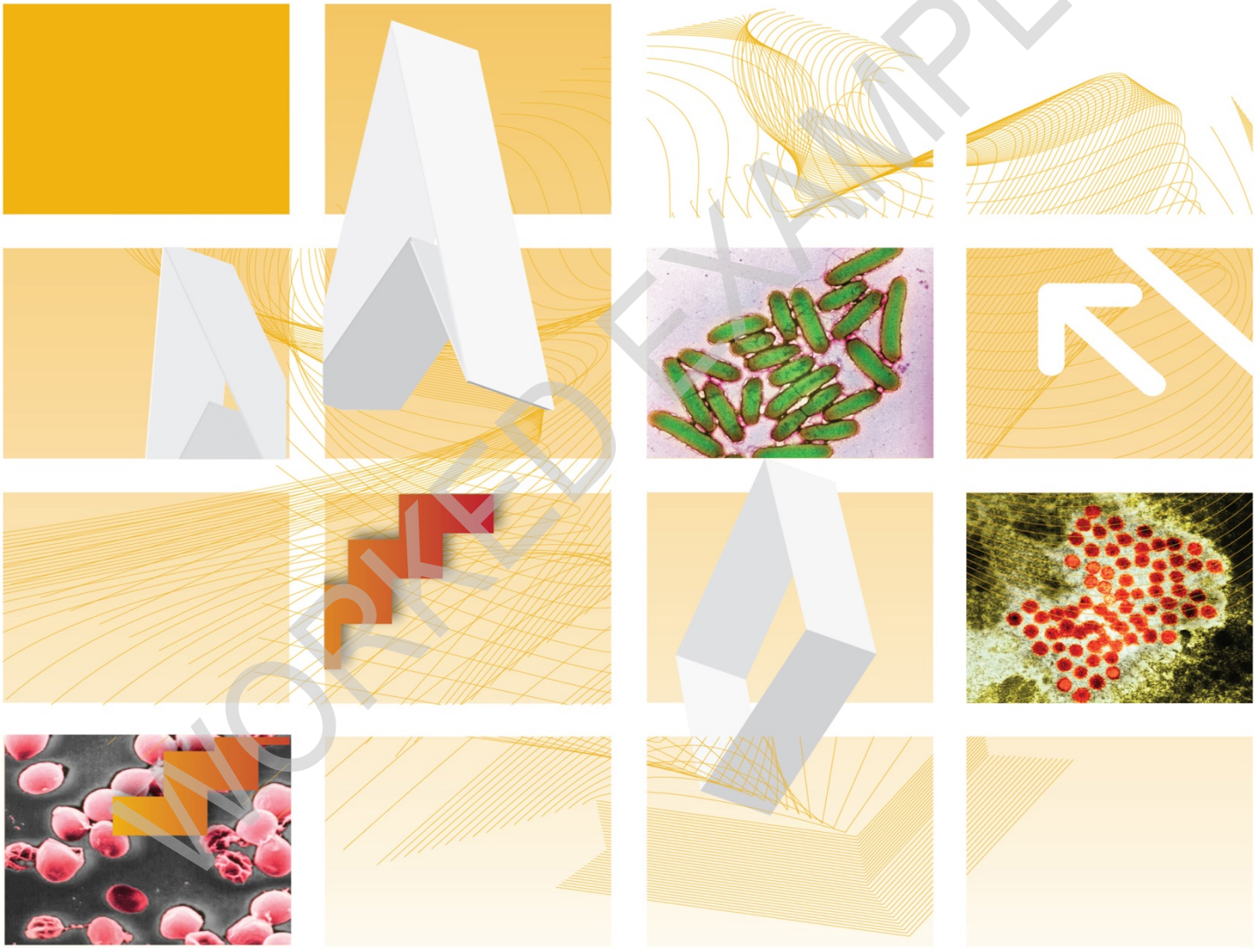
Public Health England

NHS

UK standards for microbiology investigations

National user manual worked example for conjunctivitis



NICE accredited
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"NICE has renewed accreditation of the process used by **Public Health England (PHE)** to produce **UK Standards for Microbiology Investigations**. The renewed accreditation is valid until **30 June 2021** and applies to guidance produced using the processes described in **UK standards for microbiology investigations (UKSMIs) Development process, S9365', 2016**. The original accreditation term began in **July 2011.**"

Issued by the Standards Unit, Microbiology Services, PHE

Acknowledgments

UK Standards for Microbiology Investigations (UK SMIs) are developed under the auspices of Public Health England (PHE) working in partnership with the National Health Service (NHS), Public Health Wales and with the professional organisations whose logos are displayed below and listed on the website https://www.gov.uk/uk-standards-for-microbiology-investigations-smi-quality-and-consistency-in-clinical-laboratories. UK SMIs are developed, reviewed and revised by various working groups which are overseen by a steering committee (see https://www.gov.uk/government/groups/standards-for-microbiology-investigations-steering-committee).

The contributions of many individuals in clinical, specialist and reference laboratories who have provided information and comments during the development of this document are acknowledged. We are grateful to the medical editors for editing the medical content.

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Logos correct at time of publishing.

Contents

Amendment table

Each UK SMI method has an individual record of amendments. The current amendments are listed on this page. The amendment history is available from standards@phe.gov.uk.

New or revised documents should be controlled within the laboratory in accordance with the local quality management system.

Amendment number/date	-/07.08.17
Issue number discarded	-
Insert issue number	1
Anticipated next review date*	07.08.20
Section(s) involved	**Amendment**

*Reviews can be extended up to five years subject to resources available.

UK SMI[#]: scope and purpose

Users of UK SMIs

Primarily, UK SMIs are intended as a general resource for practising professionals operating in the field of laboratory medicine and infection specialties in the UK. UK SMIs also provide clinicians with information about the available test repertoire and the standard of laboratory services they should expect for the investigation of infection in their patients, as well as providing information that aids the electronic ordering of appropriate tests. The documents also provide commissioners of healthcare services with the appropriateness and standard of microbiology investigations they should be seeking as part of the clinical and public health care package for their population.

Background to UK SMIs

UK SMIs comprise a collection of recommended algorithms and procedures covering all stages of the investigative process in microbiology from the pre-analytical (clinical syndrome) stage to the analytical (laboratory testing) and post analytical (result interpretation and reporting) stages. Syndromic algorithms are supported by more detailed documents containing advice on the investigation of specific diseases and infections. Quality guidance notes describe laboratory processes which underpin quality, for example assay validation.

Standardisation of the diagnostic process through the application of UK SMIs helps to assure the equivalence of investigation strategies in different laboratories across the UK and is essential for public health surveillance, research and development activities.

Equal partnership working

UK SMIs are developed in equal partnership with PHE, NHS, Royal College of Pathologists and professional societies. The list of participating societies may be found at https://www.gov.uk/uk-standards-for-microbiology-investigations-smi-quality-and-consistency-in-clinical-laboratories. Inclusion of a logo in an UK SMI indicates participation of the society in equal partnership and support for the objectives and process of preparing UK SMIs. Nominees of professional societies are members of the Steering Committee and working groups which develop UK SMIs. The views of nominees cannot be rigorously representative of the members of their nominating organisations nor the corporate views of their organisations. Nominees act as a conduit for two way reporting and dialogue. Representative views are sought through the consultation process. UK SMIs are developed, reviewed and updated through a wide consultation process.

Quality assurance

NICE has accredited the process used by the UK SMI working groups to produce UK SMIs. The accreditation is applicable to all guidance produced since October 2009. The process for the development of UK SMIs is certified to ISO 9001:2008. UK SMIs represent a good standard of practice to which all clinical and public health microbiology laboratories in the UK are expected to work. UK SMIs are NICE accredited and represent neither minimum standards of practice nor the highest level

[#] Microbiology is used as a generic term to include the two GMC-recognised specialties of Medical Microbiology (which includes Bacteriology, Mycology and Parasitology) and Medical Virology.

of complex laboratory investigation possible. In using UK SMIs, laboratories should take account of local requirements and undertake additional investigations where appropriate. UK SMIs help laboratories to meet accreditation requirements by promoting high quality practices which are auditable. UK SMIs also provide a reference point for method development. The performance of UK SMIs depends on competent staff and appropriate quality reagents and equipment. Laboratories should ensure that all commercial and in-house tests have been validated and shown to be fit for purpose. Laboratories should participate in external quality assessment schemes and undertake relevant internal quality control procedures.

Patient and public involvement

The UK SMI working groups are committed to patient and public involvement in the development of UK SMIs. By involving the public, health professionals, scientists and voluntary organisations the resulting UK SMI will be robust and meet the needs of the user. An opportunity is given to members of the public to contribute to consultations through our open access website.

Information governance and equality

PHE is a 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. The development of UK SMIs is subject to PHE Equality objectives https://www.gov.uk/government/organisations/public-health-england/about/equality-and-diversity.

The UK SMI working groups are committed to achieving the equality objectives by effective consultation with members of the public, partners, stakeholders and specialist interest groups.

Legal statement

While every care has been taken in the preparation of UK SMIs, PHE and the partner organisations, shall, to the greatest extent possible under any applicable law, exclude liability for all losses, costs, claims, damages or expenses arising out of or connected with the use of an UK SMI or any information contained therein. If alterations are made by an end user to an UK SMI for local use, it must be made clear where in the document the alterations have been made and by whom such alterations have been made and also acknowledged that PHE and the partner organisations shall bear no liability for such alterations. For the further avoidance of doubt, as UK SMIs have been developed for application within the UK, any application outside the UK shall be at the user's risk.

The evidence base and microbial taxonomy for the UK SMI is as complete as possible at the date of issue. Any omissions and new material will be considered at the next review. These standards can only be superseded by revisions of the standard, legislative action, or by NICE accredited guidance.

UK SMIs are Crown copyright which should be acknowledged where appropriate.

Suggested citation for this document

Public Health England. (2017). National user manual worked example for conjunctivitis. UK Standards for Microbiology Investigations. U 2 Issue 1. https://www.gov.uk/uk-standards-for-microbiology-investigations-smi-quality-and-consistency-in-clinical-laboratories

User manual template - background

The user manual template has been developed by an UK SMI joint working group of microbiologists. The document aims to help microbiology service providers produce a comprehensive user manual meeting the current ISO standards. The ISO standards should be used in conjunction with this template[1]. Duplications within the document are intended to emphasise key points. The document should be considered a template, with suggested headings providing the basis on which individual laboratories or services can develop their own user manual.

The suggested ordering and content of this user manual can be changed but we recommend all suggested content remains included, for example, it may be possible to encompass many elements in a single hyperlinked table of services and tests offered.

The microbiology service provider's user manual is intended as a general resource for practising healthcare professionals.

It is recommended that user manuals are made available to general practitioners through their local Clinical Commissioning Group (CCG). Although not intended for public and patient groups, they may find the user manual a useful source of information.

The use of plain English is recommended.

Introduction and scope

This section is intended to provide basic information relevant only to the diagnosis of common bacterial and viral causes of conjunctivitis. This document does not cover parasitic or fungal causes of conjunctivitis. Specialist opinion should be sought in other clinical settings.

Conjunctivitis, that is primary inflammation of the conjunctiva, the thin layer of tissue that covers the front of the eye, is a common condition that causes symptoms of redness, grittiness/foreign body sensation, itchiness and watering of the eyes, and sometimes a sticky discharge. Conjunctivitis is sometimes called pink eye.

It should be noted that laboratory testing is not needed in most cases of infective conjunctivitis, as many will resolve spontaneously. In most scenarios there is no requirement to test, however conjunctivitis can be a feature of systemic infection (notably measles); there are some persistent or unusual organisms (notably chlamydia and also in neonates) and conjunctival inflammation or redness can be caused by non-infective disorders[2,3]. Persistent (over 3 weeks) cases, neonates and those with other systemic features should be investigated.

Features such as unusual ocular symptoms, the clinical appearance of the eye, the age of the patient, the exposure history and systemic features should be taken into account when assessing the likely cause of this condition.

Some causes of red eye are serious and require urgent specialist opinion, for example acute glaucoma, anterior uveitis (iritis), keratitis, endopthalmitis (infection after penetrating ocular surgery or trauma), rarely conjunctival inflammation secondary

to systemic inflammation (for example mucous membrane pemphigoid, Stevens Johnson syndrome). If there is any of moderate or severe eye pain, changes in vision or marked photophobia (not wanting to look at bright lights), abnormal pupil shape, recent ocular surgery or mucous membrane or skin involvement, seek a specialist opinion. Other causes of red eye may be less serious but not primarily due to a conjunctival problem for example dry eye, minor trauma (foreign body, abrasions, chemical/toxic exposure for example shampoo in eye), blepharitis (inflammation of the eyelids).

There are two main types of conjunctivitis – allergic and infective. Allergic conjunctivitis occurs when the immune system of the body attacks something that is not an infectious agent, such as pollen or make-up, causing inflammation. The eyes are typically very itchy.

Infective conjunctivitis accounts for around 35% of all eye problems presenting in general practice. Symptoms of infective conjunctivitis include red eye, foreign body sensation, watery and sticky discharge. Signs include a hyperaemic conjunctiva, a discharge ranging from watery (most likely viral) through mucoid to purulent (likely bacterial) however clinical signs are unreliable in distinguishing bacterial from viral conjunctivitis. It often starts in one eye and moves to involve the other eye but can affect one or both eyes .There may be history of contact with another infected person, and/or symptoms of upper respiratory tract infection. Infective conjunctivitis is caused by several different types of viruses and bacteria; although fungal or parasitic infection is possible it is very rare in developed countries. Estimates of the proportion of infective conjunctivitis that are bacterial vary widely between studies but clinical experience shows that the vast majority of infective conjunctivitis is viral, especially in

adults. Bacterial conjunctivitis is most commonly caused by *Staphylococcus* species, *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis.* Viral conjunctivitis is most commonly caused by adenovirus[4]. Chlamydia presents with a chronic conjunctivitis in newborns and people who are sexually active. It is worth noting that both adenoviral and chlamydia conjunctivitis can cause mild to moderate corneal involvement if severe or prolonged. Neonatal conjunctivitis (previously called ophthalmia neonatorum) is defined as any conjunctivitis of the newborn that occurs within the first 28 days of life. It is usually caused by infection in the UK although in other countries can be a toxic response to topical treatments applied to the eye around the time of birth. The most important causes are gonorrhoea because it can result in a serious localized infection as well as sepsis, and chlamydia which can be associated with the development of pneumonia. Herpes simplex infection is also possible in this age group.

Overview of services offered

You should include:

- detail of basic services (diagnostic testing, clinical advice, infection control, infectious diseases, outbreak management, antibiotic stewardship, etc)
- listing of specialist areas, for example, regional or national reference facilities and provision of immunoglobulins and vaccines

Locating and contacting the laboratory

You should include:

- location maps for both outside and inside the hospital (or links to the relevant source)
- specimen reception opening times and out of hours contact instructions
- instructions on making enquiries for results and requests for additional tests on existing samples
- availability of clinical advice on ordering of examinations and interpretation of examination results
- details of any out-of-hours service or shift system at the laboratory. Outline which services will always be provided and which will only be provided after consultation
- contact details for key members of staff including availability times, email addresses of key members of staff, how to obtain results and clinical advice for out of hours service
- whether the public has access to the laboratory or not and where phlebotomy (and paediatric phlebotomy) services are located
- clear advice to patients on how to obtain results; explain whether patients should or should not call the laboratory directly for results – indicating consideration of data security and clinical risk

Consent, collection and transport of specimens

You may wish to include generic advice on collecting and transporting specimens such as:

- instructions for preparation for sample collection (for example, for caregivers, phlebotomists, sample collectors and patients)
- recording the use of anti-infective treatments, topical or systemic and other topical eye treatments
- procedures for the safe collection and handling of primary samples, including appropriate health and safety advice on labelling and transporting high risk samples, such as those containing radioactive isotopes. Information for users on whether certain samples should be regarded as high risk should be clear. Universal precautions should be recommended
- instructions for sample collectors, including instructions for patient-collected samples, for example: type and amount of the primary sample(s) to be collected; descriptions of the primary sample containers (pictures may be helpful) and any necessary additives; special timing of collection, where needed; how and where to provide clinical information relevant to or affecting sample collection, test performance or result interpretation (for example, drug dosages and timings); information on how to order supplies of the relevant containers, forms, labels etc. This may be displayed in table format or images/pictures and may be linked or cross referenced to patient information sheets
- information on the appropriate amount of specimens required for multiple requests (this may be automatically calculated by electronic test order software)
- instructions for proper storage conditions and maximum times for storage before collected samples are delivered to the laboratory and in a manner that ensures the integrity of the sample and safety for the carrier, general public and receiving laboratory, in compliance with established requirements. You should refer to the applicable ISO standard
- instructions for transportation of samples, including any special handling needs (such as high risk samples, radioactive isotopes, samples on dry ice). You may wish to describe specific or defined details of the transport times as well as cut off times for receipt at individual laboratories, if applicable

Test repertoire - suspected infective conjunctivitis *this is an example of format only*

You should include the following:

- examinations offered by the laboratory. Include logical listings or tables of tests and turnaround times, primary sample volumes, specific specimen containers, special precautions, and procedures for medico-legal samples
- details of relevant clinical algorithms, with links to local or national policies
- lists of referred tests, including the names, addresses and accreditation status of laboratories to which work is routinely referred
- a table to state the duration of storage for samples that may need re-testing, with information on disease incubation periods, testing interval and time limits for requesting additional tests

You may also wish to include information on the costs of tests.

Clinical Setting	**First line investigation and target pathogens**	**Second line investigation and target pathogens**	**Rationale**	**Notes**	**Hyperlinks**
Uncomplicated suspected infective conjunctivitis- not neonate	Bacterial eye swab – *S. aureus,* *S. pneumoniae,* *S. pyogenes,* *M. catarrhalis,* *H. influenzae,* *N. gonorrhoeae*. The list is not exhaustive. Refer to UK SMI B 2 – Investigation of bacterial eye infections. Viral eye swab - adenovirus ***Note: Many cases of conjunctivitis will not require laboratory investigation***	Eye swab for NAAT *C. trachomatis* Rare bacterial pathogens Viral eye swab, lesion swab – VZV/HSV, enterovirus		Haemorrhagic conjunctivitis - enterovirus 70, 71 and coxsackievirus A24, B2 Adenovirus 8, 19- associated with keratoconjunctivitis. Notify laboratory if an outbreak is suspected	As above. Consider BASHH guidelines on NAAT for non-genital samples

Neonate (under 28 days old)	Eye swab for NAAT. *Add laboratory specific detail on kit used.* For detection of *C. trachomatis* and *N. gonorrhoea* Bacterial eye swab – *S. aureus, S. pneumoniae, S. pyogenes, M. catarrhalis, H. influenzae, N. gonorrhoeae,* etc.	Eye swab for virus Detection. Consider HSV *Add laboratory specific detail on kit used.*	Chlamydia and gonorrhoea are the most important cause with potential for eye damage and systemic illness, plus implications for mother and her sexual contacts. Most laboratories can offer chlamydia and gonorrhoea molecular detection as a set of tests on a single sample. Viral conjunctivitis in neonates is relatively rare and uncomplicated but can be serious if HSV.	Suspected neonatal HSV should trigger urgent paediatric referral. If *C. trachomatis* or *N. gonorrhoeae* detected, mother and her sexual contacts should be offered testing and the baby will require paediatric referral due to risk of severe local or systemic infection.	Specimen type page which should include picture of kits/ instructions on how to take samples/ pitfalls of tests/ turnaround times/sample storage duration/ if referred to another laboratory/ etc. *Duplicate links to professional guidance here (links must be maintained however)*
Conjunctivitis as a feature of systemic illness	Depends on illness- *see local document sections on rash.*		Conjunctivitis can be a feature of serious systemic infectious disease, for example measles, viral haemorrhagic fever, Zika virus, Leptospirosis.	In some of these, eye swab will detect pathogen, some not.	Links to pages on rash illness, and other relevant pages. Warnings about high risk samples.
Specific conditions	*Molluscum contagiosum* - EM/PCR of vesicle material; Papillomavirus 6,11 – Swab/ biopsy for NAAT; amoebic etc				

Reporting results

You should include the following:

- provide instructions for making result enquiries
- advice to review electronic reporting systems before phoning for results
- explanation of different report status categories (interim, final, amended)

Interpreting laboratory results ***this would normally be in another section but can be duplicated here as text or some can go in table above, for example technical test performance characteristics***

You should include relevant information on:

- biological reference intervals or clinical decision values (document their basis)
- a list of factors known to significantly affect the performance of the examination (uncertainty of measurement) or the interpretation of the results
- performance characteristics – sensitivity/specificity of the tests

You may wish to include:

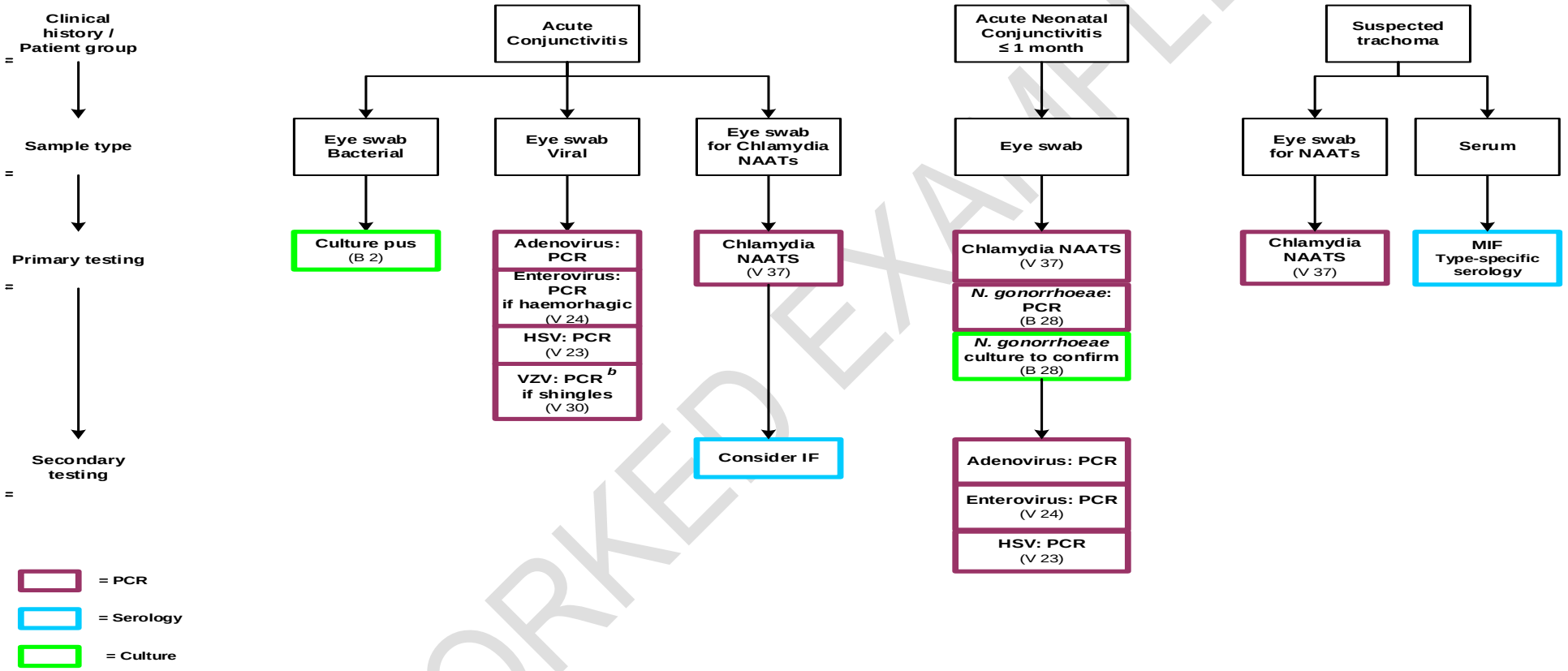
- pitfalls of serology, PCR, culture etc. As well as having such things embedded within individual tests, consider a brief explanation of passively acquired antibody, cross reactivities for IgM assays and the effects of sample quality

Quality assurance and governance

You should include details of:

- the quality assurance and governance structure for the laboratory
- the complaints procedure
- the laboratory's policy on protection of personal information; and the fax and email policy
- ensure that the manual is consistent with ISO15189 guidance[1]
- a statement on the accreditation status, link to the accreditation body, and list of which (if any) tests are excluded from the accredited scope of practice (accreditation status of test repertoire)
- how to obtain validation/verification data
- compliance with Human Tissue Act

Appendix 1: Conjunctivitis *example of format only*



Abbreviations and their definitions:
NAAT – Nucleic Acid Amplification Test, PCR – Polymerase Chain Reaction, HSV - Herpes Simplex Virus, MIF – Microimmunofluorescence Test, IF - Immunofluorescence Test, VZV - Varicella Zoster Virus

Footnotes

a) Also refer to UK SMI B 2 – Investigation of bacterial eye infections, B 28 – Investigation of genital tract and associated specimens and V 37 – Chlamydia trachomatis infection – testing by nucleic acid amplification test (NAATS).

b) Only carried out if shingles is indicated in the clinical details.

References

Modified GRADE table used by UK SMIs when assessing references

Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) is a systematic approach to assessing references. A modified GRADE method is used in UK SMIs for appraising references for inclusion. Each reference is assessed and allocated a grade for strength of recommendation (A-D) and quality of the underlying evidence (I-VI). A summary table which defines the grade is listed below and should be used in conjunction with the reference list.

Strength of recommendation	**Quality of evidence**
A Strongly recommended	I Evidence from randomised controlled trials, meta-analysis and systematic reviews
B Recommended but other alternatives may be acceptable	II Evidence from non-randomised studies
C Weakly recommended: seek alternatives	III Non-analytical studies, for example, case reports, reviews, case series
D Never recommended	IV Expert opinion and wide acceptance as good practice but with no study evidence
	V Required by legislation, code of practice or national standard
	VI Letter or other

1. European committee on Standardization. Medical laboratories - Requirements for quality and competence (ISO 15189:2012). British Standards Institution. 1-50. 2012. **A, V**

2. Royal College of General Practitioners. Management of infective conjunctivitis in primary care. 1-5. 2014. **A, V**

3. The Royal College of Opthalmologists. Commissioning better eye care. 1-17. 2013. **A, V**

4. Azari AA, Barney NP. Conjunctivitis: a systematic review of diagnosis and treatment. JAMA 2013;310:1721-9. **B, III**