



# Trends and variations in the epidemiology of meningococcal disease in Kuwait 1987–2013



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## KEYWORDS

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**Summary** The introduction of *Haemophilus influenzae* type b (Hib) conjugate vaccine and conjugate pneumococcal vaccine into routine childhood vaccination in Kuwait has resulted in the emergence of *Neisseria meningitidis* as the leading cause of invasive bacterial infection in children. Currently, a quadrivalent ACYW-135 meningococcal polysaccharide vaccine is administered as part of routine childhood vaccination in Kuwait at the age of 2 years. Conjugate meningococcal vaccines have been shown to be more effective in preventing meningococcal infection in young children. The objective of this study was to describe the epidemiology of meningococcal disease (MD) in Kuwait and evaluate the need for conjugate vaccine in routine childhood immunization. We have reviewed the MD surveillance data from the communicable disease unit, Ministry of Health, Kuwait during the period from 1987 to 2013. The analysis included microbiologically confirmed cases of *N. meningitidis* in the blood and cerebrospinal fluid. There were 293 cases of confirmed MD during the study period. Two hundred and four cases (70%) were in children  $\leq 14$  years of age. The mean incidence rate was 0.5/100,000 persons. The dominant serogroups were W-135 and B, accounting for 80 cases (32%) each. Serogroup B accounted for 69/204 (34%) of all cases in children  $\leq 14$  years and serogroup A accounted for 36/89 40% of all adult cases. There were three outbreaks: 1987 (caused by serogroup A), 1989 (caused by serogroup W-135) and 2002 (caused by serogroup B). The mean case fatality rate was 13.5%. In conclusion, despite childhood routine vaccination with

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ACYW-135 polysaccharide vaccine, infants and young children remain at high risk for MD, which supports the introduction of conjugate meningococcal vaccine to the routine childhood vaccination schedule.

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## Introduction

After the introduction of *Haemophilus influenzae* type b (Hib) conjugate vaccine and pneumococcal conjugate vaccine (PCV) into routine childhood vaccination programs, *Neisseria meningitidis* has become the leading bacterial cause of meningitis and sepsis in children [1]. It has been estimated that it causes 500,000 cases and 50,000 deaths annually in children less than 5 years of age worldwide [2].

Kuwait is situated in the northern edge of Eastern Arabia at the tip of the Persian Gulf. Its size is 17,820 km<sup>2</sup> with a population of 4 million as of 2013. The Ministry of Health is the major provider of health care through six regional health care districts. The private health sector has emerged as a contributor to health care in the last 10 years.

The Hib vaccine was introduced in Kuwait in 1996 and PCV in 2006. Additionally, the current vaccination schedule includes the routine administration of a quadrivalent ACYW-135 polysaccharide meningococcal vaccine at the age of 2 years. We have previously reported that *N. meningitidis* is the most common cause for bacterial meningitis in children in Kuwait [3].

Meningococcal vaccination recommendations in Kuwait have changed over the years based on the changing epidemiology of meningococcal infection in the country. In 1987, an outbreak of *N. meningitidis* serogroup A led to a recommendation for the use of a bivalent AC meningococcal polysaccharide vaccine in the expanded program on immunization (EPI) for children 4 years of age. Additionally, the vaccination program of pilgrims going to Hajj in Saudi Arabia was started in the same year. In 1997, following the emergence of serogroup W-135 in the country, the quadrivalent ACYW-135 meningococcal polysaccharide vaccine replaced the bivalent AC polysaccharide vaccine in the EPI schedule for children at 4 years of age. In 2008, the quadrivalent ACYW-135 polysaccharide vaccine was introduced at 2 years of age instead of 4 years as part of the EPI schedule.

In addition to routine vaccination with the quadrivalent ACYW-135 meningococcal polysaccharide vaccine in all children at the age of 2 years, the current efforts to reduce meningococcal infection in Kuwait include the following recommendations: vaccination of all contacts of cases with meningococcal disease including medical and paramedical personnel, students in police and military colleges and pilgrims going to Hajj and Umrah with quadrivalent ACYW-135 meningococcal polysaccharide vaccine [4]. In addition, a bivalent AC meningococcal polysaccharide vaccine is given to all expatriate laborers and housemaids [4]. No conjugate vaccine is routinely administered to any of the groups above.

The objective of this study was to describe the epidemiology of meningococcal disease (MD) in Kuwait from 1987 to 2013 and to evaluate the need to introduce a conjugate meningococcal vaccination in the routine vaccination schedule.

## Methods

### Surveillance

Population-based surveillance for MD is a national active surveillance in Kuwait that was started in 1987 by the Ministry of Health (MOH). Positive cases with *N. meningitidis* are instantly reported to the Preventive Medicine Department in each hospital. The report is forwarded from all six general hospitals and other subspecialty hospitals in Kuwait to the Department of Communicable Diseases Control Unit at Ministry of Health within 24 h of identification. MD is defined as the isolation of *N. meningitidis* from the blood or cerebrospinal fluid. After confirmation of the case, a notification form includes patients' demographic data including name, age, nationality, contact tracing information and outcome. This notification form is completed

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