

Introduction to CANWARD 2007

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In 1995, the American Society for Microbiology published a consensus report based on a workshop on antibiotic resistance (1). This report highlighted the urgent need for active surveillance of antibiotic resistance in both human and animal pathogens. Infections caused by increasingly resistant pathogens result in dramatically increased health care costs and treatment failures, as well as increases in morbidity and mortality worldwide. Among many recommendations, active surveillance of antibiotic resistance was prominent both on a national and local basis.

Worldwide, we have seen the emergence of methicillin-resistant *Staphylococcus aureus* (MRSA), penicillin- and multidrug-resistant (MDR) *Streptococcus pneumoniae*, vancomycin-resistant *Enterococcus faecium*, fluoroquinolone-resistant *Escherichia coli* and *Pseudomonas aeruginosa*, as well as MDR Enterobacteriaceae species (2-4). Antibiotic resistance varies with location, time, and geography within and between countries, as well as within communities and hospitals. Location, location, location (5) when studying antibiotic resistance is critical because patients may encounter antibiotic-resistant pathogens in a variety of situations.

The prevalence rates of antibiotic resistance in a hospital on a local basis can be ascertained via annual hospital antibiograms, which generally reflect prevalence rates among pathogens associated with hospital-acquired infections (6). Antibiograms, however, are cumulative collections and analysis of antibiotic susceptibility data and are not 'snapshots' of resistance in a hospital and may fail to detect emergence of resistant phenotypes. National surveillance studies coordinated to provide a true 'snapshot' of prevalence of pathogens and their degree of antibiotic resistance provide a unique opportunity to compare and contrast the degree of antibiotic resistance comparing one region or hospital to another.

The present supplement of nine articles documents the initial year (2007) of the Canadian Ward Surveillance Study (CANWARD). This national study focused on inpatient and outpatient pathogens and their degree of antibiotic resistance with a focus on hospital ward isolation (medical, surgical, intensive care unit, emergency room or clinic) as well as infection site (blood, respiratory, urine or wound). The nine manuscripts in the present supplement will by nature overlap in some areas as specific species are discussed from varying molecular and phenotypic perspectives, allowing each manuscript to portray unique CANWARD findings.

Zhanel et al (7,8) introduce CANWARD and provide an overview of pathogens, antibiotic resistance rates by ward and specimen types in the first paper, while expanding susceptibility and resistance information to commonly used agents in Canadian hospitals in 2007 to a variety of phenotypes in the second paper. In the third paper, Nichol et al (9) discuss MRSA prevalence rates in Canada, and outline the status of community-associated MRSA (CA-MRSA) and health care-associated MRSA (HA-MRSA) in Canada as well as genotyping information. In the fourth paper, Wierzbowski et al (10) describe the evolution of antibiotic resistance in *S pneumoniae*, current levels of resistance and the current prevalence of macrolide mechanisms of resistance. Baudry et al (11) discuss the current status and characterization of extended-spectrum beta-lactamases in Canadian hospitals and spectrum of activity of common antibiotics against extended-spectrum beta-lactamase-producing pathogens in the fifth paper. Lagacé-Wiens et al (12) discuss prevalence and resistance in *E coli* in Canada, including MDR phenotypes, in paper 6. In paper 7, Walkty et al (13) describe current resistance patterns in *P aeruginosa* and prevalence of MDR phenotypes. Karlowsky et al (14) subsequently discuss the spectra of activity of two new agents – ceftobiprole and doripenem – against CANWARD pathogens, and their potential role in future patient management. In the final paper, Zhanel et al (15) compare three carbapenems – doripenem, meropenem and imipenem – using mutant prevention concentration (MPC) studies to illustrate their ability to prevent resistance development. These MPC studies use *Pseudomonas* isolates from both CANWARD and other national surveillance studies. These MPC studies integrate future directions for CANWARD pathogens and investigations highlighting resistance and mutation prevention data.

The papers, and in-depth analysis of CANWARD surveillance data presented in the present supplement covering active surveillance on hospital pathogens and their resistance patterns in Canada in 2007, conform to the national objectives of surveillance of resistance. Information gathered in the 2007 CANWARD study should assist clinicians, microbiologists and infection control practitioners in understanding patterns of resistance in Canada and in making appropriate decisions on antimicrobial therapy and stewardship. More data, including regional data can be found at www.can-r.ca, the official Web site of the Canadian Antimicrobial Resistance Alliance (CARA).

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