Guideline

Neonatal Conjunctivitis: Emergency Management

Document ID	CHQ-GDL-63331	 **Standard 4** Medication Safety	
Version No.	3.0		
Risk Rating	Low		
Primary Document			
Custodian	Director of Infection Management and Prevention service (IMPS)	**Approval date**	25/03/2025
Accountable Officer	Executive Director Clinical Services	**Effective date**	31/03/2025
Applicable to	All Children's Health Queensland Clinical staff	**Review date**	25/03/2031

HUMAN RIGHTS

This governance document has been human rights compatibility assessed. Limitations identified were deemed justifiable indicating reasonable confidence that, if adhered to, there are no implications arising under the *Human Rights Act 2019.*

PURPOSE

This evidence-based guideline provides clinical practice advice for clinicians involved in the emergency management of neonates with conjunctivitis.

SCOPE

This guideline applies to all Queensland Health Hospital and Health Services Staff involved in the care and management of neonates with conjunctivitis.

INTRODUCTION

Neonatal conjunctivitis, also known as ophthalmia neonatorum, is an acute infection of the conjunctiva of neonates (up to 4 weeks of age, but typically presents within 2 weeks)[0]. Although ophthalmia neonatorum previously was defined as infection caused by *Neisseria gonorrhoea*, it now refers to a neonatal conjunctivitis of any aetiology[0], including chemical (only seen in countries who use newborn ocular prophylaxis), bacterial or viral.

The incidence of neonatal conjunctivitis has been quoted at 1.6-12% of all newborns[0], with this high variation attributed to socioeconomic status, changing prevalence of pregnant women with sexually transmitted infections, and diverse screening and prophylaxis practices in both the pregnant mother and neonate. Routine ocular prophylaxis with silver nitrate at birth to prevent gonococcal conjunctivitis was initially introduced in the 1880s[0], and is still considered the standard of care in the United States and Canada[0-0]. This practice has not been adopted in Australia due to limited evidence regarding the effectiveness of prophylaxis, as well as improved screening and treatment for sexually transmitted infections[0,0].

Causative organisms can be both bacterial and viral, with the sexually transmitted infections having high potential for morbidity (in particular, *Chlamydia trachomatis*, *Neisseria gonorrhoea* and herpes simplex virus). Other organisms include *Haemophilus species*, *Streptococcus pneumoniae*, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa, Neisseria meningitidis* and adenovirus.

Transmission commonly occurs at birth during vaginal delivery. However, there are reports of neonatal infection in Caesarean sections with, and rarely, without rupture of membranes[0]. The risk of a neonate acquiring a Chlamydia conjunctivitis is 20 to 50 % if their mother has Chlamydia cervicitis[0] , with similar rates of 30 to 40% for Neisseria gonorrhoea[0].

Co-infection is common, and hence, mothers and neonates should be investigated for both if either is suspected[0]. Additionally, like conjunctivitis of any age, organisms can be transmitted via contact from others handling the neonate[0].

Neonates can present with conjunctival injection, chemosis, swelling of the eyelid, ulceration, and a discharge that can range from watery to mucopurulent0. Onset of symptoms can give a clue of the pathogen, with gonorrhoea presenting acutely from day 2 to 5, and chlamydia from day 5 to 14[0]. Herpes simplex has a similar timing of onset as Chlamydia, with herpetic lesions being a distinguishing feature[0]. Chemical conjunctivitis presents on day 1 as a reaction to prophylaxis for ophthalmia neonatorum, and as previously stated, is not an issue in Australia[0]. Despite these features being a helpful guide, the spectrum of presenting signs is varied, and the underlying cause can still be difficult to distinguish clinically. Differentials to consider for neonatal conjunctivitis include nasolacrimal duct obstruction, congenital glaucoma, an ophthalmic foreign body (cornea abrasion more common after birth related injury) and corneal abrasion.

It is critical that the neonate is promptly evaluated, as some pathogens can be sight and life threatening. Morbidity of untreated disease can be devastating, as neonatal conjunctivitis used to be the most common cause of blindness[0]. This was primarily caused by Neisseria gonorrhoea, which can cause ulceration, perforation of globe and pan-ophthalmitis **within 24 hours**[0]. For this reason, if there is high clinical suspicion of gonococcal infection, presumptive systemic antibiotics should be commenced as well as requesting an urgent gram stain, bacterial culture and PCR. Disseminated disease may present as sepsis, meningitis or arthritis, with septic arthritis the most common manifestation[13-15]. Any concerns of disseminated disease must be investigated quickly to decrease morbidity and determine duration of antibiotics.

Systemic treatment for herpes conjunctivitis must also be commenced empirically, due to high risk of mortality and permanent neurological sequelae if left untreated. Early acyclovir prevents progression to disseminated or CNS disease, with 50 to 60 % progressing if untreated[16]. One year mortality rates have dropped from 85% to 29% for disseminated disease, and from 50% to 4% for CNS disease since the introduction of antiviral therapy[0]. Additionally, antivirals have also decreased the morbidity of survivors of disseminated disease, with normal neurological development of survivors increasing from 50% to 80%[17].

Treatment of Chlamydia conjunctivitis also requires systemic antibiotics. Topical drops are ineffective and do not address the potential for lung involvement (Chlamydia pneumonia)[0]. However, treatment with oral

antibiotics can wait until a positive diagnosis is confirmed, although when neonatal gonococcal conjunctivitis is suspected oral azithromycin treatment is commenced concomitantly with cefotaxime to delay cephalosporin resistance in *N. gonorrhoeae*, and because co-infection with *C. trachomatis* is possible.

Neonates with conjunctivitis should be co-admitted under general paediatrics and ophthalmology with involvement of other multidisciplinary teams as required.

Conversely, congenital nasolacrimal duct (NLD) obstruction (dacryostenosis) occurs in approximately 6 percent of newborns and is the most common cause of persistent tearing and ocular discharge in infants and young children. Most cases resolve spontaneously.

ASSESSMENT

HISTORY

- Past medical history of neonate
- Delivery – vaginal vs. caesarean section
- Premature rupture of membranes
- Adequacy of prenatal care
- History of maternal sexually transmitted disease and any previous microbiology results
- Neonatal prophylaxis – erythromycin/silver nitrate (if born overseas where this may be standard of care)
- Timing of symptom onset (since birth)
    - Gonorrhoea - usually 2 to 5 days
    - Chlamydia - usually 5 to 14 days
    - Herpes - usually 6 to 14 days
        - Note: can present earlier if premature rupture of membranes, or later if partially treated with antibiotics for other illnesses
- Has any treatment been already initiated?

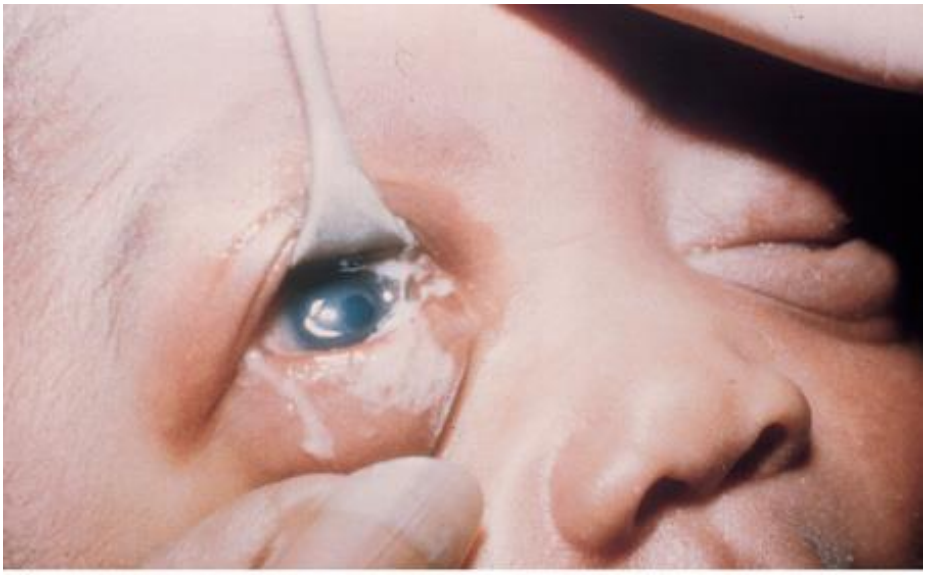
EXAMINATION

Examination should occur with standard contact precautions in place (ie. gloves + gown).

Ensure the patient has adequate analgesia to facilitate your examination.

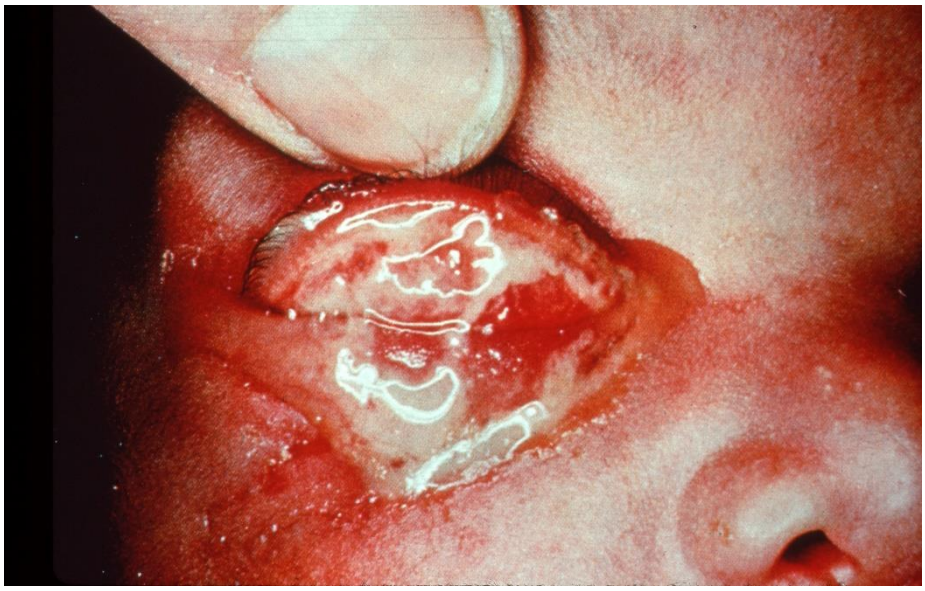
- General appearance (toxic or shocked)
- Temperature and vital signs
- Eye (refer to figures 1, figure 2 and figure 3 below)
    - General inspection
        - Unilateral vs. bilateral involvement
        - Discharge (watery, purulent, blood-tinged, volume)
            - Note: blood-tinged discharge has a high specificity and positive predictive value for chlamydial conjunctivitis[18]

        - Proptosis
        - Surrounding cellulitis or vesicles
    - Eyelids – oedema
        - Can be difficult to open eyes if severe – do not insert an eye speculum without ophthalmology review
    - Conjunctiva – erythema, chemosis, scarring, pseudomembrane formation
    - Cornea – assess clarity of cornea, ulceration
    - Complications of untreated conjunctivitis
        - Pan-ophthalmitis
        - Perforation of globe
- Instil 2 % fluorescein into the eye
    - Assess corneal integrity
    - Assess for dendritic ulcers suggestive of herpes simplex infection
- Assess for involvement of other systems
    - Chlamydia pneumonia
    - Disseminated gonococcal infection – stomatitis, arthritis, rhinitis, septicaemia, meningitis, abscess
    - Disseminated meningococcal infection – sepsis, meningitis
    - Evidence of herpetic vesicles or disseminated herpetic infection



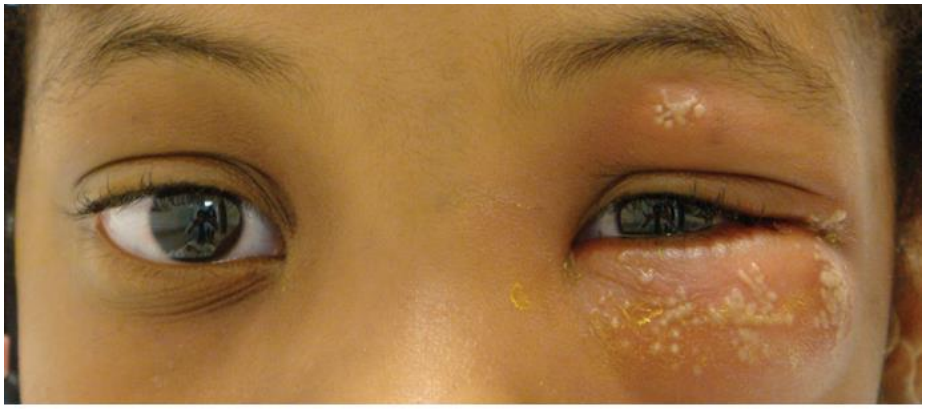
Source: Knoop KJ, Stack LB, Storrow AB, Thurman RJ: *The Atlas of Emergency Medicine, 3rd Edition:* http://www.accessmedicine.com

Figure 1 – Neonatal gonococcal conjunctivitis, with eyelid oedema and profuse purulent discharge



Source: *Red Book: 2015 Report of the Committee on Infectious Diseases*, **American Academy of Paediatrics:** 2015; 30th Edition: https://redbook.solutions.aap.org/chapter.aspx?sectionid=88187122&bookid=1484

Figure 2 – Neonatal chlamydial conjunctivitis, with blood-tinged discharge



Source: Shah BR, Lucchesi M, Amodio J, Silverberg M: *Atlas of Pediatric Emergency Medicine:* www.accessemergencymedicine.com

Figure 3 – Herpes simplex vesicles (not neonatal)

ALERT

High-risk features that should prompt urgent ophthalmologic referral include:

- **Clinical features suggestive of Neisseria gonorrhoea infection**
  - **Onset of any of the following symptoms within 2 to 5 days: bilateral, profuse purulent discharge or eyelid swelling**
- **Evidence of complications – significant chemosis, corneal ulceration or loss of corneal clarity, scarring, pan-ophthalmitis, globe perforation**

INVESTIGATIONS

Do not clean the eye(s) prior to taking swabs (Refer to Appendix 1: Swab Collection Guide)

- Bacterial swab (gel swab) for bacterial microscopy, culture and sensitivity (M/C/S) and urgent Gram stain
  - Order on iEMR as "superficial pus or swab culture (M/C/S)", and in "Reason for order/details" request "neonatal conjunctivitis - urgent Gram stain".
  - Please call the QCH laboratory specimen reception on (07) 3846 3500 to ensure urgent transfer and processing of the specimen at Royal Brisbane and Women's Hospital (RBWH). Otherwise specimens are not processed after hours or on weekends.
- Viral swab (dry swab) for polymerase chain reaction (PCR) for Chlamydia, *N. gonorrhoea*
- Consider further investigations if concerns for disseminated disease where appropriate. These may include:
  - Full blood count (FBC), urea, creatinine, electrolytes and liver function tests (CHEM20)
  - Blood culture
  - Lumbar puncture
  - Joint aspiration for M/C/S
  - Additional eye swab PCR
    - Consider Herpes Simplex Virus (HSV) 1 and HSV 2 if specific risk, examination finding or unwell neonate
    - Consider Varicella Zoster Virus (VZV) if there is specific risk or examination finding
    - Consider adenovirus if other swabs negative and patient still symptomatic

MANAGEMENT

- Contact ophthalmology registrar for review
- Treat specific organisms according to Table 2 if already known
  - Empiric: Chloramphenicol 0.5 % eye drops 1 drop into affected eye/s four times a day.
  - Gonococcal infections should be treated with immediate empiric therapy if:
    - Severe/concerning eye examination
    - Gram negative diplococci are seen on gram stain or PCR positive
  - Treat suspected herpes simplex infections in the neonate empirically with IV aciclovir
  - Meningococcal - Conjunctivitis caused by Neisseria meningitidis can precede or accompany systemic disease; treatment is as for invasive meningococcal disease.
- If severe conjunctivitis of unknown cause, treat as suspected gonococcal conjunctivitis until ophthalmology review
- Regular eye flushing with sodium chloride 0.9% as necessary (Refer to Appendix 2: Eye Flush Technique)
- Hand hygiene

Table 2: Antibiotic Treatment for Neonatal Conjunctivitis

Organism	Antimicrobial
Chlamydia trachomatis	Oral Azithromycin 20 mg/kg (1g maximum) daily for three days Note – infant should be monitored for infantile hypertrophic pyloric stenosis
Neisseria gonorrhoeae	Single dose of Ceftriaxone IV or intramuscular 50 mg/kg (Refer to RCH Paediatric injectable guidelines for administration advice) PLUS Oral Azithromycin 20 mg/kg (1g maximum) daily for three days Note: Single dose IV or IM ceftriaxone does not significantly increase risk for kernicterus in neonates. Ongoing use requires ID review and approval.
Neisseria meningitidis	Conjunctivitis caused by *Neisseria meningitidis* can precede or accompany systemic disease; treatment is as for invasive meningococcal disease. Cefotaxime IV – seek ID advice for duration of treatment For neonatal dosing recommendations, refer to Cefotaxime monograph - NeoMEDQ
Other bacterial causes • Staphylococcus aureus • Staphylococcus epidermidis • Streptococcus pneumoniae • Streptococcus viridans • Haemophilus species • E. Coli	Chloramphenicol 0.5% eye drops 1 drop into affected eye/s four times a day for up to 7 days until conjunctivitis has resolved as directed by Ophthalmologist. Chloramphenicol eye ointment can be used instead of chloramphenicol eye drops if the patient prefers. Monitor full blood count if continuing for more than days. Bone marrow hypoplasia, including aplastic anaemia and death, has been rarely reported following local application of chloramphenicol.
Herpes simplex (encephalitis excluded)	Aciclovir IV for 10 to 14 days For neonatal dosing recommendations, refer to Aciclovir monograph - NeoMEDQ If corneal involvement, add Aciclovir 3 % eye ointment, applied to affected eye/s 5 times daily under guidance of Ophthalmology team

It is important to treat mother and her sexual partner(s) for any sexually transmitted organisms.

- They should be referred to their General practitioner (GP) or an appropriate sexual health clinic for further assessment, management and contact tracing.

DISPOSITION

- All neonates with suspected neonatal conjunctivitis should be co-admitted under general paediatrics and ophthalmology if any of the concerns below are present. This is to observe response to therapy and monitor for disseminated disease.
  - Suspicion of gonococcal, chlamydia or HSV infection
  - Signs of severe conjunctivitis, e.g. bilateral, profuse purulent discharge or eyelid swelling
  - Evidence of complications, e.g. significant chemosis, corneal ulceration or loss of corneal clarity, scarring, pan-ophthalmitis, globe perforation
  - If likely non-compliance, loss to follow-up or geographic isolation
- Infection in a neonate, infant or child may reflect mother-to-child transmission, accidental transmission or sexual abuse
- Discharge can be considered if the neonate has mild symptoms, systemically well, and able to return for follow up in the ophthalmology outpatient clinic. Swabs must be sent, and neonate must be discussed with the ophthalmology registrar prior to discharge.

SUPPORTING DOCUMENTS

STANDARDS:

- Australian Standard Medical and Surgical Equipment
- National Safety and Quality Health Service (NSQHS) Standards

SUPPORTING DOCUMENTS:

- CHQ-GDL-01202 Paediatric Antibiocard: Empirical Antibiotic Guidelines
- CHQ Procedure 01036 Antimicrobial: Prescribing, Management and Stewardship

CONSULTATION

Key stakeholders who reviewed this version:

• Director, IMPS, Immunology and Rheumatology • Infection Management Specialist	• Pharmacist Advanced - Antimicrobial Stewardship • Medicines Advisory Committee – Endorsed 20/03/2025

ABBREVIATIONS

Term	Definition
AMS	Antimicrobial Stewardship
CHEM20	Biochemistry including electrolytes, urea, creatinine and liver function tests
CHQ	Children's Health Queensland
FBC	Full blood count
GP	General Practitioner
HSV	Herpes simplex virus
ID	Infectious diseases specialist
iEMR	Integrated electronic medical record
IMPS	Infection Management and Prevention services
IV	Intravenous
MCS	Microscopy, culture and sensitivities
PCR	Polymerase chain reaction
QCH	Queensland Children's Hospital
RBWH	Royal Brisbane and Women's Hospital
VZV	Varicella zoster virus

DEFINITIONS

Term	Definition
Pseudomembrane	A layer of exudate resembling a membrane
Pan-ophthalmitis	Inflammation of all the tissues in the eye
Chemosis	Swelling/oedema of the conjunctiva
Proptosis	Abnormal protrusion or displacement of an eye

REFERENCES

No.	Reference
1	*Treatment and Prevention of Ophthalmia Neonatorum.* **Matejcek, A., and Goldman, R.D.** Canadian Family Physician: 2013; **59**; pp 1187-90
2	*Recommendations for Prevention of Neonatal Ophthalmia.* **Canadian Paediatric Society Infectious Diseases and Immunization.** Paediatr Child Health: 2002;**7:7**; pp 480–8

3	*Gonococcal Infections in Neonates and Young Children.* **Woods, C.R.** Semin Pediatr Infect Dis: 2005; **16:4**; pp 258-70
4	*A Meta-Analysis of the Efficacy of Ocular Prophylactic Agents Used for the Prevention of Gonococcal and Chlamydial Ophthalmia Neonatorum.* **Darling, E.K., and McDonald, H.** Journal of Midwifery & Women's Health: 2010; **55:4**; pp 319-27
5	*Reconsideration of Crede Prophylaxis. A study of Maternity and Neonatal Care.* **Wahlberg, V.** Acta Paediatr Scand Suppl: 1982; **295**; pp 1-73
6	*Risk of Perinatal Transmission of Chlamydia Trachomatis By Mode Of Delivery.* **Bell, T.A., Stamm, W.A., Kuo, C.C., et al.** J Infect: 1994; **29:2**; pp 165-9
7	*Gonorrhoea in the Newborn.* **Alexander, E.R.** Ann N Y Acad Sci: 1998; **549**; pp 180-186
8	Red Book: 2015 Report of the Committee on Infectious Diseases. **American Academy of Pediatrics** 2015; 30th edition; p 288
9	*Prospective Study of Perinatal Transmission of Chlamydia Trachomatis.* **Schachter, J., Grossman, M., Sweet, R.L., et al.** JAMA: 1986; **255:24**; pp 3374-7
10	*Sexually Transmitted Diseases Treatment Guideline, 2015.* **Workowski, K.A., and Bolan, G.A.** MMWR Recomm Rep: 2015; **64;** pp 1-137
11	*Transmission and Control of Infection in Ophthalmic Practice.* **Seewoodhary, R., and Stevens, S.** Community Eye Health: 1999; **12:30**; pp25-8
12	*Ophthalmia Neonatorum: What Kind Of Prophylaxis?.* **Zuppa, A.A., D'Andrea, V., Catenazzi, P., et al.** J Matern Fetal Neonatal Med: 2011; **42:6**; pp 769-73
13	*Gonococcus Arthritis in Infancy: A Clinical Study of 44 Cases.* **Cooperman M.B.** Am J Dis Child: 1927; **33**; pp. 932
14	*Neonatal Gonococcal Arthritis: Three Cases and Review of the Literature*. **Kohen D.P.** Paediatrics: 1974; **53**; pp. 436
15	*Neonatal Gonococcal Arthritis after Negative Prenatal Screening and Despite Conjunctival Prophylaxis*. **Babi F. E., Ram S., Barnett E.D., et al.** Pediatr Infect Dis J: 2000; **19**; pp. 346
16	*Changing on of Herpes Simplex Virus Infection in Neonates.* **Whitley, R.J., Nahmias, A.J., Soong, S.J., et al.** J Infect Dis: 1988; **158:1**; pp 109-16
17	*Herpes Simplex Virus Infections of the Newborn.* **Kimberlin, D.W.** Semin Perinatol: 2007; **31:1**; pp 19-25
18	*Sequelae of neonatal inclusion conjunctivitis and associated disease in parents.* **Mordhost, C.H., and Dawson, C.** Am J Ophthalmol: 1971; **71**: pp. 861
19	Therapeutic Guidelines: Antibiotic 2020 Therapeutic Guidelines Ltd. Melbourne
20	The Australasian Neonatal Medicines Formulary Steering group. https://www.anmfonline.org/clinical-resources/ [Accessed 12 April 2023]
21	Antiviral Approaches for the Treatment of Herpes Simplex Virus Infections in Newborn Infants. **Poole CL, Kimberlin DW.** Annu. Rev. Virol. 2018. 5:407–25

GUIDELINE REVISION AND APPROVAL HISTORY

Version No.	Modified by	Amendments authorised by	Approved by / DATE	Comments
1.0 31/03/2021	Ophthalmology Specialist team	Medicines Advisory Committee	Executive Director Clinical Services (QCH)	
2.0 20/04/2023	Director – Ophthalmology Director – IMPS, Immunology and Rheumatology Pharmacist Advanced - AMS	Medicines Advisory Committee	Executive Director Clinical Services (QCH)	
3.0 25/03/2025	Paediatric Infection Specialists Director – IMPS, Immunology and Rheumatology Pharmacist Advanced - AMS	Medicines Advisory Committee	Executive Director Clinical Services (QCH)	Scheduled review

Key words	Neonatal conjunctivitis, ophthalmia neonatorum, ophthalmology, chloramphenicol, azithromycin, ceftriaxone, cefotaxime, aciclovir, Neisseria meningitidis, Gonorrhoea, antimicrobial stewardship, 63331
Accreditation references	National Safety and Quality Health Service Standards (1-8) – • 3: Preventing and Controlling Healthcare-Associated Infection • 4: Medication Safety

APPENDIX 1: SWAB COLLECTION GUIDE

This is a Health Support Queensland document 32843 - V2.0 - Swab Collection Guide - Microbiology Central Laboratory. The below images are for reference only.

HealthSupport Queensland

Pathology Queensland

Swab Collection Guide – Microbiology Central Laboratory

GEL - AMIES

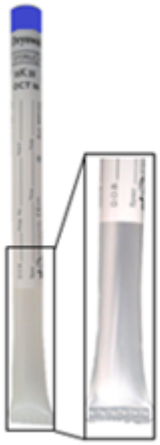
Gel swabs contain bacterial transport medium to maintain viability of organisms.

USE FOR:

- Bacterial M/C/S (skin, wound, abscess and surgical)
- MRSA screening
- Vancomycin resistance *Enterococcus* (VRE)
- ESBL screening
- Group B *Streptococcus* (Antenatal patients only) – introital or perianal swab
- Genital swabs for *Neisseria gonorrhoeae* culture

DO NOT use for PCR

DRY SWABS



Dry swabs are required for PCR testing. (Gel will interfere with these tests).

USE FOR:

- PCR testing - specify what PCR testing is requested
- Combination of *Chlamydia*, *Gonorrhoeae* and *Trichomonas* require 2 dry swabs

DO NOT use for M/C/S
(acceptable for screening swabs)

VIRAL SWABS

Vial contains viral transport medium. This maintains the viability of the virus.

USE FOR:

- Viral PCR
- Can also be used for PCR testing (Specify type of PCR)

DO NOT use for M/C/S
DO NOT use for Chlamydia, or Gonorrhoea PCR

Page: 1 of 1
Document Number: 32843V2
Valid From: 08/03/2021
Approver/s: Claire HENEY

Queensland Government

APPENDIX 2: EYE FLUSH TECHNIQUE

EQUIPMENT

- Cotton balls
- Sodium chloride 0.9%
- Gloves

PROCEDURE

- Explain to procedure to the carer
- Soak cotton balls in sodium chloride 0.9%
- Hand hygiene + apply non-sterile gloves
- Clean least affected eye first
- Using the soaked cotton ball, gently wipe from the inner canthus to the outer canthus. Discard the cotton ball after one sweep. If the same eye requires further cleaning, use a new cotton ball.
- Remove non-sterile gloves and perform hand hygiene
- Apply another pair of gloves and repeat the procedure for the opposite eye. Do not use the same gloves for both eyes (to avoid cross-contamination).