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Pneumococcal surveillance in Malaysia and the need for carriage studies

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Despite the global health burden posed by pneumococcal disease and the World Health Organisation's (WHO) strong recommendation to include pneumococcal conjugate vaccines (PCV) in national immunisation programmes, most countries in South East Asia, including Malaysia, have yet to introduce these vaccines. PCVs are licensed for use in the region but available only privately in the majority of countries in South East Asia. In consequence, uptake is low due to a lack of awareness of the vaccine and difficulties surrounding its affordability for the majority of the population.

Four of the 10 members of the Association of South East Asian Nations (ASEAN) are currently eligible for full Global Alliance for Vaccines and Immunisation Alliance support towards introducing PCVs. Not being amongst the world's poorest countries, Malaysia is ineligible for such support and would need to entirely self-fund PCV inclusion in its National Immunisation Programme (NIP). At present adding PCVs to Malaysia's NIP is not deemed sufficient a priority despite the evidence in favour of their use. The WHO recommends their adoption even in the absence of data on pneumococcal disease burden or prevalence of pneumococcal serotypes, such is the reported efficacy of PCVs in studies around the globe.[1] Both pneumococcal disease burden and serotype prevalence is grossly understudied in Malaysia so the basis for inclusion of certain vaccines and exclusion of PCV from the priorities of the NIP health spend is unclear. For pneumococcal meningitis alone there is very conservatively estimated to be 2,809 cases annually in Malaysia.[2]

Over 94 serotypes of *Streptococcus pneumoniae* cause pneumococcal disease, though certain serotypes are more prevalent than others. Protection against the seven most common serotypes (4, 6B, 9V, 14, 18C, 19F and 23F) were the first to be included the first PCV vaccine – PCV7. Subsequently, higher valency vaccines like PCV10 and PCV13 added protection against three additional commonly occurring serotypes (1, 5, 7F and 3, 6A, 19A, respectively). Epidemiological surveillance had shown increasing prevalence of the additional serotypes of the higher valency vaccines since PCV7 use, probably in part an effect of widespread pneumococcal immunisation – a process known as serotype replacement. Disease surveillance can be highly informative about changing serotype epidemiology, however recruitment of large patient cohorts and cost drawbacks frequently constrain their use, particularly in resource-limited settings. Colonisation by at least one of the serotypes is an accepted prerequisite to any form of pneumococcal disease. Consequently examination of pneumococcal serotypes carried in the upper respiratory tract of the general (non-diseased) population can be a proxy for disease surveillance studies. Carriage studies can generate large data sets quickly, rather than relying on an incidence of disease to present and then to be reported, as is the case in disease studies. Carriage studies are also relatively cheap to implement. This makes them more likely to run for longer than disease surveillance studies, and so generate data over longer timescales which compounds the value of a study.

A review of epidemiological studies describing pneumococcal serotype prevalence in Malaysia highlights the limitations of the data available for the country.[3] Issues include focus on a single centre with small numbers of isolates, the limited time span of studies as well as being dated and providing little serotyping data. It is therefore difficult to fully assess the serotypes currently prevalent in carriage or causing disease in the wider community. This makes it impossible to fully assess the potential overall benefit of pneumococcal immunisation in Malaysia – both directly to the immunised individual and through the broader, indirect benefits of herd immunity. These shortcomings in the data also preclude modification of the immunisation schedule (should any PCV be introduced) to suit local epidemiological peculiarities, as well as to monitor changes in epidemiology where appropriate adjustments in immunisation policy would even enhance widespread PCV use.

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The WHO advocates pneumococcal surveillance to begin at least 2 years prior to the introduction of a PCV programme[1] and there is an urgent need to increase the data for pneumococcal carriage and disease in Malaysia. Thus, whilst the Malaysian Ministry of Health continues to consider widespread PCV implementation in Malaysia, immediate initiation of carriage studies could generate data to help inform immunisation policy in the country. Should widespread PCV immunisation occur, data on circulating serotypes from carriage studies will enable an assessment of the cost-effectiveness of PCV inclusion in the country's NIP. Additionally, Malaysian serotype data prior to widespread PCV use would provide very scarce information on the direct and indirect epidemiological effects of widespread higher valency PCV10 or PCV13 immunisation in a population where pre-exisiting PCV7 herd immunity is likely negligible – in contrast to the epidemiological setting in most western countries where the majority of surveillance occurs. Pneumococcal carriage studies in Malaysia would be more epidemiologically relevant to the South East Asian region where serotype data is scarce, and so help inform regional as well as specifically Malaysian national vaccine policy. Lastly, better quality data from Malaysia could help inform development of newer, even higher valency vaccines that would provide greater pneumococcal disease protection by including more comprehensive serotype coverage in future.

Keywords: Streptococcus pneumoniae, conjugate vaccine, serotypes, colonisation, surveillance

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