PREVENT PNEUMOCOCCAL PNEUMONIA

Co-organised by:

Malaysian Society of Infectious Diseases & Chemotherapy

MALAYSIAN THORACIC SOCIETY

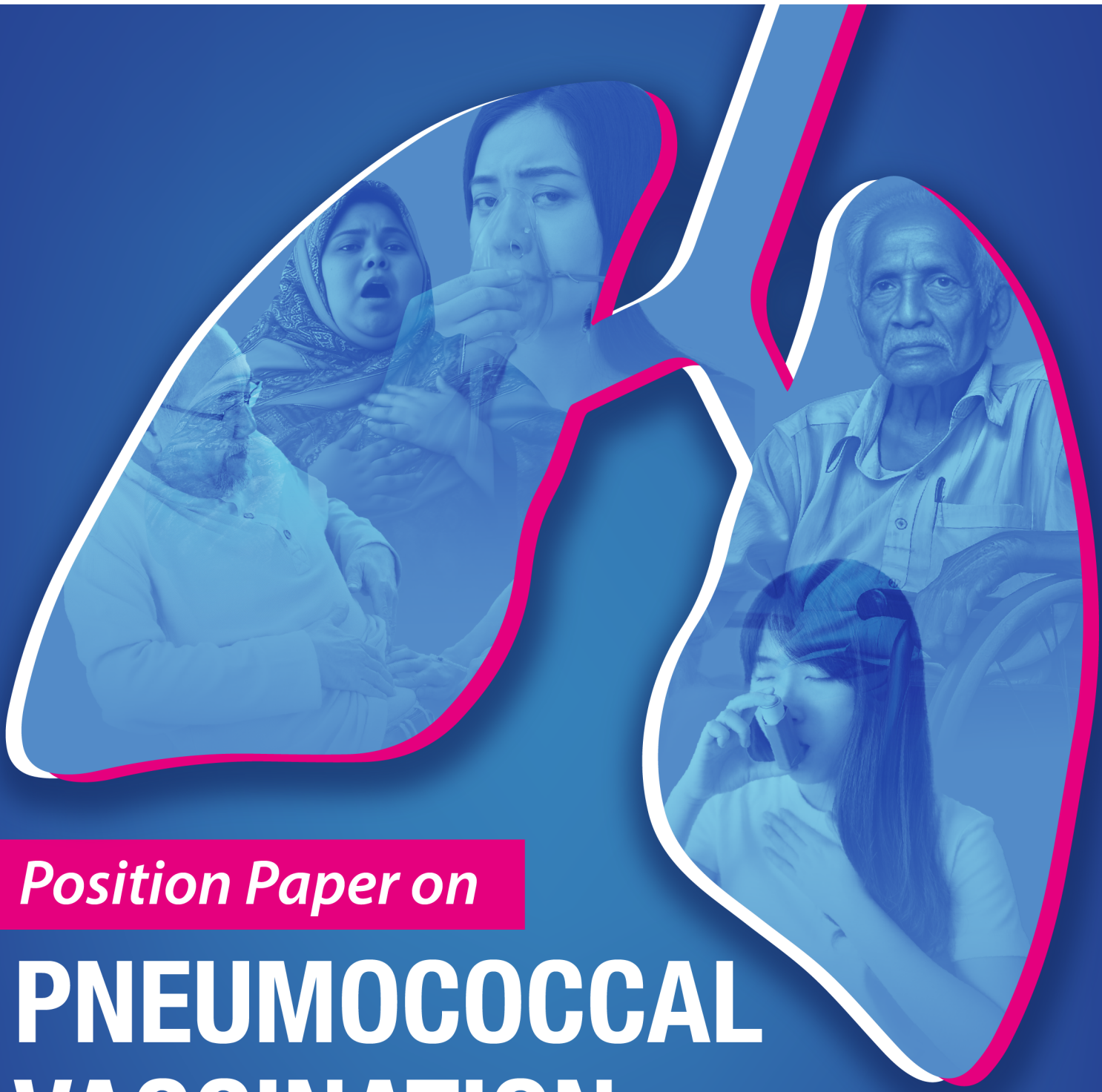
In collaboration with:

mma MALAYSIAN MEDICAL ASSOCIATION

MSGM Malaysian Society of Geriatric Medicine

Malaysian Society of Infection Control & Infectious Diseases MyICID

FPMS



*Position Paper on*

# PNEUMOCOCCAL VACCINATION FOR OLDER PERSONS & HIGH-RISK ADULTS

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**Abbreviations:** Malaysian Society of Infectious Diseases and Chemotherapy (MSIDC), Malaysian Thoracic Society (MTS), Malaysian Society of Infection Control and Infectious Diseases (MyICID), Malaysian Society of Geriatric Medicine (MSGM), Malaysian Medical Association (MMA), and Malaysian Family Medicine Specialists' Association (FMSA)

# Acknowledgement

Special thanks to the following for endorsing this position paper:

1. Academy of Family Physicians of Malaysia
2. Diabetes Malaysia
3. Family Medicine Specialists' Association
4. IKRAM Health Malaysia
5. Lung Cancer Network Malaysia
6. Lung Foundation of Malaysia
7. Malaysian Diabetes Educators Society
8. Malaysian Medical Association
9. Malaysian Nurses Association
10. Malaysian Oncological Society
11. Malaysian Pharmacists Society
12. Malaysian Research Institute on Ageing (MyAgeing)
13. Malaysian Society of Geriatric Medicine
14. Malaysian Society of Haematology
15. Malaysian Society of Infection Control and Infectious Diseases
16. Malaysian Society of Infectious Diseases and Chemotherapy
17. Malaysian Society of Intensive Care
18. Malaysian Society of Nephrology
19. Malaysian Thoracic Society
20. Malaysian Urological Association
21. Medical Practitioners Coalition Association of Malaysia
22. National Diabetes Institute, Malaysia
23. National Kidney Foundation of Malaysia

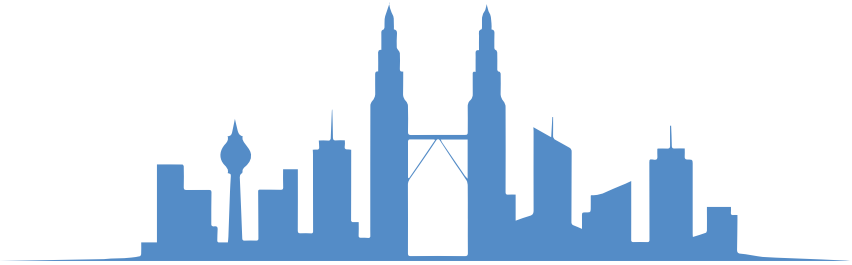
# INTRODUCTION

Pneumococcal disease poses significant morbidity and mortality worldwide especially among young children, older persons, and individuals with underlying medical conditions (NFID, 2023). Caused by bacteria called *Streptococcus pneumoniae*, or pneumococcus, it can lead to potentially debilitating or deadly non-invasive and invasive diseases such as otitis media, community-acquired pneumonia, meningitis and bacteraemia (CDC, 2022; Drijkoningen & Rohde, 2014). The World Health Organisation (WHO) estimated approximately one million (1,000,000) children die of the disease each year (WHO, n.d.). The global burden of pneumococcal disease in adults is not widely studied. However, population-based data in developed countries on invasive pneumococcal disease suggested an annual incidence of ≥15-20 cases per 100,000 persons of all ages and ≥50 cases per 100,000 elderly adults (≥65 years) (Fedson, Anthony & Scott, 1999). Adult mortality rates for bacterial pneumococcal pneumonia range from 10-30% and for meningitis from 16-37%. Older adults and patients with comorbidities have substantially higher mortality rates (Lynch and Zhanel, 2009).

Vaccination is one of the best ways to protect children and adults against pneumococcal disease and its potentially deadly complications (NFID, 2018). While universal pneumococcal vaccination among young children has been widely practised, the same cannot be said about adults. Pneumococcal vaccination is recommended for older adults (>60 years old), those with chronic medical conditions, immunocompromised state and chronic smokers who are at risk of developing pneumococcal disease and its complications (MSIDC, n.d.; Bello et al., 2014). However, studies in high-income countries reported low pneumococcal vaccination uptake among eligible older adults, even in countries where routine and universal vaccination programmes are offered (Kirubarajan et al., 2023).

In Malaysia, pneumococcal vaccination was recently added to the national immunisation programme for children in 2020 (Mohamad, 2020). However, there is no similar programme offered to adults. In addition, no published data are available regarding the pneumococcal vaccination uptake among adults in the country. It is high time for adult vaccination to receive its due attention as we transition into an ageing nation with an increasing threat of communicable diseases (Institute for Public Health, 2020).

However, a survey conducted by the Malaysian Thoracic Society (MTS) in 2021 painted a bleak picture with only 24% and 26% of respondents believing that adults above the age of 50 and those with chronic conditions need to be vaccinated against pneumococcal disease respectively (CodeBlue, 2021). There is a clear need to step up adult pneumococcal vaccination advocacy. Thus, this position paper aims to provide actionable recommendations for all relevant stakeholders, especially healthcare professionals, to make pneumococcal vaccination for older persons and other high-risk adults a norm and standard of care.



According to a survey conducted by the Malaysian Thoracic Society (MTS):

only **24%** of the respondents believed that adults above the age of 50 need to be vaccinated against pneumococcal disease

&

only **26%** of the respondents believed that those with chronic condition need to be vaccinated against pneumococcal disease

Population-based data in developed countries on invasive pneumococcal disease suggested an annual incidence of:

**≥15-20 cases** per 100,000 persons of all ages

&

**≥50 cases** per 100,000 elderly adults (≥65 years)

*(Fedson, Anthony & Scott, 1999)*

# PNEUMOCOCCAL DISEASE THREAT ON ADULTS SHOULD NOT BE OVERLOOKED

Pneumococcal disease describes any infection caused by *Streptococcus pneumoniae (S. pneumoniae)*, or pneumococcus bacteria (CDC, 2022). It often colonises the nasopharynx (NP) and humans are its only carrier (Song, Nahm, & Moseley, 2013). Asymptomatic carriage is estimated at 20% to 60% among children and 5% to 10% among adults (CDC, 2021). However, rates of asymptomatic carriage among adults may increase in certain environments, such as crowded living conditions. Spread of the bacteria from NP to surrounding tissues or the bloodstream leads to the development of disease (Simell et al., 2012).

Adults over 50 and children under 5 years old are at greater risk of developing pneumococcal disease (WHO, 2014). Certain underlying medical conditions (e.g., chronic kidney, heart or lung disease, diabetes, immunocompromised) and lifestyle (e.g., smoking and alcoholism) also increase an individual's risk of developing the disease (NFID, 2023). The clinical spectrum of pneumococcal infection ranges from non-invasive diseases, such as otitis media, sinusitis, bronchitis and pneumonia (without bacteraemia), to more severe and potentially deadly invasive diseases, including pneumonia with bacteraemia and meningitis (NHS Inform, n.d.). Community-acquired pneumonia (CAP) is a leading cause of hospitalisation among Hajj pilgrims and S. pneumoniae is one of the common pathogens isolated from patients (Shirah et al., 2017).

Invasive pneumococcal disease (IPD) can result in high morbidity and mortality rates in children and adults. The case fatality rate (CFR) of pneumococcal pneumonia ranges from 5% to 7% but is even higher among older adults and those with underlying medical conditions. While the overall CFR of bacteraemia is approximately 20%, it can reach as high as 60% among older adults (CDC, 2022). The CFR of pneumococcal meningitis is about 8% in children, whereas in adults it is higher, at 22% (CDC, 2022).

The pneumococcal disease burden in Malaysia is understudied, resulting in limited data availability. However, estimates based on data collected from six hospitals in the country suggest that the annual incidence of pneumococcal bacteraemia and pneumococcal pneumonia are highest among adults aged 65 years and above, at the rates of 2.533 and 6.34 per 1,000 population, respectively, compared to other age groups (Aljunid et al., 2011).

The annual incidence of pneumococcal bacteraemia in Malaysia among adults aged 65 years and above

**2.533**

per 1,000 population

*(Aljunid et al., 2011)*

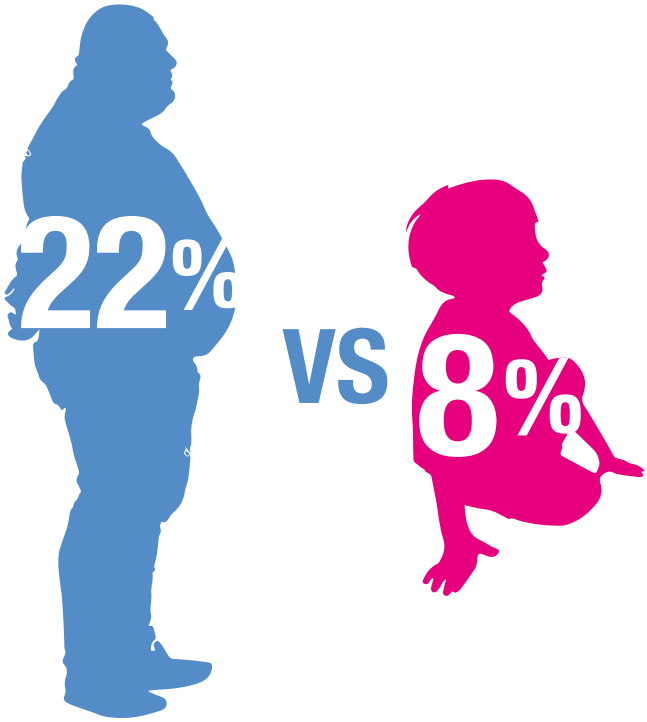
The annual incidence of pneumococcal pneumonia in Malaysia among adults aged 65 years and above

**6.34**

per 1,000 population

*(Aljunid et al., 2011)*

The case fatality rate of pneumococcal meningitis is higher in adults compared to children *(CDC, 2022).*



# PNEUMOCOCCAL VACCINATION IS CRUCIAL TO PROTECT VULNERABLE ADULTS

Vaccination is one of the most effective ways to protect individuals from pneumococcal disease. It is also crucial to help address the growing issue of antibiotic resistance. In the United States, the introduction of the pneumococcal conjugate vaccine in the children's immunisation programme led to a significant reduction in antibiotic-resistant pneumococcal infections (CDC, 2021).

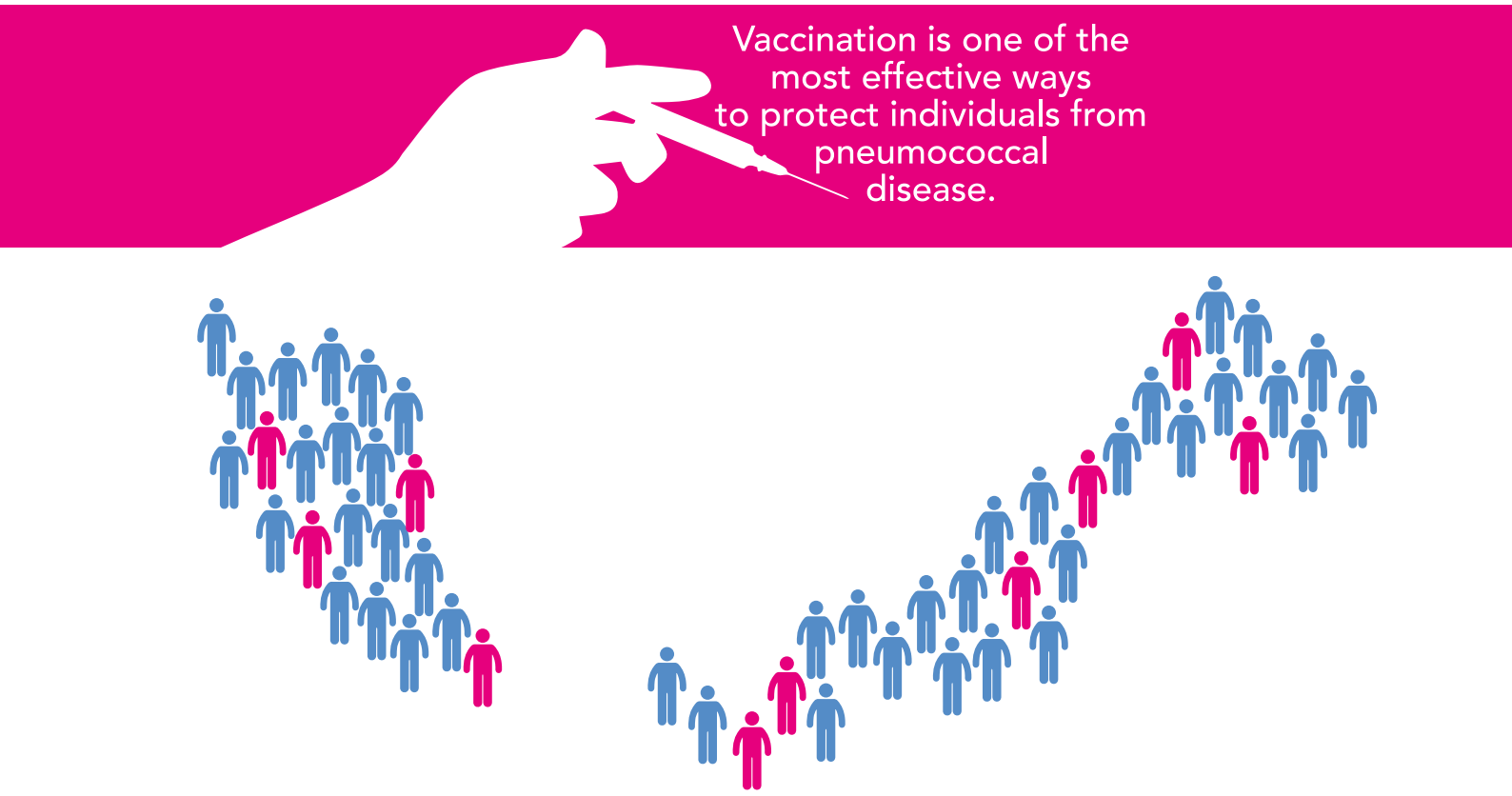
Pneumococcal vaccines can be divided into two categories: conjugate and polysaccharide vaccines. In Malaysia, the pneumococcal conjugate vaccine, PCV13, and the pneumococcal polysaccharide vaccine, PPSV23, are approved and available for use in adults. While polysaccharide vaccines provide a certain level of protection by inducing a T-cell-independent response, they cannot sustain an increase in antibody titres (Clutterbuck et al., 2012; CDC 2021). Moreover, there is no evidence to suggest that they can reduce nasopharyngeal carrier rates among vaccinated individuals. On the other hand, pneumococcal conjugate vaccines elicit a T-dependent response, leading to the formation of serotype-specific antibodies and B memory cells, resulting in sustained immunity (Clutterbuck et al., 2012; Jha & Janoff, 2019; Bonnave et al., 2019). There is also substantial evidence to suggest that they help reduce nasopharyngeal carriage and transmission of vaccine serotypes (CDC, 2022).

PCV13 is indicated for both children (above 2 months) and adults (above 18 years old), covering serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F (Hanquet et al., 2022; MIMS, n.d.). PPSV23 is indicated for children ≥ 2 years old with risk factors and adults >50 years old. The vaccine covers 23 serotypes (1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, and 33F) (MIMS, n.d.). In the United States (U.S.) and several other countries, two more conjugate vaccines have been approved for use in the adult population. These are the 15-valent (PCV15) and 20-valent

(PCV20) pneumococcal conjugate vaccines (CDC, 2022). As of 26 May 2023, the two conjugate vaccines are yet to be made available in Malaysia.

In a large, randomised placebo-controlled trial (CAPiTA) of over 84,000 Dutch adults ≥65 years old who received either PCV13 or placebo, PCV13 showed the efficacy of 75% against vaccine-type IPD, 45.6% against vaccine-type pneumococcal pneumonia, and 45% against vaccine-type nonbacteraemic pneumococcal pneumonia. Efficacy persisted for the duration of the trial (mean follow-up was four years) (Musher & Rodriguez-Barradas, 2023). PCV13 was also found to be effective in preventing community-acquired pneumonia (CAP) and vaccine-type (VT) invasive pneumococcal disease (IPD) (Marra & Vadlamudi, 2019). Overall, PCV13 has been found to be safe, and data showed that it sometimes elicits minor side effects such as pain at the injection site, muscle ache, fatigue, chills and headache (CDC, 2019).

Various estimates of clinical effectiveness have been found in PPSV23 vaccine efficacy studies (CDC, 2021). In general, its effectiveness in preventing VT-IPD is 60%-70%. Although the vaccine showed reduced effectiveness among immunocompromised individuals, PPSV23 is still recommended for such individuals because of their high susceptibility to developing IPD. There is no consensus regarding the effectiveness of PPSV23 against non-bacteraemic pneumococcal pneumonia although recent studies seem to suggest that it may provide some protection against VT-pneumonia (CDC, 2021; Farrar et al., 2022). Thus, the Centre for Disease Control, United States advised healthcare professionals against using the term "pneumonia vaccine" in reference to PPSV23 (CDC, 2021).



# PNEUMOCOCCAL VACCINATION RECOMMENDATION FOR ADULTS

Pneumococcal immunisation guidelines for adults vary from country to country and are primarily based on several factors, including the burden of pneumococcal disease, serotype distribution, vaccine availability, and the presence of immunisation programmes for children or adults in each country (Bonnave et al., 2019). The World Health Organization (WHO) recommends that countries with established childhood pneumococcal immunisation programmes consider initiating programs for adults, using either PPSV23 or PCV13, after taking into account local disease burden and cost-effectiveness (WHO, 2014).

European countries have different recommended starting ages for vaccination in healthy older adults, ranging from ≥50 years to ≥65 years (Bonnave et al., 2019). Most countries in the region suggest either PPSV23 alone or both PCV13 and PPSV23 for primary vaccination in healthy older adults (Bonnave et al., 2019). Boosters are only recommended for this group in countries that use PPSV23. For older adults with chronic diseases, such as diabetes, heart, kidney, lung, and liver diseases, most countries recommend PCV13 and PPSV23 or PPSV23 alone for primary vaccination, with some countries suggesting booster doses. Immunocompromised patients, including those with asplenia or HIV, are generally advised to receive primary vaccination with both PCV13 and PPSV23, often followed by booster doses, particularly for asplenic patients (Bonnave et al., 2019).

In the United States, pneumococcal vaccination recommendations for adults have been simplified with the introduction of PCV20 and PCV15. The Centers for Disease Control and Prevention (CDC) currently recommends a single dose of PCV20 or PCV15 followed by a dose of PPSV23 (at least one year apart) for all adults ≥65 years and for adults aged 19-64 years with underlying medical conditions or other risk factors who have not previously received PCV or have an unknown vaccination history (CDC, 2022).

In Singapore, older adults aged ≥65 years are recommended to receive sequential doses of PCV13 followed by PPSV23 (8-week intervals for chronic renal failure patients; 1-year interval for others). Immunocompetent adults aged 18-64 with chronic diseases are recommended to receive one dose of PPSV23. Adults <65 years with cochlear implants, CSF leaks, and chronic renal failure are recommended to receive sequential doses of PCV13 followed by PPSV23 (8-week intervals). No booster doses are indicated for the aforementioned individuals. However, for adults <65 years with functional/anatomic asplenia or who are immunocompromised, a booster dose is recommended after five years of completing the sequential doses of PCV13 and PPSV23 (8 weeks intervals) (Wijaya et al., 2020).

According to the latest edition of Guidelines for Adult Immunization by the Malaysian Society of Infectious Diseases and Chemotherapy (MSIDC), all adults aged ≥60 years should receive sequential doses of PCV13 followed by PPSV23 (1-year interval). Adults with immunocompromising conditions, cochlear implants, CSF leaks and shunts, and chronic kidney disease should receive sequential doses of PCV13 followed by PPSV23 (8-week interval) as primary vaccination. A booster dose with PPSV23 vaccine should be given at least five years after the primary vaccination. One dose of PPSV23 is recommended for adults with chronic diseases and people going for religious pilgrimages (e.g., Hajj and Umrah) (MSIDC, n.d.).

Recommendations for the use of only PPSV23 in certain adult groups are due to countries seeing a reduction in PCV serotype IPD in all age groups years after introducing PCV into their childhood national immunisation programme (NIP) (GOV.UK., 2020; CDC, 2019). However, such indirect protection took time to develop and was not observed in the first few years after PCV introduction in childhood immunisation programme (WHO, 2021). It is also dependent on the type of PCV vaccine use as well as vaccine coverage among children (Tsaban & Ben-Shimol, 2017; van der Linden et al., 2015). Malaysia has only introduced PCV in its childhood NIP at the end of 2020 (DG of Health, 2020). Thus, indirect protection for other age groups including adults would not have been established. Therefore, the use of PCV13 in vulnerable adult groups including chronic disease patients and pilgrims is still very much relevant.

In short, pneumococcal vaccination is recommended for adults who are at increased risk of developing pneumococcal disease: a) all older persons (≥ 60 years old); b) immunocompromised (e.g. immunosuppressive therapy, HIV); c) individuals with cochlear implants or CSF leaks and shunts; d) living with chronic diseases (e.g kidney, heart, liver or respiratory disease, diabetes) e) people going for religious pilgrimage (e.g. Hajj) (MSIDC, n.d.).

# MAKE ADULT PNEUMOCOCCAL VACCINATION A STANDARD OF CARE

Significant progress has been achieved in recommending and advocating for pneumococcal vaccination among children in Malaysia. Years of dedicated effort by the medical community, particularly paediatricians, have resulted in the inclusion of pneumococcal vaccination in the National Immunisation Programme (NIP) for Infants and Children in 2020. Prior to government provision, private practices played a crucial role in advocating and encouraging the uptake of the vaccine.

However, the situation regarding pneumococcal vaccination in adults is quite different. While specific data on the uptake of pneumococcal vaccination among adults in Malaysia is lacking, findings from studies on other vaccines indicate poor adult immunisation rates in general, including among healthcare workers (HCW). A study involving participants over the age of 35 from The Malaysia Cohort (TMC) project revealed that only 34.6% and 26.3% of HCW received influenza and hepatitis vaccines, respectively, despite both being recommended for this group (Muhammad Azami et al., 2023).

Thus, it is not surprising that vaccination coverage among older persons (60-79 years old) and diabetes patients was found to be even lower (Muhammad Azami et al., 2023). The same study found that influenza vaccination coverage among older individuals and diabetes patients was as low as 5.5% and 6.4%, respectively (Muhammad Azami et al., 2023). Furthermore, a 2021 survey conducted by the Malaysian Thoracic Society (MTS) indicated that only 24% of respondents believed that adults above 50 years old should be vaccinated against pneumococcal disease, while half of the respondents were uncertain about the target population for vaccination (CodeBlue, 2021).

Malaysia is currently experiencing an increasing number of individuals at higher risk of developing pneumococcal disease. By 2044, it is estimated that 14% of the country's population will be above the age of 65, marking Malaysia as an "aged society." Additionally, it is predicted that by 2056, the country will become a "super-aged society" with 20% of the population aged 65 or older (World Bank Group, 2020). The National Health Morbidity Survey (NHMS) conducted by the Ministry of Health (MOH) has also reported a rising incidence of chronic diseases among Malaysian adults. For instance, the overall prevalence of diabetes among adults was 18.3% in 2019, compared to 11.2% in 2011 and 13.4% in 2015 (Institute for Public Health, 2019).

Given these circumstances, pneumococcal vaccination for adults becomes a standard of care in Malaysia. Healthcare providers, particularly primary care physicians (such as family medicine and general internal medicine practitioners), relevant internal medicine sub-specialists (e.g., endocrinologists, pulmonologists, cardiologists, oncologists, nephrologists, geriatricians), medical officers, nurses, and general practitioners who frequently engage with high-risk adults, are key to making this a reality. Older individuals and other high-risk adults deserve protection against pneumococcal disease through vaccination, and concerted efforts are needed to ensure widespread awareness and uptake of adult pneumococcal vaccination.

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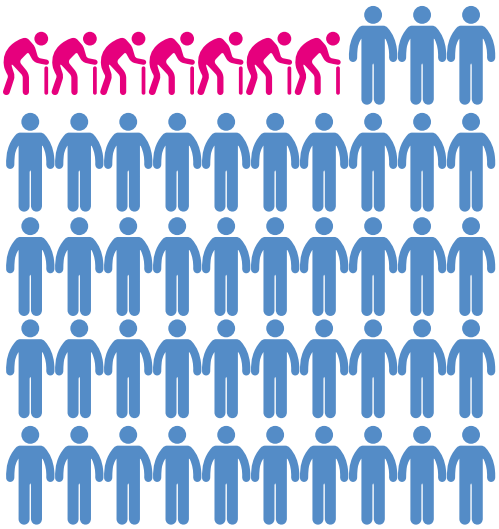

marking Malaysia as an

**"AGED SOCIETY"**

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**20%**

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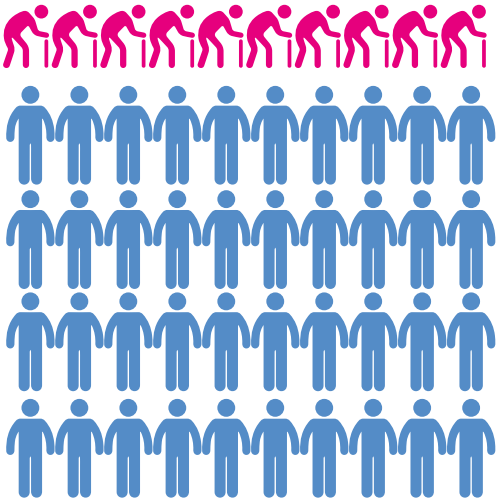

hence, the country will become

**"SUPER-AGED SOCIETY"**

*(World Bank Group, 2020).*

# ADULT PNEUMOCOCCAL VACCINATION ADVOCACY A MORAL & COLLECTIVE RESPONSIBILITY

Healthcare professionals (HCPs) bear the duty to safeguard and promote health. These responsibilities may be fulfilled through various means, including providing preventive, curative or palliative care at the individual or policy level, conducting research as well as teaching other HCPs to ensure sustainability and quality of patient care. Protecting and promoting health form the core of the medical profession, serving as its ethical and moral foundation (Rogers, 2020). Beneficence, non-maleficence, autonomy and justice constitute the four principles of Biomedical Ethics (Varkey, 2020). These principles should also serve as a guide when discussing pneumococcal vaccination advocacy.

The principle of beneficence compels HCPs to act in the best interest of the patient or the public. HCPs should educate individuals about the importance of this potentially life-saving preventive measure. This includes older persons, adults with underlying medical conditions, and those going for religious pilgrimages. HCPs must also refrain from causing harm to their patients. HCPs should weigh the benefits and identify those who had a history of anaphylaxis following previous vaccination. Thus, recommendations should be based on established adult immunisation guidelines, which are developed using sound scientific evidence, taking into consideration vaccine efficacy, effectiveness, and safety in the target population.

The ethical principle of autonomy recognises that every individual should have the freedom to make rational decisions and moral choices. Individuals and patients should be given a chance to make an informed decision about receiving the pneumococcal vaccine. HCPs should avoid making presumptive decisions on behalf of the patients. For example, some physicians might steer away from recommending vaccination as they perceive it might pose an additional financial burden to patients. While well-meaning, it takes away a patient's right to self-determination. Instead, they should facilitate cost-

effective vaccination by selling vaccines at a reasonable price in clinics, informing patients about tax reliefs such as the income tax relief up to RM1,000 by the Inland Revenue Board of Malaysia/Lembaga Hasil Dalam Negeri (LHDN) (n.d.), or other financial assistance programmes (such as the vaccination subsidy under Program Iltizam Selangor Sihat for B40 by Selangor State Government) (Iltizam Selangor Sihat, n.d.).

In the context of pneumococcal vaccination for adults, fulfilling the principle of fair and equitable allocation of healthcare resources, it requires the implementation of a National Immunisation Programme (NIP) for priority adult groups, such as older persons (in line with WHO recommendations). This will ensure that all older persons, regardless of socioeconomic status, can receive the protection. However, HCP advocacy alone is not sufficient at this stage. It requires support and commitment from policymakers and a strong political will.

While Malaysia currently lacks a pneumococcal vaccination programme for older persons, it is encouraging to witness initiatives on a smaller scale being carried out at the state level. In 2022, the Selangor state government launched a pneumococcal vaccination drive, offering 5,000 fully subsidised doses to senior citizens residing in the state. This effort was successful, with all doses fully utilised. It is hoped that not only will the Selangor state government continue this initiative, but it will also lead to the implementation of pneumococcal vaccination for older persons at the federal level.

In addition to individual HCPs and the government, various stakeholders, including civil society, non-governmental organisations, professional bodies, the media, employers, and the pharmaceutical industry, have a crucial role in advocating for pneumococcal vaccination among vulnerable adults. Employers can include pneumococcal vaccination as part of employee benefits to promote wellness, leading to increased productivity. The pharmaceutical industry has a moral obligation to provide vaccines at fair prices and ensure their equitable distribution, not only to high-income countries but also to middle- and low-income countries. Furthermore, industries, businesses, civil society, non-governmental organisations, professional bodies, and the media should contribute to pneumococcal vaccine education for both healthcare professionals and the public.

Protecting and promoting health form the core of the medical profession, serving as its ethical and moral foundation

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# POSITION & RECOMMENDATIONS

1. Malaysia is an ageing nation where the burden of non-communicable diseases is increasing. The number of adults who are at higher risk of developing pneumococcal disease (ie. Older persons, individuals with chronic diseases, immunocompromised and pilgrims) is expected to continue to rise. Therefore, it is crucial to intensify pneumococcal vaccination advocacy efforts to enhance uptake among this vulnerable group.
2. HCPs, policymakers, and other stakeholders, including civil society, non-governmental organisations, professional bodies, the media, businesses, and the pharmaceutical industry, should each contribute within their capacity and sphere of influence to advocate for pneumococcal vaccination among older persons and other high-risk adults. It is a moral obligation for HCPs to make pneumococcal vaccination a standard of care.
3. Active participation from HCPs who regularly engage with older persons and high-risk adults is crucial in establishing pneumococcal vaccination as a standard of care. This includes general practitioners, primary care physicians and their teams (such as medical officers and nurses), general physicians as well as relevant internal medicine subspecialty specialists (such as geriatricians, endocrinologists, pulmonologists, cardiologists, oncologists, nephrologists, etc.).
4. HCPs should view each patient visit as an opportunity to advocate for pneumococcal vaccination, adhering to local guidelines and scientific evidence (for more detailed recommendations, please refer https://adultimmunisation.msidc.my/pneumococcal/ :
    a. Recommend sequential vaccination with PCV13 followed by PPSV23 (1-year interval) to all adults ≥60 years old who have yet to receive any pneumococcal vaccine or whose vaccination history is unknown.
    b. Recommend one dose of PPSV23 (or PCV13) to adults 18-59 years old with chronic diseases:
        i. Heart disease

ii. Liver disease

iii. Diabetes mellitus

iv. Respiratory disease

c. Recommend sequential vaccination with PCV13 followed by PPSV23 (8 weeks interval) and PPSV23 booster (one dose after 5 years of completing primary vaccination; and a final dose given at least 5 years later, or at age 60 years, whichever is later) to adults with the following conditions:

i. Immunocompromised (eg. asplenia, congenital/acquired immunodeficiency, haematological and other malignancies, solid organ transplant, HIV, on immunosuppressive therapy)

ii. Cochlear implants

iii. CSF leaks and CSF shunts

iv. Chronic kidney disease

d. Recommend PPSV23 (or PCV13) to adults going for religious pilgrimages such as Hajj and Umrah.

5. HCPs may employ the following strategies to improve pneumococcal vaccination uptake especially in primary care settings (Kirubarajan et al., 2023):

   a. Standing orders for vaccination

   b. Reminders for healthcare providers and patients

   c. Set periodic health examination

   d. Bundling of vaccines for convenience and cost-effectiveness

   e. Inform patients regarding relevant financial assistance (e.g., LHDN tax relief, vaccination subsidy under Program Iltizam Selangor Sihat for B40 by Selangor State Government)

   f. Decision-making tools for healthcare providers and patients (i.e., leaflet, communication aid, preventative health checklist etc)

6. All relevant stakeholders should consistently conduct educational and advocacy campaigns across various communication channels to enhance awareness and understanding among healthcare professionals and the general public regarding the importance of adult pneumococcal vaccination.

7. All relevant stakeholders should advocate the introduction of pneumococcal vaccination into the Malaysian NIP for older persons as recommended by the WHO.

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The Prevent Pneumococcal Pneumonia Campaign
is supported by an educational grant from

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