



**BRITISH COLUMBIA ASSOCIATION OF  
MEDICAL MICROBIOLOGISTS**

**Antibiotic Resistant Organism (ARO) Surveillance in British Columbia  
2007 Report**

The Medical Microbiologists of British Columbia (BCAMM) have established a network for gathering annual information on AROs in British Columbia. The network is broadly representative of the provincial population, as participants contributing data work in all Health Regions in BC, and in laboratories serving both in- and outpatients. The report is formatted to prevent identification of individual sites and/or patients. After BCAMM review, it is made available to the Provincial Health Officer, BCCDC Epidemiology, PICNET, CHICA-BC and to others interested in surveillance for AROs. Further use or dissemination of this report should acknowledge the efforts of BCAMM and participants.

This is the sixth consecutive year for this report, with cumulative data from January 1, 2002 to December 31, 2007. The 2007 report does not include statistics from one Health Authority (HA) which had reported statistics for previous years. The absence of data from this HA compromises the ability to do trending analysis. However, in an effort to detect trends from 2006 to 2007, adjusted data for 2006 excluding the statistics from this HA is provided. Further limitations to the interpretation of the data are included in the next section.

Similar to the 2006 report, this report presents aggregate data for the entire province (Table 1), and aggregate data by HA (Table 2). Where only a single site reports for a region, these sites are included with other HA as indicated. Continued in this report is an estimation of whether patients with MRSA were identified from either clinical specimens or from surveillance cultures. This data was provided by 75% of participants and was quite variable. Surveillance specimens identified 1% to 100% of patients newly identified to have MRSA, while clinical specimens identified 39-99%.

Community associated MRSA isolates are noted to have increased susceptibility to trimethoprim-sulfamethoxazole. This data is included in this report as a surrogate marker of community associated strains. Participants who provided this information reported a range of 6-97% susceptibility to trimethoprim-sulfamethoxazole in MRSA isolates,. This compares to 74-98% trimethoprim-sulfamethoxazole strain susceptibility reported in 2006.

Emerging antibiotic resistance in gram negative bacilli is another area of concern. For the first time with this report, sites were asked to provide any available data on the presence of resistance to extended spectrum cephalosporins, or Extended Spectrum Beta-lactamases (ESBLs). Eleven sites were able to provide an estimated range of the presence of this resistance pattern (Table 3).

We acknowledge the contributions of Medical Microbiologists, General Pathologists, Infectious Disease specialists, laboratory technologists and infection control practitioners without whom this report would not be possible. While it would be desirable to collect additional demographic or clinical data, or extend the surveillance project to other organisms, this would require additional resources.

**Report prepared by Diane Roscoe MD FRCPC and Sylvie Champagne MD FRCPC  
Reviewed and approved by BCAMM and all participants**

**April 7, 2009**

## MRSA reported by BCAMM ARO Surveillance Project

During 2002-2003, the number of new patients identified with MRSA (2,500-3,000 patients) and the approximate proportion of MRSA/total *S.aureus* (9-10%) remained fairly constant. An increase in numbers was first observed in 2004, and was sustained in 2005-2006. For 2007, the year of this current report, trend analysis is compromised by the lack of statistics from one HA which had reported statistics for previous years. However, in an effort to detect trends from 2006 to 2007, adjusted data for 2006 excluding the statistics from this HA is included (Table 1). In 2007, 10,501 new patients were reported with MRSA, and the overall proportion of MRSA/total *S. aureus* was relatively stable at 24%. There is a steady increase in the number of MRSA isolates reported by the community laboratories since 2004.

**Table 1: MRSA Statistics for British Columbia, 2002 to 2006, BCAMM**

Year	Total new MRSA patients <sup>a</sup>	Total <i>S.aureus</i> isolates <sup>b</sup>	Approx % MRSA/ Total <i>S.aureus</i> <sup>b</sup>	Approx % MRSA - Range <sup>b,c</sup>	Approx % MRSA - Median <sup>b</sup>
<b>2002</b>	2,504	27,641	9.1%	1.3 – 62.7%	NA
<b>2003</b>	3,122	29,991	10.4%	2 – 51%	NA
<b>2004</b>	5,063	33,079	14.4%	6-33%	12.3%
<b>2005</b>	8, 923	39, 471	22.6%	8-47%	21%
<b>2006</b>	10,069	43,694	23 %	11-30%	20%
<b>2006 adjusted***</b>	9,755***				
<b>2007**</b>	11,062**	43,456**	24% **	7-38% **	23% **

<sup>a</sup> See limitation 1

<sup>b</sup> See limitation 2

<sup>c</sup> Numbers at high end of range are outliers and reflect local outbreaks

\*\*Data missing one HA that previously reported statistics

\*\*\*Adjusted data from 2006, excluding data from HA that did not report in 2007

**Table 2: MRSA Statistics by Health Region, 2004 to 2006, BCAMM**

Region	2004		2005		2006		2007	
	New MRSA patients	%MRSA/ All <i>S. aureus</i>	New MRSA patients	%MRSA/ All <i>S. aureus</i>	New MRSA patients	%MRSA/ All <i>S. aureus</i>	New MRSA patients	%MRSA/ All <i>S. aureus</i>
<b>VCH PHSA</b>	1600	20%	2,263	25%	2,270	24%	1990	23%
<b>VIHA South</b>	535	15%	686	24%	314	18%	NR*	NR*
<b>FHA</b>	840	12%	2,023	27%	2,229	24%	2375	31%
<b>IHA NHA</b>	264	9%	601	15%	745	18%	1203	21%
<b>Community Laboratories</b>	1824	13%	3,350	19%	4,511	24%	5224	26%

\* Not reported

## VRE reported by BCAMM ARO Surveillance Project

During 2002-2003, the number of new patients identified with VRE (43-45 patients) remained stable. From 2004 to 2005, the absolute number of patients identified to have VRE increased 10-fold due to several local institutional outbreaks primarily in lower mainland hospitals that began at the end of 2004. The numbers reported in 2006 and 2007 continue to show steady increases. For 2007, the year of this current report, trend analysis is compromised by the lack of statistics from one HA which had reported statistics for previous years. However, in an effort to detect trends from 2006 to 2007, adjusted data for 2006 excluding the statistics from these sites is included (Table 2). There is a wide range in incidence in VRE as evidenced by the range of reports from 1 patient with VRE (reported by two sites) to a high of 443 patients (reported by one site). The number of patients with VRE reported by many sites still continues to be low, as reflected by the median number of 8 patients by all sites reporting. Seven sites reported more than 60 patients and only 3 sites reported greater than 200 patients. The prevalence of VRE as a percentage of all enterococci isolated in laboratories is believed to be very low. As in previous years, very few patients with VRE were identified in community laboratories.

**Table 2: VRE reported by BCCAMM ARO Surveillance Project, 2002-2006**

Year	Total new VRE patients <sup>a</sup>	Estimate of VRE as % of all enterococci <sup>c</sup>	Range: # patients with VRE	Median # patients with VRE by site	Sites reporting >60 patients with VRE
<b>2002</b>	43	<1%			
<b>2003</b>	45*	<1%			
<b>2004</b>	150*	Estimate: no more than 1%			
<b>2005</b>	1,107*	Estimate: no more than 1%	0-656	7	5
<b>2006</b>	1,368*	Estimate: no more than 1%	0-550	18	7
<b>2006 adjusted***</b>	1,351***				
<b>2007**</b>	1,504**	Estimate: no more than 1%	1-433**	8**	7**

<sup>a</sup> See limitation 1

<sup>c</sup> See limitation 3

\* Reflects local outbreaks

\*\*Data missing from one HA that previously reported statistics

\*\*\*Adjusted data from 2006, excluding data from HA that did not report in 2007

**Table 3: Resistance in Gram negative bacilli: ESBLs**

Eleven sites provided data on the presence of ESBLs in Enterobacteriaceae. These numbers are reported as estimates as computer systems do not always allow the tracking of this data.

Year	E. coli ESBL*	Klebsiella pneumoniae ESBL*
<b>2007</b>	0.7 to 5%	0-3%

\* Estimated data



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**Limitations:**

1. **Number of MRSA and VRE patients:** The patient numbers submitted are those identified at each participating laboratory, each patient counted only once at each site. However, patients may be counted more than once if they submitted cultures to more than one of the participating laboratories. Anecdotally, one large tertiary center found on one annual review that only 2.5% were repeated reports.
2. **Number of isolates:** The number of isolates reported is generated by laboratory information systems. Laboratories use a variety of approaches to count isolates, some of which are chosen according to local need and some of which are dictated by the constraints of the laboratory information system. For example, some laboratories re-test every isolate on a patient (and thus re-count every isolate), while some laboratories have policies which require that the same isolate be re-tested (and thus re-counted) only every four or seven days, depending on the source of the isolate, or the location of the patient. Some laboratories only count in-patient isolates. Thus any calculation using the number of isolates tested, e.g. #MRSA/total MRSA tested, is subject to a degree of error.
3. **Number of enterococci:** Denominator data for enterococci is not provided, as the degree of resistance would be largely over-estimated. This is due to the fact that enterococci are common colonizers, or are present with other more virulent pathogens. They therefore are not subject to susceptibility testing and are not counted in laboratory information systems. Or to state it another way, the search for VRE is much more vigilant than the testing and reporting of enterococci in general. The same is not as much of a problem for *S. aureus*, since when *S. aureus* is present in a specimen it is usually considered a pathogen, subjected to susceptibility testing, and is counted. Having said this, it is still fair to estimate that VRE represent less than 1% of all enterococci isolated in B.C.
4. **Community versus hospital incidence:** Further epidemiologic investigation is required to meaningfully separate the isolates as arising from the community or arising in the hospital setting. Breaking the numbers down into those reported by community laboratories and those reported by in-patient settings would not necessarily reflect acquisition in the community, but could be provided if of interest.
5. **Time Period:** Centres may differ on the periods used for counting, some counting on calendar months, and others using “periods” within a fiscal year. The data collected were requested for the 12 calendar months or “periods” which best reflect those months, or for the calendar year. This is not felt to introduce significant error into these statistics, as it will be the trend of these data that is most useful.



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*ARO Surveillance in British Columbia: Participating Locations*

**We acknowledge and thank the Medical Microbiologists, General Pathologists, Infectious Disease specialists, laboratory technologists and infection control practitioners at the following centres who have contributed to this report.**

**Community-based Laboratories:**

1. BC Biomedical Laboratories
2. LifeLabs (formerly MDSMetro Laboratories) -Burnaby, Victoria, & Northern BC Laboratory locations

**Hospital-based Laboratories:**

**Vancouver Coastal Health:**

3. Lion's Gate Hospital
4. Powell River General Hospital
5. Providence Health Care
6. Richmond Hospital
7. Squamish General Hospital
8. St. Mary's Hospital, Sechelt
9. Vancouver Acute (VGH, UBCH, GF Strong, George Pearson sites)

**Provincial Health:**

10. Children's and Women's Hospital (Vancouver)

**Fraser Health:**

11. Fraser Health East (MSA General, Chilliwack General, Mission Memorial and Fraser Canyon Hospitals)
12. Fraser Health North (Burnaby Hospital, Eagle Ridge Hospital, Royal Columbian Hospital, Ridge Meadows Hospital)
13. Fraser Health South (Surrey Memorial Hospital, Delta Hospital, Surrey Youth Outreach Clinic, Peace Arch Hospital, Langley Memorial Hospital)

**Interior Health:**

14. East Kootenay Regional Hospital (Cranbrook)
15. Kelowna General Hospital
16. Penticton Regional Hospital
17. Summerland Health Centre
18. Princeton General Hospital
19. Keremeous Diagnostic Centre
20. Royal Inland Hospital (Kamloops)

**Northern Health:**

21. Prince George Regional Hospital

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BCAMM also constitutes the BCALP Microbiology Science Section