



# MICROBIOLOGY NEWSLETTER

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A monthly presentation of specimen collection problems  
and tips on how to interpret Microbiological report

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THERE ARE NO NORMAL VALUES IN MICROBIOLOGY!  
AN IMPROPERLY COLLECTED SPECIMEN MEANS UNINTERPRETABLE RESULTS!

## Analysis and presentation of Cumulative Antimicrobial Susceptibility data

CLS provides on an annual basis an overview on the susceptibility patterns of medically important bacteria isolated from the community, acute care settings and nursing homes within the Calgary Health Region. Recently the national Committee on Clinical Laboratory Standards (NCCLS) published a document namely NCCLS M-39A "Analysis and Presentation of Cumulative Antimicrobial Susceptibility data" or creating an antibiogram. The Susceptibility Standardization Committee of Alberta consisting of members from CLS (Calgary), MDS-Kasper Dynacare (Edmonton) and Provincial Laboratory (Calgary and Edmonton) recently discussed the M-39A document.

The purpose of this newsletter is to highlight some of the issues pertaining to this document and to discuss how this will influence the annual antibiogram published by CLS.

1. What is an antibiogram? This is the overall profile of antimicrobial susceptibility results of an organism to various antimicrobial agents. An example of an antibiogram is depicted in Table 1.
2. What is the purpose of the M-39A document? This document is intended as a guideline to assist individuals who prepare an antibiogram report. The purpose of an antibiogram report is to guide physicians in empiric therapy decisions and can be helpful to look for trends in antimicrobial resistance patterns. The knowledge of local resistance trends can help physicians select empiric therapy and support prudent antimicrobial prescribing practices.
3. Which species should be included in an antibiogram? Table 2 illustrates the different organisms to be included in an antibiogram. NCCLS recommends that at least 10 isolates/species should be included in the report. The Susceptibility Standardization Committee of Alberta feels that 30 isolates/specie is more appropriate on an annual basis. Those organisms with < 30 isolates can be grouped together (e.g., AmpC producing enterobacteria, etc.).
4. What about intermediate results? (As opposed to sensitive, resistant)? The antibiogram should only include the percentage of isolates that are **susceptible** to a given antimicrobial agent. The exceptions for this are the calculations for *Streptococcus pneumoniae* and viridans streptococci.
5. How should duplicate isolates be handled? NCCLS recommends that calculations should include only the 1<sup>st</sup> isolated per patient per analysis period. However, the Susceptibility Standardization Committee of Alberta recommends that it is more appropriate to do the following:
  - Include the 1<sup>st</sup> isolate of a given species and count the same species again if encountered after 30 days have elapsed.
  - Count an isolate again if the susceptibility pattern change (i.e. change from susceptible to resistant or resistant to susceptible)
  - It is important that data analysis should be calculated using the entire data set. Data should not be presented from analysis of select resistant isolate subsets. E. G. if amikacin is only tested against enterobacteria resistant to gentamicin, amikacin should not be included in the analysis.
6. Verify identification and susceptibility results. The accuracy of susceptibility for individual patient isolates are not guaranteed, even when results of routine laboratory quality control testing are within the control range. Therefore, the laboratory must verify certain results on isolates.
7. Although the report generated by the NCCLS does not meet all the needs of every user, the Susceptibility Standardization Committee of Alberta found this document to be informative and helpful in creating an

antibiogram. The members of the Susceptibility Standardization Committee of Alberta will incorporate the above-mentioned recommendations for future antibiograms.

**Table 1. Cumulative Antimicrobial Susceptibility Report Example**

Memorial Medical Center

January 1 – December 31, 2001 Cumulative Antimicrobial Susceptibility Summary

Percent susceptible

Gram negative organisms	N	Amp	Cz	Ctx	Caz	Cip	Fm <sup>1</sup>	Gm	Imi
<i>Acinetobacter baumannii</i>	38	-	-	39	73	98	-	85	100
<i>Citrobacter freundii</i>	49	-	-	92	92	98	96	96	100
<i>Enterobacter aerogenes</i>	31	-	-	97	97	100	94	95	100
<i>Enterobacter cloacae</i>	76	-	-	90	90	100	94	97	100
<i>Escherichia coli</i>	1123	46	84	97	97	96	90	96	100
<i>Klebsiella pneumoniae</i>	532	-	88	97	97	98	92	98	100
<i>Morganella morganii</i>	44	-	-	98	98	100	-	100	100
<i>Proteus mirabilis</i>	88	72	90	99	99	100	-	99	100
<i>Providencia</i> spp.	31	-	-	96	96	100	-	100	100
<i>Pseudomonas aeruginosa</i>	401	-	-	-	94	76	-	88	80
<i>Salmonella</i> spp.	41	88	-	98	-	-	-	-	-
<i>Serratia marcescens</i>	43	-	-	96	96	98	90	96	100
<i>Shigella</i> spp	-	-	-	100	-	-	-	-	-
<i>Stenotrophomonas maltophilia</i>	72	-	-	-	63	-	-	-	-

N = number of isolates<sup>1</sup> - Tested on urine isolates only (-) drug not tested or not indicated

S for each organism/antimicrobial combination was generated by including the first isolate of that patient and counted again if encountered after 30 days have elapsed.

**Table 2. Species recommended for inclusion when sufficient numbers of isolates are tested**

Gram negatives	Gram positives	Anaerobes	Other
<i>Acinetobacter baumannii</i>	<i>Enterococcus</i> spp.	<i>Bacteroides fragilis</i>	<i>Haemophilus influenzae</i>
<i>Citrobacter freundii</i>	<i>Staphylococcus aureus</i>	<i>Clostridium perfringens</i>	<i>Moraxella catarrhalis</i>
<i>Citrobacter koseri</i>	Coagulase-negative <i>Staphylococcus</i> spp.		
<i>Enterobacter aerogenes</i>	<i>Streptococcus pneumoniae</i>		
<i>Enterobacter cloacae</i>	Viridans group <i>Streptococcus</i> spp.		
<i>Escherichia coli</i>			
<i>Klebsiella pneumoniae</i>			
<i>Morganella morganii</i>			
<i>Proteus mirabilis</i>			
<i>Providencia</i> spp.			
<i>Pseudomonas aeruginosa</i>			
<i>Salmonella</i> spp.			
<i>Serratia marcescens</i>			
<i>Shigella</i> spp			
<i>Stenotrophomonas maltophilia</i>			

**IF YOU HAVE ANY QUESTIONS OR COMMENTS ABOUT HOW THE LABORATORY WORKS, PLEASE CALL US AT 209-5396 (Brenda Kirkham, Manager, Microbiology) or 209-5281 (Dr. Church, Division Head, Microbiology)**

The Microbiology Newsletter is also available on the Internet and may be accessed at:  
<http://www.crha-health.ab.ca/clin/cme/microbio.htm>