

Optimizing the benefits of pneumococcal vaccination in the Kingdom of Saudi Arabia

Esam I. Azhar, Alimuddin Zumla¹

Special Infectious Agents Unit, Department of Medical Laboratory Technology, Faculty of Applied Medical Sciences, King Fahd Medical Research Centre, King Abdulaziz University, Jeddah, Kingdom of Saudi Arabia, ¹Center for Clinical Microbiology, Division of Infection and Immunity, University College London, NIHR Biomedical Research Centre, UCL Hospitals NHS Foundation Trust, London, United Kingdom

Address for correspondence:

Dr. Alimuddin Zumla, Center for Clinical Microbiology, Division of Infection and Immunity, University College London, NIHR Biomedical Research Centre, UCL Hospitals NHS Foundation Trust, London, United Kingdom. E-mail: a.i.zumla@gmail.com

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A decade ago in 2005, an article in the *Annals of Saudi Medicine* published entitled, "Vaccination against invasive pneumococcal disease in Saudi Arabia: Where do we stand?" by Frayha and Al Mazrou raised a crucial public health issue in the Kingdom of Saudi Arabia (KSA).^[1] An evidence-based answer to that question has not forthcoming despite the conduct of several prospective and retrospective clinical, epidemiological, and cohort studies, and publication of numerous reviews and "systematic analysis" focused on aspects of the burden of pneumococcal carriage, pneumococcal pneumonia, or invasive pneumococcal disease (IPD) both in the local resident KSA population and on pilgrims at the annual Hajj pilgrimage. The difficulty with the question posed by Frayha and Al Mazrou is that optimal strategies for use of pneumococcal vaccines in a country can only be determined from having evidence-based information on (a) actual burden of disease in all age groups, (b) *Streptococcus pneumoniae* carriage rates in locals and visitors, (c) pneumococcus serotype distribution and their changes with time, (d) risk factors, and (e) high-risk groups for IPD.

Global guidelines and recommendations for pneumococcal vaccination in adults and children are available from the World Health Organization and other global public health agencies, and these are regularly updated as new evidence base of efficacy accumulates, or new vaccines are introduced.^[2,3] While these global recommendations are generically applicable worldwide, every country needs to refine them to suit local needs so that maximal benefit is achieved from pneumococcal vaccination programs. The KSA health services face several unique challenges which need to be taken into consideration for developing optimal pneumococcal vaccination guidelines that are relevant for preventing IPD in local residents and visitors. First, a large proportion of the KSA population is <50 years of age.^[4] Second, there is a high prevalence in the Saudi population of risk factors for IPD (diabetes, hemoglobinopathies, cardiac diseases, chronic renal, liver and lung diseases, among others).^[5] Third, Saudi Arabia is host to millions of pilgrims from all over the

world who travel to KSA for the Umrah and Hajj, and many of them develop pneumococcal disease and have to be hospitalized.^[6] Fourth, pilgrims may have or acquire nasopharyngeal carriage of various serotypes of *S. pneumoniae*, and they may constantly change the epidemiology of pneumococcal disease.^[7] The close contact between pilgrims may alter the distribution of pneumococcal serotypes, and the pilgrims may export local serotypes back to their home countries. Fifth, antibiotic-resistant pneumococci are on the increase in KSA and worldwide and may be imported into, or exported out of KSA.^[8] Sixth, there have been no high-quality data available from properly designed, large-scale, adequately powered, controlled, longitudinal, or cross-sectional studies on the efficacy of currently available pneumococcal vaccines conducted on the population of KSA or in pilgrims for preventing pneumococcal disease.^[9]

Thus, the important question raised by Frayha and Al Mazrou,^[1] "Where do we stand on pneumococcal vaccination in KSA?" a decade ago, still stands and needs to be addressed. Promoting the "best practice" in KSA on the issue of the prevention of pneumococcal disease, and reducing morbidity and mortality due to it in the local KSA population and pilgrims, remains a major public health issue. In this issue of *Annals of Thoracic Medicine*, Al-Harbi *et al.* from the Saudi Thoracic Society (STS) publish the long-awaited 2016 STS guidelines for pneumococcal vaccination in KSA.^[10] These were developed after extensive review of the literature and includes personal clinical experiences of

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members of the KSA-STs. They present epidemiological, microbiological, and clinical features of *S. pneumoniae* infections, and summarize available literature on the 23-valent pneumococcal polysaccharide vaccine (PPSV23) and 13-valent pneumococcal conjugate vaccine (PCV13). The publication of the guidelines is timely and important. Apart from providing easy to follow and clear recommendations supported by grade of evidence available to them, they highlight areas where scanty information is available and knowledge gaps. While their recommendations are largely similar to those recommended by other public health agencies, their recommendations for adults have the lowered age limit of vaccination at >50 years old. This is important since this recommendation is based on the presence of a large number of comorbidities in the KSA population <50 years of age, many of whom have risk factors for contracting pneumococcal infections such as diabetes, cardiovascular diseases, chronic renal, liver and lung diseases, and hemoglobinopathies in KSA.

KSA is a host for millions of pilgrims annually who travel from all over the world for the Umrah and Hajj pilgrimages, from over 184 countries and are at risk of developing pneumococcal pneumonia or IPD disease due to underlying risk factors. There is also the high risk of transmission of *S. pneumoniae* including antibiotic-resistant pneumococcal strains between pilgrims and their global spread upon their return. Vaccination against pneumococcus for pilgrims is not currently an entry visa requirement for travelers to KSA due to the absence of any credible evidence base. The STS guidelines also point out major knowledge gaps that are required to refine the guidelines. Given the continuing knowledge gaps and since the epidemiology of pneumococcal disease is constantly changing, there remains an urgent need to move away from small cohort or retrospective analyses studies which result in anecdotal or inconclusive data and to focus on the conduct a range of high-quality research studies and which will accurately define pneumococcal vaccination policies in the KSA. Recognizing the knowledge gaps and challenges now requires movement toward finding solutions. The annual Hajj and high prevalence of risk factors in the KSA population present unique opportunities for conduct several large-scale, cross-sectional and longitudinal, adequately powered, controlled, long-term follow-up studies on the efficacy of currently available PPSV23 and PCV13. These will also allow conduct of substudies on the basic biology, epidemiology, transmission dynamics, clinical burden, and potential for global spread of the pneumococcus. Operational studies and educational campaigns are required to increase awareness, acceptance, and implementation of

vaccines among healthcare workers, KSA population, and pilgrims about pneumococcal disease. The studies will present to engage young Saudi scientists, public health personnel, infectious diseases, and thoracic physicians in pursuing doctoral or postdoctoral research. By developing and publishing the pneumococcal guidelines, the STS has taken an important first step toward defining public health policy and taking forward the research and training agenda. The STS guidelines are a welcome addition to the literature on pneumococcal vaccination in KSA, and they will require refinement on a regular basis as further data becomes available.

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