



South Asia symposium on pneumococcal disease and the promise of vaccines – Meeting report



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ABSTRACT

Despite the licensure of the pneumococcal conjugate vaccine (PCV) in the US and other Western countries for over 14 years, as of September 2014 only 4 South Asian countries were using PCV in their universal immunization program. To generate momentum toward addressing this issue a “South Asia symposium on pneumococcal disease and the promise of vaccines” was organized just prior to the 9th international symposium on pneumococci and pneumococcal diseases held in India recently. Leading scientists, program managers, and decision makers including ministry officials from the region participated in the meeting. The participants discussed available data on pneumococcal disease burden in South Asia, surveillance methods, efficacy and safety of pneumococcal conjugate vaccines (PCV), the status of PCV introduction, programmatic challenges in introducing PCV and available data on the impact of PCV in South Asia and globally. There was a strong consensus that available data on disease burden and the global experience with PCV justified the introduction of PCV in all Asian countries in order to accelerate the gains in child survival in the region.

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1. Introduction

The ninth international symposium on pneumococci and pneumococcal diseases (ISPPD-9) was held in Hyderabad, India from March 9 to 13, 2014. The ISPPD has been convening eminent scientists from around the world to discuss the latest scientific developments in the field of pneumococcal diseases and prevention strategies biennially since 1998. Previous ISPPD meetings paid special attention to the role of pneumococcal conjugate vaccines in disease prevention, emerging data on serotype replacement post-immunization, and the importance of continuous disease surveillance both before and after pneumococcal vaccine introduction [1–3]. ISPPD-9 reviewed advancements made in these areas, and also examined evidence that could inform the development of policies and programs relating to pneumococcal disease, and accelerate access to pneumococcal vaccines in the world's poorest countries.

ISPPD-9 also marked the first time, the conference was held in Asia. It provided an extraordinary opportunity to foster collaborations, promote knowledge sharing and examine topics ranging from the epidemiology of and diagnostics for pneumococcal disease to the development of disease control policies in low- and middle-income countries (LMICs). To this aim, a satellite meeting – the South Asia symposium on pneumococcal disease and the promise of vaccines – was held in conjunction with ISPPD on March 9, 2014. Leading scientists, program implementers, and decision-makers including officials of Ministries of Health from Asian countries convened to examine and review the available scientific data and share policy and programmatic considerations for pneumococcal conjugate vaccine (PCV) introduction. The purpose of the symposium was to accelerate the introduction and uptake of PCV in the region, specifically in countries like India facing the highest burden of pneumococcal disease.

The co-chairs of the South Asia symposium, Dr. Narendra Arora and Dr. Mathuram Santosham opened the meeting by remarking on the timeliness of the gathering, underscoring the need for tackling pneumonia as a top public health priority and highlighting the promising role of prevention through vaccination in reducing pneumonia-related childhood morbidity and mortality.

The key-note speaker, Dr. Rakesh Kumar, Joint Secretary (Reproductive & Child Health Programme) to the Government of India,

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Ministry of Health and Family Welfare shared India's progress toward improving child and maternal health, and reviewed the steps India had taken to reinvigorate its commitment toward achieving the millennium development goals (MDGs). Specifically, the national government had increased allocations from 1.36% to 1.87% of the GDP to the health sector and implemented policies to scale-up high-impact interventions for newborn and child survival, including key interventions to reduce pneumonia-related deaths in India [4,5]. Specifically, Dr. Kumar acknowledged existing health system barriers – such as, the irregular supply of essential antibiotics, inadequate capacity of the public health workforce, and the failure to implement policies at the subnational level – that have stymied progress toward reducing pneumonia-related deaths [4]. In his concluding slide, Dr. Kumar reflected on the policy decision to introduce PCV currently facing the country [4].

This query set the stage for the symposium's agenda of examining available evidence to facilitate discussions and debate to identify barriers to PCV introduction and lessons learnt from other countries. This article presents a summary of these deliberations and the conclusions of the symposium according to the following thematic areas:

1. Epidemiology, disease surveillance methods, and estimates of pneumococcal disease burden globally and in South Asia.
2. Safety, efficacy, and the impact of PCV.
3. Policy and programmatic considerations to support country-level decision-making for PCV introduction.
4. A call to action to leverage the promising role of PCV in preventing pneumococcal disease burden in the region.

2. Burden of pneumococcal disease in South Asia and challenges of pneumococcal disease surveillance

The first panel reviewed the epidemiology of the pneumococcal disease globally and in South Asia and highlighted the successes and challenges of disease surveillance in Asia. Dr. Thomas Cherian presented World Health Organization's (WHO) unofficial estimates from 2008, which reported approximately 100,000 deaths from pneumococcal pneumonia and 13,000 deaths from pneumococcal meningitis in South Asia based on data from Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka [6]. Dr. Cherian also described the challenges of establishing *Streptococcus pneumoniae* (*Spn* or pneumococcus) etiology and how it had limited the direct estimation of the pneumococcal disease burden. In particular, evidence supported that surveillance of laboratory confirmed culture positives of *Spn* disease represented only the "tip of the iceberg" because a vast majority of pneumonia cases are not easily diagnosed [6,7]. Experts at the meeting generally agreed that the previously held belief of low pneumococcal disease burden in Asia was likely due to diagnostic factors like lowered sensitivity of culture techniques, antibiotic use before diagnostic work up, and delay in processing of specimens, which limited the availability of national estimates on disease burden. When newer diagnostic techniques were used, the rates of disease were similar to other developing regions of the world such as Africa [8]. For example, rates of invasive pneumococcal disease (IPD) detection were consistently higher in studies which used antigen detection techniques like latex agglutination and immunochromatography, or molecular assays like PCR in conjunction with culture especially for detection of pathogens in the cerebrospinal fluid [9,10].

Furthermore, experts acknowledged the differences in the annual incidence of invasive pneumococcal disease (IPD) among five year olds living in countries sharing similar socio-economic and mortality profiles in the region. They concluded, the incidence of IPD among under five year olds – ranged from approximately 204

per 100,000 in Sri Lanka to 3058 per 100,000 in Bangladesh and that these differences were likely representative of differences in the diagnostic methodologies and surveillance methods that were used [11].

Based on the available epidemiological data reviewed at the symposium, experts at the meeting agreed there was sufficient evidence at the time to conclude the epidemiology of *S. pneumoniae* in Asian countries was comparable to that seen in other countries with similar socio-economic and mortality profiles prior to vaccine introduction. Therefore, in order to address the high burden of pneumococcal disease in region, particularly in India, Pakistan and Bangladesh, there was strong consensus to improve surveillance for invasive pneumococcal disease by providing adequate financial and technical support by global development partners. Although specifically not discussed, alternative and innovative financing mechanisms that have successfully expanding the fiscal space for health should be considered as potential tools for financing new vaccine introduction [12].

Dr. Pushpa Wijesinghe synthesized the successes and challenges of IPD surveillance from the experiences of the WHO-supported surveillance networks established in South and Southeast Asian countries. Establishing in-country sentinel surveillance networks had several advantages, including the generation of local and regional data on pneumococcal disease incidence and prevalence, as well as, bringing transparency to decision making processes at the National Immunization Technical Advisory Groups (NITAGs) in different countries [11]. The NITAGs in Bangladesh and Nepal selected PCV10 over PCV13 for national introduction in 2015. In making that decision, they took into account many factors including serotype coverage, presentation of the vaccine, cost of the vaccine, and cold chain issues etcetera. Similarly, regional data generated through these surveillance networks informed Myanmar's decision to introduce PCV10 despite lacking country-based surveillance mechanisms.

Evidence of IPD serotype distribution through surveillance networks also addressed the historic concerns about the serotype distribution in Asia, where questions about regional serotype coverage of the currently available pneumococcal vaccines have been raised. Available evidence on serotype prevalence for pneumococci in the region from India, Nepal, Bangladesh and Sri Lanka demonstrated that PCV10 covers approximately 70% and PCV13 covers approximately 74% of the serotypes which cause IPD [13]. These data are important for countries like India and Sri Lanka that are still determining whether to introduce PCV in their national immunization programs, as well as for countries conducting evaluations to assess the impact of PCV on both vaccine and non-vaccine type pneumococcal serotypes. It was also reported that IPD surveillance networks enhanced the capacity of country-led surveillance efforts and informed policy changes in certain countries. For example, India and Bangladesh integrated Acute Meningitis/Encephalitis Surveillance (AMES) with their existing polio and measles surveillance networks [11]. In addition, in Sri Lanka, data on antibiotic sensitivity gathered from pneumococcal surveillance informed changes in the antibiotic prescription policy [11].

Despite these successes, several concerns about the sustainability of these WHO-supported networks were raised, specifically, the dependence on external funding of ongoing surveillance activities, the lack of country leadership and the immediate need for establishing adequate surveillance systems in order to monitor serotype replacement in countries post-vaccine introduction [11]. Other challenges that were discussed related to diagnosis and data quality, for example, the lack of standardization of surveillance practices and data management, poor quality of existing culture techniques, limited access to newer higher sensitivity diagnostics, extensive use of antibiotics prior to obtaining diagnostic specimen,

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