

Gonorrhoea: Drug Resistance in Australia

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This paper provides AFAO members, affiliates and stakeholders with an overview of antimicrobial resistance in sexually transmissible infections (STIs) in Australia.

Antimicrobial resistance and STIs

Antimicrobial resistance (AMR) refers to the ability of an infection to resist the effects of medicines used to treat the infection. It is sometimes also referred to as 'drug resistance'. Globally, drug resistance can be caused by the suboptimal use of antibiotics, non-compliance with treatment regimens and/or poor quality of some generic medicines.

In 2015, *Australia's First National Antimicrobial Resistance Strategy 2015-2019* identified that "the increasing number of antimicrobial resistant infections appearing in the community and acquired during international travel represent a looming public health issue"¹.

There has long been concern globally about the potential emergence of drug resistant STIs. In response, the World Health Organisation released new treatment guidelines for three common STIs – chlamydia, gonorrhoea and syphilis – in 2016².

At present, strains resistant to first line treatment of syphilis and chlamydia are not common and not a concern in Australia. There is, however, a growing level of concern about gonorrhoea. This paper therefore focuses on the likelihood and implications of the emergence of drug resistant cases of gonorrhoea in Australia. It also highlights treatment options in Australia and current and emerging strategies for preventing drug resistant gonorrhoea.

Drug resistant gonorrhoea

Gonorrhoea is a bacteria that can be transmitted through contact with the genitals, rectum and throat of a sexual partner. Gonorrhoea can have serious health implications. It can be a co-factor in HIV acquisition and is associated with serious reproductive health consequences and adverse pregnancy outcomes.

There were 23,887 gonorrhoea notifications in Australia in 2016, an increase of 29% from 2015. Between 2012-2016 there was a 63% increase in notification rates, with increases in both men and women³. Gonorrhoea is most commonly diagnosed in gay men and other men who have sex with men, young heterosexual Aboriginal and Torres Strait Islander people and travellers returning from high prevalence areas overseas⁴.

At present in Australia, gonorrhoea is relatively easy to treat and to cure with a dual therapy of ceftriaxone and azithromycin. However, the bacteria which causes gonorrhoea (*Neisseria Gonorrhoea*) has significant capacity to mutate and over the past three decades has become resistant to several treatments.

¹ Australian Government Department of Health. Responding to the Threat of Antimicrobial Resistance: Australia's First National Antimicrobial Resistance Strategy 2015-2019. Canberra, 2015.

² World Health Organization. WHO Guidelines for the treatment of *Neisseria gonorrhoeae*. Geneva, 2016.

³ Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2017. Kirby Institute, UNSW Sydney, 2017.

⁴ Australasian Sexual Health Alliance. Australian STI Management Guidelines for Use in Primary Care, Sydney, 2017.

Recently in Australia, there has been an increase in cases of gonorrhoea that are resistant to the drug azithromycin⁵. In addition, there have been two cases of gonorrhoea diagnosed in Australia in 2018 that were multi-drug resistant – that is, they were resistant to all antibiotics in routine use against gonorrhoea. It is likely that there are other cases of undetected multi-drug resistant gonorrhoea in Australia.

Some media coverage of this data implied that gonorrhoea has extremely high levels of resistance to all treatments and that the bacteria is virtually untreatable. This is *not* the case. The combination of ceftriaxone and azithromycin continues to be effective in the vast majority of cases with extremely low resistance to ceftriaxone in the Australian community. Moreover, older antibiotics can also be used to treat individuals who acquire a strain of gonorrhoea that is resistant to ceftriaxone and azithromycin. As such, drug resistant gonorrhoea is not a significant problem in the Australian community at this time.

It would however be a significant public health issue if multi-drug resistant gonorrhoea were to become established in Australia. This is because multi-drug resistant gonorrhoea is significantly more complicated to treat as there are few antibiotic options left to treat it that are simple, well-studied, highly tolerated and highly effective⁶.

Given this, there is concern that some strains of gonorrhoea may become difficult if not impossible to cure⁷.

Community response to gonorrhoea

It is important to reduce the rate of gonorrhoea, both for its immediate health impact on individuals and to reduce the risk of treatment resistant strains emerging. To achieve this, we need to maintain focus on reducing both the incidence of gonorrhoea in the Australian community and the time between infection and diagnosis.

Health promotion and behavioural strategies are one component of that. Population-wide health promotion messaging increases awareness about the risks of exposure, assists in increasing the frequency of STI testing and reinforces condom use. In many cases, gonorrhoea can be asymptomatic – especially where the infection is present in the throat – meaning an individual can present with few or no symptoms. Detection of pharyngeal (throat) gonorrhoea therefore cannot rely on a person recognising their symptoms alone. Early detection through frequent testing and immediate treatment is essential to limit further transmission and the emergence of antimicrobial resistance.

In addition, there is a need to improve access to testing and treatment services. The approach will need to vary for each key population:

- there is potential to increase frequency and coverage of testing among gay and bisexual men through increased provision of free STI screening in community-based services such as AIDS Councils, a model that has been highly successful
- for Aboriginal and Torres Strait Islander communities, the response will need to include both overall improvements in access to health care, and better symptom recognition and health seeking for men with urethral discharge

⁵ Australian Commission on Safety and Quality in Health Care. CARAlert First Annual Report March 2016 -March 2017. Sydney, 2017.

⁶ Centers for Disease Control. Antibiotic-Resistant Gonorrhoea. <https://www.cdc.gov/std/gonorrhea/arg/default.htm>. Atlanta. 2018

⁷ World Health Organisation. Emergence of Multi-Drug Resistant Neisseria Gonorrhoeae: Threat of Global Rise in Untreatable Sexually Transmissible Infections. Geneva, 2012.

- for heterosexual women and men there is a need to make it easier for GPs to offer and for patients to ask for an STI test.

Emerging strategies for gonorrhoea prevention and treatment

While prevention and testing messaging is important in preventing drug resistant gonorrhoea, other strategies are emerging. These include patient delivered partner therapy, antibiotic prophylaxis, daily mouthwash use and alternative drug recycling schemes.

1. Patient delivered partner therapy (PDPT)

PDPT is the provision of additional medicine to a person diagnosed and treated for gonorrhoea that they can give to their sexual partner(s) without the need for their partner(s) to go to a doctor themselves for a prescription. As gonorrhoea is highly infectious, PDPT can prevent reinfection and transmission. This strategy is currently not being used in Australia because one of the treatments for gonorrhoea (ceftriaxone) is typically injected and has the potential risk of an allergic reaction. Researchers at the Kirby Institute at the University of NSW are investigating the use of oral treatments for PDPT.

2. Resistance testing at point of care

Another emerging strategy to address drug resistant gonorrhoea is to trial resistance testing at the point of diagnosis. This means that the bacteria is tested to see whether it shows signs of being resistant to treatments. This would allow for the health professional to administer a different combination of treatment immediately and limit the potential for treatment failure.

3. Daily mouthwash use

There is emerging evidence that daily use of antiseptic mouth wash, such as Listerine, may have the potential to reduce throat transmission of gonorrhoea. There is also evidence to show that this strategy would be feasible and acceptable to gay and bisexual men and is acceptable in some other key populations. There is currently a trial of mouthwash use being conducted at sexual health clinics in Australia and the results will be available later this year.

4. Alternative drug recycling schemes

Alternative drug recycling schemes involve the use of 'older' drugs that were previously used to treat gonorrhoea. The benefit of this is that it expands treatment options and preserves the treatment efficiency of current drugs. This strategy would need further investigation.

5. Research and development

It is AFAO's understanding that there are currently no new drugs in development for gonorrhoea treatment or prevention. The relatively low commercial return on the discovery and development of new antibiotics has resulted in most large and mid-sized pharmaceutical companies withdrawing from antibiotic research. There is currently no effective vaccine for gonorrhoea, however, a recent study from New Zealand has shown some protection against gonorrhoea using the meningococcal vaccine⁸.

⁸ Petousis-Harris, H, Paynter, J, Morgan, J and Goodyear-Smith F, *Effectiveness of a group B outer membrane vesicle meningococcal vaccines against gonorrhoea in New Zealand*, The Lancet, July 10 2018, [http://dx.doi.org/10.1016/S0140-6736\(17\)31449-6](http://dx.doi.org/10.1016/S0140-6736(17)31449-6)