AHCA/NCAL Infection Preventionist Hot Topic Brief

Understanding and Utilizing Antibiograms

Residents in long-term care facilities are more vulnerable to infections, which often leads to increased antibiotic use and a higher risk of resistance. Antibiotic resistance results in higher mortality rates, more stringent isolation measures, and greater restrictions on resident activities. An antibiogram is a useful tool that guides antibiotic selection based on local resistance patterns, improving treatment efficacy allowing facilities to guide treatment while culture and sensitivity results are pending. By effectively understanding and utilizing antibiograms, facilities can enhance resident safety, improve treatment outcomes, and support antimicrobial stewardship initiatives.

Background and Scope

An antibiogram is usually prepared by the laboratory and displayed as a table showing the susceptibility percentages of common antibiotics for common pathogens in the local community. It is facility or community specific, offering more precise guidance for clinicians when prescribing antibiotics. Ideally it would be from the facility's culture history but since most residents might be admitted from local hospitals, antibiograms from referring facilities can be helpful as well.

In essence, antibiograms assist clinicians in selecting the most effective antibiotic for a given pathogen. An antibiogram increases the odds that the antibiotic started before the culture results are available, will work against the likely pathogen. This targeted approach to prescribing helps reduce unnecessary antibiotic use, lowers the risk of side effects, and supports compliance with antimicrobial stewardship standards. It does not negate the need to still compare the final culture and sensitivity results against the prescribed antibiotic.

Sample Antiobiogram

XYZ Nursing Home

Antibiotic Susceptibility Patterns of Commonly Isolated Bacteria for 2024

Numbers below represent **percent of susceptible isolates** (no. of isolates tested)

		Aminoglycosides			Carbapenems		Cephalosporins			Penicillins						Quinolones		Miscellaneous					
		Amikacin	Gentamicin	Tobramycin	Ertapenem	Meropenem	Cefazolin	Cefepime	Ceftriaxone	Ampicillin	Ampicillin-Sulbactam	Aztreonam	Oxacillin	Penicillin G	Piperacillin-tazobactam	Ciprofloxacin	Levofloxacin	Clindamycin	Gentamicin	Nitrofurantoin[2]	Tetracycline	Trimethprim-Sulfamethoxazole	Vancomycin
Gram Negative[1]	*Enterobacter aerogenes*																						
	Eshcerichia coli	**100** (68)	**91** (320)	**84** (68)	**100** (320)	**100** (252)	**86** (320)	**93** (320)	**92** (320)	**50** (321)	**79** (322)	**92** (13)	--	--	**95** (319)	**70** (320)	**60** (346)	--	**91** (320)	**97** (312)	**72** (253)	**71** (320)	--
	Klebsiella pneumoniae																						
	Proteus mirabilis																						
	Pseudomonas aeruginosa	**100** (2)	**95** (20)	**100** (2)	--	**100** (18)	--	**95** (21)	--	--	--	--	--	--	**100** (20)	**95** (20)	--	--	**95** (20)	--	--	--	--
Gram Positive[1]	*Enterococcus faecalis*	--	**56**[3] (16)	--	--	--	--	--	--	**100** (18)	--	--	--	**100** (18)	--	**69** (16)	**73** (212)	--	**56**[3] (16)	**100** (16)	**44** (16)	--	**100** (18)
	Staphylococcus aureus	--	**100** (3)	--	--	--	--	--	--	--	--	--	**33** (3)	**0** (3)	--	**33** (3)	**78** (3)	**100** (3)	**100** (3)	--	**67** (3)	**67** (3)	**100** (3)
	Staphylococcus epidermidis																						
	Staphylooccus saprophyticus																						

Suggestions for Practice and Resources

The Infection Preventionist should partner with the local laboratory to ensure the facility has an antibiogram that has been updated within the previous 12–18 months. They may also get one from all the hospitals that send patients to the facility. It's important to be familiar with the antibiogram so that trends in bacterial resistance that may impact the effectiveness of antibiotics prescribed at the facility can be addressed. Collaboration with prescribing clinicians is essential for making informed treatment decisions, which can take place during QAPI meetings, infection prevention meetings, or separately. The antibiogram should be integrated into the facility's infection prevention program. Prescribers and those providing patient care should receive training on how to interpret and apply antibiogram data as part of clinical decision-making. For example, when a physician wants to start an antibiotic for a presumed infection (e.g., potential UTI for a resident meeting Loeb criteria), but initially prescribes an antibiotic that has low sensitivity for common pathogens (e.g., E. coli) the nurse would raise this with the physician to see if he/she wants to change antibiotics. Additionally, awareness of pathogen sensitivity may prompt a nurse to assess the resident for improvement after the antibiotic therapy has started, alerting the physician if the resident does not improve. A system should be established to regularly review antibiotic prescribing patterns as part of the QAPI program. CMS states protocols should contain a system of reports related to monitoring antibiotic usage and resistance data. One of the examples given is summarizing antibiotic resistance (e.g., antibiogram) based on laboratory data from, for example, the last 18 months.

Resources

Medicare State Operations Manual, Appendix PP: Interpretive Guidelines for Long-Term Care Facilities. Available at: https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/som107ap_pp_guidelines_ltcf.pdf. Accessed February 11, 2025.

J Am Med Dir Assoc. 2020 January; 21(1): 8–11. Are Antibiograms Ready for Prime Time in the Nursing Home? https://pmc.ncbi.nlm.nih.gov/articles/PMC11040279/pdf/nihms-1981191.pdf.

AHRQ. Toolkit 3. The Nursing Home Antibiogram Program Toolkit: How to Develop and Implement an Antibiogram Program. https://www.ahrq.gov/nhguide/toolkits/help-clinicians-choose-the-right-antibiotic/toolkit3-develop-implement-antibiogram-program.html. Accessed February 14, 2025. (Includes an example of an antibiogram).