

Excessive antimicrobial consumption in New Zealand is driving resistance

- New Zealand has “*very high antibiotic use*” compared with many other developed countries.
- Antimicrobial use, both appropriate and inappropriate, drives antimicrobial resistance.
- The prevalence of multidrug resistant organisms (MDROs) is steadily increasing across New Zealand.
- Key strategies to slow MDRO development are to decrease the *quantity* of antimicrobials used (**column 1**), and to improve the *quality* of antimicrobial prescribing (**pink box**).

ANTIMICROBIAL CONSUMPTION IN NEW ZEALAND

New Zealand had “*very high antibiotic use*” (70 units per person in 2010) in a recent survey of 71 countries that used sales data for *hospital* and *community* pharmacies to estimate antimicrobial consumption¹. Our use greatly exceeded other high income countries like the Netherlands and France, and was comparable to Australia (~8, 23 and 87 units per person, respectively).

A local study² also reported high antimicrobial use in NZ compared with many European nations. This study focused on *community* antimicrobial consumption and reported an increase of 43% in the seven years to 2012². In 2010, our community use equated to ~23 Defined Daily Doses (DDDs – **orange box**) per 1000 inhabitants per day, compared with 10 – 16 for the Netherlands, Germany, Austria, Norway and Denmark².

The steady increase in antimicrobial use in NZ correlates with growth in the prevalence of MDROs. For example, there was a 46% increase in the proportion of *E. coli* producing Extended Spectrum Beta-Lactamase (ESBL) isolated from blood cultures between 2006 (2.6%) and 2011 (3.8%)³.

🏥 HOSPITAL ANTIMICROBIAL USE

Comparative data on *hospital* antimicrobial consumption at five DHBs – Auckland, Canterbury, Capital & Coast, Counties-Manukau and Waitemata – are available⁴. Total antimicrobial consumption varied from 704 – 798 DDDs per 1000 occupied bed days across the DHBs, with CDHB at the lower end of the range (707 DDDs per 1000 bed days). Use at all five DHBs was less than the average in Australian or English hospitals (~940 and 1300 DDD per 1000 bed days, respectively) but above that of countries like France, Switzerland and Sweden (633, 540 and 329 DDDs per 1000 bed days, respectively)^{5,6}.

CDHB’s use of cephalosporins was within the range of the other NZ DHBs and Australia, but well above the mean in England where use has been restricted to try and curtail development of *C. difficile* disease. Our use of carbapenems and piperacillin/tazobactam was also within the range of the other DHBs and markedly less than in Australia and England. However, quinolone use at CDHB was 1.4- to 2.4-fold higher than seen in the other NZ DHBs and warrants investigation. We are undertaking work to further understand our antimicrobial use, especially our high quinolone use, and will then put additional strategies in place to help improve antimicrobial prescribing.

DEFINED DAILY DOSES

- The World Health Organisation describes a defined daily dose (DDD) as “...*the assumed average maintenance dose per day for a drug used for its main indication in adults*”.
- DDDs standardise drug usage in a way that is independent of cost and dose form. It does not necessarily reflect the therapeutic dose (Table).
- Use of DDDs facilitates comparison of drug usage between different drugs and populations.

TABLE: EXAMPLES OF ANTIBACTERIALS AND DDDs

DRUG	DEFINED DAILY DOSE	ROUTE
Amoxicillin	1 g	oral or parenteral
Ceftriaxone	2 g	parenteral
Ciprofloxacin	1 g (0.5 g)	oral (parenteral)
Clarithromycin	0.5 g (1 g)	oral (parenteral)
Doxycycline	0.1 g	oral or parenteral
Gentamicin	0.24 g	parenteral

Quality prescribing of antimicrobials at CDHB

- ❖ Avoid unnecessary use of antimicrobials, especially those that are broad spectrum.
- ❖ When antimicrobials are indicated, use the *right agent* at the *right dose* via the *right route* for the *right duration*.
- ❖ To inform prescribing, use the CDHB:
 - [Antimicrobial Guidelines](#) [Pink Book, 2015] via the intranet, smart phone (<http://mob.pinkbook.org.nz>), or in hardcopy.
 - [Antimicrobial Susceptibility Booklet](#) under Clinical Resources on the Intranet, or in hardcopy.
- ❖ Consult with services such as Infectious Diseases, Clinical Microbiology, Clinical Pharmacology or Pharmacy when required.

Antimicrobial use in New Zealand, Australian and English hospitals (April 2012- March 2013)

2012-2013 Antimicrobial use (DDD/1000 occupied bed days)	NEW ZEALAND					AUSTRALIA ⁵	ENGLAND ⁶
	ADHB ^a	CDHB ^b	CCDHB ^c	CMDHB ^d	WDHB ^e	mean	mean
Total antibacterials	735	707	798	704	727	942	1297
Quinolones	20	48	28	35	32	43	~50
Cephalosporins	125	120	197	99	178	183	~50
Carbapenems	21	14	20	15	10	21	~30
Piperacillin-tazobactam	1.6	8	19	1.1	2.5	42.7	~43

Comprised the following hospitals: Auckland City^a, Christchurch, Christchurch Women’s, Burwood and The Princess Margaret^b, Wellington and Kenepuru^c, Middlemore^d, North Shore and Waitakere^e.

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References:

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5. National Antimicrobial Utilisation Surveillance Program Annual Report (2013-2014) www.sahealth.sa.gov.au/nausp.
6. Cooke J et al., *J Antimicrob Chemother* 2015;70(1):279-85.