

NATIONAL STANDARD METHOD

UNDER REVIEW

SCREENING FOR MENINGOCOCCI

BSOP 51

Issued by Standards Unit, Evaluations and Standards Laboratory
Specialist and Reference Microbiology Division

Association of Medical Microbiologists
Association of Medical Microbiologists



SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 1 of 11

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STATUS OF NATIONAL STANDARD METHODS

National Standard Methods, which include standard operating procedures (SOPs), algorithms and guidance notes, promote high quality practices and help to assure the comparability of diagnostic information obtained in different laboratories. This in turn facilitates standardisation of surveillance underpinned by research, development and audit and promotes public health and patient confidence in their healthcare services. The methods are well referenced and represent a good minimum standard for clinical and public health microbiology. However, in using National Standard Methods, laboratories should take account of local requirements and may need to undertake additional investigations. The methods also provide a reference point for method development.

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SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 2 of 11

Reference no: BSOP 51i1.1

This SOP should be used in conjunction with the series of other SOPs from the Health Protection Agency

www.evaluations-standards.org.uk

Email: standards@hpa.org.uk

INDEX

STATUS OF NATIONAL STANDARD METHODS.....	2
INDEX.....	3
AMENDMENT PROCEDURE.....	4
SCOPE OF DOCUMENT.....	5
INTRODUCTION.....	5
CARRIAGE.....	5
SPECTRUM OF DISEASE.....	5
EPIDEMIOLOGY.....	6
1.0 SAFETY CONSIDERATIONS.....	7
1.1 SPECIMEN COLLECTION.....	7
1.2 SPECIMEN TRANSPORT AND STORAGE.....	7
1.3 SPECIMEN PROCESSING.....	7
2.0 SPECIMEN COLLECTION.....	7
2.1 OPTIMAL TIME OF SPECIMEN COLLECTION.....	7
2.2 CORRECT SPECIMEN TYPE AND METHOD OF COLLECTION.....	7
3.0 SPECIMEN TRANSPORT AND STORAGE.....	7
3.1 TIME BETWEEN SPECIMEN COLLECTION AND PROCESSING.....	7
3.2 SPECIAL CONSIDERATIONS TO MINIMISE DETERIORATION.....	7
4.0 SPECIMEN PROCESSING.....	8
4.1 TEST SELECTION.....	8
4.2 APPEARANCE.....	8
4.3 MICROSCOPY.....	8
4.4 CULTURE AND INVESTIGATION.....	8
4.5 IDENTIFICATION.....	8
4.6 REFERRAL TO REFERENCE LABORATORIES.....	8
4.7 ANTIBIOTIC SUSCEPTIBILITY TESTING.....	8
5.0 REPORTING PROCEDURE.....	9
5.1 MICROSCOPY.....	9
5.2 CULTURE.....	9
5.3 ANTIBIOTIC SUSCEPTIBILITY TESTING.....	9
6.0 REPORTING TO THE HPA (LOCAL AND REGIONAL SERVICES AND CDSC CENTRE FOR INFECTIONS).....	9
REFERENCES.....	10

SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 3 of 11

Reference no: BSOP 51i1.1

This SOP should be used in conjunction with the series of other SOPs from the Health Protection Agency

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AMENDMENT PROCEDURE

Controlled document reference	BSOP 51
Controlled document title	Standard Operating Procedure for screening for meningococci

Each National Standard Method has an individual record of amendments. The current amendments are listed on this page. The amendment history is available from standards@hpa.org.uk.

On issue of revised or new pages each controlled document should be updated by the copyholder in the laboratory.

Amendment Number/ Date	Issue no. Discarded	Insert Issue no.	Page	Section(s) involved	Amendment
1/ 03.05.05	1	1.1	1	Front page	Redesigned
			2	Status of document	Reworded
			4	Amendment page	Redesigned

SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 4 of 11
Reference no: BSOP 51i1.1

This SOP should be used in conjunction with the series of other SOPs from the Health Protection Agency

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STANDARD OPERATING PROCEDURE

SCREENING FOR MENINGOCOCCI

Types of specimens: Naso and pernasal, oropharyngeal and pernasal swabs

SCOPE OF DOCUMENT

This SOP describes the investigation of specimens for screening for *Neisseria meningitidis* for the diagnosis of cases of meningococcal disease. It may be used for the screening of contacts after discussion with the local CCDCS/reference expert.

INTRODUCTION

The majority of cases of meningococcal disease which occur in the UK are sporadic. Close contacts of a case are recognised to be at increased risk of infection. The source of infection of the case and of further cases that might appear in contacts is likely to be a carrier who is one of these close contacts. To prevent onward transmission of virulent meningococci, prophylaxis (antibiotic chemoprophylaxis and vaccination if appropriate) is recommended for such contacts. The aim is to eliminate carriage of the virulent organism from the case's immediate social network. Swabs for the detection of meningococcal carriage are generally limited to those used for diagnostic purposes, eg in the investigation of a case of suspected meningococcal disease, or screening swabs collected in the investigation of contacts of a case, or in an outbreak to determine the extent of carriage and/or the need for prophylaxis.

Characterisation of the organism producing disease is an important consideration in outbreak management as it determines whether cases may be related and if vaccination of contacts might be necessary. The increasing use of intravenous antibiotics in the community prior to hospital admission and the confirmation of cases by molecular (non culture) methods does not provide isolates for typing and determination of antimicrobial susceptibilities. This may increase the need for isolation of the organism from diagnostic or screening swabs from cases and close contacts. Typing is important for surveillance of the national Group C meningococcal vaccination programme and for detection of vaccine failures.

CARRIAGE

N. meningitidis is carried on the posterior pharyngeal wall and can be detected from pernasal or oropharyngeal swabs. Specimens for meningococcal screening are from two types of individuals: those infected and who may have been treated with penicillin; and untreated asymptomatic contacts of the index case. Oropharyngeal swabs (sampling the posterior pharyngeal wall through the mouth) are ideal, but per-nasal swabs are also acceptable where patients may be unable to cooperate. Carriage precedes invasive infection and can be detected in up to 50% clinical cases. Detection of carriage is less affected by parenteral penicillin being given prior to sampling and can be useful when other cultures from normally sterile sites are negative.

The background carriage rate in the general population has been estimated to be around 10%². This may be substantially higher in teenagers and young adults, close contacts of a case, in other communities in close contact (eg military establishments) and particularly during outbreaks. The current policy in England and Wales is to recommend chemoprophylaxis to family/household contacts of a case³. Where there is more than one case the decision on when to extend prophylaxis will be taken by the Consultant in Communicable Disease Control.

SPECTRUM OF DISEASE

Infection with *N. meningitidis* produces a wide spectrum of disease manifestations ranging from a mild illness with transient fever and bacteraemia to fulminant meningococcal sepsis, characterised by a rapidly progressive widespread purpuric skin rash, coagulation defects, septic shock and death within a few hours of onset of symptoms^{4,5}. Other presentations include a predominantly meningitic illness

SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 5 of 11

Reference no: BSOP 51i1.1

This SOP should be used in conjunction with the series of other SOPs from the Health Protection Agency

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which may or may not be accompanied by a purpuric rash, primary meningococcal arthritis^{6,7}, pneumonia, conjunctivitis⁸ and more rarely sinusitis, endocarditis⁹ and necrotising fasciitis. Occasionally a more chronic picture may be encountered in association with positive blood cultures often with cutaneous lesions and arthritis.

N. meningitidis may also be isolated from the lower genital tract or rectum in men and women during screening for gonorrhoea and may be implicated in genital tract infections¹⁰. Rare deficiencies of the later stages of the complement and porpedin pathway can predispose to recurrent infections with *Neisseria* species presenting as meningococcal disease¹¹.

EPIDEMIOLOGY

The incidence and case fatality are highest in infants less than one year of age in whom the signs of early infection may be more difficult to detect¹². There is a second but lower peak of infection in the 15-24 year age group. The seasonal peak is in the winter months in the UK.

UNDER REVIEW

SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 6 of 11

Reference no: BSOP 51i1.1

This SOP should be used in conjunction with the series of other SOPs from the Health Protection Agency

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1.0 SAFETY CONSIDERATIONS¹³⁻²³

1.1 SPECIMEN COLLECTION

N/A

1.2 SPECIMEN TRANSPORT AND STORAGE

Sealed plastic bag

1.3 SPECIMEN PROCESSING

Containment Level 2

Laboratory procedures that give rise to infectious aerosols must be conducted in a microbiological safety cabinet, isolator or be otherwise suitably contained¹³

N. meningitidis is in Hazard Group 2 although in some cases the nature of the work may dictate full Containment Level 3 conditions. Suspected isolates of *N. meningitidis* should always be handled in a microbiological safety cabinet¹³

N. meningitidis causes severe and sometimes fatal disease. Laboratory acquired infections have been reported. The organism infects primarily by the respiratory route. An effective vaccine is available for some meningococcal groups

Refer to current guidance on the safe handling of all organisms documented in this SOP

The above guidance should be supplemented with local COSHH and risk assessments

Compliance with postal and transport regulations is essential

2.0 SPECIMEN COLLECTION

2.1 OPTIMAL TIME OF SPECIMEN COLLECTION

Before antimicrobial therapy where possible

2.2 CORRECT SPECIMEN TYPE AND METHOD OF COLLECTION

Naso and pernasal, oropharyngeal and pernasal swabs. Saliva samples should be rejected

3.0 SPECIMEN TRANSPORT AND STORAGE

3.1 TIME BETWEEN SPECIMEN COLLECTION AND PROCESSING

Specimens should be transported and processed as soon as possible. Recovery of meningococci may be compromised if culture is delayed

3.2 SPECIAL CONSIDERATIONS TO MINIMISE DETERIORATION

Swabs should be transported in Amies transport medium with charcoal²⁴

Direct plating, when the swab is taken, should be considered

SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 7 of 11

Reference no: BSOP 51i1.1

This SOP should be used in conjunction with the series of other SOPs from the Health Protection Agency

www.evaluations-standards.org.uk

Email: standards@hpa.org.uk

4.0 SPECIMEN PROCESSING

4.1 TEST SELECTION

N/A

4.2 APPEARANCE

N/A

4.3 MICROSCOPY

N/A

4.4 CULTURE AND INVESTIGATION

4.4.1. Pre-treatment

N/A

4.4.2. Specimen processing

Inoculate each agar plate with swab (see BSOP 54)

For the isolation of individual colonies, spread inoculum using a sterile loop

4.4.3. Culture media, conditions and organisms for all specimens:

Clinical details/ conditions	Standard media	Incubation			Cultures read	Target organism
		Temp°C	Atmos	Time		
Screening for <i>N. meningitidis</i> case or contact	GC selective agar	35-37	5-10% CO ₂	40-48h	daily	<i>N. meningitidis</i>

4.5 IDENTIFICATION

Minimum level of identification in the laboratory

N. meningitidis species level

4.6 REFERRAL TO REFERENCE LABORATORIES

N. meningitidis for confirmation of identification, typing and susceptibility testing

4.7 ANTIBIOTIC SUSCEPTIBILITY TESTING

Refer to SOP on Susceptibility Testing (BSOP 45)

SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 8 of 11

Reference no: BSOP 51i1.1

This SOP should be used in conjunction with the series of other SOPs from the Health Protection Agency

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5.0 REPORTING PROCEDURE

5.1 MICROSCOPY

N/A

5.2 CULTURE

Negatives

"*N. meningitidis* not isolated"

Positives

"*N. meningitidis* isolated" and report serogroup if known or state "Further identification to follow"

5.2.1. Culture reporting time

Clinically urgent culture results to be telephoned or sent electronically when available

Interim / final written report, 16 - 72h stating, if appropriate, that a further report will be issued

5.3 ANTIBIOTIC SUSCEPTIBILITY TESTING

Report susceptibilities as clinically indicated

6.0 REPORTING TO THE HPA²⁵ (LOCAL AND REGIONAL SERVICES AND CDSC CENTRE FOR INFECTIONS)

Refer to the following:

Individual SOPs on organism identification

Health Protection Agency publications "Reporting to the CDR: A guide for laboratories"

"Hospital infection control: Guidance on the control of infection in hospitals"

Local Memorandum of Understanding

Current guidelines on CDSC and COSURV reporting

In cases of suspected meningococcal disease and contacts the isolation of *N. meningitidis* should be reported to the CCDC immediately

Report all isolates of the following: *N. meningitidis*

SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 9 of 11

Reference no: BSOP 51i1.1

This SOP should be used in conjunction with the series of other SOPs from the Health Protection Agency

www.evaluations-standards.org.uk

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SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 10 of 11

Reference no: BSOP 51i1.1

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SCREENING FOR MENINGOCOCCI

Issue no: 1.1 Issue date: 03.05.05 Issued by: Standards Unit, Evaluations and Standards Laboratory Page 11 of 11

Reference no: BSOP 51i1.1

This SOP should be used in conjunction with the series of other SOPs from the Health Protection Agency

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