The Public Health England (PHE) Meningococcal Reference Unit (MRU) has been providing data on invasive meningococcal disease for England since 1984.

In 1999 Meningococcal serogroup C conjugate (MCC) vaccine was introduced into the UK as part of the routine infant schedule and as a catch-up campaign for children under 18 years.

From September 2013 MCC vaccine was offered to teenagers and university freshers. In August 2015 this was replaced by an ACWY conjugate vaccine programme with a catch-up component.

From 1st September 2015, Bexsero® was introduced into the UK immunisation schedule primarily to prevent group B infection: for infants born after 1st May 2015. MCC infant vaccination stopped in July 2016 with a dose of MCC+N Hib continuing to be offered at 12 months of age.

High levels of IMD in 1998/99 and 1999/00 were partly explained by better ascertainment resulting from Neisseria meningitidis for characterisation to the MRU. Since October 1996, the MRU has provided a non-culture meningococcal PCR diagnostic service for England.

Isolates are characterised by serogroup, serotype, and sero-subtype. MICs to antibiotics (penicillin, cefotaxime, rifampicin and ciprofloxacin) are also determined.

Non-culture confirmation is based on real-time Taqman® PCR assays; cfrA for detection, siaD for serogroup B, C, Y or W characterisation and mybA for serogroup A. Routine characterisation of non-culture positives by penK and flp sequencing commenced in January 2012.

Commmencing epidemiological year 2010/11 all case isolates have been submitted for whole genome sequencing (WGS) as part of the Meningococcal Genome Library (MGL); 2010/11 to 2012/13 funded by The Meningitis Research Foundation (http://www.meningitis.org/current-projects/genome) in collaboration with PHE, University of Oxford and the Wellcome Trust Sanger Institute. From 2013/14 onwards WGS characterisation has been a collaboration between PHE and University of Oxford.

Epidemiology and surveillance of meningococcal disease in England.

The incidence of laboratory-confirmed cases of all meningococcal disease peaked in 1999/00 and then decreased overall. Laboratory confirmed cases fell from 2,585 (in 1999/00) to a low of 636 in 2013/14; there were 747 cases in 2016/17 (Figure 1).

An increase was observed in Group W cases (often with severe disease and unusual presentation) from 95 cases in 2013/14, 176 cases in 2014/15 to 225 cases in 2016/17. In 2016/17 Group W represented 30% of all IMD, a substantial increase from 2% (19 cases) in 2008/09. The increase was almost entirely due to phenotype W:2a:P1.5.2 from 0 in 2008/09 to 133 case isolates in 2016/17, with W:2a accounting for 187 case isolates in 2016/17. WGS analysis implicated a single lineage13 (95% (190/200) of the UK group W case isolates in the MGL for 2015/16 were confirmed as cc11. Group W:cc11 cases were observed nationwide and across all ages (Figure 3), leading to the introduction of an ACWY conjugate vaccine programme for UK teenagers and university freshers commencing August 2015 as an emergency response measure.

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Methods

Clinicians are required to notify all clinical cases of suspected invasive meningococcal disease via the local PHE Health Protection Teams to the PHE National Infection Service, Colindale, London.

Since 1984, all microbiology laboratories in England have been encouraged to submit cultures of Neisseria meningitidis for characterisation to the MRU. Since October 1996, the MRU has provided a non-culture meningococcal PCR diagnostic service for England.

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Discussion and Conclusions

Group B cases have fallen steadily since 2000/01 to a low of 396 (53%) of all cases in 2016/17; following the introduction of 4CMenB (Bexsero®) to UK infants post 1st September 2015 in addition to possible effects of the England public area indoor smoking ban introduced from 1st July 2007.

The profile of IMD changed since MCC vaccine introduction. Group C disease has demonstrated historically low levels from 2008/09 with only 13 confirmed cases and with ~30 cases confirmed in each of the last 10 years but increased to 42 in 2015/16 and 37 in 2016/17.

Given the waning effectiveness of MCC identified following a primary infant course and after a booster in the second year of life, a booster dose for teenagers was introduced in the academic year programme, to sustain the impact due to direct and indirect protection afforded by the MCC vaccine.

In the light of the rapidly increasing Group W (cc11) disease from 2009/10 to 2014/15, ACWY conjugate vaccine was introduced from August 2015 (replacing the MCC booster) to protect teenagers and university freshers and is intended to induce herd protection.

The age profile of cases of meningococcal disease has also altered, most recently due to phenotype W:2a:P1.5.2 from 0 in 2008/09 to 133 case isolates in 2016/17; with W:2a accounting for 187 case isolates in 2016/17. WGS analysis implicated a single lineage13 (95% (190/200) of the UK group W case isolates in the MGL for 2015/16 were confirmed as cc11. Group W:cc11 cases were observed nationwide and across all ages (Figure 3), leading to the introduction of an ACWY conjugate vaccine programme for UK teenagers and university freshers commencing August 2015 as an emergency response measure.


Reference