

Gonococcal Surveillance NSW Annual Report January - December 2005

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Summary

Numbers of isolates

In 2005 the 1216 gonococcal isolates referred to and isolated in the reference laboratory was about 8% more than the 1113 seen in 2004. The highest number tested in any year of this programme was the 1625 examined from the same sources in 2002.

Source of isolates

A high proportion of isolates [92%] was again from males and rectal and pharyngeal isolates comprised 38% of strains from men. The number of isolates from females (95) rose slightly from the 78 reported in 2004 and most of these were from the genital tract. Four ophthalmic (all in adults) and four disseminated gonococcal infections were recorded.

Antibiotic resistance patterns

Historically high levels of antibiotic resistance were observed in *N. gonorrhoeae* isolated in NSW in 2005.

Gonococcal resistance to the [oral] **quinolone** agents increased significantly. 555 [46%] of isolates were QRNG and 95% of these demonstrated higher-level resistance to ciprofloxacin. About 80% of the QRNG were acquired through local contact.

Thirty-seven isolates (3%) displayed decreased susceptibility to **ceftriaxone** and all 37 were also quinolone and penicillin resistant. Thus far, this decrease in sensitivity to third generation cephalosporins has not translated into clinical treatment failure with ceftriaxone given as a 250 mg IM dose.

Resistance to the **penicillins** [including ampicillin and amoxycillin] was also at historically high levels. 574 (47.5%) of all isolates were resistant to these agents by one or more mechanisms.

All isolates remained susceptible to the injectable agent **spectinomycin**.

High-level tetracycline resistance [TRNG] was observed in 136 [11%] gonococci and three quarters of these were also PPNG. In about half cases, the TRNG were acquired through local contact.

Introduction.

The primary purpose of this programme is the surveillance of antimicrobial resistance in *Neisseria gonorrhoeae*. The Neisseria Reference Laboratory [NRL] receives isolates from private and public laboratories throughout NSW. The identity of all isolates is confirmed and the susceptibility to appropriate antibiotics determined for epidemiological purposes viz. the formulation of treatment schedules for management of gonorrhoea in NSW. Additionally strain differentiation techniques are applied to all isolates and matched with certain clinical data [e.g. acquisition history - overseas or local] to monitor the introduction and spread of antibiotic resistant isolates.

Successful treatment of gonorrhoea is important for the individual and is also of public health relevance in terms of disease control and prevention of complications. Gonococcal resistance to those antibiotics used in the treatment of gonorrhoea compromises both individual management and efforts aimed at wider disease containment.

In past years, the NRL also provided estimates of trends in gonococcal disease by analysing the isolates it examined from a relatively constant sample. Increasing use of nucleic acid based amplification assays [NAA] for diagnosis of gonorrhoea from 1999 onwards resulted in a decrease in the number of isolates referred for testing and reduced numbers of gonococci obtained from the previous exclusively isolate-derived sample base. The sample examined however has remained sufficiently large and diverse to monitor gonococcal susceptibility to antibiotics used for treatment.

Data generated in NSW by the NRL are incorporated into those of the National Neisseria Network Gonococcal Surveillance Programme and into WHO regional programmes of gonococcal susceptibility surveillance.

Numbers of Gonococcal Isolates *January - December 2005, NSW*

The total number of gonococci isolated and referred in 2005 was 1216. This number does not include duplicate isolates or those diagnoses made by nucleic acid amplification (NAA) techniques such as PCR.

This number was about 8% more than the 1113 strains received in 2004 and the 1117 examined in 2003. The highest number examined for many years was in 2002 when 1625 gonococci were available.

Historical data on the numbers of isolates examined are shown in Figures 1 (by year, 1994 - 2005) and 2 (by quarter, 1998 - 2004). Numbers of isolates increased in all quarters compared to 2003, but particularly in the third quarter of 2005.

Table 1. Number of gonococcal isolates from men and women in 2005 by quarter and for the whole year.

<u>Period</u>	<u>Men</u>	<u>Women</u>	<u>All isolates*</u>
1 January - 31 March	300	22	322
1 April - 30 June	268	24	292
1 July - 30 September	301	19	320
1 October - 31 December	<u>251</u>	<u>30</u>	<u>282*</u>
<u>1 January - 31 December</u>	<u>1120</u>	<u>95</u>	<u>1216*</u>

*The sex of one patient in the fourth quarter was not specified

Figure 1. Number of NSW gonococcal isolates examined in each year 1994 - 2005 (excludes diagnoses made by NAA based tests).

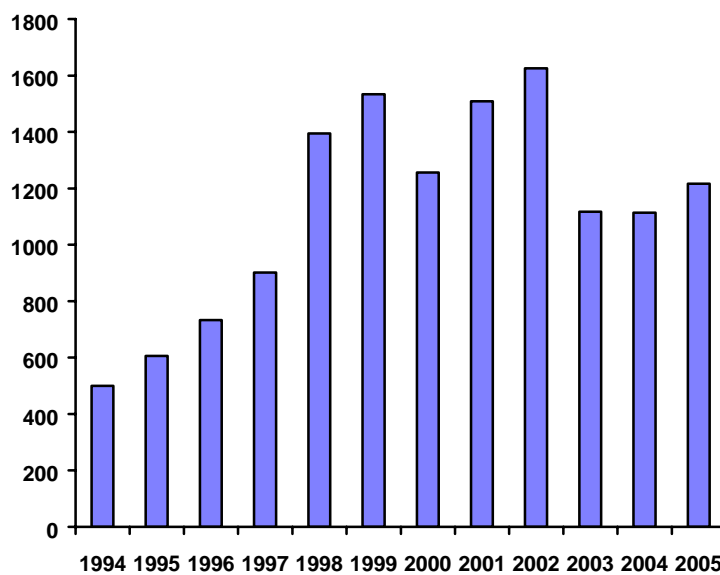
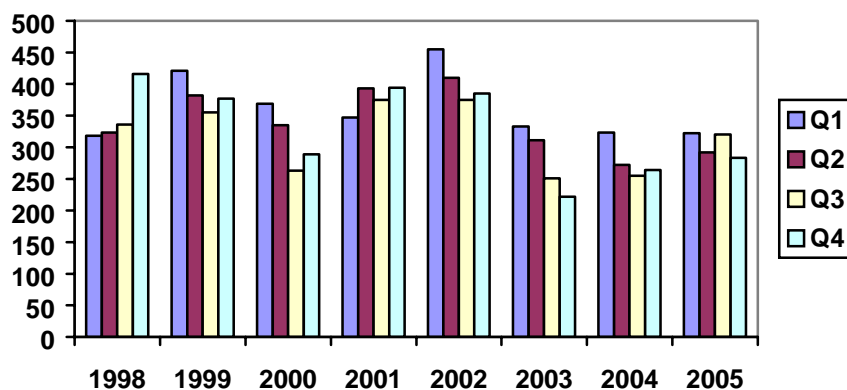


Figure 2. Number of gonococcal isolates by sequential quarters, NSW 1998 – 2005.



Infected sites - January - December 2005

Table 2. Sites of gonococcal infection in men and women, New South Wales, 2005

<i>Male patients</i>			<i>Female patients</i>		
Urethra	664	[695]	Endocervix/vagina	90	[73]
Pharynx	172	[118]	Pharynx	3	[8]
Ano-rectum	238	[201]	Ano-rectum	1	[0]
Blood/Joint	4	[2]	Blood/Joint	0	[1]
Eye	4	[4]	Eye	0	[0]
<u>Unspecified</u>	<u>38</u>	<u>[15]</u>	<u>Unspecified</u>	<u>1</u>	<u>[1]</u>
Total	1120	[1035]	Total	95	[78]

[Figures in parenthesis are data from 2004; The sex of one patient was not specified]

The male:female ratio of infected patients in 2005 was 11.8:1 [in 2004, 13:1]. Sixty one percent of isolates from known sites of infection in men were from the urethra. Rectal isolates in men comprised 22% of isolates and pharyngeal strains 15.8%. There were four disseminated infections, all in men. All of the four eye infections were in adults. Most (95%) of isolates from women were from the genital tract but also included three from the pharynx and one rectal infection.

Gonococcal antibiotic sensitivity patterns in NSW gonococci in 2005

1209 strains remained viable for susceptibility determination. For guidance in considering the following data, WHO recommends that the use of an antibiotic should be discontinued when 5% or more of isolates are resistant.

Quinolones [Ciprofloxacin, Norfloxacin, Enoxacin; more recently released fluoroquinolones such as gatifloxacin and moxifloxacin would not be expected to have any advantage over ciprofloxacin in the treatment of gonorrhoea]

2005 saw a major upsurge in the number and proportion of quinolone resistant gonococci. Five hundred and fifty five QRNG (46% of all isolates) represented the highest number and proportion of QRNG recorded in NSW in any year (Figure 3). While there has been considerable volatility in patterns of quinolone resistance in gonococci [QRNG] in NSW in past few years (Figure 3), a continuing upward trend in QRNG as a proportion of all gonococci has been evident for some time. In 2004, the 331 (30%) QRNG detected was more than twice the 160 isolated in 2003.

Additionally, from the middle of 2000 onwards, there has been a progressive increase in MICs of those gonococci identified as QRNG. The proportion of QRNG with ciprofloxacin MICs ≥ 1 mg/l) and of those with even higher MICs has increased while those in the 'less sensitive' ciprofloxacin MIC range [0.06 - 0.5 mg/L] has decreased. [Treatment failure with a 500 mg dose of ciprofloxacin is said to occur in about 6% of cases where 'less sensitive' QRNG are involved and in about 40% at an MIC of 1 mg/l. Rates of treatment failure increase rapidly above this MIC value.]

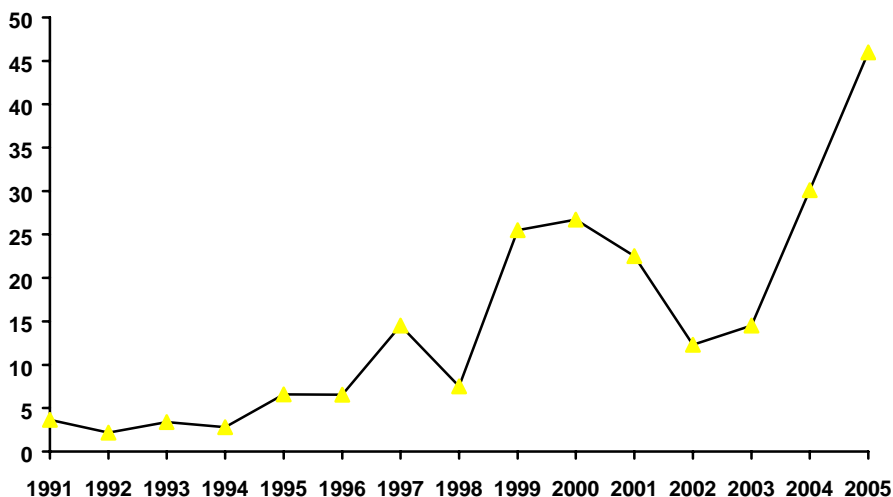


Figure 3. QRNG as a % of all gonococci isolated in NSW, 1991 – 2005.

Most of the QRNG [527, 95% of all QRNG] were resistant to the quinolones over an MIC range 1 - 16 mg/L Of these, 407 (73% of all QRNG or one third of all isolates) had high level resistance with MICs for ciprofloxacin of 8 mg/l

or more. A further 28 QRNG [2.3%] were in the less sensitive range (ciprofloxacin MICs 0.06 – 0.5 mg/l).

Data on geographic acquisition was available in about 40% the cases of infection with QRNG. The rate of local acquisition of QRNG increased again in 2005, with about 80% of infections arising from local contacts. Overseas sources of QRNG acquisition included Canada, China, Hong Kong, India, Indonesia (including Bali), Korea, Malaysia, The Philippines, Singapore, Thailand, Vietnam, UK and the USA, reflecting the wide distribution of QRNG in neighbouring countries.

Penicillins [including penicillin, ampicillin and amoxycillin]

The number (574) and proportion (47.5%) of gonococci resistant to the penicillins increased substantially from the 290 penicillin resistant strains [26.5% of isolates] detected in 2004 and 18.8% in 2003.

This increase was due to a rise in the number and proportion of gonococci intrinsically penicillin resistant by chromosomal mechanisms [CMRNG, Minimal Inhibitory Concentration - MIC =, > 1 mg/L]. In 2005, 432 CMRNG (37.5% of all isolates) were identified whereas only 130 (11.8%) were seen in 2004. The number (142) and proportion (11.8%) of penicillinase producing *N. gonorrhoeae* (PPNG) in 2005 was slightly less than the 161 (14.6%) PPNG present in 2004 (Figure 4).

In 66 of the cases, the geographic source of acquisition of the infection with PPNG was recorded. Of these, 31 were acquired through local contact and 35 from a variety of countries, most prominently Thailand, the Philippines and Indonesia but also including Malaysia, India, Fiji, China and the United Kingdom.

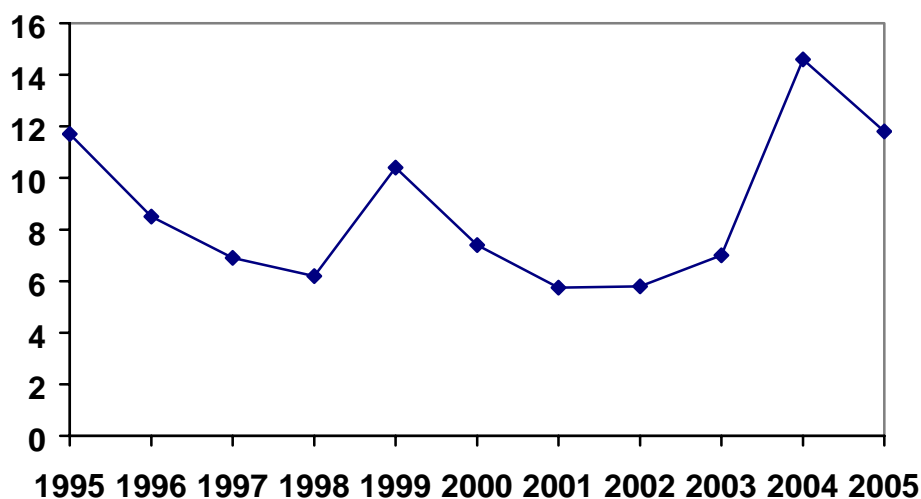


Figure 4. Percentage of NSW isolates which were PPNG, 1995 – 2004

Ceftriaxone

Thirty-seven (3%) isolates of gonococci tested in 2005 had slightly raised MICs to ceftriaxone in the range 0.06 - 0.12 mg/L, compared with 22 (2%) in 2004. All these gonococci were also quinolone and penicillin resistant. Only one was a PPNG, while the remainder were resistant to penicillin by chromosomal mechanisms (CMRNG) with penicillin MICs in the range 1 – 2 mg/L. Contact details were available in seventeen cases and all but two of the isolates were acquired locally.

These isolates have mosaic *penA* genes which phenotypically express a range of ceftriaxone MIC values. Isolates with these features are not regarded as posing any risk of treatment failure with ceftriaxone at MIC levels currently encountered, especially if the recommended dose of 250 mg IM is used. However, strains with similar characteristics were reported to have failed treatment with *oral* third generation cephalosporin antibiotics in Japan.

Spectinomycin

All strains tested were susceptible *in vitro* to this injectable antibiotic.

Tetracyclines

Tetracyclines are NOT recommended for treatment of gonorrhoea in NSW, and the continuing presence of plasmid-mediated high-level tetracycline resistance in gonococci [TRNG] has reinforced this recommendation.

High-level resistance to this agent has also fluctuated over a wide range over time. The number [136] and proportion [11.4% of all isolates] of TRNG seen in 2005 was lower than the 196 [18%] detected in 2004 and returned to levels last observed in 2002.

Some countries close to Australia have high numbers of TRNG and in the past TRNG have been seen mostly as imported infections. Geographic acquisition information was again available in about 40% of cases, and half of these were from local contact. The patients where TRNG were acquired overseas nominated Indonesia, India, the Philippines, Malaysia, Thailand, Samoa, Vietnam and China as sources of contact. Ninety-eight of the TRNG were also PPNG.

Acknowledgments :

The continuing co-operation of private and public hospital laboratories who refer strains for examination is once again gratefully acknowledged.