Update on antibiotic resistance in British Columbia

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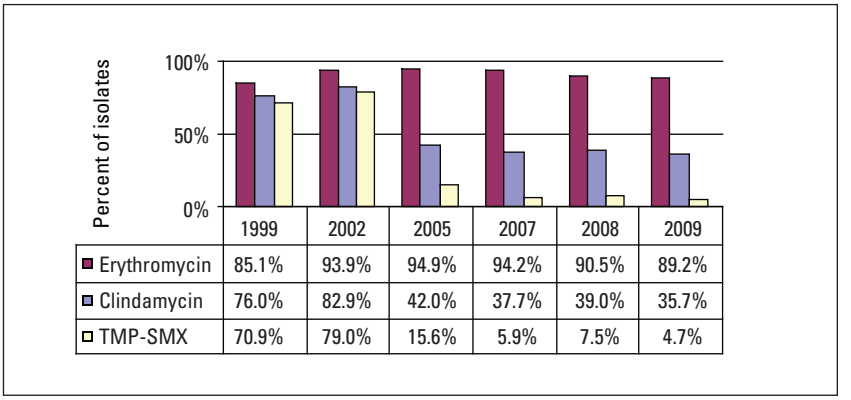
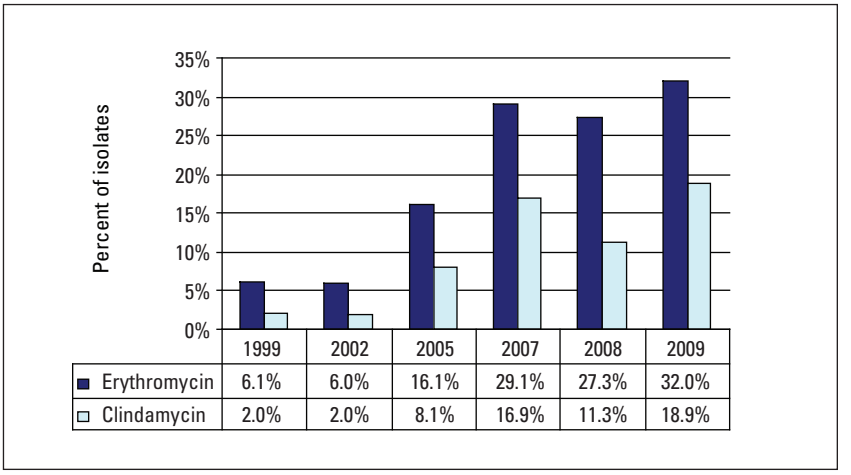
This article highlights recent trends in antimicrobial resistance of key bacterial pathogens. These findings represent a brief overview of the BCCDC's 2010 Antimicrobial Resistance Trends report.[1] Bacterial organisms that are monitored for non-susceptibility in the report include methicillin-resistant (MRSA) and methicillin-susceptible (MSSA) *Staphylococcus aureus, Streptococcus pneumoniae, Streptococcus pyogenes, Enterococcus* spp., *Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, Pseudomonas aeruginosa, Salmonella Enteriditis, Haemophilis influenzae, Neisseria meningitides* and *Neisseria gonorrhoeae*.



	1999	2002	2005	2007	2008	2009
Erythromycin	85.1%	93.9%	94.9%	94.2%	90.5%	89.2%
Clindamycin	76.0%	82.9%	42.0%	37.7%	39.0%	35.7%
TMP-SMX	70.9%	79.0%	15.6%	5.9%	7.5%	4.7%

Figure 1. Percent of MRSA non-susceptible to clindamycin, erythromycin, and TMP-SMX.



	1999	2002	2005	2007	2008	2009
Erythromycin	6.1%	6.0%	16.1%	29.1%	27.3%	32.0%
Clindamycin	2.0%	2.0%	8.1%	16.9%	11.3%	18.9%

Figure 2. Percent of S. pnemoniae isolates resistant to erythromycin and clindamycin.

Findings

Bacterial pathogens in British Columbia continue to display important changes to their resistance profile. The main trends of current relevance:

- Methicillin-resistant *Staphylococcus aureus* (MRSA) represents approximately one-quarter of all tested *S. aureus* isolates in 2009. MRSA resistance toward erythromycin, clindamycin, and trimethoprim-sulfamethoxazole (TMP-SMX) has seen a steady decline (**Figure 1**) likely attributed to the increased prevalence of community-associated (CA) MRSA strains. Moreover, MRSA isolates have displayed significantly higher resistance rates than MSSA isolates to these other agents.
- Data from BC Biomedical Laboratories indicate that *Streptococcus pneumoniae* isolates have demonstrated increasing resistance against erythromycin over the past decade. In 1999, the percent of *S. pneumoniae* isolates that exhibited resistance toward erythromycin was 6.1%, but this figure has increased dramatically to 32.0% as of 2009. Clindamycin resistance rates have also increased among *S. pneumoniae* over the past decade, from 2.0% in 1999 to 18.9% in 2009 (**Figure 2**).
- *Enterococcus* spp. isolates remain highly susceptible to ampicillin, vancomycin, and nitrofurantoin (>98%). One-quarter (25.2%) of all isolates remain ciprofloxacin resistant, although significant decreases in resistance have occurred since 2002, when 47% were resistant. The percentage of *Enterococcus* spp. isolates demonstrating resistance against vancomycin has remained under 1% in BC for years 1999 to 2009.

Restraint in prescribing can slow and even stop emergence of some resistance patterns that would otherwise increase morbidity, mortality, and health care costs.

- Urinary tract pathogens such as *Escherichia coli, Klebsiella pneumoniae* and *Proteus mirabilis* have demonstrated increasing resistance against ciprofloxacin while only *E. coli* and *P. mirabilis* isolates have seen increasing resistance in TMP-SMX. Nitrofurantoin remains highly effective for *E. coli* with over 96% of isolates showing susceptibility.
- Antimicrobial utilization rates have remained stable over the last 3 years. Although β-lactam antibacterials continue to be the most prescribed drug class in BC, utilization rates along with those for trimethoprim/sulfonamides have seen noticeable decreases since 1996. Macrolides/clindamycin have seen a dramatic increase in utilization since 1998 and combined are now the second-highest prescription drug class. Tetracyclines are the third most prescribed antibacterial group and have seen little fluctuation in the past 5 years. Fluoroquinolones and trimethoprim/sulfonamides are the fifth and sixth most prescribed antibacterials in BC, with the former displaying a steady increase driven by the drug ciprofloxacin and the introduction of new respiratory fluoroquinolones.

Why is antimicrobial resistance surveillance necessary?

Knowledge of current antimicrobial resistance trends informs targeted and empirical therapy. Findings underscore the critical value of appropriate antibiotic use and stewardship. Restraint in prescribing can slow and even stop emergence of some resistance patterns that would otherwise increase morbidity, mortality, and health care costs. The full 2010 report will be posted at www.bccdc.ca/util/about/annreport/default.htm.

Acknowledgments

We would like to thank BC Biomedical Laboratories and all contributors to the 2010 report.

Reference

1. Epidemiology Services, BC Centre for Disease Control. Antimicrobial Resistance Trends in the Province of British Columbia—March 2010. www.bccdc.ca/util/about/annreport/default.htm (accessed 1 April 2010).

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