifestyle: moving from medical intervention to health promotion. Ann Med. 2019 Apr 26:1-13.

URL: doi: 10.1080/07853890.2019.1588470. PubMed PMID: 31025882. [Payment required]

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ABSTRACT

As the global population ages, there is concern about the effect of an increased proportion of older individuals on the economic sustainability of healthcare systems and the social effects of an older society.

Health authorities and advocacy groups in countries at the forefront of this trend are now developing strategies to ameliorate the social and financial effects of an ageing population.

There is broad agreement that for both society and for the individuals, it is important to ensure that increasing lifespans are matched with increased "healthspans" - the number of years spent in good health. There is also growing consensus that vaccination is one of the tools that can play an important role in improving adult health - though currently vaccination coverage is often poor.

This review focuses on two issues that consistently appear to be associated with under-vaccination: the low awareness of risk (and potential consequences) for vaccine-preventable diseases and a poor understanding of the value of improved vaccination coverage for adults. We suggest that understanding of vaccination as a health-promoting activity, rather than a medical intervention designed to prevent the spread of a specific pathogen - is a crucial step to improve vaccination uptake among adults (see Supplementary video abstract).

Key messages: As populations age globally, we are seeing an increasing burden of vaccine-preventable disease in adults. Adult vaccination against some common diseases has been shown to dramatically improve health and quality of life for older people. Despite the attested benefits, vaccination coverage is almost always poor in adults, even in countries where access is free at point of care.

In this article, we discuss what appears to a neglected issue in adult vaccination, that of personal autonomy. We argue that adult vaccination will only be successful if it respects individual autonomy and that this requires treating the choice to vaccinate as a public health issue akin to smoking cessation, exercise and healthy diet.

READING 4 – MATERNAL CARE PROVIDERS AS VACCINATORS FOR PREGNANT WOMEN

Vilca LM(1), Esposito S(2). The crucial role of maternal care providers as vaccinators for pregnant women. Vaccine. 2018 Aug 28;36(36):5379-5384.

URL:doi: 10.1016/j.vaccine.2017.08.017. PMID: 28822646 [Payment required]

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ABSTRACT

Vaccination during pregnancy is increasingly being recognised internationally a useful means of preventing illness in pregnant women and their newborns. It has been used since the 1960s, when it was found that tetanus vaccine was highly effective in preventing neonatal tetanus, but interest has greatly increased over the last few years.

As new data become available showing the numerous benefits of maternal immunisation and its potential for improving maternal and neonatal health in relation to a number of infectious conditions, it is being increasingly incorporated into the national vaccination programmes around the world. However, the development of new vaccines, the existence of clinical trials testing the efficacy of vaccinating pregnant women in order to protect newborns against respiratory syncytial virus and group B Streptococcus infections, and the fact that the uptake of influenza and pertussis vaccines during pregnancy is lower than expected in developed countries is making it increasingly clear that existing maternal vaccination programmes need to be strengthened.

This reviews addresses the importance of integrating maternal immunisation and standard obstetrical care in order to promote vaccination administration by maternal care providers (MCPs) because the vaccination goals for pregnant women cannot be achieved without appropriate training and extending the role of MCPs as vaccinators.

In order to make meaningful progress, it is necessary to develop and refine targeted messages for pregnant women concerning the benefits of maternal immunisation for themselves and their infants.

READING 5 – MATERNAL LIFE COURSE VACCINATION

Bergin N(1), Murtagh J(2), Philip RK(3). Maternal Vaccination as an Essential Component of Life-Course Immunization and Its Contribution to Preventive Neonatology. Int J Environ Res Public Health. 2018 Apr 25;15(5). pii: E847.

URL: doi: 10.3390/ijerph15050847. PMID: 29693575 [Free full text]

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ABSTRACT

Maternal immunisation schedules are increasingly coming under the spotlight as part of the development of lifetime immunisation programmes for the role that they play in improving maternal, foetal, and neonatal health. Maternally-acquired antibodies are critical in protecting infants during the first months of their lives. Maternal immunisation was previously overlooked owing to concerns regarding vaccinations in this untested and high-risk population but is now acknowledged for its potential impact on the outcomes in many domains of foetal and neonatal health, aside from its maternal benefits.

This article highlights the role that maternal immunisation may play in reducing infections in preterm and term infants. It explores the barriers to antenatal vaccinations and the optimisation of the immunisation uptake. This review also probes the part that maternal immunisation may hold in the reduction of perinatal antimicrobial resistance and the prevention of non-infectious diseases. Both healthcare providers and expectant mothers should continue to be educated on the importance and safety of the appropriate immunizations during pregnancy.

Maternal vaccination merits its deserved priority in a life-course immunization approach and it is perhaps the only immunization whereby two generations benefit directly from a single input.

We outline the current recommendations for antenatal vaccinations and highlight the potential advances in the field contributing to preventive neonatology.

READING 6 – HPV VACCINATION – WE CAN DO BETTER

Attia AC(1), Wolf J(1), Núñez AE(1). On surmounting the barriers to HPV vaccination: we can do better. *Ann Med.* 2018 May;50(3):209-225.

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ABSTRACT

The major impediment to increased human papillomavirus (HPV) vaccination coverage in young males and females is lack of health care provider recommendation. Despite its efficacy in preventing cervical cancer, HPV vaccination in females (49.5%) and males (37.5%) ages 13 through 17 falls well below the Centers for Disease Control and Prevention's (CDC) Healthy People 2020 target of 80% coverage.

Parents' willingness to vaccinate their child has been shown to be much higher when physicians share personal vaccination decisions for their own children as well as what other parents have done at that particular clinic.

Furthermore, the vaccine must be presented presumptively as a "bundle" along with the rest of the standard adolescent vaccine panel. Multiple exemplars presented including in several European countries, low-income countries and Rwanda, demonstrate that school-based health care systems dramatically increase vaccination coverage.

Finally, acceptability for vaccination of males must improve by increasing provider recommendation and by presenting the HPV vaccine as a penile, anal and oropharyngeal cancer prevention therapy in males and not merely a vaccine to prevent cervical cancers in females. Paediatricians, obstetrician/gynaecologists and primary care physicians should consider these data as a call-to-action.

Key messages

- Despite recent efforts in the US, only 49.5% of females and only 37.5% of males ages 13 through 17 have received all recommended HPV vaccine doses. These numbers fall well below the 80% target set forth by the Healthy People 2020 initiative.
- According to the CDC, if health care providers increase HPV vaccination rates in eligible recipients to 80%, it is estimated that an additional 53,000 cases of cervical cancer could be prevented during the lifetime of those younger than 12 years. Furthermore, for every year that the vaccination rate does not increase, an additional 4400 women will develop cervical cancer.
- First and foremost, healthcare providers (HCPs) must make a strong recommendation to vaccinate patients and these recommendations must become routine, including for males.
- It is clear that HPV vaccination rates improve significantly when vaccine administration occurs at designated, well-organized sites such as school-based vaccination programmes. Furthermore, HPV vaccination should be a high school requirement and offered in the standard adolescent vaccine panel as a bundle with Tdap and MenACWY vaccines in order to promote maximum adherence.
- Finally, research on immunogenicity and antibody titre longevity needs to be done in newborns. The HPV vaccine may be recommended in the newborn panel of vaccines to avoid any issues of sexualization and misplaced fears of sexual disinhibition, akin to the success of the Hepatitis B vaccine in the 1980s.
- The HPV vaccine is a vaccine against cancer and should be aggressively marketed as such. As healthcare providers, we need to make every effort to overcome barriers, real or perceived, to protecting our population from potential morbidity and mortality associated with this virus. DOI: 10.1080/07853890.2018.1426875

READING 7 – INFLUENZA VACCINATION IN COPD

Huang HH(1), Chen SJ(2), Chao TF(3), Liu CJ(4), Chen TJ(5), Chou P(6), Wang FD(7). Influenza vaccination and risk of respiratory failure in patients with chronic obstructive pulmonary disease: A nationwide population-based case-cohort study. J. Microbiol Immunol Infect. 2019 Feb;52(1):22-29

URL: doi: 10.1016/j.mii.2017.08.014. PMID: 28927683 [Payment required].

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ABSTRACT

BACKGROUND: Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory disease which causes a considerable disease burden. Patients with COPD are at a higher risk for influenza infection and influenza vaccination are recommended at this high risk patient group.

In the current study, we aimed to evaluate the association between influenza vaccination and the risk of respiratory failure (RF) in COPD patients.

METHODS: From 2001 to 2005, patients with newly diagnosed COPD were identified from the NHIRD, and were followed until 2010. We explored the influenza vaccination rate among this COPD cohort. Furthermore, patients who experienced RF were defined as case group, whereas the others were defined as control group. Baseline characteristic were compared and association between influenza vaccination and RF were evaluated.

RESULTS: The rate of influenza vaccination was significantly higher in patients age ≥ 65 years than those age < 65 years (54.8% vs. 4%, $p < 0.001$). The vaccine cohort had more comorbidities, more health care utilization and more frequent acute exacerbations as compared with nonvaccine cohort. In multivariable logistic regression, influenza vaccination was associated with a reduced risk of respiratory failure (adjusted odds ratio [aOR] 0.87, 95% confidence interval [CI] 0.79-0.96). In subgroup analysis, we found that the association was insignificant in patients age < 65 years, patients with relatively unstable disease status and patient did not receive influenza vaccination annually.

CONCLUSIONS: Influenza vaccination was associated with a decreased risk of RF in patients with COPD. Recommendation of annual influenza vaccination should be made when managing this high-risk patient group.

READING 8 – VACCINATION IN BRONCHIECTASIS

O'Grady KF(1), Cripps AW(2)(3), Grimwood K(2)(3)(4)(5). Paediatric and adult bronchiectasis: Vaccination in prevention and management. *Respirology*. 2019 Feb;24(2):107-114.

URL: doi: 10.1111/resp.13446. PMID: 30477047 [Free full text].

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ABSTRACT

Bronchiectasis has received increased attention recently, including an emphasis on preventing infective exacerbations that are associated with disease progression and lung function decline.

While there are several bacteria and viruses associated with bronchiectasis, licensed vaccines are only currently available for *Streptococcus pneumoniae*, *Haemophilus influenzae* (H. influenzae protein D as a conjugate in a pneumococcal vaccine), *Mycobacterium tuberculosis*, *Bordetella pertussis* and influenza virus.

The evidence for the efficacy and effectiveness of these vaccines in both preventing and managing bronchiectasis in children and adults is limited with the focus of most research being on other chronic lung disorders, such as chronic obstructive pulmonary diseases, asthma and cystic fibrosis.

We review the existing evidence for these vaccines in bronchiectasis and highlight the existing gaps in knowledge.

High-quality experimental and non-experimental studies using current state-of-the-art microbiological methods and validated, standardised case definitions are needed across the depth and breadth of the vaccine development pathway.

READING 9 – INFLUENZA VACCINATION IN OLDER ADULTS

Andrew MK(1)(2), Bowles SK(3)(4)(5), Pawelec G(6)(7), Haynes L(8), Kuchel GA(8), McNeil SA(4)(9), McElhaney JE(10). Influenza Vaccination in Older Adults: Recent Innovations and Practical Applications. *Drugs Aging*. 2019 Jan;36(1):29-37.

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ABSTRACT

Influenza can lead to serious illness, particularly for older adults. In addition to short-term morbidity and mortality during the acute infection, recovery can be prolonged and often incomplete. This may lead to persistent declines in health and function, including catastrophic disability, which has dramatic implications for the well-being and support needs of older adults and their caregivers.

All of this means that prevention of infection and effective treatment when illness has occurred are of paramount importance.

In this narrative review, we discuss the effectiveness of influenza vaccines for the prevention of influenza illness and serious outcomes in older adults.

We review evidence of vaccine effectiveness for older adults in comparison with younger age groups, and also highlight the importance of frailty as a determinant of vaccine effectiveness. We then turn our attention to the question of why older and frailer individuals have poorer vaccine responses, and consider changes in immune function and inflammatory responses. This sets the stage for a discussion of newer influenza vaccine products that have been developed with the aim of enhancing vaccine effectiveness in older adults. We review the available evidence on vaccine efficacy, effectiveness and cost benefits, consider the potential place of these innovations in clinical geriatric practice, and discuss international advisory committee recommendations on influenza vaccination in older adults.

Finally, we highlight the importance of influenza prevention to support healthy aging, along with the need to improve vaccine coverage rates using available vaccine products, and to spur development of better influenza vaccines for older adults in the near future.

READING 10 – MAXIMISING INFLUENZA VACCINATION AWARENESS AMONGST SINGAPOREAN OLDER ADULTS

Rusli KDB(1), Bryar R(2). Maximising influenza vaccination awareness and uptake among older adults in Singapore Br J Community Nurs. 2018 Jun 2;23(6):296-301.

URL:doi: 10.12968/bjcn.2018.23.6.296. PMID: 29869908 [Payment required].

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ABSTRACT

Adults ≥ 65 are more susceptible to influenza infection and its associated complications. This paper critically reviews the literature, identifying the need for and priorities of a public health strategy to improve vaccination awareness and uptake among older adults.

Four electronic databases were searched for peer-reviewed articles in English published between 2001 and 2016. Twelve studies were included. Three themes were identified on analysis: impact on healthcare services; barriers and motivators influencing influenza vaccination uptake; and health promotion interventions.

Studies suggest vaccination may reduce the health-care costs of influenza-associated infection. Socioeconomic factors, information about vaccination and cultural beliefs may influence an individual's decision. Multicomponent interventions, such as home visits combined with reminders, support increased uptake. Interventions are identified that could be adopted at the community level in Singapore and other countries to improve influenza vaccination uptake among older adults.