Why should teenagers and adults living in the UK consider vaccination against meningococcal serogroup B disease?

A Vyse, G Ellsbury, H Madhava (The authors have no conflicts of interest to declare)

Pfizer Limited, Walton Oaks, Dorking Road, Tadworth, Surrey, KT20 7NS

BACKGROUND

- Meningococcal serogroup B (MenB) is considered endemic in Europe where it continues to cause the majority of invasive meningococcal disease (IMD)[1-4]
- Quadrivalent ACWY conjugate vaccines for serogroups A, C, W and Y became available during the first decade of the 21st century. Broadly protective MenB vaccines remained elusive until recently, with two new protein-based MenB vaccines now available in the UK, both with a wide age indication[5–7]
- **In September 2015, the UK became the first country in the world to routinely vaccinate infants against MenB disease, but this recommendation has not yet been extended to older age groups[8-10]**
- MenB vaccines can be used to directly protect teenagers and adults concerned about the possibility of MenB outbreaks occurring and also as part of localised containment strategies when they do occur
- **With two broadly protective MenB vaccines with a wide age indication now licensed in the UK, it is important to ensure that adolescents and adults are aware of the opportunity to individually protect themselves against MenB disease[6]**

AIMS/OBJECTIVES

- To summarise the evidence supporting the need for adolescents and adults living in the UK to consider vaccination to protect themselves against MenB disease

METHODS

- Data relating to MenB disease and its epidemiology in the UK in those aged 10+ years over the past two decades were identified and reviewed in searches of the literature and the Public Health England website

EPIDEMIOLOGY

- The epidemiology of IMD varies globally, with disease incidence and the serogroups responsible fluctuating unpredictably by time and region
- In the UK, MenB has been the major cause of IMD for the past several decades. Between 2001/02 and 2012/13 it consistently caused more than three-quarters of all IMD, and in 2015/16 was responsible for 55% of all reported cases[11]
- The UK consistently reports one of the highest annual incidence estimates for MenB within the European region (1.44 cases per 100,000 across the full age range over the period 2000–2015)[3]
  - Incidence is highest in infants with an important second peak of disease in adolescents and young adults
  - Over a third of reported MenB cases in the UK occur in those aged 10+ years, with approximately half of these in teenagers and young adults[12]
  - 444 MenB cases were reported in the UK in 2015/16, with 93 cases seen in those aged 25+ years and 82 cases seen in teenagers and young adults aged 10–24 years[12]

CARRIAGE AND TRANSMISSION

- Whilst IMD is rare, asymptomatic carriage is common with most transmission of the meningococcus occurring silently through carriage
- **Carriage is considered a prerequisite for disease and is highest in those aged 16–24 years in industrialised countries,[13] where up to 25% of adolescents and young adults may be carriers at any one time[14,15]**
- MenB is often the dominant serogroup carried, as demonstrated in carriage studies both in the UK and elsewhere[15,16]
- Increased carriage is associated with high levels of social contact and is often especially high amongst university students, where carriage acquisition increases rapidly during the first weeks of term
- MenB vaccination to protect against subsequent disease is now an option for those adolescents concerned about being at an elevated risk of carriage and exposure to MenB

OUTBREAKS AND STUDENTS

- MenB is a major cause of outbreaks of IMD in regions where it is endemic
- MenB outbreaks are unpredictable but have repeatedly occurred in the UK and can be localised and short lived or large and prolonged. Post-exposure vaccination may be too late to protect[17,18]
  - **Outbreaks often affect younger age groups, especially teenagers attending school or university**
  - Living on a university campus and sharing halls of residence is a known risk factor for IMD
  - Studies with UK university students show them to be at increased risk compared with non-students of a similar age[19-22]
  - MenB meningococci are often the most frequent cause of IMD amongst UK university students[23,24]
  - In 2017, a MenB outbreak at the University of Surrey resulted in three cases with one death[25]
  - **MenB outbreaks have been occurring with increasing frequency in US students, resulting in an ACIP recommendation in June 2015 for those aged 16–23 years to be vaccinated with either of the new protein-based MenB vaccines[26,27]**

OUTCOMES OF MenB DISEASE

- MenB disease carries a significant risk of death; even with the best medical care,[28] global estimates of case fatality range 3–10% (7.4% for Europe)[3]
- MenB disease is associated with a substantial loss in quality of life, with survivors often left with life-changing disabling sequelae, either physical, psychological, or both[28,29]
  - Acute hearing loss, skin scarring and amputation are now clearly identified; cognitive impairments and psychiatric problems are recognised but less well defined[27]
- **A study in the UK estimated the overall case fatality for MenB disease to be 4.2%; however, this varies with age, with the odds of death in adolescents and young adults twice that of infants[30]**
- A study of outcomes of MenB disease in UK children and adolescents showed that a tenth of survivors may be left with major disabling deficits, and over a third with physical, cognitive and psychological problems[29]

OTHER GROUPS IN THE UK WITH A RAISED RISK

- Individuals participating in mass gathering events involving intense periods of close social contact are at raised risk of exposure to infectious diseases
  - The Islamic Hajj pilgrimage and World Scout Jamboree are both associated with outbreaks of IMD, with many participants from global regions where MenB is endemic and who therefore may be asymptomatic carriers[31-38]
  - An 18-year-old student contracted MenB and died at the 2017 Boardmasters Festival in Cornwall[39]
  - There is significant potential for MenB outbreaks to occur at such mass gathering events, and future participants concerned about this can now consider prior protection with MenB vaccination
- HIV-positive children and adults have a significantly heightened risk of IMD, particularly those aged 16 to 24 years[40]
  - In the UK, all those with immunosuppression and HIV infection are recommended to receive both ACWY and MenB vaccines

DISCUSSION

- MenB is the most common cause of IMD in teenagers and young adults but is relatively rare, meaning the perception of the disease and its severity is low with limited awareness of the vaccination opportunity that now exists
- Studies suggest this perception changes following discussion with healthcare providers and parents, particularly when the severity of the disease and the potentially life-changing sequelae are highlighted[41-43]

CONCLUSIONS

- Teenagers and adults living in the UK continue to be at risk of MenB disease
- It is important that healthcare providers can discuss this topic with individuals in this age group and ensure they are aware of the relevant information and that MenB vaccines designed to be broadly protective are now available
- Individuals who are concerned about MenB disease should consider vaccination to protect themselves

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