



Nursing Home

Antimicrobial Stewardship Guide

Help Clinicians Choose the Right Antibiotic

Toolkit 1. Working With a Lab To Improve Antibiotic Prescribing

Tool 4. Antibiogram Formats and Instructions

Formats

The medical director must become familiar with the format of the antibiogram provided by the lab and develop an understanding of its content. A variety of approaches can be taken to formatting and presenting information about the antibiogram, including the use of highlighting, different font sizes, and notes. The medical director can talk with the lab to see if there are options available to choose from and select an antibiogram format that best suits the nursing home's needs. For example, the lab can include only those organisms that were actually isolated in each year, or include common infection-causing organisms even when they were not isolated in nursing home residents in a given year. The antibiogram may emphasize susceptibility rates that are particularly high or low by formatting them differently. Two basic designs for antibiogram reports are shown below.

Consider how prescribers will obtain and use the antibiogram when making formatting choices. For example, color highlighting will not appear if the antibiogram is faxed or printed in black & white. Full-page antibiograms may be best for faxing to a physician along with information about a suspected infection. Web-based formats should also be considered if the nursing home can receive or distribute the antibiogram this way. Your laboratory may also already be familiar with the formatting preferences of physicians in your geographic area.

As an alternative to providing the antibiogram to prescribing clinicians, the medical director can review the antibiogram and create a statement regarding which antibiotics are showing high rates of resistance in the nursing home. This statement can then be provided to prescribing clinicians in place of, or together with, the antibiogram. For example, if Gram-negative organisms isolated in the nursing home are showing high rates of resistance to ciprofloxacin and trimethoprim/sulfamethoxazole (TMP/SMX), the medical director can draft a caution alerting prescribers to avoid these drugs unless culture results from the resident indicate otherwise. A sample cautionary statement is provided below.



Instructions to accompany the antibiogram

Include the following information with the antibiogram when it is distributed to prescribing clinicians.

For each antibiotic listed, this antibiogram provides aggregated data for the percent susceptibility (%S) of bacteria isolated in residents from this nursing home during the time period indicated, unless otherwise noted. This antibiogram has been prepared according to standards established by the Clinical and Laboratory Standards Institute.

Antibiograms have been shown to improve the appropriate use of antibiotics by providing the actual susceptibilities of infection-causing organisms found in nursing homes. The antibiogram should be used to guide empiric therapy. Selection of empiric therapy in a particular resident should not be based solely on an antibiogram. A resident's individual characteristics, including infection history, past antimicrobial use, and other risk factors must also be considered. Refer to microbiologic lab results for %S information for a specific resident.

Sample Antibiograms

Title: Sample Antibiogram #1

Major Headings: Gram (-), Gram (+), # of patients, Aminoglycosides, B-Lactams, Cephalosporins, Quinolones, Others

Description: This figure depicts a sample antibiogram. The first column lists the organisms that were included, separated by Gram-positive and Gram-negative results. The second column shows the number of residents in the nursing home who had the organism and were included in the antibiogram. The remaining columns of the antibiogram are the antibiotics that were tested and the organisms' susceptibilities. Yellow highlighting in any row indicates that fewer than 30 residents were included in the set of cultures; these results are less reliable than those for 30 cultures or more. Asterisks are used to indicate organisms for which more than 1 year of data is used in creating the antibiogram. Solid grey boxes indicate that the organism was not tested against that antibiotic.

		Aminoglycosides			B-Lactams			Cephalosporins				Quinolones	Others			
Gram (-)	# of residents	Amikacin	Gentamicin	Tobramycin	Ampicillin	Imipenem	Piperacillin-tazobactam	Cefazolin	Cefoxitin	Ceftriaxone	Ceftazidime	Ciprofloxacin	Nitrofurantoin	TMP/SMX		
<i>Escherichia coli</i>	37	100	100	100		100	100				100	75				
<i>Klebsiella sp</i> *	* 33	100	84.6	92.3	38.5	100	92.3	84.6	100	100	100	38.5	92.3	38.5		
<i>Proteus sp</i>	31	71.4	57.1	71.4		85.7	85.7			57.1	57.1		28.6	71.4		
<i>Pseudomonas aeruginosa</i> †	† 23	100	83.3	92.3	91.7		100		81.8	100	100	30.8		69.2		
Gram (+)	# of residents	Penicillins				Cephalosporins		Quinolones		Others						
		Penicillins	Ampicillin	Oxacillin	Nafcillin	Cephalothin	Ceftriaxone	Ciprofloxacin	Moxifloxacin	Gentamicin	Linezolid	Rifampin	Tetracycline	TMP/SMX	Vancomycin	Nitrofurantoin
<i>Staph aureus</i> (all) †	† 17	0	0	0	0			0	0	87.5	100	100	100	100	100	100
Methicillin Resistant (MRSA)	34	0	0	0	0			0	0	87.5	100	100	100	100	100	100
Methicillin Susceptible (MSSA)	0															
<i>Enterococcus sp</i> *	* 30	100	100					50		75			25		100	100

* This antibiogram uses 2 years of culture data for these organisms.

† Results based on fewer than 30 isolates are less reliable and should be interpreted with caution.

Title: Sample Antibiogram #2

Headings: Gram-Positive, *Staph aureus*, *Enterococcus* sp, *Streptococcus agalactiae*, Gram-Negative, *Escherichia coli*, *Klebsiella* sp, *Proteus* sp, *Pseudomonas aeruginosa*

Description: This figure shows an alternate format for printing an antibiogram. Brief instructions and cautions are included along with the nursing home name and date of the report. Organisms for which fewer than 30 isolates were obtained are indicated by altering the font and marking each result with a footnote symbol. Organisms with fewer than 20 isolates are not included. Solid black boxes indicate that the organism was not tested against that antibiotic.

[Nursing Home Name] Antibiogram January 2013–January 2014

The antibiogram provides an estimate of % susceptibilities for bacteria isolated in residents. Use this as a guideline in selecting empiric therapy. Refer to lab results for specific susceptibility of individual resident isolates.

GRAM-POSITIVE				GRAM-NEGATIVE				
	<i>Staph aureus</i>	<i>Enterococcus</i> sp	<i>Streptococcus agalactiae</i>		<i>Escherichia coli</i>	<i>Klebsiella</i> sp	<i>Proteus</i> sp	<i>Pseudomonas aeruginosa</i>
# of Residents				# of Residents				
34 * 30 0				37 33 31 † 23				
Penicillins	Penicillin	0	100	Aminoglycosides	Amikacin	100	100	71.4 100
	Ampicillin	0	100		Gentamicin	100	84.6	57.1 † 83.3
	Oxacillin	0			Tobramycin	100	92.3	71.4 † 92.3
	Nafcillin	0			Ampicillin		38.5	† 91.7
Quinolones	Ciprofloxacin	0	50	B-Lactams	Imipenem	100	100	85.7
	Moxifloxacin	0			Piperacillin-tazobactam	100	92.3	85.7 † 100
Others	Gentamicin	87	75	Cephalosporins	Cefazolin		84.6	
	Linezolid	100			Cefoxitin		100	† 81.8
	Rifampin	100			Ceftriaxone		100	57.1 † 100
	Tetracycline	100	25		Ceftazidime	100	100	57.1 † 100
	TMP/SMX	100		Others	Ciprofloxacin	75	38.5	† 30.8
	Vancomycin	100	100		Nitrofurantoin		92.3	28.6
	Nitrofurantoin	100	100		TMP/SMX		38.5	71.4 † 69.2

* Indicates when 2 years of resident data used.

† Indicates fewer than 30 isolates used; interpret these results with caution.

Sample cautionary statement regarding antibiotic resistance

CAUTION: Antibiotic Resistance Trends for [NAME OF NURSING HOME]

Date: [DATE]

To: All Physicians and Advanced Practice Clinicians

From: [NAME OF MEDICAL DIRECTOR]

We recently reviewed the antibiogram report for [NAME OF NURSING HOME] for [INSERT TIME PERIOD COVERED BY ANTIBIOGRAM]. Our antibiogram report indicates high rates of resistance among diagnostic isolates from our residents to the following antimicrobial agents:

Organism	Antibiotic Name	Rate of Resistance to Antibiotic
[e.g., <i>E. coli</i>]	[e.g., ciprofloxacin]	[e.g., 48%]

We recommend avoiding these antibiotics for empiric usage. If chosen for empiric therapy, you should prescribe only a 24–72-hour supply and reassess the resident within this timeframe for clinical response, results of any tests, and the ability to narrow any further antibiotic therapy that might be necessary.

A copy of our antibiogram may be obtained by contacting [INSERT CONTACT INFORMATION]

Please feel free to contact me with any questions about this information. You may reach me at [phone] or by email at [email]. Thank you for your consideration of this information.

Signed,

[NAME OF MEDICAL DIRECTOR]

Medical Director

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