



UK Health  
Security  
Agency

# National enhanced surveillance of vaccination programmes targeting invasive meningococcal disease in England

Updated December 2022

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## Summary of revisions

Version number	Date
1.0	28 August 2015
1.1	1 September 2015
1.2	10 December 2015
1.3	24 March 2022
1.4	9 December 2022

### Version 1.4 summary of revisions

1. EDTA blood, CSF and other diagnostic clinical samples should still be submitted for PCR using the standard MRU request form. Acute and convalescent serum samples for serological analysis, and additional acute EDTA blood samples for meningococcal non-culture characterisation (both previously collected on MENSAM01) will no longer be collected.
2. Additional sections 9.1.2 and 9.1.3.
3. New MensV01 form to complete with an added section for university students.

### Version 1.3 summary of revisions

1. From 1 September 2019, the clinical questionnaire (MENSV02) has not been collected for children under 5 years of age after collection of this data over a 4-year period and the introduction of the MENSV03 follow up surveillance (as below).
2. As part of ongoing national surveillance GPs of children under 5 years of age with confirmed IMD will be contacted by the UKHSA Immunisations team and asked to complete the MENSV03 surveillance form on sequelae 3 to 6 months after the case has been confirmed by the UKHSA MRU.
3. As part of national surveillance the HPT or the UKHSA Immunisations team will liaise with GPs of confirmed cases aged 5 to 25 years to request immunological work-up and completion of MENSV04 form for individuals who meet specific criteria.
4. Laboratory methods were updated to reflect current practice on culture and non-culture samples including the role of gMATS, alongside MATS testing of isolates, in identifying PCR confirmed cases likely to be covered by the 4CMenB vaccine (Bexsero).
5. Acute EDTA blood samples for meningococcal non-culture characterisation (previously collected on MENSAM01) will no longer be collected. Acute and convalescent serum samples are, however, still being requested from all children born on or after 1 May 2015 with laboratory-confirmed IMD for the purpose of serology.
6. MenQuadfi ACWY conjugate vaccine.
7. Summary of public health actions flow chart has been updated.
8. Rewording of required samples section.
9. Linking cases to context in HP Zone.

## Version 1.2 summary of revisions

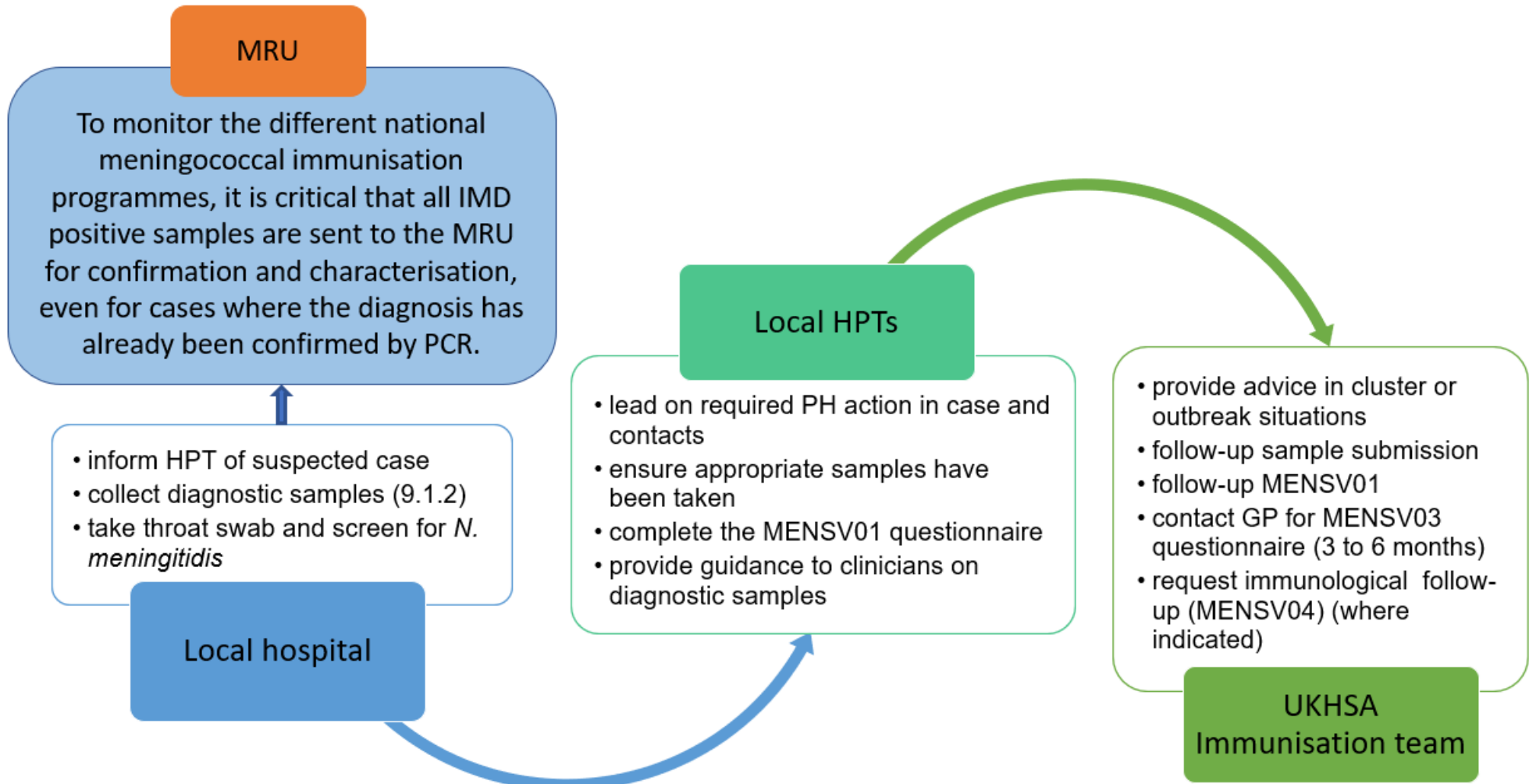
1. Section 6: tables 6.1 and 6.2 have been replaced with a flowchart in order to clarify the role of the UKHSA HPT and the text has been updated accordingly.
2. Simplified surveillance sample submission for all age groups.
3. The document has been updated to include specific mention of meningococcal infection of the conjunctiva.
4. The MENS01 surveillance form has date of onset and a new Part H included.

## Version 1.1 summary of revisions

1. Changes consisted of minor edits. No substantive changes were made.

## Summary of public health actions

An accessible, text-only version of this flowchart is available [online](#). See [section 9](#) for information on public health actions.



# 1. Programme objectives

This national surveillance programme has been adapted from previous surveillance strategies implemented when the Haemophilus influenzae type b (Hib), Meningococcal C (MenC) and pneumococcal vaccines were introduced into the national immunisation programme. It describes the public health actions for collecting epidemiological and clinical information as well as appropriate samples from patients with invasive meningococcal disease (IMD) in order to inform and evaluate future vaccine policy.

The UK Health Security Agency (UKHSA) Health Protection Team (HPT) role is vital to meningococcal surveillance because their early involvement with cases can help ensure the correct surveillance information can be collected quickly and the appropriate samples can be obtained in a timely manner.

This plan aims to encompass all meningococcal vaccines in the national immunisation programme and their impact on all meningococcal capsular groups across all ages in England.

The surveillance plan will be reviewed at regular intervals in the light of: the surveillance data generated, the programmes adopted, and vaccine coverage.

The programme objectives are:

- to continue to monitor the impact and age-specific vaccine-effectiveness of the:
  - meningococcal C conjugate (MCC) immunisation programme
  - meningococcal B (MenB) immunisation programme
  - meningococcal ACWY (MenACWY) immunisation programme
- to monitor the evidence of any indirect impact of MenACWY across the population
- to monitor the phenotypic and genetic characteristics of invasive meningococcal strains
- to describe the clinical characteristics, risk factors and outcomes of IMD
- to monitor vaccine safety (undertaken by the Medicines and Healthcare Regulatory Agency (MHRA) in collaboration with UKHSA)

## 2. Meningococcal vaccine programmes in the UK

MCC vaccines were introduced into the routine infant schedule in England from 1 November 1999 (1). A phased catch-up programme for all other children up to 18 years began concurrently and was later extended to all students aged up to 25 years. In clinical trials MCC vaccines were found to be safe, immunogenic and to prime for memory and licensure was based on immunogenicity rather than efficacy data. At that time the fundamental requirement for enhanced case confirmation, strain characterisation and surveillance were recognised in order to monitor the impact of these MCC immunisation programmes. An appropriate surveillance strategy was published in November 1999 and has been in place ever since. Information generated from this surveillance has been key in furthering understanding of the impact of MCC vaccines on group C IMD and has influenced the way that meningococcal conjugate vaccine programmes were subsequently introduced in other countries, including the Meningococcal A (MenA) vaccination programme in the African meningitis belt. It also led to changes in the MCC programme in England (1) with a reduction in primary infant doses based on comparable immunogenicity, the introduction of a Hib-MCC (Menitorix) booster at 12 months of age and in 2016 the removal of the remaining infant dose.

The MCC immunisation programmes had a very rapid and marked impact on invasive meningococcal group C (MenC) disease in the cohorts targeted by the vaccine. An indirect effect on age groups outside the immunised group was also apparent with a large reduction in cases in older ages. There have been around 30 MenC cases confirmed annually in England and Wales since 2006 to 2007. MenB now accounts for the vast majority of IMD (2). In 2014, there were 400 laboratory-confirmed MenB cases in England, with a quarter of cases occurring in infants (under one year) and a further quarter in one to 4 year-olds (UKHSA [data](#) is available online).

Two quadrivalent conjugate vaccines (offering protection against capsular groups A, C, W and Y; Nimenrix and Menveo) are currently licensed and used in routine programmes in the UK (3). A third vaccine (MenQuadfi) is also licensed and currently used as a travel vaccine in the UK. In England, a hypervirulent strain of Meningococcal W (MenW) belonging to the South American strain sublineage of the ST-11 complex (cc11) emerged in 2009. Eventually MenW became responsible for a quarter of all IMD cases by 2015 and a MenACWY vaccine was introduced at 13 to 15 years with a catch-up cohort of those born from 01/09/1996 and too old for the routine dose (4, 5).

MenACWY vaccine is additionally recommended for travel to endemic areas and for children and adults with asplenia or splenic dysfunction or complement deficiency who may be at increased risk of invasive meningococcal infection. It is also offered to those at close prolonged contact with individuals with confirmed capsular group A, W or Y disease, or probable cases with capsular group A, W or Y from a nasopharyngeal swab, to reduce the risk of late disease.

Efforts to develop an effective MenB vaccine initially focussed on MenB outer membrane vesicles (OMVs), which have exhibited varying efficacy and are usually restricted to specific epidemic strains because the immune-dominant antigen (PorA) is highly variable (3). In order to provide broader, cross-protective immune responses, more recent vaccines have incorporated recombinant outer membrane proteins from multiple strains with or without OMVs. The first of these vaccines, Bexsero (GSK Biologicals), was licensed in Europe in January 2013 and [introduced](#) into the UK infant immunisation programme on 1 September 2015. In 2017, MenB-fHbp (Trumenba®) was authorised for individuals  $\geq 10$  years of age as a 2- or 3-dose schedule for the prevention of MenB disease.



### 3. Meningococcal surveillance in the UK

A case of IMD is defined as an individual with a culture of *N. meningitidis* or meningococcal DNA isolated from a normally sterile site. As set out in the [guidance for the public health management of meningococcal disease](#) in the UK, meningococcal infection of the conjunctiva is considered an indication for public health action because of the high immediate risk of invasive disease but this does not meet the definition for a confirmed case of invasive meningococcal disease.

Surveillance of meningococcal disease in England currently relies on collation of information on cases of laboratory-confirmed infection identified by the UKHSA Meningococcal Reference Unit (MRU) in Manchester. The MRU provides laboratory confirmation of IMD cases through characterisation of *Neisseria meningitidis* isolates submitted from local microbiology laboratories. The MRU also offers a free national reference service for meningococcal PCR of clinical samples from suspected IMD cases.

Regular electronic downloads are made from the MRU to UKHSA Immunisation and Vaccine-Preventable Diseases Division, Colindale, reporting all meningococcal infections confirmed by the MRU. Ascertainment of fatal laboratory-confirmed cases is supplemented at the UKHSA Immunisation Division by linkage of laboratory reports with meningococcal deaths reported by the Office for National Statistics (ONS). MenC cases have been routinely followed-up since the introduction of the MCC vaccine in November 1999 in order to ascertain vaccination history and other epidemiological data. These details are now routinely collected using [the MENS01 surveillance form](#) which requests vaccination histories for cases of MenB/C/W/Y in those eligible for Bexsero, Menitorix or MenACWY vaccination.

## 4. Laboratory confirmation of meningococcal disease

Phenotypic confirmation of *N. meningitidis* isolates is based on cell or colony morphology, biochemical reactions and serotypic analysis. Phenotype identification is routinely undertaken by:

- serogroup: co-agglutination (polyclonal antibodies) and/or dot-blot ELISA using monoclonal antibodies (mAbs)
- serotype (PorB) and Serosubtype (PorA): identification of outer membrane protein by a dot-blot ELISA using monoclonal antibodies (mAbs)

IMD is also confirmed using meningococcal real-time PCR on clinical samples from normally sterile body sites. The meningococcal screening PCR assay targets the *ctrA* gene, part of the capsular polysaccharide locus. The screening assay is multiplexed with the capsular group B (MenB)-specific PCR target (*siaDb*). Any samples positive for the screening target (*ctrA*) but negative for the MenB target is subsequently tested on a secondary grouping PCR assay detecting groups W, C and Y. Testing for MenA can be performed where indicated using the *mynA* assay although this is rarely performed for UK samples (unless a recent history of travel is indicated) due to the rarity of MenA in the UK.

Guidance on sample submission can be found in the [MRU User Manual](#).

## 5. Characterisation of meningococcal strains

### 5.1 Clinical isolates

Since 2012, invasive isolates routinely undergo serogrouping, serotyping, serosubtyping and antibiotic resistance testing as well as genome sequence analysis which provides genogroup, PorA subtype, multilocus sequence type, Bexsero vaccine antigen genotypes and most other genotypic data as required.

The Meningococcal Antigen Typing System (MATS) assay is used to determine Bexsero strain coverage on all clinical MenB isolates (refer to [section 6](#)).

### 5.2 Clinical samples (non-culture cases)

Using PCR and Sanger sequencing, Bexsero antigens PorA and factor H-Binding Protein are characterised for PCR-positive clinical samples for all cases where an isolate was not obtained (non-culture cases). The likelihood of obtaining a PCR product for either of these targets is determined by the amount of meningococcal DNA in the sample.

## 6. Assessing vaccine susceptibility of meningococcal strains

### 6.1 MCC and MenACWY vaccines

A case of MenA/C/W/Y IMD is defined as an individual meeting the case definition for IMD with isolation of MenA/C/W/Y or positive capsular group A/C/W/Y (siaD) specific PCR from a normally sterile site.

MCC and MenACWY vaccines are composed of capsular polysaccharide conjugated to carrier proteins. As the immune response is directed against the capsular polysaccharide, any strain expressing an ACWY capsular polysaccharide is expected to be susceptible to MenACWY vaccine-induced antibodies. Due to the importance of capsular polysaccharide for bacterial survival *in vivo*, capsular expression is detected from almost all invasive strains. All cases of MenACWY IMD confirmed by culture and/or PCR are considered covered by MenACWY vaccines.

### 6.2 MenB vaccines

A confirmed case of MenB IMD is defined as an individual meeting the case definition for IMD with isolation of MenB or positive capsular group B (siaD) specific PCR from a normally sterile site.

There are 2 MenB vaccines licensed for use in the UK: Bexsero® (GSK) and Trumenba® (Pfizer). Trumenba® is only licensed for use in individuals aged 10 years and older. The licensed MenB vaccines, unlike the meningococcal conjugate vaccines, do not target the polysaccharide capsule (which determines the capsular group).

Bexsero vaccine, which is routinely used in the infant schedule, is based on recombinant surface proteins including an outer membrane vesicle from a specific New Zealand outbreak strain. Although the vaccine was developed to maximise protection against MenB, it also has the potential to protect against invasive disease caused by other capsular groups. Similarly, the vaccine will not protect against all MenB strains – in England, it is estimated that Bexsero will protect against 73 to 88% of currently circulating MenB strains ([6](#), [7](#)). Thus, additional definitions are required to capture antigen-specific vaccine coverage against MenB cases and against all IMD cases.

#### 6.2.1 Assessing vaccine strain coverage in MenB culture cases

A MenB culture case is defined as an IMD case in which either:

- a MenB strain has been isolated from a sterile site, or
- a MenB throat swab isolate was grown in conjunction with a positive MenB-specific PCR result from a sterile site

In all MenB culture cases, the susceptibility of the isolate to Bexsero is determined using the Meningococcal Antigen Typing System (MATS). The MATS is an ELISA-based assay used in conjunction with subtyping (for PorA) to determine the coverage of MenB isolates.

The definition of an isolate with a positive MATS assay result ('MATS positive') and therefore considered covered by Bexsero, is a MenB isolate with a relative potency (versus that of a reference strain) that is above the positive bactericidal threshold (PBT) for at least one vaccine peptide (fHbp, NadA, NHBA) and/or determination of a P1.4 PorA subtype by sequencing of VR2 and/or by serosubtyping.

### 6.2.2 Assessing vaccine strain coverage in MenB non-culture cases

A MenB non-culture case is defined as an IMD case in which no MenB isolate was grown and confirmation was by positive MenB-specific PCR result only.

MATS cannot be performed in the absence of a viable isolate, however, PorA and fHbp genotyping is performed directly from clinical samples to estimate coverage of these 2 Bexsero antigens.

In accordance with Muzzi and others (8), for non-culture MenB cases, a meningococcus with DNA yielding a PorA genosubtype of P1.4 is considered covered by the vaccine (gMATS positive for PorA). A meningococcus with DNA yielding an fhbp genotype for peptides 1, 2, 4, 14, 15, 37, 89, 90, 110, 144, 224, 232, 245, 249, 252 or 510 is considered likely to be covered by the vaccine, that is, gMATS positive for fHbp.

## 8. National surveillance data management

Electronic downloads from MRU to the UKHSA Immunisation Division of all laboratory-confirmed IMD cases occur at least once a week. National data on laboratory-confirmed IMD cases will continue to be published quarterly in the Health Protection Report (HPR). A reconciled database holding demographic, clinical, serological and immunological information from the follow up of all cases will be maintained and used to monitor the impact of the meningococcal vaccination programmes. The use of personal information is in compliance with the General Data Protection Regulation (GDPR), the Data Protection Act 2018, the National Data Guardian's data security standards, and the NHS Caldicott principles.

## 9. Public health surveillance actions

The public health actions for patients with probable or confirmed IMD will depend on the age of the patient (born before or after 1 May 2015). These procedures have been summarised in the flowchart below.

### 9.1 Public health protection team (HPT) actions

All notified cases should be entered onto HPZone according to local protocols. If a case is known to be linked to a particular setting, for example a university or nursery ensure that the correct context (like university or college) has been selected and add the record to the specific named setting. For cases linked to a university, under congregation select 'Member of Meningo in Universities'. This is essential for national surveillance.

#### 9.1.1 MENSVO1 questionnaire

UKHSA HPTs informed of a suspected case of IMD are requested to collect information needed to undertake public health action using the short epidemiological surveillance questionnaire ([MENSVO1 surveillance form](#)) or a local equivalent. It may be necessary to contact the GP to obtain an accurate vaccination history for confirmed IMD cases in the vaccine-eligible age-group. The completed [MENSVO1 surveillance form](#) or local equivalent should be uploaded to the appropriate HPZone record for the case. If the case is linked to a higher education setting a new additional MensV01 section needs to be completed by the HPTeams.

#### 9.1.2 Request an acute throat swabs is taken, where possible

This is required in all cases wherever possible as it may be the only chance to obtain a viable culture for characterisation.

Important note: please process swabs locally and send any viable meningococcal isolates on solid media (chocolate agar slopes). Please do not send unprocessed swabs to the MRU as they rarely survive.

#### Request samples submitted to Meningococcal Reference Unit

In all cases of IMD or suspected IMD, even where diagnosis has already been made by PCR, please request the following samples are submitted to the MRU, where available:

- all meningococcal cultures including those obtained from sterile sites (for example, from blood, CSF, joints), and those from throat swabs

Important note: please send meningococcal sub-cultures on solid media (chocolate agar slopes) only. Please do not send blood cultures bottles.

- all diagnostic specimens from sterile sites (for example, blood (where sepsis known or suspected), CSF (where meningitis known or suspected), joint fluid)

All samples above must be submitted along with a completed [MRU request form](#). Refer to the [MRU user guide](#) for more information on sample requirements.

### Important notes

In order to monitor the different national meningococcal immunisation programmes currently in place, it is also critical that all IMD positive samples are sent to the MRU for confirmation and characterisation, even for cases where the diagnosis has already been confirmed by PCR.

Where possible, PCR-positive clinical samples are stored long-term under a HTA research license to allow further studies on cases of IMD. Ethics committee approval will be sought before any stored samples are used.

## 9.2 UKHSA immunisation team actions

### 9.2.1 Sample and questionnaire follow-up

For confirmed cases, the UKHSA Immunisation Team will contact the laboratory to confirm that all available samples have been collected including:

- throat swabs (see 9.1.2)
- diagnostic samples and cultures (see 9.1.3)

The UKHSA Immunisation Team will also liaise with the HPTs for any incomplete or missing surveillance forms ([MENSVO1 surveillance form](#)) for confirmed IMD cases.

### 9.2.2 Sequelae questionnaire (MENSVO3)

Around 6 months after the confirmation of any cases under 5 years of age the UKHSA Immunisation Team will contact the GP and ask them to complete a surveillance form that collects information on sequelae (MENSVO3). The UKHSA Immunisation Team may also contact the GP if further epidemiological, clinical and/or immunisation information is required.

### 9.2.3 Immunological work-up (MENSVO4)

The HPT liaising with general practice can highlight where immunological investigation may be recommended for an IMD case. UKHSA Immunisation Team will liaise with the case's GP to follow up, request an immunological work-up where this has not already occurred and request



completion of a questionnaire (Form MENSV04) for confirmed cases in those aged 5 to 25 years, inclusive, that meets any of the following criteria:

- caused by non-MenB/C/W meningococci
- a repeat episode of IMD (by any capsular group)
- caused by MenA,C,W or Y meningococci after MenACWY conjugate vaccination

## 10. Measurement of vaccine coverage

Routine coverage data for the proportion of children receiving 2 doses of Bexsero vaccine by first birthday and 3 doses by second and fifth birthday is collected and the proportion of children receiving a dose of MCC-Hib vaccine by second and fifth birthday is currently collected on a quarterly basis through the [UKHSA Coverage of Vaccination Evaluated Rapidly \(COVER\)](#) scheme. National data is also published annually for England by the Department of Health.

[Vaccine coverage data for the teenage age group targeted by MenACWY conjugate vaccine](#) is collected using the ImmForm website managed by UKHSA, which coordinates and manages the collection and reporting of national data.

## 11. Calculation of vaccine effectiveness

Vaccine effectiveness (VE) is generally defined as the % reduction in the attack rate in vaccinated compared with unvaccinated children in the same birth cohorts. VE will be assessed by the screening method. For this method, the VE can be estimated using the formula below, where PCV is the proportion of cases that are vaccinated and PPV is the proportion of the population vaccinated (coverage):

$$VE = \frac{1 - (PCV \times (1 - PPV))}{(1 - PCV) \times PPV}$$

Text version of equation: VE equals 1 minus (PCV multiplied by (1 minus PPV)), divided by (1 minus PCV) multiplied by PPV.

This requires knowledge of the numbers vaccinated and unvaccinated in the population (by birth cohort or age group) at any given time and the numbers of cases by vaccination status arising in the same period (by birth cohort or age group).

Information on the proportions vaccinated by age group and birth cohort will be generated through the COVER scheme described above. The vaccination status of confirmed cases by meningococcal capsular group will be ascertained by routine follow-up.

Age specific vaccine effectiveness estimates will be carried out using cases occurring after implementation of the relevant vaccination campaign in that age group. VE estimates will be generated for the various meningococcal vaccines in eligible cohorts targeted for immunisation. Where possible, VE will also be estimated for vaccine-specific antigens.

MenACWY conjugate vaccine effectiveness in teenagers will be undertaken using the indirect cohort method and case control follow up.

Estimates of vaccine effectiveness will be made available through peer-reviewed publication ([9](#), [10](#), [11](#), [12](#)).

## 12. Dissemination of information and outputs

Successful implementation of the national surveillance programme will continue to depend on collaboration of health protection units, immunisation co-ordinators, microbiologists and clinicians looking after patients with IMD. Information on the surveillance scheme will be disseminated widely through UKHSA web pages. This information will include names, contact numbers and addresses of lead individuals for different parts of the programme.

Regular reporting already undertaken through publication in the HPR will continue. Reports to Joint Committee on Vaccination and Immunisation (JCVI) to include disease incidence and coverage and VE when this becomes available. Data on impact and effectiveness will also continue to be published in peer reviewed publications.


## 13. References

1. Campbell H and others. '[Updated postlicensure surveillance of the meningococcal C conjugate vaccine in England and Wales: effectiveness, validation of serological correlates of protection, and modelling predictions of the duration of herd immunity](#)' Clinical and Vaccine Immunology 2010: volume 17, number 5
2. Ladhani SN and others. '[Invasive meningococcal disease in England and Wales: implications for the introduction of new vaccines](#)' Vaccine 2012: volume 30, issue 24
3. Tan LK and others. '[Advances in the development of vaccines against \*Neisseria meningitidis\*](#)' New England Journal of Medicine 2010: volume 362, number 16
4. Campbell H and others. '[Targeted vaccination of teenagers following continued rapid endemic expansion of a single meningococcal group W clone \(sequence type 11 clonal complex\), United Kingdom 2015](#)' Eurosurveillance 2015: volume 20, issue 28
5. Ladhani SN and others. '[Increase in endemic \*Neisseria meningitidis\* capsular group W sequence type 11 complex associated with severe invasive disease in England and Wales](#)' Clinical Infectious Diseases 2015: volume 60, issue 4
6. Frosi G and others. '[Bactericidal antibody against a representative epidemiological meningococcal serogroup B panel confirms that MATS underestimates 4CMenB vaccine strain coverage](#)' Vaccine 2013: volume 31, issue 43
7. Vogel U and others. '[Predicted strain coverage of a meningococcal multicomponent vaccine \(4CMenB\) in Europe: a qualitative and quantitative assessment](#)' Lancet Infectious Diseases 2013: volume 13, issue 5
8. Muzzi A and others. '[Genetic meningococcal antigen typing system \(gMATS\): A genotyping tool that predicts 4CMenB strain coverage worldwide](#)' Vaccine 2019: volume 37, issue 7
9. Findlow H and others. '[Serogroup C \*Neisseria meningitidis\* disease epidemiology, seroprevalence, vaccine effectiveness and waning immunity, England, 1998/1999 to 2015/2016](#)' Eurosurveillance 2019: volume 24, issue 1
10. Ladhani SN and others. '[First real world evidence of meningococcal group B vaccine, 4CMenB, protection against meningococcal group W disease; prospective enhanced national surveillance, England](#)' Clinical Infectious Diseases 2020: volume 7, issue 7
11. Ladhani SN and others. '[Vaccination of Infants with Meningococcal Group B Vaccine \(4CMenB\) in England](#)' New England Journal of Medicine 2020: volume 382, number 4
12. Parikh SR and others. '[Effectiveness and impact of a reduced infant schedule of 4CMenB vaccine against group B meningococcal disease in England: a national observational cohort study](#)' Lancet 2016: volume 388, issue 10,061

## 14. Appendix 1. Surveillance questionnaires

- a) MENS01 – this form is available to [download](#)
- b) MENS03 – for use by UKHSA Immunisation team
- c) MENS04 – for use by UKHSA Immunisation team

## a) MENSVO1

 <p>UK Health Security Agency</p>	<p><b>National epidemiological surveillance – confirmed invasive meningococcal disease*</b></p> <p>Immunisation and Vaccine Preventable Diseases Division, 61 Colindale Avenue, London, NW9 5EQ. Tel: 020 8327 7588 or 6421 Email: <a href="mailto:meningo@ukhsa.gov.uk">meningo@ukhsa.gov.uk</a></p>	<p>Form MENSVO1 Version: December 2022 Ref: [UKHSA National ref]</p>								
<b>Please complete in block capital letters</b>		<b>IN CONFIDENCE</b>								
<b>Patient details</b>										
Surname:	Forename:	Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female								
Date of birth: DD/MM/YYYY	NHS number:	HPZone reference: Onset date: DD/MM/YYYY								
<b>Part A: Ethnicity – please tick below</b>										
<input type="checkbox"/> White British <input type="checkbox"/> White other <input type="checkbox"/> Black-Caribbean <input type="checkbox"/> Black African <input type="checkbox"/> Indian <input type="checkbox"/> Pakistani <input type="checkbox"/> Bangladeshi <input type="checkbox"/> Chinese										
<input type="checkbox"/> Mixed* <input type="checkbox"/> other*, *please specify:										
<b>Part B: Vaccination history. This covers Men B, Men C and MenACWY vaccination.</b>										
<b>Please complete details for all vaccines below as fully as possible.</b>										
Vaccine	Did this case receive any doses of each vaccine before disease onset?	1 <sup>st</sup> dose date	1 <sup>st</sup> dose batch number	1 <sup>st</sup> dose manufacturer/brand	2 <sup>nd</sup> dose date	2 <sup>nd</sup> dose batch number	2 <sup>nd</sup> dose manufacturer/brand	3 <sup>rd</sup> dose date	3 <sup>rd</sup> dose batch number	3 <sup>rd</sup> dose manufacturer/brand
MenB vaccination <sup>1</sup>	Yes <input type="checkbox"/> No <input type="checkbox"/> NK <input type="checkbox"/> Not eligible <input type="checkbox"/>	DD/MM/YYYY		Bexsero®	DD/MM/YY YY		Bexsero®	DD/MM/YY YY		Bexsero®
MenC Vaccination <sup>2</sup>	Yes <input type="checkbox"/> No <input type="checkbox"/> NK <input type="checkbox"/> Not eligible <input type="checkbox"/>	DD/MM/YYYY			DD/MM/YY YY			DD/MM/YY YY		
MenC/Hib Vaccination <sup>3</sup>	Yes <input type="checkbox"/> No <input type="checkbox"/> NK <input type="checkbox"/> Not eligible <input type="checkbox"/>	DD/MM/YYYY		Menitorix®	All high-risk groups (complement deficiency or asplenia) should be offered MenB and MenACWY vaccination.					
MenACWY vaccination <sup>4</sup>	Yes <input type="checkbox"/> No <input type="checkbox"/> NK <input type="checkbox"/> Not eligible <input type="checkbox"/>	DD/MM/YYYY								
<sup>1</sup> MenB vaccine (Bexsero®) included in the routine infant programme since 01/09/2015 including any child born from 01/05/2015. Routinely offered at 8 weeks, 16 weeks and 1 year. <sup>2</sup> MenC vaccine (Meningitec®, Menjugate® or Neissvac®) included in the routine infant programme from 01/11/1999-30/6/2016. Catch-up vaccination means all those born between 01/09/1981-31/03/2016 should have been offered at least one dose of MenC vaccine. MenC vaccine was offered to teenagers aged 13/14 years and Freshers June 2013-May 2015. <sup>3</sup> A single dose of Menitorix® vaccine (combined MenC-Haemophilus influenzae type B [Hib]) has been offered at 12-13 months of age from 01/09/2006 (DOB>01/08/2005). <sup>4</sup> MenACWY vaccine (Menveo®, Nimenrix®) replaced MenC vaccine for teenagers routinely at 13-15 years (all young people at least 13 years of age and born after 31/08/1996 would be eligible to 25th birthday). In addition, fresher doses for those eligible <25 years from 01/09/2015-31/08/2022 at university or another Higher Education Institution										

<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"><b>Part C: Clinical presentation</b></div> <p><b>1) What was the clinical presentation?</b></p> <p><input type="checkbox"/> Meningitis</p> <p><input type="checkbox"/> Septicaemia</p> <p><input type="checkbox"/> Both meningitis and septicaemia</p> <p><input type="checkbox"/> Septic arthritis</p> <p><input type="checkbox"/> Epiglottitis</p> <p><input type="checkbox"/> Pneumonia</p> <p><input type="checkbox"/> Other</p> <p><input type="checkbox"/> Unknown</p> <p>Comments: <input style="width: 100%;" type="text"/></p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"><b>Part E: Co-morbidities and pregnancy</b></div> <p><b>3) At the time of meningococcal disease, did the patient have any co-morbidities?</b></p> <p><input type="checkbox"/> Yes   <input type="checkbox"/> No   <input type="checkbox"/> Unknown</p> <p><b>3.1) If yes, what were their co-morbidities?</b></p> <p><input type="checkbox"/> Chronic heart disease</p> <p><input type="checkbox"/> Congenital or chromosomal abnormality</p> <p><input type="checkbox"/> Chronic lung disease</p> <p><input type="checkbox"/> CNS disease (CSF leak, VP shunt etc)</p> <p><input type="checkbox"/> Chronic renal disease</p> <p><input type="checkbox"/> Chronic gastrointestinal disease</p> <p><input type="checkbox"/> Metabolic disease</p> <p><input type="checkbox"/> Other</p> <p>Comments: <input style="width: 100%;" type="text"/></p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"><b>Part G: Travel history</b></div> <p><b>7) Was the patient born in the UK?</b></p> <p><input type="checkbox"/> Yes   <input type="checkbox"/> No   <input type="checkbox"/> Unknown</p> <p><b>7.1) If no, when did they arrive in the UK</b></p> <p>DD/MM/YYYY</p> <p><b>7.2) Country of birth:</b></p> <p><b>8) Has the patient recently travelled abroad (returning in the last 28 days)?</b></p> <p><input type="checkbox"/> Yes   <input type="checkbox"/> No   <input type="checkbox"/> Unknown</p> <p><b>8.1) If yes, where did they travel (town/ country)?</b></p> <p><b>8.2) When did they return? DD/MM/YYYY</b></p>						
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"><b>Part D: Risk factors</b></div> <p><b>2) At the time of onset did the patient have any known risk factors for meningococcal disease?</b></p> <p><input type="checkbox"/> Yes   <input type="checkbox"/> No   <input type="checkbox"/> Unknown</p> <p><b>2.1) If yes, what were their risk factor/s?</b></p> <p><input type="checkbox"/> Asplenia/ splenic dysfunction</p> <p><input type="checkbox"/> Complement deficiency</p> <p><input type="checkbox"/> Malignancy/ immune deficiency</p> <p><input type="checkbox"/> Immunosuppressive drug (Including complement inhibitors, e.g. eculizumab)</p> <p>Comments: <input style="width: 100%;" type="text"/></p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"><b>Part F: Outcome</b></div> <p><b>4) Was the patient pregnant at the time?</b></p> <p><input type="checkbox"/> Not applicable   <input type="checkbox"/> Yes   <input type="checkbox"/> No   <input type="checkbox"/> Unknown</p> <p><b>5) Was the patient admitted to ITU?</b></p> <p><input type="checkbox"/> Yes   <input type="checkbox"/> No   <input type="checkbox"/> Unknown</p> <p><b>6) Is the patient currently alive?</b></p> <p><input type="checkbox"/> Yes   <input type="checkbox"/> No   <input type="checkbox"/> Unknown</p> <p><b>6.1) If patient died, date of death</b></p> <p>DD/MM/YYYY</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"><b>Part H: Is the case working at or attending any of these situations? <a href="#">Complete page 3 for university or other higher education settings</a></b></div> <p><input type="checkbox"/> child minder   <input type="checkbox"/> nursery   <input type="checkbox"/> school/college</p> <p><input type="checkbox"/> university   <input type="checkbox"/> barracks   <input type="checkbox"/> care/nursing home</p> <p><input type="checkbox"/> other _____</p>						
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"><b>Part I: Please provide any further comment</b></div> <p><input style="width: 100%; height: 50px;" type="text"/></p>								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 2px;">Completed by (full name):</td> <td style="width: 30%; padding: 2px;">Contact Number:</td> <td style="width: 30%; padding: 2px;">Date: DD/MM/YYYY</td> </tr> <tr> <td colspan="3" style="padding: 2px;">Surgery/hospital/HPT:</td> </tr> </table>			Completed by (full name):	Contact Number:	Date: DD/MM/YYYY	Surgery/hospital/HPT:		
Completed by (full name):	Contact Number:	Date: DD/MM/YYYY						
Surgery/hospital/HPT:								
<p><b>Thank you for your time and assistance. Please return by post or secure email (both as detailed overleaf) or upload to HPZone.</b></p>								




**MENSV01 Cases of confirmed and probable invasive meningococcal disease in university/ HEIs**

Please ensure the case has been added to the appropriate HPZone contexts.

<u>Institution full name</u>		
Year of study	<input type="checkbox"/> Year 1 <input type="checkbox"/> Year 2 <input type="checkbox"/> Year 3 <input type="checkbox"/> Year 4 <input type="checkbox"/> Year abroad/ in industry <input type="checkbox"/> MSc <input type="checkbox"/> PhD <input type="checkbox"/> Staff <input type="checkbox"/> Other, please explain:	
Study course (e.g. physiology, law etc.)		
Usual term time accommodation details (please provide postcode for every case)	<input type="checkbox"/> Family home <input type="checkbox"/> Student accommodation with shared space <input type="checkbox"/> Shared private rental <input type="checkbox"/> Accommodation with no shared space <input type="checkbox"/> Other, please explain:	
	<u>Postcode:</u>	If student accommodation, name:
Where was the case at time of onset?	<input type="checkbox"/> Usual accommodation during term time <input type="checkbox"/> family home, <u>Postcode:</u> <input type="checkbox"/> Other, please explain: Did the case return to their family home after they became ill? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NK	
In the 7 days pre-onset did the case have contact with another confirmed/ probable IMD case?	<input type="checkbox"/> Unknown <input type="checkbox"/> No <input type="checkbox"/> Yes (inc. eye infection) If YES, full name/ HPZone number:	
The following details are being collected for national surveillance purposes and may be helpful if a further case arises. These do not need to be included as an HPZone context unless additional cases arise with a specific venue in common. Please do collect these details whenever possible.		
Please detail any current paid/ voluntary work the case attends in person (eg. bar staff, shop assistant)	Work type:	Venue/Postcode:
	Work type:	Venue/Postcode:
Bars/clubs/pubs visited in the 7 days pre-onset	Venue names:	
Other social groups case actively takes part in, in person (e.g. sports teams, uni societies, choir)		
Were any of the contacts who were offered prophylaxis also studying at university/ HEI?	<input type="checkbox"/> No, there were no university contacts <input type="checkbox"/> Yes, at the same university as the case <input type="checkbox"/> Yes, at a <u>different</u> university to the case, <u>name of the institution:</u> <input type="checkbox"/> It is not known whether there were university contacts	

## b) MENSV03



**UK Health  
Security  
Agency**

**Enhanced National Surveillance of Meningococcal Disease**

Immunisation Department  
61 Colindale Avenue  
London NW9 5EQ, UK  
www.gov.uk/ukhsa

T: 020 8327 7588 or 6058  
F: 020 8327 7404  
E: PHE.meningo@nhs.net

Consequences of disease questionnaire form, MENSV03, January 2022, Ref: «Reflabno»

**Patient name:** \_\_\_\_\_

**Date of Birth:** «DOB»      **NHS Number:** «NHSno»

**Gestational age at delivery:** \_\_\_\_\_ weeks

**Section A: Reporter Details**

**A1** Completed by: \_\_\_\_\_ **Date:** dd / mm / yyyy

**A3** Telephone number: \_\_\_\_\_ Email: \_\_\_\_\_

**Section D: Outcomes**

**D1** Duration of hospital stay: Admission date: dd / mm / yyyy Discharge date: dd / mm / yyyy

**D2** Was the patient admitted to PICU? Yes  No

Did the patient survive the infection? Yes  No

If died, date: dd / mm / yyyy Cause of death: \_\_\_\_\_

**If survived:**

**I2** Date of last follow-up: dd / mm / yyyy

**I3** At follow-up, did the patient have any of the following?

	Yes	No	NK
a) Epilepsy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Other Neurological complications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Amputations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If yes to (a)- (d) above, give details: \_\_\_\_\_

**I4** Date of hearing test: dd / mm / yyyy, Any Hearing loss? Yes  No  NK

If yes: please indicate: RIGHT EAR: Mild  Moderate  Severe

LEFT EAR: Mild  Moderate  Severe


**Section E: Additional Comments**

Please include the hospital discharge summary. Hospital discharge summary attached

Thank you for taking the time to complete the Questionnaire Please return the completed form to: Immunisation Department, UK Health Security Agency, 61 Colindale Avenue, London NW9 5EQ, UK.

Any questions? Please call or email us using [meningo@phe.gov.uk](mailto:meningo@phe.gov.uk).

## c) MENS04

	<p>Meningococcal Surveillance Immunisations and vaccine preventable diseases 61 Colindale Avenue London, NW9 5EQ</p>	<p>T +44 (0)20 8327 7150 F +44 (0)20 8327 7404 <a href="http://www.gov.uk/ukhsa">www.gov.uk/ukhsa</a></p>
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**IMD Surveillance MENS04**

**UKHSA patient ref**

This patient was referred to a Consultant Immunologist  no  yes on: \_\_\_/\_\_\_/\_\_\_

This patient has:

- had a pre-existing diagnosis
- been investigated and found to have no underlying immunodeficiency
- not been investigated but has no known underlying immunodeficiency
- inherited complement deficiency affecting:
  - C3  C3a  C3b  properdin                      diagnosed on \_\_\_/\_\_\_/\_\_\_
  - Factor B  Factor D  Factor H  Factor I                      diagnosed on \_\_\_/\_\_\_/\_\_\_
  - C5  C5a  C5b  C6  C7  C8  C9                      diagnosed on \_\_\_/\_\_\_/\_\_\_
  - other – please specify component \_\_\_\_\_ diagnosed on \_\_\_/\_\_\_/\_\_\_
- complement deficiency due to  glomerulonephritis or  vasculitis                      diagnosed on \_\_\_/\_\_\_/\_\_\_
- Eculizumab therapy for atypical haemolytic uraemic syndrome                      starting from \_\_\_/\_\_\_/\_\_\_
- Eculizumab therapy for paroxysmal nocturnal haemoglobinuria                      starting from \_\_\_/\_\_\_/\_\_\_
- Eculizumab therapy for \_\_\_\_\_ starting from \_\_\_/\_\_\_/\_\_\_
- asplenia                      diagnosed on \_\_\_/\_\_\_/\_\_\_
- splenic dysfunction                      diagnosed on \_\_\_/\_\_\_/\_\_\_
- HIV                      diagnosed on \_\_\_/\_\_\_/\_\_\_
- Other \_\_\_\_\_ diagnosed on \_\_\_/\_\_\_/\_\_\_

Comments:

Please return in the addressed envelope provided with pre-paid postage or email via an nhs.net email account to [PHE.meningo@nhs.net](mailto:PHE.meningo@nhs.net). Email enquiries to [meningo@phe.gov.uk](mailto:meningo@phe.gov.uk)

## About the UK Health Security Agency

UKHSA is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. We provide intellectual, scientific and operational leadership at national and local level, as well as on the global stage, to make the nation's health secure.

[UKHSA](#) is an executive agency, sponsored by the [Department of Health and Social Care](#).

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Version 1.4

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Published: December 2022

Publishing reference: GOV-13866



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