

thus the potential for induction of herd immunity. Duration of protection against disease and carriage are important in estimating how many cases can be prevented and thus the potential cost-effectiveness of the vaccine. The impact of such vaccines in high income countries may have resulted more from the excellent direct and herd protection amongst adolescents and young adults than from the short duration responses induced by the vaccination of young children [8]. The reasons for these age-dependent differences in immunity are not completely understood but may relate to developmental differences in the immune system, or be driven by environmental factors. There is also evidence of genetic control of the duration of protection [9] which points to the importance of monitoring duration of protection induced by vaccines in populations with differing genetic backgrounds.

With prevention of meningococcal disease using glycoconjugate vaccines demonstrated elsewhere, bridging data on immunogenicity in India, and leadership in this field from Indian vaccine manufacturers, it is lamentable that there is so little surveillance data available in India to inform policy, to determine the need for programs and to direct the response to outbreaks.

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## Preventing Meningococcal Infections in India INDIAN PERSPECTIVE

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**N***eisseria meningitidis* causes invasive diseases like meningococemia and meningitis with a case fatality rate of 10-15% and a disability rate of 11-19% among survivors [1]. Although the bacterium largely continue to be sensitive to

antibiotics but rapid course of illness and emerging antibiotic resistance warrants that the disease be prevented as far as possible [2,3]. Currently, several vaccines against meningococcus are available, but one has to choose wisely to ensure maximum efficacy. At least

five serotypes (A, B, C, Y and W135) have been associated with invasive meningococcal disease (IMD) worldwide. Polysaccharide vaccine (against 2 or 4 serotypes) have been available for quite some time but have the inherent disadvantage of lacking T cell response, resulting in their lack of utility in children below 2 years of age, and also failing to confer immunological memory [1]. Attempts to conjugate the polysaccharide antigen with protein have resulted in successful development of conjugated monovalent or quadrivalent vaccines against different serotypes of meningococci. Quadrivalent vaccine with polysaccharides of serogroup A, C, Y and W 135 conjugated to Diphtheria toxoid has been in use for adolescents (11-14 years) in USA since 2005 [4]. Although having 80-90% protective efficacy in first year after vaccination, the same has been found to decline to 60-65% in the fifth year, warranting a recent recommendation of a booster dose at 16-18 years of age [5].

Yadav, *et al.* [6]. – in a study reported in this issue of *Indian Pediatrics* – have shown 90-100% sero-efficacy of this quadrivalent vaccine in Indian children, adolescents and adults. The authors have chosen to estimate antibodies in rabbit serum where the protective levels are highly unpredictable and hard to define. Generally, bactericidal titers of  $\geq 1:4$  in human serum are considered protective against IMD [7]. Titers as high as 1:128 in rabbit serum are needed to assure that a titer of 1:4 are present, if measured with human serum [8]. Despite this shortcoming, the results of this bridging study are adequately reassuring regarding efficacy and safety of this vaccine in the Indian context.

However, before considering the introduction of this vaccine in the National program or even in the list of 'optional vaccines' of schedule recommended by Indian Academy of Pediatrics, the potential utility of this vaccine in our country needs to be examined. Epidemiology of meningococcal disease in India appears to be distinctly different from that in USA. While in USA, the disease mostly occurs in a sporadic manner with serotypes B, C and Y accounting for about 30% cases each, occasional small outbreaks among college students are usually due to serotype B [4]. In contrast, all the epidemics in India since 1930 have been due to serotype A [2]. Occasional cases of meningitis due to serogroup B are reported but to the best of our knowledge, cases of IMD due to serotype C, Y or W 135 have not been reported from our country [9]. Thus, we have predominantly serotype A IMD in our country, a situation not very different from other Asian countries and Sub-Saharan belt in Africa [1,10].

Different countries in the world have used different monovalent or polyvalent polysaccharide conjugated

vaccines depending on their disease epidemiology. While USA is using the quadrivalent vaccine, a serogroup B polysaccharide conjugated vaccine has recently been recommended for routine use in UK for infants, and is being considered for interrupting the ongoing epidemic in Princeton University in USA [11]. A serogroup C monovalent vaccine has been used successfully in several countries of the world like Spain, Italy, Greece, France, Canada, Australia, Brazil and Argentina [12]. It would seem logical that with known preponderance of serogroup A IMD in our country, a monovalent conjugate vaccine targeted against serogroup A meningococcus will be more useful and cost effective in our country. A novel meningococcal serogroup A conjugated vaccine (PsA-TT, MenAfrVac) – introduced in Burkina Faso [13], Mali and Niger in 2010 – resulted in 71% (hazard ratio 0.29, 95% CI 0.28,030;  $P < 0.0001$ ) decline in risk of meningitis and a 64% decline in risk of fatal meningitis. No case of serogroup A IMD occurred in vaccinated individuals and no serotype replacement was seen. The incidence of laboratory confirmed serogroup A meningococcal meningitis dropped to 0.1 per 100,000 representing a 98.6% reduction [13].

*Obviously, we must know the size of shoe that is likely to fit us, before ordering it or even trying it on! Wrong size shoe cannot even be an option!*

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## The New INCLLEN Diagnostic Tool – A Comment DEVELOPMENTAL PEDIATRICIAN'S PERSPECTIVE

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With modernization comes associated pressure on children to achieve ever higher academic standards. It is therefore important to identify children who are struggling to meet expectations but could respond to intervention. Attention deficit hyperactivity disorder (ADHD) is one of the commonest reasons for academic under-attainment worldwide [1], and the prevalence rates in India are comparable to other countries [2]. As ADHD is a treatable condition, the need for accessible diagnostic instruments – that are appropriate for use in local setting – is readily apparent. Lack of universal education and established pathways of communication with schools, combined with poor awareness, make establishing the diagnosis a real challenge.

The INCLLEN Trust has adapted the diagnostic criteria of the American Psychiatric Association (DSM-IV TR) by rewording them to make them more applicable to an Indian setting [3]. The development of such a tool based on the DSM-IV TR criteria, and validation in the local population, are major advancements to assist in diagnosis. This should translate into increased awareness of ADHD, and ultimately to better management of these children. The INCLLEN diagnostic tool is divided into sections A and B; section A derives directly from the DSM diagnostic criteria. However, the fundamental principle of diagnosing ADHD is not that the child meets the diagnostic criteria, but rather the presence of

pervasive functional impairment deriving from the core symptoms. This is addressed in Section B of the tool. Recognition of the way that the particular symptoms can lead to impairment would need to be emphasized in the follow-through training in the use of the tool to prevent overdiagnosis. This is particularly important when considering section B item 4, that lists some modalities of functional impairment. For example, the failure to form stable friendships may result from a child not attending or listening to a playmate and therefore being bossy. A short attention span may mean that the child gets bored and tries to change the rules of the game. Alternatively a bored child may try to make life more interesting by being deliberately annoying or playing for attention. Children with ADHD tend to live in the present and not consider the future. They may be prone to injury through not stopping to consider the risks or consequences of an action. Their short term view of life can place unreasonable stress on parents and teachers. For example, a child may try to put off a task for as long as possible, on the basis that every minute spent arguing is time well spent because they are not doing the task. The fact that in the end it still has to be done may not appear to have any relevance to the child. Similarly, when punished the child may not be interested in the reason for the punishment, which therefore takes away its effectiveness. Academic underachievement may result from a short attention span and difficulty with sustained concentration. When assessing the acuity of ADHD it is