2018 UK national guideline for the management of infection with *Neisseria gonorrhoeae*

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Changes since 2011 guideline

- First line empirical treatment is now monotherapy with ceftriaxone 1g intramuscularly
- If antimicrobial susceptibility test results are available prior to treatment and the isolate is sensitive to ciprofloxacin, then this should be used for treatment in preference to ceftriaxone
- Inclusion of testing recommendations in people following gender reconstructive surgery
- Recommendations for extra-genital testing in those with suspected or confirmed antimicrobial resistance
- Epidemiological treatment is recommended only for those presenting within 14 days of exposure. For those presenting after 14 days of exposure we recommend treatment based on the results of testing.

SCOPE AND PURPOSE

This guideline offers recommendations for the diagnostic tests, treatment regimens and health promotion principles needed for the effective management of gonorrhoea in people aged 16 years and older. For individuals under the age of 16 years please see the BASHH guideline on STI and Related Conditions in Children and Young People. The guidelines are primarily aimed at level 3 sexual health services within the United Kingdom (UK) although the principles of the recommendations could be adopted at all levels.

EDITORIAL INDEPENDENCE

This guideline was commissioned and edited by the Clinical Effectiveness Group (CEG) of the British Association for Sexual Health and HIV (BASHH), which provided funding for the literature search. No other funding was obtained.

CONFLICT OF INTEREST

All authors have signed BASHH conflict of interest forms.

AUTHOR AFFILIATION

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RIGOUR OF DEVELOPMENT

This guideline was produced according to specifications set out in the CEG's 2015 document 'Framework for guideline development and assessment' outlined at https://www.bashh.org/bashh-groups/clinical-effectiveness-group/ and has been updated by reviewing the previous gonorrhoea guideline (2011) and medical literature since its publication. A MEDLINE search of published articles in English language for the years 2009–18 was done using the subject headings 'gonorrhoea' OR 'gonorrhea' OR 'Neisseria gonorrhoeae' AND 'therapy' OR 'treatment' OR 'therapeutics' OR 'resistance' OR 'anti-bacterial agents' OR 'antibiotics' OR 'failure' OR 'toxicity'. All entries in the English language or with abstracts in English were viewed because of the paucity of 'clinical trials' or 'reviews'. The Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effectiveness and Cochrane Controlled Trials Register were reviewed using the textword 'gonorrhoea' and all entries were considered. Abstracts from meetings in the relevant period were hand-searched and considered. Priority was given to randomized controlled trials and systematic review evidence. Recommendations were made and graded on the basis of best available evidence. There is a scarcity of high quality evidence to guide treatment recommendations and therefore, a meeting was held in June 2018 to discuss and resolve differences in opinion surrounding treatment recommendations. This was attended by representatives from the guideline writing group, the CEG, the

Gonococcal Resistance to Antimicrobials Surveillance Programme (GRASP) Steering Group and the BASHH Bacterial Special Interest Group. Final agreement was achieved by a majority decision following an open vote in this meeting. The draft guideline was appraised with the AGREE instrument, posted on the BASHH website for a consultation period of two months and piloted in a sample of clinics.

PATIENT AND PUBLIC INVOLVEMENT

A patient representative was a member of the writing group, attended writing group meetings and was involved in the development of the guideline. In addition, attendees for treatment of confirmed gonorrhoea at a specialist sexual health service were consulted on treatment options (including epidemiological treatment) and test of cure.

AETIOLOGY

Gonorrhoea is caused by the Gram-negative diplococcus *Neisseria gonorrhoeae*. The primary sites of infection are the columnar epithelium-lined mucous membranes of the urethra, endocervix, rectum, pharynx and conjunctiva. Transmission is by direct inoculation of infected secretions from one mucous membrane to another. Secondary infection to other anatomical sites, through systemic or transluminal spread, can also occur.

CLINICAL FEATURES[1-3]

Symptoms and signs of infection with gonorrhoea depend, in part, on the site of infection. Co-existing infections and conditions such as *Chlamydia trachomatis, Trichomonas vaginalis, Mycoplasma genitalium, Candida albicans* and bacterial vaginosis, are not uncommon and these should be considered as a possible cause for an individual's symptoms.

Penile urethral infection

Symptoms occur in over 90% of individuals, with discharge and/or dysuria appearing two to five days following exposure. A mucopurulent urethral discharge is often

present on examination. Rarely, individuals may complain of testicular and epididymal pain with tenderness and swelling present on examination.

Female urethral infection

Urethral infection may present with dysuria without urinary frequency.

Endocervical infection

The most common symptom, occurring in about 50% of individuals, is an increased or altered vaginal discharge. In about a quarter of individuals, lower abdominal pain is present. Gonorrhoea rarely causes intermenstrual bleeding and menorrhagia. On examination, a mucopurulent endocervical discharge may be seen and easily induced endocervical bleeding is a common finding. However, pelvic and lower abdominal tenderness is an uncommon examination finding in the absence of coinfection with *Chlamydia trachomatis*.

Rectal infection

Most cases are asymptomatic but symptoms may include anal discharge and perianal/ anal pain or discomfort. Rectal infection in cisgender women is present in up to a third of cases of urogenital infection but rarely in the absence of a history of anal sex.

Pharyngeal infection

This is predominantly asymptomatic but is occasionally associated with a sore throat.

Complicated infection

Transluminal spread of *N. gonorrhoeae* from the urethra or endocervix may occur and cause epididymo-orchitis, prostatitis or pelvic inflammatory disease (PID). Haematogenous dissemination may occur from infected mucous membranes to cause skin lesions, arthralgia, arthritis and tenosynovitis (disseminated gonococcal infection). In a study involving nearly 4,000 cisgender women attending a sexual health clinic in the UK, PID was reported in approximately 14% of those with gonorrhoea.[4]

DIAGNOSIS AND SPECIMEN COLLECTION

This section should be read in conjunction with Public Health England's 'Guidance for the detection of gonorrhoea in England', 2014.[5] The diagnosis of gonorrhoea is established by the detection of *N. gonorrhoeae* at an infected site, either by nucleic acid amplification tests (NAATs) or by culture. The approach and method used to test for gonorrhoea will be influenced by the clinical setting, storage and transport system to the laboratory, local prevalence of infection and the range of tests available in the laboratory. No test for gonorrhoea offers 100% sensitivity and specificity.[5-8]

Microscopy

- Microscopy of Gram-stained genital specimens allows direct visualisation of *N. gonorrhoeae* as monomorphic Gram-negative diplococci within polymorphonuclear leukocytes.
- **Penile urethra**
  - Microscopy of urethral or meatal swab smears has good sensitivity (90–95%) in people with discharge from the penile urethra and is recommended to facilitate immediate presumptive diagnosis in these individuals (Grade 1C).[1]
  - Microscopy of penile urethral smears in those without symptoms is less sensitive (50–75%) therefore, it is not recommended in asymptomatic individuals (Grade 1C).[1]
- **Female urethra and endocervix**
  - Microscopy has only 37–50% and 20% sensitivity compared with culture for detecting gonorrhoea from endocervical and female urethral smears, respectively.[3]
  - The sensitivity of cervical microscopy compared to NAATs in a more recent study was only 16%.[9]
  - Female urethral and cervical microscopy is therefore not routinely recommended, although may be helpful in facilitating early presumptive diagnosis in high risk patients (Grade 1C).

- **Rectum and pharynx**
  - Ano-rectal smears and microscopy should be offered if rectal symptoms are present (Grade 1C).[10]
  - The sensitivity of microscopy for detecting asymptomatic rectal infection is low and is not recommended (Grade 1C).[11]
  - Microscopy of pharyngeal specimens is not recommended (Grade 1C).

Nucleic acid amplification tests

- NAATs are more sensitive than culture, particularly for oropharyngeal and rectal sites.[12-14] NAATs show high sensitivity (>95%) in both symptomatic and asymptomatic infection.[13,15,16] Therefore, although NAATs are not licensed for use at extra-genital sites, their use is recommended.[5]
- Commercially available NAATs differ in their cross-reactivity to commensal *Neisseria* species which may be present at significant levels, particularly in the pharynx.[17] It is recommended that laboratories confirm any reactive test with an alternative molecular target if the positive predictive value of the initial test for the population tested is less than 90% (Grade 1B).[5,6,18] This is particularly important for extra-genital specimens.
- Pooling of self-collected or clinician- collected rectal, pharyngeal and urine samples from the same individual could provide cost savings. There is a small evidence base with mixed results using different testing platforms, specimen collection and pooling methods. The largest study to date has shown that pooling of self-taken swabs has lower sensitivity for detection of *N. gonorrhoeae* from pharyngeal sites, when compared with single site testing.[19] Any service considering the implementation of pooling should perform appropriate clinical evaluation.

- **Penile urethra**
  - NAATs show equivalent sensitivity in urine and urethral swab specimens from cisgender men although a first-pass urine is the preferred sample.[6,20]

- **Female urethra and endocervix**
  - Self-collected or clinician-collected vulvovaginal swabs perform better than endocervical swabs and significantly better than urine for cisgender women.[5,6,8,21-23] Vulvovaginal swabs are therefore recommended as the optimal specimen (Grade 1A).

- **Rectum and pharynx**
  - Infection can occur at multiple sites and an individual can be infected with more than one strain of *N. gonorrhoeae*.[24-26]
  - Rectal and pharyngeal sampling should be routine in all men who have sex with men (MSM), as recommended by the BASHH guideline on the sexual health care of MSM, considered in women who are sexual contacts of gonorrhoea and be guided by an assessment of risk and symptoms in everyone else.[27-29]
  - Oropharyngeal infection is more difficult to treat.[30-33] Therefore, people with genital gonorrhoea should have pharyngeal sampling if either of the following apply (Grade 1D):
    - **i.** Infection may have been acquired in the Asia-Pacific region and susceptibility results are not available. This is because of high levels of antimicrobial resistance in that region[34-37] which may lead to treatment failure
    - **ii.** Genital infection with a confirmed ceftriaxone resistant strain

Culture

- The primary role of culture is for antimicrobial susceptibility testing, which is of increasing importance as antimicrobial resistance in *N. gonorrhoeae* continues to evolve and spread.
- Specimens for culture (urethral, endocervical, neovaginal, anorectal and pharyngeal swabs) should be taken alongside NAATs from people suspected clinically of having gonorrhoea, and from sexual contacts.[5]

- All individuals with gonorrhoea diagnosed by NAAT should have cultures taken for susceptibility testing prior to treatment (Grade 1D).
- For culture, the sensitivity depends on several factors including time from sample collection to plating. Services should seek to minimise this time whether by direct plating in the clinic or use of transport media with prompt transfer for plating in the laboratory.

Considerations for people following gender reconstructive surgery (GRS)

- The susceptibility of a site to gonococcal infection is likely to be related to the nature of the reconstruction, with sites constructed from mucosal tissue (e.g. from the vaginal or bowel mucosa) being more susceptible than sites constructed from skin.
- Gonococcal infections of the urethra[38], sigmoid neovagina[39] and penile skin-lined neovagina[40,41] have all been reported following GRS. Gonococcal infections of the neopenis are rare.
- The sensitivity of microscopy for the diagnosis of gonococcal infection of the neovagina and neopenis is not known. Examination of a Gram-stained smear from a bowel segment neovagina may facilitate a presumptive diagnosis of gonorrhoea and could be considered (Grade 1D).
- We recommend that optimal genital testing in transgender women at risk of gonorrhoea should include swabs from the neovagina and first-pass urine (Grade 1D).
- We recommend first-pass urine as the specimen of choice from people with a neopenis (Grade 1D). Where the vagina is still present following GRS a vaginal swab should be considered as directed by the sexual history and symptoms.
- Extragenital testing should be guided by sexual history and symptoms.

Testing for other STIs

Approximately 19% of patients with gonorrhoea have concurrent *C. trachomatis* infection.[42] Testing for other STIs should be undertaken according to BASHH STI testing guidelines.[43]

Timing of testing

Infection cannot be ruled out in individuals who test within two weeks of sexual contact with an infected partner. Therefore, it is recommended that patients return for repeat testing after this window period if epidemiological treatment is not given (Grade 1D).[44]

MANAGEMENT

General advice

Patients should be given a detailed explanation of their condition with particular emphasis on the long-term implications for the health of themselves and their partner(s). This should be reinforced, if necessary, with clear and accurate written information (Grade 1D). Patients should be advised to abstain from sexual intercourse until seven days after they and their partner(s) have completed treatment (Grade 1D).

Treatment

Indications for therapy:

1. Identification of intracellular Gram-negative diplococci on microscopy;
2. A positive culture for *N. gonorrhoeae*;
3. A confirmed positive NAAT for *N. gonorrhoeae*;
4. Sexual partner of confirmed case of gonococcal infection (See section below on Sexual Partners);
5. Treatment should be considered on epidemiological grounds following sexual assault (see BASHH Sexual Assault guideline).

Treatment of uncomplicated ano-genital and pharyngeal infection in adults

When antimicrobial susceptibility is not known prior to treatment:

Ceftriaxone 1g intramuscularly as a single dose (Grade 1C)

When antimicrobial susceptibility is known prior to treatment:

Ciprofloxacin 500mg orally as a single dose[45,46] (Grade 1A)

The prevalence of ciprofloxacin resistance in the UK is high (33.7% in 2016).[42] Therefore, we only recommend considering ciprofloxacin as first-line treatment if phenotypic or genotypic antimicrobial susceptibility data indicates susceptibility to ciprofloxacin at all suspected sites of infection. Molecular testing for *gyrA* gene mutations of NAAT positive gonorrhoea samples is feasible to identify patients who could be treated with ciprofloxacin[26,47,48] although commercial tests are not currently available in the UK.

The move to ceftriaxone monotherapy represents a major change from the 2011 guideline. There is a lack of high quality evidence regarding the best strategy to delay the emergence of resistance. However, for the reasons outlined below, monotherapy is recommended. A high level of vigilance through use of culture, follow up of patients and test of cure coupled with maintenance of strong surveillance is vital in order to monitor the impact of this approach.

1. **The dose of ceftriaxone has been increased from 500mg to 1g**
    - The prevalence of ceftriaxone resistance (MIC >0.125 mg/L) is very low in England and Wales, however, there has been an increase in the modal ceftriaxone MIC distribution (i.e. an increase in the proportion of isolates with reduced susceptibility).[42,49]
    - Ceftriaxone resistant isolates have been identified in the UK[31,32] and globally.[50-54] The UK cases, which were resistant to both ceftriaxone and azithromycin (including one case of high-level azithromycin resistance, MIC ≥256mg/L), had epidemiological links to the Asia-Pacific region where significant levels of reduced susceptibility and resistance to ceftriaxone have been reported.[34,35]
    - Although a lower dose of ceftriaxone would be adequate to treat the majority of gonococcal strains that are currently circulating in the UK, data suggest that ceftriaxone 1g would be more effective against most isolates with increased MICs.[55]

- Therefore, in an attempt to ensure successful treatment of strains with reduced susceptibility, the recommended dose of ceftriaxone has been increased to 1g.

2. Dual therapy with azithromycin 1g is no longer recommended

- Azithromycin 1g was added to recommended therapy in 2011 in an attempt to ensure successful treatment of infection with reduced susceptibility to ceftriaxone.[55] Evidence to suggest synergy between cephalosporins and azithromycin *in vitro* is inconclusive.[56-60]
- Since 2011 the prevalence of azithromycin resistance in the UK and globally has increased (4.7% in GRASP 2016, 7.5% in Euro-GASP 2016).[42,61-66] There has also been sustained transmission of high-level azithromycin resistant *N. gonorrhoeae* across the UK[67] and clusters reported elsewhere.[68]
- Although some of the internationally reported ceftriaxone resistant isolates are susceptible to azithromycin,[50,51,54] a 1g dose of azithromycin may be insufficient to clear infection. In a randomized control trial, the combination of gentamicin 240mg IM with azithromycin 1g only cleared infection in 91% of participants and did not demonstrate non-inferiority compared to ceftriaxone 500mg IM with azithromycin 1g. This suggests a 1g dose of azithromycin is insufficient to treat gonorrhoea.[69]
- For infections with azithromycin MICs around the breakpoint (>0.5mg/L), a 2g dose of azithromycin could potentially be more effective than 1g. However, the 2g dose would not be effective against high-level azithromycin resistant isolates. In addition, the incidence of gastrointestinal side-effects is higher with 2g azithromycin and so this dose may not be acceptable to patients or clinicians.[70]
- With higher doses of azithromycin, the duration of sub-MIC levels at mucosal surfaces is extended for up to four weeks.[71-73] If a patient is reinfected with gonorrhoea during this time period, this could potentially select for azithromycin resistance.
- Other reasons for avoiding azithromycin in the treatment of gonorrhoea centre around antibiotic stewardship in sexual health more generally,

particularly the fears of accelerating the induction and spread of resistance in other STIs such as *Mycoplasma genitalium* and *Treponema pallidum*.

3. **Use of ciprofloxacin first line when infection is known to be susceptible**
    - Using alternative antibiotics where appropriate can reduce the selective pressure which comes from the universal use of ceftriaxone and this may delay the emergence of ceftriaxone resistance.[48,74]

Alternative regimens

The following options have all been associated with treatment failure when used as monotherapy particularly when used for pharyngeal infection,[75-78] therefore it is recommended to use dual therapy with azithromycin 2g where possible (Grade 2C). Clinicians using alternative regimens for empirical treatment of gonorrhoea without antibiotic susceptibility data are recommended to regularly review local and national trends in gonococcal antimicrobial resistance.

Alternative regimens may be given because of allergy, needle phobia or other absolute or relative contraindications. Third-generation cephalosporins such as cefixime and ceftriaxone show negligible cross-allergy with penicillins.[79] Contraindications to the administration of ceftriaxone include hypersensitivity to any cephalosporin or to any of the excipients listed in the product packaging or history of severe hypersensitivity (e.g. anaphylactic reaction) to any other type of beta-lactam antibacterial agent (penicillins, monobactams and carbapenems).[80]

- Cefixime 400mg orally as a single dose plus azithromycin 2g orally (Grade 1B)
    - Only advisable if an intramuscular injection is contraindicated or refused by the patient. Resistance to cefixime is currently low in the UK.[42]

- Spectinomycin 2g intramuscularly as a single dose plus azithromycin 2g orally (Grade 1B)

- Spectinomycin is not recommended for pharyngeal infection because of poor efficacy.[30] In addition, spectinomycin may be difficult to obtain as it is an unlicensed imported product.

- Gentamicin 240mg intramuscularly as a single dose plus azithromycin 2g orally (Grade 1A)
    - A large, UK-based, RCT examined the efficacy and safety of gentamicin for the treatment of gonorrhoea.[69] This study used gentamicin in combination with 1g of azithromycin. Microbiological cure (negative NAAT two weeks after treatment) was achieved in 94% of urogenital, 90% of rectal and 80% of pharyngeal infections. Another randomised trial used a 2g dose of azithromycin in combination with gentamicin.[81] This found 100% clearance of infection however, few extragenital infections were included and culture was used to confirm clearance (i.e. it is likely to overestimate the effectiveness).

- Azithromycin 2g as a single oral dose (Grade 1B)
    - The clinical efficacy of azithromycin does not always correlate with *in vitro* susceptibility testing[82] and azithromycin resistance is high.[42]

Treatment of complicated infections

Gonococcal PID

- Ceftriaxone 1g intramuscularly as a single dose in addition to the regimen chosen to treat PID (see BASHH PID guideline)

Gonococcal epididymo-orchitis

- Ceftriaxone 1g intramuscularly as a single dose in addition to the regimen chosen to treat epididymo-orchitis (see BASHH epididymo-orchitis guideline)

Gonococcal conjunctivitis

- Ceftriaxone 1g intramuscularly as a single dose (Grade 2D)

- There is a single study of the treatment of gonococcal conjunctivitis conducted in twelve adults.[83] All were successfully treated with a single dose of ceftriaxone.
- The eye should be irrigated with saline/water.
- If history of penicillin anaphylaxis or established cephalosporin allergy then seek expert advice.

Disseminated gonococcal infection

- Ceftriaxone 1g intramuscularly or intravenous every 24 hours or
- Cefotaxime 1g intravenous every eight hours or
- Ciprofloxacin 500mg intravenous every 12 hours (if the infection is known to be susceptible) or
- Spectinomycin 2g intramuscularly every 12 hours

Therapy should continue for seven days but may be switched 24–48 hours after symptoms improve to one of the following oral regimens guided by sensitivities:

- Cefixime 400mg twice daily or
- Ciprofloxacin 500mg twice daily or
- Ofloxacin 400mg twice daily

Pregnancy and breastfeeding[84-86]

Pregnant and breastfeeding individuals should not be treated with quinolone or tetracycline antimicrobials. The manufacturer of azithromycin advises use only if adequate alternatives are not available. Pregnancy does not diminish treatment efficacy.

- Ceftriaxone 1g intramuscularly as a single dose (Grade 1A) or
- Spectinomycin 2g intramuscularly as a single dose (Grade 1A)
  - Spectinomycin is in the FDA pregnancy category B and therefore not expected to be harmful and can be used if no suitable alternatives. It is not known if it is excreted in breastmilk and should be used with caution in those who are breastfeeding.

HIV-positive individuals

HIV-positive individuals with gonorrhoea should be managed in the same way as HIV-negative individuals.

SEXUAL PARTNERS

Partner notification

Partner notification should be pursued in all patients identified with gonococcal infection. Action and outcomes should be documented.[87]

Partner notification should follow national recommendations[88]:

- Male patients with symptomatic urethral infection should notify all partners with whom they had sexual contact within the preceding two weeks or their last partner if longer ago;
- Patients with infection at other sites or asymptomatic infection should notify all partners within the preceding three months.

Treatment of contacts

Epidemiological treatment is not needed for all sexual contacts, and ideally treatment should only be given to those partners who test positive for gonorrhoea. However, an infection may be missed if a test is performed too soon after a potential exposure. The time between exposure and a positive test result may vary depending on a number of host, pathogen and diagnostic factors. Therefore, in order to reduce the unnecessary use of antibiotics, we recommend the following:

- For those presenting after 14 days of exposure we recommend treatment only following a positive test for gonorrhoea.[89]
- For those presenting within 14 days of exposure we recommend considering epidemiological treatment based on a clinical risk assessment and following a discussion with the patient.

FOLLOW-UP AND TEST OF CURE (TOC)

All patients diagnosed with gonorrhoea should be advised to return for TOC with extra emphasis given to patients:

1. With persistent symptoms or signs
2. With pharyngeal infection
3. Treated with anything other than first line recommended regimen when antimicrobial susceptibility unknown
4. Who acquired infection in the Asia-Pacific region when antimicrobial susceptibility unknown

Assessment after treatment may be helpful to:

- detect treatment failure and emerging resistance
- confirm compliance with treatment
- ensure resolution of symptoms
- enquire about adverse reactions
- take a sexual history to explore the possibility of reinfection
- pursue partner notification and health promotion

Method and timing of TOC

A positive TOC could be due to treatment failure, reinfection or residual non-viable organism and should be interpreted in the clinical context.

- Culture, performed at least 72 hours after completion of therapy, should be used if symptoms or signs are present at time of TOC.[90]
- NAAT should be used if asymptomatic, followed by culture if NAAT-positive.
- The time to a negative TOC using NAATs is variable and there are limited data to inform optimum time to TOC. However, most individuals should be negative seven days following treatment where an RNA NAAT is used and 14 days following treatment when using a DNA NAAT.[91]
- We recommend TOC should be performed at an appropriate time depending on the type of NAAT used (Grade 1B).

Treatment Failures

Cases of possible ceftriaxone treatment failure in England should be reported to Public Health England using the on-line form:

https://hivstiwebportal.phe.org.uk/login.aspx

Only authorised users are permitted to access this secure website. All specialist sexual health clinics should have access. If required, usernames and passwords can be obtained from gumcad@phe.gov.uk

AUDITABLE OUTCOME MEASURES

- All individuals with gonorrhoea diagnosed by NAAT should have cultures taken for susceptibility testing prior to treatment (performance standard 97%)
- Individuals treated for gonorrhoea should have a test of cure performed (performance standard 97%)
- Individuals diagnosed with gonorrhoea should be tested for all sexually transmitted infections including HIV (unless previously diagnosed with HIV) (performance standard 97%)
- Individuals diagnosed with gonorrhoea should have partner notification carried out in accordance with the BASHH statement on partner notification (performance standard 97%)
- Individuals diagnosed with gonorrhoea should be offered information (written or digital) about their diagnosis and management (performance standard 97%)
- Individuals diagnosed with gonorrhoea should receive first-line treatment or the reasons for not doing so documented (performance standard 97%)
- Cases of possible treatment failures with ceftriaxone should be reported to Public Health England (performance standard 97%)

QUALIFYING STATEMENT

Decisions to follow these recommendations must be based on professional clinical judgement, consideration of individual patient circumstances and available resources.

All possible care has been undertaken to ensure specification of the correct dosage of medication and route of administration. However, it remains the responsibility of the prescribing clinician to ensure the accuracy and appropriateness of the medication they prescribe.

Time scale for next revision

An author group will be invited by the BASHH CEG to review and revise the guideline in 2023 using the BASHH framework for guideline development. However, addenda may be issued sooner than 2023, particularly if relevant new data are available relating to treatment or antimicrobial resistance.

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