MENINGOCOCAL DISEASE IN ENGLAND FROM 2014 TO 2019: A FIVE-YEAR HEALTHCARE RESOURCE USE STUDY USING AN ADMINISTRATIVE ELECTRONIC DATABASE

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INTRODUCTION

• Meningococcal disease, caused by Neisseria meningitidis, is a potentially fatal (5%-10%) disease, and can lead to death if not treated.1,2
• Of the 13 meningococcal strains reported, only six (A, B, C, W, X and Y) are known to be endemic worldwide. Young children, teenagers and young adults are most at risk of developing meningococcal disease.3,4
• Its incidence is highest in the sub-Saharan African region.5 Disease rates in the US, Europe and South America range from 0.1-3 cases per 100,000 population.6
• Routine vaccination has effectively reduced cases over time. Despite that, meningococcal disease outbreaks continue to occur in several regions.7

• Although the UK became the first country to routinely vaccinate against meningococci (MenB) and C, the incidence and cost burden of meningococcal disease across all age groups is still considerable.8,9 Even in England, the incidence of meningococcal disease (April to June 2019) has been estimated at 3.79 per 100,000 population, accounting for 55% MenB, 27% MenC, 10% and 8% of all meningococcal cases (n=120).10 However, long-term trends in hospital admissions in England have not been reported to gauge the disease burden.

• This study aimed to assess the healthcare resource burden (HCRU) of meningococcal disease in England's secondary care setting.

METHODS

Study design

This was a five-year descriptive retrospective study which utilised the Hospital Episode Statistics (HES) dataset that included all episodes of care occurring in secondary care in England’s National Health Service (NHS), to identify the HCRU of patients diagnosed with meningococcal disease through ICD-10 coding (A99) in any diagnosis position. Costs were estimated using Healthcare Resource Groups (HRGs) linked to costs from the UK National tariff. The index period was set at the first documented diagnosis during the study period of 1 April 2014 to 31 March 2019.

Key eligibility criteria

Inclusion
• Patient diagnosed with an ICD-10 diagnosis code of A99 (meningococcal infection) in any diagnosis position
• Diagnosis as part of a non-elective admission
• Patients with anti-lymp-hist-natal activity

Exclusion
• Diagnosis as part of a non-elective admission (restricted to non-elective admissions)
• Patients with meningococcal disease as primary diagnosis (restricted to non-elective admissions)
• Mean number of admissions per patient
• Mean length of stay (days) per admission
• Total HRG tariff (£, defined as the HRG tariff tagged in each spell)

Statistical analyses

• Descriptive statistics were used to summarise the data

RESULTS

• The study included 3522 patients with a slight male predominance (51.3%), covering 615,167 patient-days of follow-up, with a mean age of 29.51 years (Table 1).
• Mean (median) age on inclusion was seen to increase from the year 2014 with 19.40 (4) years to 37.29 (27) years by 2019 (Table 1) indicating variation in the age of meningococcal infection over the 5-year period.
• There was a total of 220 inpatient mortalities, with the annual rate increasing from 4.0% to 6.6% (Table 1).
• Total number of all inpatient non-elective admissions decreased from 2014 (1127) to 2019 (858). The initial peak of disease incidence was <2 years in 2014/15, which was seen to evolve over time.
• Mean length of stay increased from 6 days to 8 days, possibly signifying increased severity of these cases (Figure 2).
• The overall cost burden of non-elective admissions for meningococcal disease was £13,466,784.26 over the 5-year period (Figure 3).

Study endpoints

• Patient characteristics and descriptive statistics results
• Inpatient burden with meningococcal disease as primary diagnosis (restricted to non-elective admissions)
• Mean number of admissions per patient
• Mean length of stay (days) per admission
• Total HRG tariff (£, defined as the HRG tariff tagged in each spell)
• Accident and emergency (A&E) burden (restricted to non-elective admissions)
• Mean number of A&E attendances per patient
• Mean HRG tariff per patient (£)

Table 1. Overall descriptive statistics results

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<tbody>
<tr>
<td>Total patients, n</td>
<td>928</td>
<td>824</td>
<td>823</td>
<td>718</td>
<td>599</td>
<td>3522</td>
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<tr>
<td>Mean, years</td>
<td>19.40</td>
<td>20.79</td>
<td>30.75</td>
<td>31.63</td>
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<td>29.51</td>
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<tr>
<td>Male, %</td>
<td>50.83</td>
<td>52.55</td>
<td>50.67</td>
<td>54.74</td>
<td>46.86</td>
<td>51.27</td>
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<tr>
<td>Total inpatient mortalities</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>220</td>
</tr>
<tr>
<td>Mean follow up, months</td>
<td>21.50</td>
<td>21.88</td>
<td>20.83</td>
<td>18.38</td>
<td>12.48</td>
<td>18.97</td>
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<tr>
<td>Total HRG tariff (£)</td>
<td>52,155</td>
<td>108,159</td>
<td>117,590</td>
<td>133,939</td>
<td>114,649</td>
<td>472,389</td>
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<tr>
<td>Total A&amp;E attendances</td>
<td>853</td>
<td>654</td>
<td>655</td>
<td>748</td>
<td>763</td>
<td>750</td>
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<tr>
<td>Mean A&amp;E attendances per patient</td>
<td>0.55</td>
<td>1.33</td>
<td>1.43</td>
<td>1.59</td>
<td>1.62</td>
<td>1.58</td>
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<tr>
<td>Total HRG tariff (£)</td>
<td>2,685,298</td>
<td>1,905,088</td>
<td>2,203,080</td>
<td>2,391,305</td>
<td>3,253,000</td>
<td>10,435,108</td>
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<tr>
<td>Total A&amp;E attendances</td>
<td>532</td>
<td>1186</td>
<td>1173</td>
<td>1164</td>
<td>905</td>
<td>4,913</td>
</tr>
<tr>
<td>Mean A&amp;E HRG Tariffs per patient (£)</td>
<td>49.03</td>
<td>127.94</td>
<td>142.88</td>
<td>159.54</td>
<td>194.65</td>
<td>125.12</td>
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LIMITATIONS

• This dataset was not linked with vaccination status

CONCLUSIONS

• The mean age on inclusion was seen to increase from 2014 to 2019, indicating variation in the incidence of meningococcal disease across different age distributions through the years.
• It was noted that the number of non-elective admissions decreased over the period of 2014 to 2019 with vaccination programmes. However, length of stay increased with decreased disease incidence from 2014 to 2019, possibly signifying increased severity of these cases.
• Overall, the cost burden associated with meningococcal disease remained high throughout the study period of 5 years. This maybe due to factors such as severity of cases and length of stay.
• These findings suggest that meningococcal disease still poses a significant burden (cost and healthcare resources) on the NHS, although ongoing progress in vaccination programmes may be aiding in reducing this burden.
• We recommend further analysis using linkable data, and sensitivity analysis on paediatric and at-risk populations.

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AUTHOR DISCLOSURES

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REFERENCES


Figure 1. Mean number of non-elective admissions per patient

Figure 2. Mean length of stay per non-elective admission

Figure 3. Mean HRG tariffs per non-elective admission

Figure 4. Mean A&E attendances per patient

Figure 5. Mean A&E HRG Tariffs per patient