

Surveillance of antibiotic resistance in *Neisseria gonorrhoeae* in the World Health Organization Western Pacific Region, 2003

The WHO Western Pacific Gonococcal Antimicrobial Surveillance Programme

Abstract

The World Health Organization Western Pacific Region Gonococcal Antimicrobial Surveillance Programme examined over 11,000 isolates of *Neisseria gonorrhoeae* from 13 countries for resistance to antibiotics in 2003. Very high rates of resistance to penicillins and quinolones were again present in most centres, but little resistance to spectinomycin was detected. Several centres once more reported the presence of gonococci with decreased susceptibility to third generation cephalosporins. Treatment options for gonococcal disease acquired in the Region are increasingly limited. *Commun Dis Intell* 2005;29:62–64.

Keywords: annual reports; antibiotics; *Neisseria gonorrhoeae*; penicillin; quinolone; spectinomycin

Introduction

Attempts to treat and control gonorrhoea are compromised by the emergence and spread of antibiotic-resistant *Neisseria gonorrhoeae*. Surveillance of antimicrobial resistance in prevalent gonococci assists in the optimisation of standard treatment regimens by identifying those antibiotics that remain effective in a particular region or country. The close relationship between laboratory measures of *in vitro* resistance in gonococci and in the clinical response to antibiotic treatment provides the basis for use of data derived from antimicrobial resistance surveillance in *N. gonorrhoeae*. The World Health Organization Western Pacific Gonococcal Antimicrobial Surveillance Programme (WHO WPR GASP) has monitored resistance in gonococci isolated in the WPR since 1994, and in that time has reported the significant decline in usefulness of several agents, most notably quinolone antibiotics.^{1,2} This report provides an analysis of surveillance of antimicrobial resistance in *N. gonorrhoeae* conducted in the WHO WPR in 2003.

Methods

The methods used by the WHO WPR GASP have been published² and provide full details of the source of isolates, sample populations, laboratory test methods and quality assurance programs used to generate data. These methods were unaltered in 2003. Most isolates were collected from symptomatic STD clinic patients. As a guide to the interpretation

of the following data, a WHO expert committee has recommended that treatment regimens be altered once resistance to a particular antibiotic reaches 5 per cent.³

Results

About 11,250 gonococcal isolates were examined for susceptibility to one or more antibiotics in 13 participating countries (listed in the acknowledgements) in 2003.

Quinolone antibiotics

Table 1 shows the distribution of quinolone resistant *N. gonorrhoeae* (QRNG) in 11 countries that examined a total of 10,600 isolates in 2003. With the exception of Papua New Guinea, QRNG were present in all centres and the proportion of all isolates ranged between 5.7 per cent in New Caledonia to greater than 90 per cent in China, Hong Kong and Korea. Japan had a rate of 85 per cent. With only some slight variation, the percentage of QRNG observed in reporting centres in 2003 was similar to that recorded in 2002, and most resistance was at higher level MICs (ciprofloxacin MIC \geq 1 mg/L) that are associated with high rates of treatment failure.

Cephalosporins

From 2000 onwards, a small number of isolates with altered susceptibility to third generation cephalosporins has been reported in WHO WPR

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Table 1. Quinolone resistance in 10,629 strains of *Neisseria gonorrhoeae* isolated in 11 countries in the World Health Organization Western Pacific Region in 2003

Country	Tested	Less susceptible		Resistant		All QRNG	
	n	n	%	n	%	n	%
Australia	3,772	77	2.0	452	12.0	529	14.0
Brunei	50	5	10.0	31	62.0	36	72.0
China	1,254			1,171	93.4	1,171	93.4
Hong Kong SAR	3,378	165	4.9	3,167	93.7	3,332	98.6
Japan	200	17	12.8	154	77.0	171	85.5
Korea	212	39	18.4	166	78.3	205	96.7
New Caledonia	53	0	0.0	3	5.7	3	5.7
New Zealand	1,113	31	2.8	96	8.6	127	11.4
Papua New Guinea	286	0	0.0	0	0.0	0	0.0
Philippines	111	11	9.9	62	55.9	73	65.8
Singapore	200	9	4.5	103	51.5	112	56.0

QRNG Quinolone-resistant *Neisseria gonorrhoeae*.

surveys. In 2003, these were again detected in small numbers of isolates from Australia, New Zealand, China, Korea and Brunei.

Spectinomycin

A small number of spectinomycin resistant strains were reported from China. Only very small numbers of spectinomycin resistant gonococci have been reported in recent years in WPR GASP surveys.

Penicillins

Resistance to penicillins has been widespread and at high levels for many years in the WPR, and is mediated by a combination of mechanisms (Table 2). Little change was seen in 2003 from the generally high levels seen in 2002 except for Papua New Guinea where rates of penicillinase-producing *N. gonorrhoeae* (PPNG) fell from 82 per cent to 46 per cent of strains tested. Exceptionally high rates of resistance to this group of antibiotics were again observed in Laos, China and the Philippines.

Tetracyclines

These antibiotics are still widely available in the WPR. About 7,000 isolates were examined for one particular form of resistance, namely, that high-level plasmid-mediated form referred to as TRNG (Table 3). Again rates of resistance, expressed as a percentage of all isolates tested, were similar to those found in 2002. Singapore, China and the Philippines had rates between 25 per cent and 59 per cent, those in Australia and New Zealand approximated 10 per cent and elsewhere the rates were less than 5 per cent.

Discussion

There was little change in patterns of gonococcal resistance to antibiotics in the WHO WPR in 2003. However these rates remained generally high and the use of many cheap oral agents such as ciprofloxacin and penicillins remains contraindicated in most centres. The challenge to find suitable alternative agents is made more difficult by their high cost or the need to use injectable antibiotics. The continuing detection of isolates with decreased susceptibility to third generation cephalosporins, albeit in small numbers, remains a matter of interest and concern. Spread of these strains beyond the WHO WPR has been documented as has their resistance to multiple antibiotics.⁴

Although the total number of isolates examined in the program in 2003 was similar to that in 2002, the number of participating centres declined. Continuation of surveillance is essential for local, regional and international efforts for control of gonorrhoea.

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Table 2. Penicillin resistance in 11,246 strains of *Neisseria gonorrhoeae* isolated in 13 countries in the WHO WPR in 2003

Country	Tested n	PPNG		CMRNG		All penicillin-resistant	
		n	%	n	%	n	%
Australia	3,772	306	8.0	333	9.0	639	17.0
Brunei	49	27	55.0	0	0.0	27	55.0
China	1,254	445	35.5	374/409	91.5		92.5
Fiji	565	17	3.0	NT			
Hong Kong	3,378	852	25.2	1,287	38.1	2,139	63.3
Japan	200	3	1.5	69	34.5	165	77.8
Korea	212	35	16.5	130	61.3	165	77.8
Lao	52	22/28	78.6	6/28	21.4	52	100.0
New Caledonia	53	5	9.4	NT			
New Zealand	1,113	31	2.8	30	2.7	61	5.5
Papua New Guinea	286	132	46.2	0	0.0	132	46.2
Philippines	112	88	78.6	13	11.6	101	90.1
Singapore	200	89	44.5	14	7	103	51.5

PPNG Penicillinase-producing *Neisseria gonorrhoeae*.

CMRNG Chromosomally mediated resistance in *Neisseria gonorrhoeae*.

NT Not tested.

Table 3. High-level tetracycline resistance in 7,055 strains of *Neisseria gonorrhoeae* isolated in 9 countries in the WHO WPR in 2003

Country	Tested n	TRNG	
		n	%
Australia	3,772	411	11.0
China	1,254	403	32.1
Japan	53	2	3.8
Korea	212	4	1.9
New Caledonia	53	0	0.0
New Zealand	1,113	92	8.3
Papua New Guinea	286	1	0.3
Philippines	112	29	25.9
Singapore	200	117	58.5

TRNG Tetracycline resistant *Neisseria gonorrhoeae*

Caledonia; M Brokenshire, Auckland, New Zealand; C Manesikia, Port Moresby, Papua New Guinea; CC Carlos, D Agdamag, Manila, Philippines; Cecilia Ngan, Singapore.

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