

NATIONAL STANDARD METHOD

# INVESTIGATION OF MOUTH SWABS

BSOP 4

Issued by Standards Unit, Department for Evaluations, Standards and Training  
**Centre for Infections**



*Association of Medical Microbiologists*  
*Association of Medical Microbiologists*  
*Association of Medical Microbiologists*



## INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 1 of 13  
BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

# 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.

National Standard Methods are developed, reviewed and updated through an open and wide consultation process where the views of all participants are considered and the resulting documents reflect the majority agreement of contributors.

Representatives of several professional organisations, including those whose logos appear on the front cover, are members of the working groups which develop National Standard Methods. Inclusion of an organisation's logo on the front cover implies support for the objectives and process of preparing standard methods. The representatives participate in the development of the National Standard Methods but their views are not necessarily those of the entire organisation of which they are a member. The current list of participating organisations can be obtained by emailing [standards@hpa.org.uk](mailto:standards@hpa.org.uk).

The performance of standard methods depends on the quality of reagents, equipment, commercial and in-house test procedures. Laboratories should ensure that these have been validated and shown to be fit for purpose. Internal and external quality assurance procedures should also be in place.

Whereas every care has been taken in the preparation of this publication, the Health Protection Agency or any supporting organisation cannot be responsible for the accuracy of any statement or representation made or the consequences arising from the use of or alteration to any information contained in it. These procedures are intended solely as a general resource for practising professionals in the field, operating in the UK, and specialist advice should be obtained where necessary. If you make any changes to this publication, it must be made clear where changes have been made to the original document. The Health Protection Agency (HPA) should at all times be acknowledged.

The HPA is an independent organisation dedicated to protecting people's health. It brings together the expertise formerly in a number of official organisations. More information about the HPA can be found at [www.hpa.org.uk](http://www.hpa.org.uk).

The HPA aims to be a fully Caldicott compliant organisation. It seeks to take every possible precaution to prevent unauthorised disclosure of patient details and to ensure that patient-related records are kept under secure conditions<sup>1</sup>.

More details can be found on the website at [www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk). Contributions to the development of the documents can be made by contacting [standards@hpa.org.uk](mailto:standards@hpa.org.uk).

The reader is informed that all taxonomy in this document was correct at time of issue.

*Please note the references are now formatted using Reference Manager software. If you alter or delete text without Reference Manager installed on your computer, the references will not be updated automatically.*

## **Suggested citation for this document:**

Health Protection Agency (2008). *Investigation of mouth swabs*. National Standard Method BSOP 4 Issue 6.1. [http://www.hpa-standardmethods.org.uk/pdf\\_bacteriology.asp](http://www.hpa-standardmethods.org.uk/pdf_bacteriology.asp).

### **INVESTIGATION OF MOUTH SWABS**

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 2 of 13  
BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

# INDEX

<b>STATUS OF NATIONAL STANDARD METHODS</b> .....	<b>2</b>
<b>INDEX</b> .....	<b>3</b>
<b>AMENDMENT PROCEDURE</b> .....	<b>4</b>
<b>SCOPE OF DOCUMENT</b> .....	<b>5</b>
<b>INTRODUCTION</b> .....	<b>5</b>
<b>TECHNICAL INFORMATION</b> .....	<b>5</b>
<b>1 SAFETY CONSIDERATIONS</b> .....	<b>6</b>
1.1 SPECIMEN COLLECTION .....	6
1.2 SPECIMEN TRANSPORT AND STORAGE .....	6
1.3 SPECIMEN PROCESSING.....	6
<b>2 SPECIMEN COLLECTION</b> .....	<b>6</b>
2.1 OPTIMAL TIME FOR SPECIMEN COLLECTION .....	6
2.2 CORRECT SPECIMEN TYPE AND METHOD OF COLLECTION .....	6
2.3 ADEQUATE QUANTITY AND APPROPRIATE NUMBER OF SPECIMENS .....	6
<b>3 SPECIMEN TRANSPORT AND STORAGE</b> .....	<b>6</b>
3.1 TIME BETWEEN SPECIMEN COLLECTION AND PROCESSING.....	6
3.2 SPECIAL CONSIDERATIONS TO MINIMISE DETERIORATION .....	6
<b>4 SPECIMEN PROCESSING</b> .....	<b>7</b>
4.1 TEST SELECTION .....	7
4.2 APPEARANCE .....	7
4.3 MICROSCOPY .....	7
4.4 CULTURE AND INVESTIGATION .....	7
4.5 IDENTIFICATION .....	8
4.6 ANTIMICROBIAL SUSCEPTIBILITY TESTING.....	8
<b>5 REPORTING PROCEDURE</b> .....	<b>9</b>
5.1 MICROSCOPY.....	9
5.2 CULTURE.....	9
5.3 ANTIMICROBIAL SUSCEPTIBILITY TESTING .....	9
<b>6 REPORTING TO THE HPA (LOCAL AND REGIONAL SERVICES AND CENTRE FOR INFECTIONS)</b> .....	<b>9</b>
<b>7 ACKNOWLEDGEMENTS AND CONTACTS</b> .....	<b>10</b>
<b>APPENDIX</b> .....	<b>11</b>
<b>REFERENCES</b> .....	<b>12</b>

## INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 3 of 13

Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

# AMENDMENT PROCEDURE

<b>Controlled document reference</b>	<b>BSOP 4</b>
<b>Controlled document title</b>	<b>Investigation of mouth swabs</b>

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](mailto: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
7/ 13.10.08	6	6.1	All	<b>All</b>	ESL replaced with DEST
			11	<b>Appendix</b>	Flow chart inserted

## INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 4 of 13  
Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

# INVESTIGATION OF MOUTH SWABS

Type of specimen: Mouth swab

## SCOPE OF DOCUMENT

This National Standard Method (NSM) describes the processing and bacteriological investigation of mouth swabs.

## INTRODUCTION

**Candidosis** is the most frequent type of oral infection. Infection of the buccal mucosa, tongue or oropharynx is usually due to *Candida albicans*. Species of yeast other than *C. albicans*, such as *Candida krusei* and *Candida glabrata*, can also occasionally colonise the mouth but are rarely associated with infection. However, they are becoming increasingly important, particularly in patients who are immunocompromised<sup>2,3</sup>.

**Cancrum oris (noma or gangrenous stomatitis)** is a necrotising polymicrobial infection, rarely seen in the UK, arising in the severely debilitated and malnourished, with children most often affected particularly in Africa<sup>4,5</sup>. It is usually preceded by ulcerative (Vincent's) gingivitis<sup>6</sup>. Vincent's gingivitis is diagnosed by microscopy, and the appearance of a fusospirochaetal complex is pathognomonic for the disease<sup>7</sup>.

**Sialadenitis** or infections of the salivary glands (parotid, submandibular, sublingual and accessory parotid) include suppurative, chronic bacterial and viral parotitis<sup>4</sup>.

**Parotitis** may result in pus exuding from the parotid glands which is sampled via the mouth<sup>4</sup>. The predominant organisms causing suppurative parotitis are staphylococci, but members of the enterobacteriaceae and other Gram-negative bacilli, viridans streptococci and anaerobes have been isolated. Chronic bacterial parotitis is due to staphylococci, or mixed oral aerobes and anaerobes. Mumps, influenza and enteroviruses are the usual viral agents of parotitis.

Other infective causes of oral ulceration include syphilis, herpes simplex virus and *Mycobacterium* species. Fungi may attack the sinuses and encroach on the palate, eg *Aspergillus* species. Infection with *Histoplasma* can lead to ulceration of oral mucosa<sup>8</sup>.

Specimens which may be submitted for the investigation of dental abscesses include pus (see [BSOP 14 - Investigation of abscesses and post-operative wound and deep-seated wound infections](#)).

## TECHNICAL INFORMATION

N/A

### INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 5 of 13

Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

# 1 SAFETY CONSIDERATIONS<sup>9-20</sup>

## 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

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 SPECIMEN COLLECTION

## 2.1 OPTIMAL TIME FOR SPECIMEN COLLECTION

Before antimicrobial therapy where possible

## 2.2 CORRECT SPECIMEN TYPE AND METHOD OF COLLECTION

Sample pus if present otherwise sample any lesions or inflamed areas. A tongue depressor or spatula may be helpful to aid vision and avoid contamination from other parts of the mouth.

## 2.3 ADEQUATE QUANTITY AND APPROPRIATE NUMBER OF SPECIMENS

N/A

# 3 SPECIMEN TRANSPORT AND STORAGE

## 3.1 TIME BETWEEN SPECIMEN COLLECTION AND PROCESSING

Specimens should be transported and processed as soon as possible.

## 3.2 SPECIAL CONSIDERATIONS TO MINIMISE DETERIORATION

Swabs should be transported in Amies transport medium with charcoal<sup>21</sup>.

If processing is delayed, refrigeration is preferable to storage at ambient temperature.

### INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 6 of 13

Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

## 4 SPECIMEN PROCESSING

### 4.1 TEST SELECTION

N/A

### 4.2 APPEARANCE

N/A

### 4.3 MICROSCOPY

(See [BSOP TP 39 – Staining Procedures](#))

Stain for Vincent's organisms if clinically indicated

### 4.4 CULTURE AND INVESTIGATION

#### 4.4.1 PRE-TREATMENT

N/A

#### 4.4.2 SPECIMEN PROCESSING

Inoculate each agar plate with swab (see [QSOP 52 - Inoculation of Culture Media](#) )

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

#### 4.4.3 CULTURE MEDIA, CONDITIONS AND ORGANISMS FOR ALL SPECIMENS:

Clinical details/ conditions	Standard media	Incubation			Cultures read	Target organism(s)
		Temp °C	Atmos	Time		
Oral candidosis Fungal infection	Sabouraud agar	35-37	air	40-48 h	≥40 h*	Yeasts Fungi
For this situation, add the following:						
Clinical details/ conditions	Supplementary media	Incubation			Cultures read	Target organism(s)
		Temp °C	Atmos	Time		
Mouth ulcer	Blood agar	35-37	5-10% CO <sub>2</sub>	16-24 h	≥16 h	Lancefield group A streptococcus <i>S. aureus</i>

\*Fungal culture may need to be prolonged if clinically indicated; in such cases plates should be read at ≥40h and then left in the incubator/cabinet until required.

#### INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 7 of 13  
Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

## 4.5 IDENTIFICATION

### 4.5.1 MINIMUM LEVEL IN THE LABORATORY

<a href="#">Lancefield group A streptococcus</a>	Lancefield group level
<a href="#">S. aureus</a>	species level
Yeasts	"yeasts" level

Organisms with unusual or unexpected resistance, and whenever there is a laboratory or clinical problem, or anomaly that requires elucidation should be sent to the appropriate reference laboratory.

### 4.5.2 REFERRAL TO REFERENCE LABORATORIES

For information on the tests offered, turn around times, transport procedure and the other requirements of the reference laboratory [click here for user manuals and request forms](#).

Isolates associated with outbreaks, where epidemiologically indicated and organisms with unusual or unexpected resistance and whenever there is a laboratory or clinical problem or anomaly that requires elucidation should be sent to the appropriate reference laboratory.

Organisms with unusual or unexpected resistance, and whenever there is a laboratory or clinical problem, or anomaly that requires elucidation should be sent to the appropriate reference laboratory.

## 4.6 ANTIMICROBIAL SUSCEPTIBILITY TESTING

Refer to NSM on Antimicrobial Susceptibility Testing (See [BSOP 45 - Susceptibility Testing](#)).

#### INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 8 of 13

Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

## 5 REPORTING PROCEDURE

### 5.1 MICROSCOPY

Stain for Vincent's organisms: report on Vincent's organisms detected

#### 5.1.1 MICROSCOPY REPORTING TIME

Urgent microscopy results to be telephoned or sent electronically

Written report, 16 – 72 h for Vincent's organisms

### 5.2 CULTURE

Report clinically significant organisms isolated or

Report other growth, eg: "Mixed upper respiratory tract flora" or

Report absence of growth

#### 5.2.1 CULTURE REPORTING TIME

Clinically urgent culture results to be telephoned or sent electronically

Written report, 16 – 72 h stating, if appropriate, that a further report will be issued

### 5.3 ANTIMICROBIAL SUSCEPTIBILITY TESTING

Report susceptibilities as clinically indicated

## 6 REPORTING TO THE HPA<sup>22</sup> (LOCAL AND REGIONAL SERVICES AND CENTRE FOR INFECTIONS)

Refer to the following:

Individual NSMs on organism identification

Health Protection Agency publications:

"Laboratory reporting to the HPA. A guide for diagnostic laboratories"

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

Local guidelines

#### INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 9 of 13

Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

## 7 ACKNOWLEDGEMENTS AND CONTACTS

This National Standard Method has been developed, reviewed and revised by the National Standard Methods Working Group for Clinical Bacteriology ([http://www.hpa-standardmethods.org.uk/wg\\_bacteriology.asp](http://www.hpa-standardmethods.org.uk/wg_bacteriology.asp)). The contributions of many individuals in clinical bacteriology laboratories and specialist organisations who have provided information and comment during the development of this document, and final editing by the Medical Editor are acknowledged.

The National Standard Methods are issued by Standards Unit, Department for Evaluations, Standards and Training, Centre for Infections, Health Protection Agency, London.

For further information please contact us at:

Standards Unit  
Department for Evaluations, Standards and Training  
Centre for Infections  
Health Protection Agency  
Colindale  
London  
NW9 5EQ

E-mail: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

### INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 10 of 13

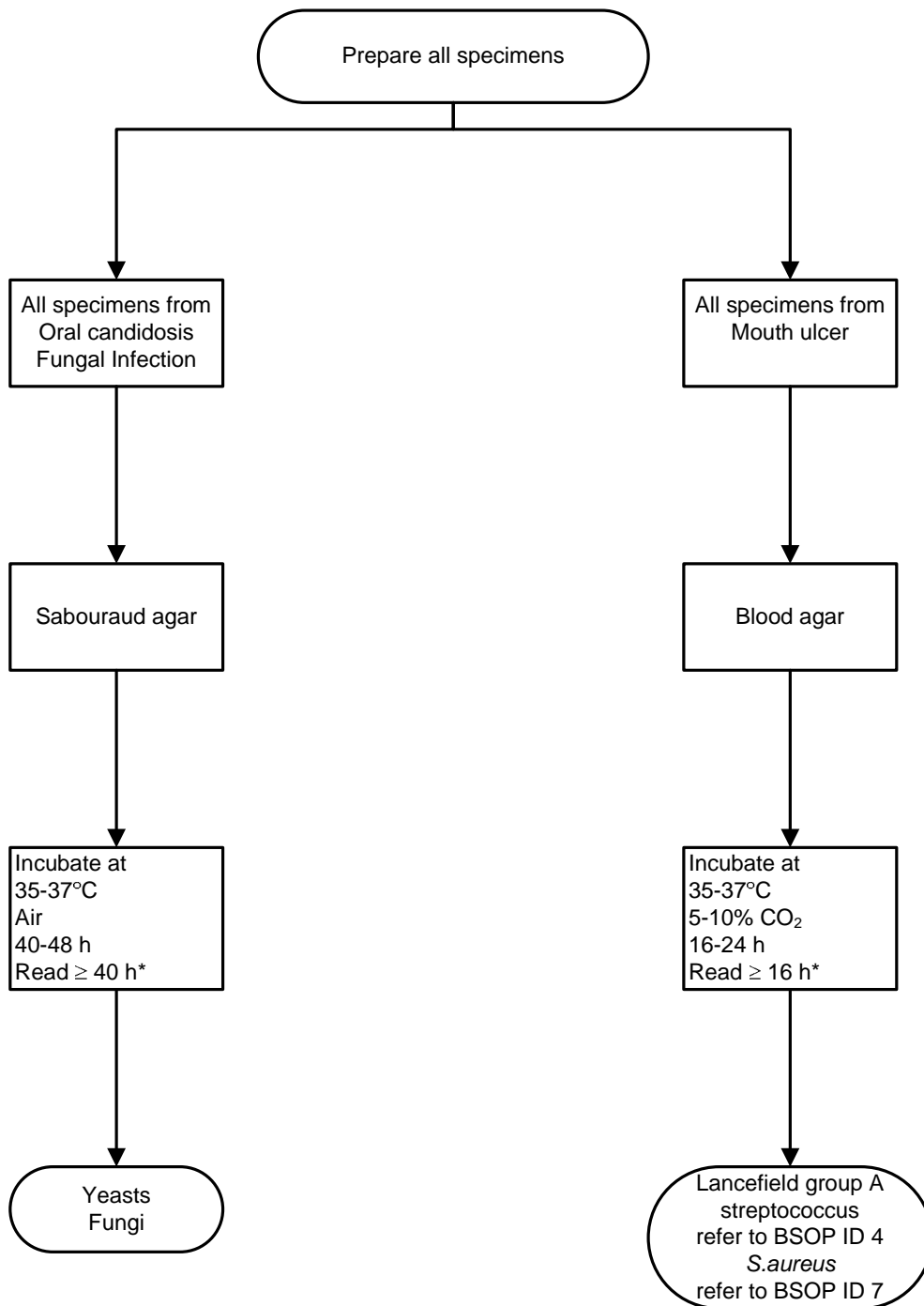
Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

# APPENDIX



\*Fungal culture may need to be prolonged if clinically indicated; in such cases plates should be read at  $\geq 40$ h and then left in the incubator / cabinet until required.

## INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 11 of 13

Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

# REFERENCES

1. Department of Health NHS Executive: The Caldicott Committee. Report on the review of patient-identifiable information. London. December 1997.
2. Powderly WG. Mucosal candidiasis caused by non-albicans species of Candida in HIV- positive patients. AIDS 1992;6:604-5.
3. Forbes BA, Sahm DF, Weissfeld AS, editors. Bailey and Scott's Diagnostic Microbiology. 11th ed ed. Vol 7. St Louis: Mosby Inc; 2002. p. 899-906
4. Chow AW. Infections of the oral cavity, neck and head. In: Mandell GL, Bennett JE, Dolin R, editors. Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases. 5<sup>th</sup> ed. Vol 1. Edinburgh: Churchill Livingstone; 2000. p. 689-702.
5. Lehner T. The mouth and salivary glands. In: Ledingham JGG, Warrell DA, editors. Concise Oxford Textbook of Medicine. Vol 1. Oxford: Oxford University Press; 2000. p. 519-26.
6. Enwonwu CO, Falkler WA, Idigbe EO. Oro-facial gangrene (noma/cancrum oris): pathogenetic mechanisms. Crit Rev Oral Biol Med 2000;11:159-71.
7. Holbrook WP, Cawson RA. The problem of the taxonomy of the fusiform bacillus of acute necrotizing ulcerative gingivitis (Vincent's gingivitis). Antonie Van Leeuwenhoek 1990;57:55-8.
8. Gomes FO, Vieria FA, Sebastiao BA, Simao FM, Mota LA. Orofacial manifestations of histoplasmosis in HIV-positive patients: a case report. Medicina Oral 2001;6:101-5.
9. Advisory Committee on Dangerous Pathogens. Categorisation of biological agents according to hazard and categories of containment. 4th ed. Suffolk: HSE Books; 1995. Supplements 1, 1998 and 2, 2000.
10. Public Health Laboratory Service Standing Advisory Committee on Laboratory Safety. Safety Precautions: Notes for Guidance. 4th ed. London: Public Health Laboratory Service (PHLS); 1993.
11. Control of Substances Hazardous to Health Regulations 2002. General COSHH Approved Code of Practice and Guidance, L5. Suffolk: HSE Books; 2002.
12. Health and Safety Executive. 5 steps to risk assessment: a step by step guide to a safer and healthier workplace, IND (G) 163 (REVL). Suffolk: HSE Books; 2002.
13. Health and Safety Executive. A guide to risk assessment requirements: common provisions in health and safety law, IND (G) 218 (L). Suffolk: HSE Books; 2002.
14. Health Services Advisory Committee. Safety in Health Service laboratories. Safe working and the prevention of infection in clinical laboratories and similar facilities. 2<sup>nd</sup> ed. Suffolk: HSE Books; 2003.
15. NHS Estates. Health Building Note 15. Accommodation for pathology services. 1<sup>st</sup> ed. London: Her Majesty's Stationary Office (HMSO); 1991. (Out of print - 2nd edition in press).
16. BS 5726: 1992. Microbiological safety cabinets. Part 2. Recommendations for information to be exchanged between purchaser, vendor and installer and recommendations for installation. London: British Standards Institution (BSI); 1992.
17. BS 5726: 1992. Microbiological safety cabinets. Part 4. Recommendations for selection, use and maintenance. London: British Standards Institution (BSI); 1992.

## INVESTIGATION OF MOUTH SWABS

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 12 of 13

Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)

18. BS EN 12469: 2000. Biotechnology - performance criteria for microbiological safety cabinets. London: British Standards Institution (BSI); 2000.
19. Advisory Committee on Dangerous Pathogens. The management, design and operation of microbiological containment laboratories. Suffolk: HSE Books; 2001.
20. Health and Safety Executive, editor. Biological Agents: Managing the risks in laboratories and healthcare premises. 2005.
21. Barber S, Lawson PJ, Grove DI. Evaluation of bacteriological transport swabs. Pathology 1998;30:179-82.
22. Health Protection Agency. Laboratory Reporting to the Health Protection Agency. Guide for diagnostic laboratories (as amended). 2008.

#### **INVESTIGATION OF MOUTH SWABS**

Issue no: 6.1 Issue date: 13.10.08 Issued by: Standards Unit, Department for Evaluations, Standards and Training Page 13 of 13

Reference no: BSOP 4i6.1

This NSM should be used in conjunction with the series of other NSMs from the Health Protection Agency

[www.evaluations-standards.org.uk](http://www.evaluations-standards.org.uk)

Email: [standards@hpa.org.uk](mailto:standards@hpa.org.uk)