

## PRESERVING SENIORS HEALTH: SAFEGUARDING MALAYSIA'S ELDERLY WITH PNEUMOCOCCAL VACCINATION

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### ABSTRACT

*Pneumonia poses a significant threat to the health and well-being of Malaysia's elderly population. As age weakens the immune system, older adults become more susceptible to respiratory infections, including pneumonia. This article aims to shed light on the importance of implementing widespread pneumococcal vaccination programs targeted at protecting the elderly. It explores the impact of pneumonia on the elderly in Malaysia, examining its prevalence, severity, and associated complications. It also delves into the efficacy and safety of available pneumococcal vaccines, considering their suitability for the elderly demographic. Moreover, this article discusses the barriers and challenges encountered in promoting and implementing pneumococcal vaccination among Malaysia's elderly population. It addresses issues such as vaccine accessibility, awareness campaigns, and healthcare provider engagement. Additionally, it presents potential strategies to overcome these challenges, emphasizing the importance of collaboration among stakeholders, including healthcare professionals, policymakers, and senior care organizations. Ultimately, this article emphasizes the urgent need to prioritize pneumococcal vaccination as a key element in preserving the health and well-being of Malaysia's elderly population. Studying the need for pneumococcal vaccination in the elderly is crucial for understanding and addressing their susceptibility to infections. Research can help assess the effectiveness of current vaccination protocols, identify potential gaps in coverage, and ultimately contribute to enhancing the overall health and well-being of elderly individuals.*

Key words: *Pneumonia, vaccination, elderly, pneumococcal vaccine, geriatric*

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### Introduction

Pneumonia is an infectious respiratory condition characterized by inflammation of the alveoli (the air sacs) in one or both lungs, which can fill with fluid or pus. This leads to symptoms such as a cough with phlegm or pus, fever, chills, and difficulty breathing. The severity can vary from mild to life-threatening and is particularly serious in infants, young children, the elderly, and individuals with weakened immune systems or chronic diseases. Pneumonia can be categorized in several ways, typically based on the causative agent, the location where the infection was acquired, or the area of the lung affected.

The Global Burden of Disease (GBD) study provides a comprehensive regional and global assessment of mortality and disability from major diseases, injuries, and risk factors. Pneumonia is a leading cause of morbidity and mortality worldwide, particularly among children under five and the elderly.

Individuals above the age of 50 and children under five years have a higher susceptibility to pneumococcal diseases (WHO, 2014). Various chronic health issues (for instance, kidney, heart, or lung ailments, diabetes, weakened immune systems), as well as lifestyle habits (such as smoking and alcohol consumption), can elevate the likelihood of contracting the infection (NFID, 2023).

Pneumococcal infections present a broad clinical spectrum, ranging from non-invasive conditions like otitis media, sinusitis, bronchitis, and pneumonia (without bacteremia), to more dangerous and potentially fatal invasive diseases, encompassing pneumonia with bacteremia and meningitis (NHS Inform, n.d.). Pneumonia acquired in the community (CAP) is a primary reason for hospital admissions among Hajj pilgrims, and *S. Pneumoniae* is a frequently detected pathogen among patients (Shirah et al., 2017).

Invasive Pneumococcal disease (IPD) has the potential to cause high levels of morbidity and mortality in both children and adults. The mortality rate associated with pneumococcal pneumonia can vary between 5% and 7%, with an even greater risk for older adults or those with pre-existing health issues. Bacteraemia's overall case fatality rate (CFR) is around 20% more or less, however, it can surge up to 60% among the elderly (CDC, 2022). In children, the CFR for pneumococcal meningitis is roughly 8%, but among adults, it's greater, standing around 22% (CDC, 2022).

In Malaysia, the impact of pneumococcal disease is under-studied, leading to a scarcity of data. Nevertheless, approximations drawn from information gathered from six hospitals across the country indicate that the yearly incidence of pneumococcal

bacteraemia and pneumococcal pneumonia is predominantly prevalent among adults who are 65 years old or older. The figures show rates of 2.533 and 6.34 per 1,000 population, correspondingly, compared to other age categories (Aljunid et al., 2011).

Addressing the health burden of pneumonia in the elderly requires preventive measures, including vaccination and public health interventions to improve awareness, access to care, and appropriate treatment. By reducing the incidence and severity of pneumonia through vaccination and other preventive strategies, we can alleviate the health burden on the elderly population and lessen the strain on healthcare systems.

### **Elderly are at greater risk of developing pneumonia**

The elderly are at greater risk of developing pneumonia due to several physiological and immunological factors associated with aging. The immune system naturally weakens with age, which makes it harder for the body to fight off infections such as those that lead to pneumonia.

With age, the lungs lose elasticity, and the muscles involved in breathing may weaken. This can make it more difficult for the lungs to expand and contract, clear out mucus, and keep airways fully clear, creating an environment more susceptible to infection. The elderly individuals often have reduced lung capacity and less effective cough reflexes, which are critical for clearing bacteria and viruses from the respiratory tract. Chronic health conditions, such as chronic obstructive pulmonary disease (COPD), heart disease, and diabetes—more common in older adults—can also compromise the body's defenses against infection. Malnutrition can weaken an elderly person's overall health and immune system, making them more susceptible to pneumonia.

Additionally, the presence of dental problems and increased aspiration risk due to conditions like dementia or stroke can lead to higher rates of aspiration pneumonia in this age group. Furthermore, elderly individuals are more likely to be living in community settings like nursing homes where infections can spread more easily. The changes in swallowing function and the presence of gastroesophageal reflux disease (GERD) can also increase aspiration risks, further elevating the chances of developing this serious lung infection. Many elderly people are less mobile or may be bedridden due to various health issues or as a result of surgery. Reduced mobility can lead to poor lung expansion and an increased risk for respiratory infections.

The use of multiple medications, common among the elderly, can sometimes lead to drug interactions and side effects that may compromise respiratory function or mask the symptoms of pneumonia. Despite the availability of vaccines that can prevent pneumonia (like the pneumococcal and flu vaccines), some elderly individuals may not have up-to-date vaccinations, leaving them more vulnerable to infection.

Due to these factors, pneumonia in the elderly can be particularly severe and may require prompt and aggressive medical attention. Vaccination, good nutrition, regular exercise, and other preventive measures can help reduce the risk of pneumonia in this population.

### **Health impacts of pneumonia in elderly**

Pneumonia in the elderly can lead to severe and often debilitating health consequences. This age group is more likely to experience intense symptoms and a more prolonged illness, significantly disrupting their daily lives and diminishing quality of life. The severity of pneumonia can necessitate hospitalization, which carries additional risks for the elderly, such as hospital-acquired infections and the physical and cognitive declines associated with prolonged bed rest.

A study by Han et al (2020) reported the incidence of clinical failure in elderly community-acquired pneumonia (CAP) patients in China was 13.1%. The patients were older, longer hospital stays and higher treatment costs than clinical success (CS) patients. The CF patients were more prone to present hyperglycemia, hyponatremia, hypoproteinemia, pleural effusion, respiratory failure and cardiovascular events.

Furthermore, pneumonia in older adults can exacerbate underlying chronic conditions, such as congestive heart failure or chronic obstructive pulmonary disease (COPD), leading to a worsening of these conditions. Complications from pneumonia, including sepsis and respiratory failure, are more common and more serious in this demographic, increasing the risk of death. Recovery can be slow and incomplete, with many elderly patients experiencing lingering effects, like reduced lung function and decreased mobility.

The psychological impact is also considerable, as the experience of a serious illness like pneumonia can lead to increased anxiety, depression, and in some cases, a greater degree of cognitive impairment. Overall, pneumonia represents a significant threat to the health of the elderly, emphasizing the importance of preventive measures such as vaccination and prompt treatment of respiratory symptoms in this vulnerable population.

### **Social impacts of pneumonia in elderly**

Pneumonia in the elderly can have profound social impacts, affecting not just the individual patients but also their families and wider community networks. As recovery can be protracted, with considerable periods of illness and incapacitation, elderly patients often require extended care, placing a substantial burden on caregivers, often who are family members. This demand for care can lead to financial strain, emotional stress, and burnout, as caregivers juggle their own responsibilities alongside the elevated care needs of their loved one.

Social isolation is a notable consequence for the elderly affected by pneumonia, as their ability to engage in social activities may be drastically reduced, detrimentally affecting their mental health and sense of community connection. The decreased independence due to illness can undermine the elderly's self-esteem and contribute to a perceived loss of purpose, exacerbating feelings of loneliness and depression.

Community resources, such as healthcare systems and social services, can also become stressed, especially during times of an outbreak, further highlighting the comprehensive social repercussions of pneumonia among the elderly population. The overall consequence is a ripple effect—stretching from the individual experience of illness to wider societal challenges, showcasing how a health issue can permeate multiple facets of social life.

### **Economic impacts of pneumonia in elderly**

Pneumonia in the elderly generates substantial economic impact at both the individual and societal levels. For individuals and their families, the costs associated with treating pneumonia can be significant, encompassing medical expenses like doctor's visits, medications, possibly inpatient hospital care, and in some cases, prolonged rehabilitation or long-term care services. The indirect costs, such as lost income for both the elderly patient and their caregivers who may need to reduce work hours or even leave employment to provide care, contribute to the financial burden.

From a broader perspective, the economic impact on healthcare systems and society is considerable. Pneumonia in the elderly often leads to longer hospital stays compared to younger patients due to the higher prevalence of complications, which inflates healthcare costs. These higher treatment costs, combined with the extended recovery time associated with aging, amplify the strain on healthcare infrastructures and resources. Public health insurance programs may bear the burden of these direct medical costs, translating to higher healthcare spending.

Moreover, the condition can result in a significant economic loss due to decreased productivity. When elderly patients are unable to return to their previous level of independence, they may require long-term care placement or home healthcare services, which carry ongoing costs and potentially reduce the available workforce. Additionally, pneumonia outbreaks, especially in closed environments like care homes, necessitate further investment in preventive measures, outbreak management, and post-illness rehabilitation – all of which add to the economic toll.

Overall, the economic implications of pneumonia in the elderly are multifaceted, impacting the health sector's budget, the economy's productivity, and the financial security of the patients and their families. Effective preventive strategies such as vaccination and early intervention can mitigate some of these economic burdens, highlighting the importance of comprehensive healthcare strategies for the elderly population.

### **Overview of pneumococcal vaccination**

Pneumococcal infections pose a higher risk to the elderly population due to age-related changes in the immune system and the presence of underlying health conditions. Vaccination is a critical preventive measure to protect older adults from severe pneumococcal diseases and their associated health complications.

Since the early 1900s, the pneumococcal vaccine has been evolving. For over thirty years, it has been employed to prevent pneumococcal illnesses. Currently, there are two distinct versions of pneumococcal vaccines available: (i) the 23-valent polysaccharide vaccine (PPV23), which has been available since the early 1980s, and (ii) two conjugate vaccines, the 10-valent (PCV10) and the 13-valent (PCV13), which have been available since 2009 (Oliveira et al, 2021).

The pneumococcal vaccine, specifically the pneumococcal conjugate vaccine (PCV13) and the pneumococcal polysaccharide vaccine (PPSV23), is a preventive measure against pneumococcal infections, particularly in the elderly and high-risk individuals. The pneumococcal vaccine helps protect against infections caused by the bacterium *Streptococcus pneumoniae*. It is designed to prevent pneumococcal diseases such as pneumonia, meningitis, and bloodstream infections, which can be severe and potentially life-threatening.

The pneumococcal vaccine is recommended by health authorities worldwide, including the World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), and various national vaccine advisory committees. Vaccine recommendations may vary slightly between countries, so it's important to consult local guidelines.

The Ministry of Health in Malaysia recommends the pneumococcal conjugate vaccine PCV13 for infants, young children, and adults aged 65 and older. It provides protection against 13 strains of *Streptococcus pneumoniae*. In most countries, PCV13 is administered as a series of doses during infancy and early childhood. For adults aged 65 and older who have never received the vaccine, a single dose is recommended.

PPSV23 is recommended for adults aged 65 and older, as well as for individuals aged 2 to 64 with certain medical conditions or risk factors. It provides protection against 23 strains of *Streptococcus pneumoniae*. For adults aged 65 and older, a single dose of PPSV23 is recommended. Some individuals might require additional doses based on their underlying health conditions.

The pneumococcal vaccine has been proven to be effective in reducing the incidence of pneumococcal infections, hospitalizations, and deaths among vaccinated individuals. It helps the immune system recognize and fight against the specific strains of

*Streptococcus pneumoniae* included in the vaccine. The pneumococcal vaccine is generally safe and well-tolerated. Common side effects are usually mild and temporary, such as pain or redness at the injection site, low-grade fever, or muscle aches. Serious side effects are rare.

In a large-scale, randomised placebo-controlled study (CAPIta) involving more than 84,000 Dutch adults aged 65 or older given either PCV13 or a placebo, PCV13 demonstrated a 75% efficacy against vaccine-type invasive pneumococcal diseases (IPD), a 45.6% efficacy against vaccine-type pneumococcal pneumonia, and a 45% efficacy against vaccine-type nonbacteraemic pneumococcal pneumonia. The efficacy was maintained for the duration of the study, with the average follow-up session spanning four years (Musher & Rodriguez-Barradas, 2023). PCV13 was also observed to be effective in preventing community-obtained pneumonia (CAP) and vaccine-type (VT) invasive pneumococcal disease (IPD) (Marra & Vadlamudi, 2019). PCV13 has been found to be generally safe with data indicating that it occasionally causes minimal side effects including pain at the site of injection, muscle discomfort, tiredness, chills, and headaches (CDC, 2019).

Clinical efficacy estimates have been formulated for the PPSV23 vaccine through multiple studies (CDC, 2021). Generally, it demonstrates an effectiveness between 60% to 70% in preventing VT-IPD. The vaccine's effectiveness declines in individuals with weakened immune systems, however, use of PPSV23 remains encouraged for such individuals due to their susceptibility to IPD. There is no universal agreement regarding PPSV23's effectiveness against non-bacteraemic pneumococcal pneumonia, though current studies suggest at potential protective effects against VT-pneumonia (CDC, 2021; Farrar et al., 2022). Consequently, the U.S. Center for Disease Control discourages health professionals from referring to PPSV23 as the "pneumonia vaccine" (CDC, 2021).

### **Uptake of Pneumococcal vaccination for elderly in Malaysia**

Whilst comprehensive data on the uptake of pneumococcal immunisation in adults living in Malaysia is scarce, research conducted on various other vaccines suggest that immunisation rates for adults are generally low, including among individuals working in healthcare. A research study including participants aged 35 and above from The Malaysia Cohort (TMC) project found that only 34.6% and 26.3% of Healthcare Workers (HCW) received influenza and hepatitis vaccinations, respectively, despite both being recommended for this group (Muhammad Azami et al., 2023). Hence, it's hardly a surprise that vaccination coverage among elderly persons (those aged between 60-79 years) and patients suffering from diabetes was discovered to be significantly lower (Muhammad Azami et al., 2023).

The same study discovered that influenza vaccination coverage among the elderly and diabetic patients was shockingly low, standing at 5.5% and 6.4% respectively (Muhammad Azami et al., 2023). Also, a 2021 survey conducted by the Malaysian Thoracic Society (MTS) revealed that a mere 24% of participants believed that individuals aged 50 and above should receive the pneumococcal vaccination, with half of the participants unsure about the intended target demographic for the immunisation (CodeBlue, 2021).

At present, Malaysia is witnessing a rising number of people at a high-risk level for pneumococcal disease. Projections indicate that by 2044, around 14% of the nation's populace will be aged 65 and above, thus designating Malaysia an "aged society". Moreover, it is forecasted that by 2056, the country will transition into a "super-aged society", with a population where 20% are aged 65 or older (World Bank Group, 2020). The National Health Morbidity Survey (NHMS), carried out by the Ministry of Health (MOH), has also documented an escalating rate of chronic diseases among Malaysian grown-ups. For instance, the overall prevalence of diabetes among adults was 18.3% in 2019, as opposed to 11.2% in 2011 and 13.4% in 2015 (Institute for Public Health, 2019).

In view of these situations, pneumococcal vaccination for adults is becoming a standard care practice in Malaysia. Healthcare service providers, especially primary care doctors (such as practitioners of family medicine and general internal medicine), relevant internal medicine sub-specialists (e.g., endocrinologists, pulmonologists, oncologists, geriatricians, cardiologists), medical officers, nurses, and general practitioners who often interact with high-risk adults, play a pivotal role in achieving this milestone. Senior citizens and other high-risk adults should be shielded from pneumococcal diseases through vaccination, and a united effort is needed to promote widespread awareness and uptake of adult pneumococcal vaccination.

### **Policy on Pneumococcal vaccination for elderly in Malaysia**

In Malaysia, the pneumococcal vaccine is available and recommended for certain populations, particularly infants, young children, and individuals with specific medical conditions. The PCV13 vaccine is available in Malaysia and can be obtained at government health clinics, private healthcare clinics, and hospitals.

In Malaysia, the pneumococcal conjugate vaccine PCV10 has recently begun to be administered to children under two years old, as part of the National Immunisation Programme starting from December 2020, to infants born after January 2020. The introduction of this vaccine is considered vital and timely for Malaysia, due to the recent surge in cases of pneumococcal disease amongst children. Despite this, there is still no national program for pneumococcal vaccination using PPV23 for the elderly population, even though their risk of disease severity and death from invasive pneumococcal disease has greatly increased.

While the pneumococcal vaccine is not routinely recommended for all adults aged 65 years and older in Malaysia, individuals in this age group may benefit from vaccination depending on their health condition. The most recent version of the Malaysian Society of Infectious Diseases and Chemotherapy (MSIDC) Adult Immunization Guidelines suggests that all individuals who are 60 years

old or above should receive sequential dosages of PCV13 and afterward of PPSV23, with a one-year gap. Adults with compromised immune systems, those with cochlear implants, CSF leaks and shunts, in addition to individuals with chronic kidney disease, should get a sequence of PCV13 and then PPSV23 doses as their first immunization, with an 8-week gap between them. After the initial immunization, it's recommended to have a PPSV23 booster shot at a minimum of five years afterward. One dose of PPSV23 is advised for adults suffering from chronic illnesses and individuals about to embark on religious journeys, such as Hajj and Umrah (MSIDC, n.d.).

Briefly, it is advised that adults with a heightened chance of contracting pneumococcal disease get pneumococcal vaccination: a) every person aged 60 or above; b) people with weakened immune systems (for instance, those undergoing immunosuppressive therapy or HIV positive); c) individuals with cochlear implants or CSF leaks and shunts; d) those living with chronic illnesses such as kidney, heart, liver or respiratory disease, diabetes and e) individuals embarking on religious pilgrimages (for example, the Hajj) (MSIDC, n.d.).

The cost of the pneumococcal vaccine in Malaysia may vary depending on where it is obtained (government or private sector). Under the National Immunization Program, the vaccine is provided free of charge for eligible individuals, such as infants. For adults and individuals in high-risk groups, the vaccine may be available for purchase at private healthcare facilities.

### **Barriers in implementing pneumonia vaccination among elderly**

Successful implementation of pneumonia vaccination among the elderly population faces several barriers that need to be addressed. One of the primary barriers is the lack of awareness among elderly individuals and their caregivers. Many may not be familiar with the importance of pneumonia vaccination, its benefits, and the recommended vaccination schedule. This lack of awareness leads to a low demand for vaccines and hampers efforts to ensure comprehensive vaccine coverage.

Another significant barrier is limited access to healthcare services, particularly in rural or remote areas. Elderly individuals residing in these areas may face challenges in reaching healthcare facilities where pneumonia vaccines are available. The lack of accessible healthcare services contributes to inadequate vaccine coverage and leaves a vulnerable population unprotected. Even in the urban areas, they might face difficulty in assessing the healthcare facilities due to logistic issues. Logistical challenges, such as identifying and reaching homebound or long-term care facility residents, can also hinder vaccine implementation efforts. Developing strategies to overcome these logistical barriers, such as mobile vaccination units and targeted outreach programs, is vital to ensure equitable access to vaccines for all elderly individuals.

Furthermore, vaccine availability and affordability pose substantial hurdles. Insufficient supply and distribution of pneumonia vaccines can impede vaccination programs. Additionally, the cost of vaccines can be a significant barrier, particularly for elderly individuals with limited financial resources. Ensuring a steady and affordable supply of vaccines is crucial for overcoming this barrier. To provide the vaccination for free will require in-depth cost-effectiveness analysis to the government.

Vaccine hesitancy, driven by concerns or misconceptions about vaccine safety and effectiveness, is another barrier to consider. Elderly individuals and their families may harbour doubts, leading to a reluctance to receive the pneumonia vaccine. Addressing vaccine hesitancy through education, communication, and dispelling myths is essential in boosting vaccine acceptance among the elderly population.

Communication and language barriers also present challenges in disseminating information about pneumonia vaccination. Limited communication channels and language proficiency can hinder understanding and awareness, particularly among minority or marginalized elderly individuals. Tailoring communication strategies to address these linguistic and cultural barriers is crucial for effective vaccine promotion.

Engaging healthcare providers is critical for successful implementation. Inconsistent recommendation and administration of pneumonia vaccines by healthcare professionals can impact vaccine uptake. It is imperative to enhance provider knowledge, address misconceptions, and emphasize the importance of vaccine recommendation during routine check-ups or hospital visits.

Lastly, inadequate policies or regulations related to vaccine coverage, reimbursement, and monitoring can impede implementation efforts. Establishing strong policy support and addressing regulatory gaps are necessary to create an enabling environment for successful pneumonia vaccination programs among the elderly population.

### **Increasing the uptake of pneumococcal vaccination in elderly: The way forward**

The first essential step is to launch targeted awareness campaigns addressing the elderly, families, and caregivers. These campaigns should emphasize the importance of pneumonia vaccination and its benefits in preventing severe respiratory infections. Collaborating with healthcare providers, community centers, and senior care organizations can facilitate educational workshops and seminars, providing accurate and accessible information. Utilizing multiple communication channels, such as social media, pamphlets, and television, will ensure widespread awareness.

Ensuring easy access to pneumonia vaccines is crucial. Strengthening distribution channels and availability in healthcare centers, clinics, and pharmacies should be prioritized. Establishing mobile vaccination units that can reach remote areas and senior care facilities will cater to those with limited healthcare access. Collaborating with public and private sectors to subsidize vaccine prices for the elderly can alleviate financial barriers.

Healthcare professionals play a crucial role in vaccine promotion. Conducting training programs and workshops to update their knowledge and highlight the importance of pneumonia vaccination for seniors will enhance their understanding. Encouraging providers to actively recommend and administer pneumonia vaccines during routine check-ups and hospital visits will increase vaccine uptake. Developing partnerships between healthcare institutions and community outreach programs will strengthen implementation and monitoring of vaccination initiatives.

Advocacy for the inclusion of pneumonia vaccination in national immunization schedules for the elderly is vital. Collaboration with policymakers and legislation development mandating healthcare facilities and senior care centers to offer and promote pneumonia vaccination will ensure comprehensive coverage. Monitoring vaccine coverage rates, tracking adverse reactions, and evaluating vaccine efficacy and safety specifically for the elderly population should be supported through robust policies.

Establishing partnerships with relevant stakeholders is essential. Engaging government agencies, healthcare providers, non-governmental organizations, and community leaders will foster collaboration to coordinate efforts. Joint initiatives such as vaccination drives and awareness campaigns, targeted at elderly individuals in both urban and rural areas, can be developed. Collaboration with pharmaceutical companies, research institutions, and international organizations will facilitate research and innovation in developing more effective and tailored pneumonia vaccines for the elderly.

Implementing this comprehensive way forward strategy can effectively preserve the health of Malaysia's elderly population by safeguarding them through pneumonia vaccination. By addressing barriers, enhancing awareness, improving accessibility, engaging healthcare providers, strengthening policies, and fostering collaboration, maximum vaccine coverage and better protection for Malaysia's seniors can be achieved. This strategy presents an opportunity to prioritize the health and well-being of the elderly, contributing to a healthier society overall.

## Conclusion

Ultimately, pneumonia vaccination is important in ensuring the health of Malaysia's elderly. Pneumonia greatly affects older adults, increasing hospital stays and mortality. Challenges such as low awareness, healthcare access, cost, hesitancy, and policy issues hinder vaccination efforts. Tackling these via awareness drives, accessible vaccines, clear communication, healthcare worker training, logistics and policy improvement is key. Collaborative efforts among stakeholders are essential to better strategize the vaccination uptake. Focusing on pneumonia vaccines for the elderly will enhance their health and life quality, easing pneumonia's impact and strengthening societal health.

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