INTRODUCTION

- Invasive meningococcal disease (IMD) can present as meningococcal septicaemia or meningitis. Severe cases of meningococcal septicaemia can cause purpura fulminans1.
- IMD is fatal in 50% to 80% of cases if not treated2. Even if treated, 5 to 10% of patients die 24 to 48 hours after first symptoms3. This rate is even higher for patients with purpura fulminans (15 to 30%)4,5.
- Sequelae include cerebral lesions, hearing loss, learning difficulties, severe cognitive deficit, cerebral palsy, or epilepsy4. Purpura fulminans helps skin necrosis, limb ischemia needing orthopaedic surgical management and sometimes even limb amputation6.
- Though vaccination against serogroups C, A, Y and W has been available for several years, incidence of meningococcal infections in France is still about 1 case per 100,000 inhabitants. Purpura fulminans is reported in 30% of cases7. In France, there is high predominance of B (74%) and C (17%) serogroups8.
- The economic impact of meningococcal infection is substantial because of major sequelae requiring lifelong care. To date, very few studies on the economic impact of meningococcal infection in France has been published.

OBJECTIVES

- This study aimed to estimate lifetime management costs associated with 2 severe cases of IMD in France.

METHODS

- The study was adapted from the Meningitis Research Foundation (MRF) study conducted in the UK9.
- Two scenarios of severe IMD cases were developed:
  - A 6-year-old with purpura fulminans resulting in amputation of both legs below the knee (Scenario A).
  - A 3-year-old with meningitis resulting in severe neurological sequelae (Scenario B).
- Alternative scenarios were created to include additional typical sequelae of IMD: chronic renal insufficiency (CRI), profound deafness and epilepsy were assessed.
- Lifetime patient management was defined by consulting with specialists, called experts, to estimate the costs associated with the management of patients collected from experts and families of patients with similar sequelae. Assumptions have been made on family's and patient's type of care, type of home and distance from home to healthcare professionals, etc.
- Direct medical and non medical costs as well as indirect costs have included (income loss was calculated for patients only and productivity loss due to the patients lifetime disability was not included).
- A 4% discount rate decreasing to 2% after 30 years was applied as recommended by French Authorities10.
- Unit costs (€) associated with each resource were obtained from the literature, the National Health Insurance (NH) and companies websites.
- Time horizon was based on lifetime expectancies of patients (77 and 55 years for scenario A and B respectively).
- Results are presented from NHI publicly funded organisations and patient or his/her private health insurance perspectives.

ANALYSES

- A total of 19 experts agreed to participate in the study and both scenarios were validated by national experts of NH.
- For each scenario, the following outcomes were estimated by type of expense and by type of payer:
  - discounted and undiscounted lifetime cost of IMD from beginning of symptoms to patient death,
  - discounted and undiscounted annual mean cost.
- Additionally, sensitivity analyses were performed around parameters and uncertainty costs using lower and upper boundary estimates.

RESULTS

- Purpura fulminans with amputations is associated with a lifelong discounted cost of €798,875 (undiscounted: €3,453,492). Adding CRI doubles the amount: €1,480,546 (undiscounted: €6,397,558).
- Meningitis with severe neurological sequelae results in a lifelong discounted cost of €1,924,475 (undiscounted: €7,921,657). Adding profound deafness and epilepsy increases the total: €2,267,251 (undiscounted: €9,579,218).
- Overall, NH covers half of total cost, publicly funded organisations 1/3 and private patients' health insurance the remainder.
- Results of this study are line with those published in January 2013 by the MRF in the UK9.
- This study has the following limitations: the uncertainty around unit cost of prophylaxis is high, costs of CRI were obtained from Bondi et al. manuscript which is not well detailed and finally some costs were not included as they were very difficult to measure (e.g. child care for brothers and sisters or indirect costs related to patients).
- However, this study fills a gap in the body of knowledge on IMD sequelae care and costs, as there is very limited published information about this currently available in France.
- In the end, the financial impact of association with IMD is very high over lifetime and especially the 1st year, not only for NH and publicly funded organisations but also for families. Therefore, these results should be considered for the assessment of funding measures related to IMD in France.

CONCLUSION

REFERENCES