Appendix 1 Model parameters [posted as supplied by author]

Parameter	Base case	Reference/source
Epidemiological parameters		
Carriage prevalence	Age variable	All serogroup carriage prevalence estimates (fixed effect estimates) from[11]
Average duration of carriage (months)	6.0	Assumed
Disease incidence (per 100,000)	2.6 (age variable)	Hospital Episode Statistics 2005/06-2011/12*
Case fatality rate (percentage)	3.8 (age variable)	Hospital Episode Statistics 2005/06-2011/12
Years of life lost	Age variable	Julie Mills, Office for National Statistics, personal communication,[40]
Natural mortality rates (modified to remove deaths due to meningococcal disease)	Age variable	Julie Mills, Office for National Statistics, personal communication,[40-48]
Population - initial size of single birth cohort	679102	[49]
Acute treatment parameters		
Hospitalisation rate (%)	100	Assumed†
Proportion requiring ambulance transfer	0.48	Unpublished data from Meningitis Research Foundation members survey, Laura Clark, University of Bristol, personal communication
Proportion who require High Dependency Unit care	0.10 (age variable)	Hospital Episode Statistics 1998/99-2005/06‡
Proportion who require Intensive Therapy Unit care	0.14 (age variable)	Hospital Episode Statistics 1998/99-2005/06
Length of stay in the High Dependency Unit (days)	2.7 (age variable)	Hospital Episode Statistics 1998/99-2005/06
Length of stay in the Intensive Therapy Unit (days)	4.9 (age variable)	Hospital Episode Statistics 1998/99-2005/06
Long-term effects of meningococcal disease		
Percentage of survivors with minor sequelae	13.8	John Edmunds (London School of Hygiene and Tropical Medicine) personal communication
Percentage of survivors with major sequelae	6.8	John Edmunds (London School of Hygiene and Tropical Medicine)

Parameter	Base case	Reference/source
		personal communication
Quality of life utilities		
Quality of life utility loss for survivors without sequelae – short term loss due to acute disease (loss over first year)	0.201	Iain Kennedy (Public Health England, Colindale) personal communication
Quality of life utility loss for survivors with sequelae – short term loss due to acute disease over and above the long term loss (loss over first year)	0.139	Iain Kennedy (Public Health England, Colindale) personal communication
Quality of life utility loss for survivors with sequelae – in the long term (loss each year in the first and subsequent years) including quality of life adjustment factor	0.222	Disutility from John Edmunds (London School of Hygiene and Tropical Medicine) personal communication, with quality of life adjustment factor of 3 applied
Quality of life losses in family and network members		
Quality of life adjustment factor applied to short term and long term losses in the patient, to allow for family and network quality of life loss	1.48	Al-Janabi (University of Birmingham) personal communication
Quality of life adjustment factor applied to quality adjusted life years lost through death of the person with meningococcal disease, to allow for family and network quality of life loss	1.09	Al-Janabi (University of Birmingham) personal communication
Litigation		
Percentage of cases arising in a claim, child	1.77	Communication with Department of Health (Health Protection Analytical Team)
Percentage of cases arising in a claim, adult	3.97	Communication with Department of Health (Health Protection Analytical Team)
Vaccination parameters		
Vaccination uptake - routine immunisation infants (%)	94.0	[50]
Vaccination uptake - routine immunisation adolescents (%)	90.0	[51]
Vaccination coverage - 1-17 years catch-up (%)	Age variable	[52]
Vaccine wastage (proportion)	0	Assumed

Parameter	Base case	Reference/source
Strain coverage (%)	88.0	[18]
Vaccine efficacy against carriage (%)	30.0	[9]
Vaccine efficacy against disease (%)	95.0	[19 20]
Duration of protection: 2,3,4 [+12] infant course, months	18 [36]	Assumed, based on [34 53 54 55]
Duration of protection: 2,4 [+12] infant course, months	18 [36]	Assumed, based on [34 53 54 55]
Duration of protection: catch-up in 1-4 years, months	60	Assumed, based on [34 53]
Duration of protection: catch-up in 5-17 years, months	120	Assumed, based on [34 53]
Number of vaccine doses resulting in 1 mild reaction (non-fever)	2199	Assumed, based on [56]
Number of vaccine doses resulting in 1 mild reaction (fever), 0-4 years	45	Assumed, based on [19 20]
Number of vaccine doses resulting in 1 mild reaction (fever), 5+ years	370	Assumed, based on [19 20]
Number of vaccine doses resulting in 1 febrile convulsion, 0-10 years only	400	Assumed, based on [57]
Number of vaccine doses resulting in 1 anaphylaxis	719790	Assumed, based on [56]
Cost of acute treatment		
Cost of ambulance transfer to hospital, call (£)	7.73	[58]
Cost of ambulance, see and treat and convey (£)	229.61	[58]
Cost per spell in hospital, (£)	2936.20	[58]
Cost per High Dependency Unit day, paediatric (29 days to ≤18 years) (£)	1038.27	[58]
Cost per Intensive Therapy Unit day, paediatric 29 days to ≤18 years (£)	1924.90	[58]
Cost per critical care day, adult (19≥ years)(£)	1188.94	[58]
Cost of follow-up appointment, paediatric (≤18 years)(£)	302.72	[58]
Cost of follow-up appointment, adult (19≥ years)(£)	279.98	[58]
Cost of hearing assessment	58.93	[58]
Public health response costs		
Cost of public health response to a case, excluding vaccine costs (£)	80	[22], Charlotte Chamberlain, personal communication
Costs of long-term care		
Cost of support/care for those with mild sequelae (annual, £)	1383.19	John Edmunds (London School of Hygiene and Tropical Medicine)

Parameter	Base case	Reference/source
Cost of support/ care for those with severe sequelae (annual, £)	4603.01	personal communication John Edmunds (London School of Hygiene and Tropical Medicine)
Litigation costs		personal communication
Total costs per claim, child	1099424.00	Communication with Department of Health (Health Protection Analytical Team)
Total costs per claim, adult	357165.00	Communication with Department of Health (Health Protection Analytical Team)
Vaccination costs		
Cost per vaccine dose (£)	75.00	[22]
Cost of administration - school (per dose, £)	10.00	Department of Health standard figures
Cost of administration - GP surgery (per dose, £)	7.50	Department of Health standard figures
Meningococcal group C conjugate vaccination costs (annual cost)	9575338.00	Based on Department of Health standard costs of administration and [22]
Costs for adverse reactions due to vaccination		
GP consultation cost, mild reactions (£)	31.00	[59]
Adverse reaction (anaphylaxis), hospitalisation cost (£)	463.00	[58]
Adverse reaction (febrile convulsion), hospitalisation cost, <1 year (£)	547.12	[58]
Adverse reaction (febrile convulsion), hospitalisation cost, 1-18 years (£)	520.30	[58]

*Hospital Episode Statistics data from 2005/06-2011/12 were obtained from the University of Bristol. In scenario analyses HES data from 2010/11-2011/12 were used to provide a recent estimate of incidence and case fatality.

†Due to the severity of disease all cases were assumed to be hospitalised.

‡Proportion and length of stay in High Dependency Units and Intensive Therapy Units was based on data Hospital Episode Statistics data from 1997/98 to 2005/06, from a previous study (Christensen et al. *Vaccine* 2013; 31(23): 2638-46). The recording of critical care ceased within Hospital Episode Statistics ceased in March 2006. Critical care data are now collected under a new system, however the dataset is still experimental with known issues surrounding quality and coverage of certain key fields, thus the previous HES data has been used here.