

Annual report of the Australian Gonococcal Surveillance Programme 1996

*The Australian Gonococcal Surveillance Programme*¹

Abstract

In 1996 the Australian Gonococcal Surveillance Programme (AGSP) examined 2,753 isolates of *Neisseria gonorrhoeae*. The source of isolates, site of infection and antibiotic susceptibility patterns showed considerable regional variation. Strains examined in Adelaide, Sydney and Melbourne were predominantly from male patients where rectal and pharyngeal isolates were common. Cases in other centres had a much lower male:female ratio and most were genital tract isolates. Resistance to the penicillin and quinolone groups of antibiotics was highest in Sydney and Melbourne. Gonococcal resistance to the penicillins was similar to previous years. Quinolone-resistant *Neisseria gonorrhoeae* (QRNG) were isolated mostly from overseas travellers. However, some local transmission of QRNG was documented in Sydney. All isolates were sensitive to spectinomycin and ceftriaxone. *Comm Dis Intell* 1997;21:189-192.

Introduction

The Australian Gonococcal Surveillance Programme (AGSP) is a collaborative program conducted by reference laboratories in each State and Territory. The primary aim of the program is to monitor antibiotic susceptibility of Australian isolates of *Neisseria gonorrhoeae* to assist in the formulation of treatment regimens appropriate to proper management of gonorrhoea. Management of gonorrhoea is based on single dose antibiotic therapy at first diagnosis; a

strategy that ensures patient compliance. There is a close correlation between the likely outcome of treatment and the *in vitro* susceptibility of the causative organism. However, treatment is required before results of susceptibility tests on individual isolates can be performed. Treatment regimens are therefore formulated on a knowledge of the *in vitro* sensitivity of prevalent gonococci¹. That is, the overall pattern of susceptibility of prevalent gonococci is the critical determinant of appropriate antibiotic therapy,

rather than individual strain susceptibility identified on a case by case basis².

The gonococcus has a well demonstrated capacity to develop antibiotic resistance by numerous chromosomal and extrachromosomal mechanisms. Continuing long-term surveillance is required to monitor and respond to changes in resistance which can occur in a short time¹.

A report appeared in *Communicable Diseases Intelligence* in 1981³ when antibiotic sensitivity data were

ISSN 0725-3141
Volume 21
Number 14
10 July 1997

1. Corresponding author, John Tapsall, Department of Microbiology, The Prince of Wales Hospital, High Street, Randwick, New South Wales 2031

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Table. Gonococcal isolates in Australia by sex, site and region, 1 January to 31 December 1996

	Site	Sydney	Melbourne	Brisbane	Adelaide	Perth	Northern Territory	Australia
<i>Male</i>	Urethra	528	300	279	51	364	112	1640
	Rectal	70	56	10	15	6	1	159
	Pharynx	35	22	6	3	0	0	66
	Other/NS	7	4	3	2	14	127	168
	<i>Total</i>	<i>640</i>	<i>382</i>	<i>298</i>	<i>71</i>	<i>384</i>	<i>240</i>	<i>2033</i>
<i>Female</i>	Cervix	79	32	194	15	189	144	658
	Other/NS	4	1	11	0	5	41	62
	<i>Total</i>	<i>83</i>	<i>33</i>	<i>205</i>	<i>15</i>	<i>194</i>	<i>185</i>	<i>720</i>
<i>TOTAL</i>		<i>723</i>	<i>415</i>	<i>503</i>	<i>86</i>	<i>578</i>	<i>425</i>	<i>2753</i>

NS Not stated

first produced by the AGSP. Initially, data on penicillin resistance were reported and the AGSP documented the appearance and spread of penicillinase-producing *Neisseria gonorrhoeae* (PPNG) in Australia⁷. Monitoring of resistance to other antibiotics was added as newer therapeutic agents became available. Quarterly reports have been published in *Communicable Diseases Intelligence* since 1996⁴⁻⁶. This is the first annual summary of AGSP data in *Communicable Diseases Intelligence*.

Method

The AGSP has participating laboratories in each State and Territory. It is a network of collaborating centres which seeks to obtain data from as wide a section of the community as possible. For example, strains from the Northern Territory isolated in Alice Springs, Katherine and Darwin, and the laboratories of Western Diagnostic Pathology and Queensland Medical Laboratory in the Northern Territory, are further tested in AGSP centres in Perth, Adelaide and Sydney.

Gonococci isolated in or referred to the participating laboratories are examined by a standardised methodology. The AGSP has a program-specific quality assurance (QA) program^{7,8}. Antibiotic sensitivity data are submitted quarterly to a coordinating laboratory which collates the results and also conducts the QA program. The AGSP also receives data on the sex and site of isolation of

gonococcal strains. The geographic source of acquisition of resistant strains is ascertained whenever possible. The AGSP has previously reported on trends in gonorrhoea infection in Australia⁹. A summary of this information from 1996 is included in this report.

Results

Number of isolates

There were 2,753 isolates examined in 1996 (Table). Twenty-six per cent of isolates tested were from New South Wales, 21% from Western Australia, 18% from Queensland, 15% from the Northern Territory (examined in Adelaide, Perth and Sydney), 15% from Victoria and smaller percentages from other centres.

Source of isolates

There were 2,033 strains from men and 720 from women; the male:female ratio was 2.8:1. The male:female ratio was higher for patients in Adelaide (4.7:1), Melbourne (11.6:1) and Sydney (7.7:1) than from Perth (2:1), Brisbane (1.5:1) and the Northern Territory (1.3:1). Similarly, male rectal and pharyngeal isolates were more commonly reported in Sydney and Melbourne. There were 12 cases of disseminated gonococcal infection (five males and seven females). Five per cent of isolates were from other sites. Most of these were from specimens of urine and could also be regarded as genital tract isolates.

Antibiotic susceptibility patterns

In 1996, the AGSP reference laboratories examined 2,753 gonococcal isolates for sensitivity to the penicillins. Of these 2,742 were examined for sensitivity to ceftriaxone, ciprofloxacin and spectinomycin, and for high-level resistance to tetracyclines (tetracycline resistant *Neisseria gonorrhoeae* - TRNG).

The patterns of gonococcal antibiotic susceptibility differed between the States and Territories. For this reason, data are presented by region as well as aggregated data for Australia. Percentages quoted in the text are region specific, unless otherwise stated. The highest proportion of resistant strains were from Sydney and Melbourne.

Penicillins

Resistance to the penicillin group (penicillin, ampicillin, amoxycillin) may be mediated by the production of beta-lactamase (penicillinase-producing *N. gonorrhoeae* - PPNG) or by chromosomally controlled mechanisms (chromosomally mediated resistant *N. Gonorrhoeae* - CMRNG).

The proportion of strains fully sensitive (FS) to penicillin (minimum inhibitory concentration -MIC \leq 0.03 mg/L), less sensitive (LS, MIC 0.06 - 0.5 mg/L), relatively resistant (RR, MIC \geq 1 mg/L) or penicillinase-producing (PPNG) varies throughout the country (Figure).

There were 161 PPNG detected throughout Australia in 1996, representing 5.9% of all isolates. These were mostly isolated from patients infected overseas. Sixty PPNG were isolated in Sydney, (8.3% of Sydney isolates), 41 (9.9%) in Melbourne, 28 (4.8%) in Perth and 17 (3.4%) in Brisbane. The smaller numbers of PPNG seen in Adelaide and the Northern Territory represented 2.3% of all isolates in these centres. Three PPNG were detected in the Australian Capital Territory. Most of the 'imported' isolates were from infections acquired in South-East Asian countries.

There were 271 isolates resistant to penicillin by chromosomal mechanisms. Strains of this type were concentrated in Melbourne (94 CMRNG, 23% of all Melbourne isolates) and Sydney (132 CMRNG, 18% of all isolates). A cluster of CMRNG was also seen in Adelaide in the December quarter.

Isolates which were fully sensitive to the penicillin group were also prominent in Sydney, Melbourne and Brisbane.

Ceftriaxone and Spectinomycin

All strains from all parts of Australia were sensitive to these injectable agents.

Quinolone antibiotics

In 1996, 108 gonococcal isolates throughout Australia displayed altered quinolone sensitivity (4% of all strains). These quinolone resistant *Neisseria gonorrhoeae* (QRNG) were detected most frequently in Melbourne (34 isolates, 8%) and Sydney (50 isolates, 7%). Perth had 11 QRNG (2%), Brisbane 7 (1.4%) and there were three QRNG in the Northern Territory and Adelaide. Strains with high level quinolone resistance were detected most often in Sydney (34 isolates). In the December quarter, there was an increase in the number and proportion of QRNG in Sydney with the 25 strains (20 with high-level resistance) representing 11.5% of isolates. Most QRNG were isolated from patients infected overseas but significantly, local acquisition is now being recorded.

High-level tetracycline resistance

One hundred and thirty-six tetracycline resistant *Neisseria*

gonorrhoeae (TRNG, 5% of isolates) were detected throughout Australia in 1996. Nearly half of these (64) were detected in Sydney (9% of Sydney isolates), and about another one-third in Perth (39, 7%). Tetracycline resistant *Neisseria gonorrhoeae* were also prominent in Melbourne (24, 6%), 12 were isolated in Brisbane (2.5%) and 8 in the Northern Territory (2%). Infections with TRNG were mainly acquired in Indonesia, Thailand and Singapore. However an increasing number of isolates were acquired through local contact.

Discussion

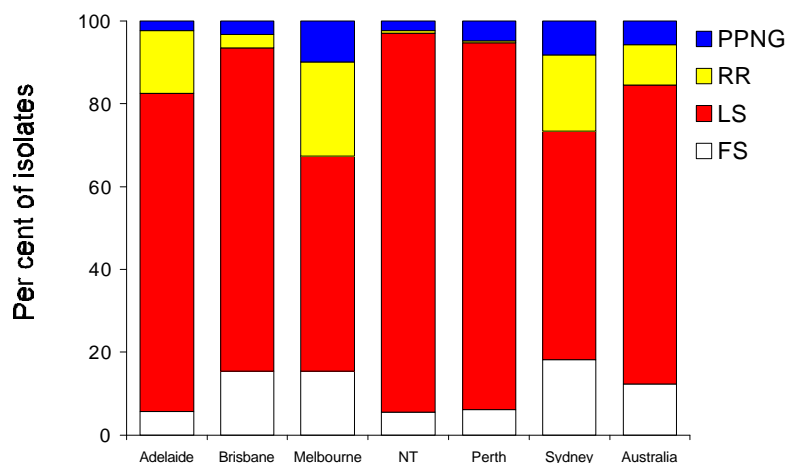
The AGSP commenced reporting in July 1981 and has previously analysed data on the basis of financial rather than calendar years^{7,10}. Although the source of isolates has remained constant for many years in most AGSP centres, a rearrangement of services in Western Australia has seen the Royal Perth Hospital assume the role of reference laboratory in that State. Additional sources have also been added to the AGSP referral pattern in the Northern Territory. For these reasons direct comparisons with previous years are not always possible, but are included where appropriate. It is envisaged that comparative summaries will be included in future annual reports.

The source of isolates differed in different parts of Australia. The high male:female ratio of cases, and the

more common occurrence in Sydney and Melbourne of male rectal and pharyngeal isolates indicate a higher proportion of gonorrhoea in homosexual men in those centres. In isolates from centres across northern Australia, the male:female ratio was lower and most isolates were from genital sites.

While aggregated data on penicillin resistance in gonococci in Australia have been of the order of 15% to 18% for a number of years and changed little in this period¹¹, significant regional variation in sensitivity to this group of antibiotics remains. Infections with strains in the less-sensitive or fully-sensitive categories usually respond to therapy with standard treatment regimens with the penicillins. Infections with strains which are PPNG or in the relatively resistant category (CMRNG) usually fail to respond to the penicillins. Most penicillin resistance was concentrated in the more populous centres of Sydney and Melbourne where about 30% of isolates were penicillin resistant. While the penicillins should not be used to treat gonorrhoea in these centres, they remain useful in some parts of rural Australia where resistant strains are infrequently encountered. Approximately two-thirds of the penicillin resistance detected throughout Australia was due to chromosomal mechanisms. The increasing importance of CMRNG

Figure. Penicillin resistance of gonococcal isolates for Australia and by region, 1996



FS Fully sensitive to penicillin, MIC \leq 0.03mg/L
 LS Less sensitive to penicillin, MIC 0.06 - 0.5 mg/L
 RR Relatively resistant to penicillin, MIC \geq 1 mg/L
 PPNG Penicillinase producing *Neisseria gonorrhoeae*

and the decline in PPNG has also been previously noted¹¹.

Recent reports of the AGSP have emphasised the appearance and spread of isolates resistant to the quinolone group of oral agents - that is, QRNG. Although some level of quinolone resistance has been present in Australia since 1984¹², this had been accommodated by the use of increased doses of these antibiotics. In 1991, a few cases of treatment failure with higher dose regimens were recorded¹³, and in October 1994, strains with very high levels of quinolone resistance were detected^{14,15}. The further spread of these isolates in Melbourne¹⁶ and Sydney¹⁷ has been separately documented. The 1996 data indicate the continuing spread of QRNG; particularly in Sydney where there were more QRNG, more strains with higher MICs, and the repeated isolation of QRNG through local contact. This situation obviously requires close monitoring, and strains from patients entering or returning to Australia from overseas need particularly close examination and careful follow-up. Any isolate from a case of apparent treatment failure should be accorded particular attention.

Quinolone-resistant gonococci are also being isolated in increasingly high numbers in countries close to Australia¹⁸. Consideration should be given to the use of alternative treatment regimens for patients infected outside Australia.

Tetracyclines are not recommended therapy for gonococcal disease in Australia. There is interest in the worldwide spread of strains manifesting high-level plasmid-mediated tetracycline resistance (TRNG). There has been a slow rise in the number of TRNG, with Sydney, Perth and Melbourne isolating most strains of this type. As with QRNG, an increasing proportion of TRNG is acquired through local contact.

The choice of antibiotic therapy for gonorrhoea is limited in the larger cities of Australia. The increase in antibiotic resistance in gonococci, particularly to the quinolone group, further limits the options for therapy for this disease. While cure of virtually all cases can be guaranteed if ceftriaxone and spectinomycin are used, these are injectable agents and

this mode of administration is not always favoured. The oral third-generation cephalosporin recommended for use by the World Health Organization (cefixime) is not available in Australia. The treatment of gonorrhoea will be complicated by the capacity of the organism to develop resistance. Continued monitoring of resistance patterns will be required to optimise treatment regimens and detect new forms of resistance as they emerge.

Acknowledgements

Participating laboratories in the AGSP

John Bates, Denise Murphy and Vicki Hicks. Queensland Health Scientific Services, Coopers Plains, Queensland

Edna Limnios, Tiffany Shultz and John Tapsall. Department of Microbiology, The Prince of Wales Hospital, Randwick, New South Wales

Julia Griffith and Geoff Hogg. The Microbiological Diagnostic Unit, University of Melbourne Parkville, Victoria

Greg Handke. Infectious Diseases Laboratories, Institute of Medical and Veterinary Science Adelaide, South Australia

Cheryll McCullough. Microbiology Department, Royal Perth Hospital Perth, Western Australia

Mark Gardam and Keith Ott. Microbiology Department, Royal Hobart Hospital Hobart, Tasmania

Gary Lum and Microbiology Staff. Microbiology Department, Royal Darwin Hospital, Casuarina, Northern Territory

Linda Halliday and Peter Collignon. Microbiology Department, Canberra Hospital South, Woden, Australian Capital Territory

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