Antibiogram for Urine

North Carolina Antimicrobial Stewardship Conference
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We have no significant financial relationships with ineligible companies to disclose.

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Objectives

- Describe the development of a community antibiogram
- Review North Carolina susceptibilities for common ambulatory pathogens
- Discuss strategies for data dissemination and clinical application

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Attempts at community antibiograms have primarily focused on compiling inpatient data from multiple facilities

Antibiograms from hospitals and nursing homes in SC[1]

2017 South Carolina Statewide Antibiogram[1]

Gram Negative Organisms	# isolates	Ampicillin	Ampicillin/sulbactam	Amoxicillin/clavulanate	Piperacillin/tazobactam	Cefazolin	Cefuroxime	Ceftriaxone	Ceftazidime	Cefepime	Aztreonam	Meropenem	Gentamicin	Tobramycin	Amikacin	Ciprofloxacin	Levofloxacin	Trimeth/sulfa	Nitrofurantoin
Acinetobacter baumannii	507		87		79			47	68	83		92	90	95	98	81	83	83	
Enterobacter aerogenes[2]	996				85		50	83	87	98	84	100	99	98	99	96	97	97	19
Enterobacter cloacae	1930				82		42	77	82	94	79	98	95	96	100	90	94	88	35
Escherichia coli	33848	50	53	83	96	85	89	94	95	95	91	100	90	90	100	75	75	74	95
Klebsiella oxytoca	621		64	86	91	49	86	89	95	93	83	100	95	95	100	95	97	90	78
Klebsiella pneumoniae	9800		82	93	93	89	90	94	95	94	89	99	96	94	99	94	94	89	42
Proteus mirabilis	5020	85	94	98	99	90	97	98	98	98	92	100	93	93	100	77	80	81	
Pseudomonas aeruginosa	5211				91				88	87	73	92	89	97	96	80	77		

Gram Positive Organisms	# isolates	Oxacillin/nafcillin	Penicillin G	Ceftriaxone	Gentamicin (synergy)	Rifampin (synergy)	Levofloxacin	Clindamycin	Erythromycin	Tetracycline	Trimeth/sulfa	Nitrofurantoin	Linezolid	Vancomycin	Daptomycin
MSSA	5181	100	19		97	100	62	77	58	92	99	91	100	100	99
MRSA	6630				95	96	30	70	13	93	93	84	100	100	99
Total *Staphylococcus aureus*[3]	14647	50	9		97	98	52	73	36	93	96	89	100	100	99
Streptococcus pneumoniae	609		87	93			99	81	48	78	74		100	100	
S. pneumoniae (meningitis)	510		60	89											

Plante JG. ICHE 2020; Bailey P. Antimicrobial Stewardship and Healthcare Epi 2023

Antimicrobial Stewardship Collaborative of South Carolina

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Creation of State Antibiogram and Subsequent Launch of Public Health–Coordinated Antibiotic Stewardship in New Hampshire: Small State, Big Collaboration

NH state antibiogram from hospital laboratories

Created clinical messaging, both of which were posted on DPHS and sent it through Health Alert Network system

Table 1. Summary comparison of 2016 and 2017 antibiogram clinical messaging, New Hampshire

Infection	2016 antibiogram messaging	2017 antibiogram messaging
Urinary tract infection	• Asymptomatic bacteriuria should not be treated in most cases. • Nitrofurantoin and cephalexin are most likely to be active against *Escherichia coli*. • Fosfomycin can be considered for *E coli* and *Enterococcus* species.	• Nitrofurantoin and cephalexin are more likely to be active against *E coli*. • Most *Enterococcus* species are susceptible to amoxicillin/ampicillin.[a] • Fosfomycin can be considered for *E coli* and *Enterococcus* species. • Treatment for uncomplicated urinary tract infections can be as short as 3-5 days (depending on antibiotic). Treatment for complicated urinary tract infections or pyelonephritis can be as short as 7 days.[a] • Asymptomatic bacteriuria should not be treated in most cases.
Pneumonia	• Azithromycin should not be prescribed if there is concern for pneumococcal pneumonia. • Preferred antibiotics to treat pneumococcal pneumonia: ◦ Amoxicillin ◦ Amoxicillin-clavulanate ◦ Cefuroxime • Avoid fluoroquinolones due to toxicity. • Ceftriaxone PLUS doxycycline or azithromycin recommended for hospitalized patients with community-acquired pneumonia.	• Azithromycin should not be prescribed if there is concern for pneumococcal pneumonia. • Preferred antibiotics to treat pneumococcal pneumonia: ◦ Amoxicillin ◦ Amoxicillin-clavulanate ◦ Cefpodoxime (changed from 2016 due to increasing resistance)[a] • Avoid fluoroquinolones due to toxicity. • Ceftriaxone PLUS doxycycline or azithromycin recommended for hospitalized patients with community-acquired pneumonia. • Vancomycin is not necessary for all episodes of hospital-acquired pneumonia.[a] • Treatment for community-acquired pneumonia can be as short as 5 days. Treatment for hospital-acquired pneumonia is 7 days.[a]

Leeman JH, Public Health Reports 2022

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Uropathogens differ in distribution and sensitivity between inpatient and ambulatory

Survey of urine cultures from pediatric patients found *E.coli* represented 30% of inpatient samples and 86% of ambulatory samples

Antibiotic	*E. coli* Hospital Susceptibility	*E. coli* Ambulatory Susceptibility
Ampicillin	39%	55%
Cefotaxime	97%	99%
Nitrofurantoin	97%	99%
Trimethoprim-sulfa	72%	79%

Dahle KW. JPIDS 2012

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Building a true ambulatory antibiogram

Ambulatory stewardship program began partnership with Labcorp to explore production of an ambulatory antibiogram

Through partnership, Labcorp and Novant Health have been able to provide an ambulatory antibiogram annually to Novant providers

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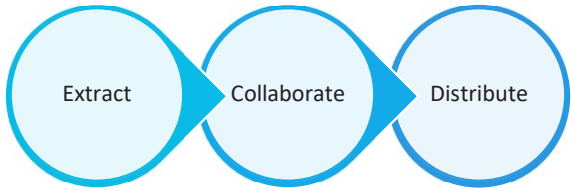
Built on scale, clinical oversight and stewardship principles

Labcorp antibiograms support smarter, more targeted empiric antibiotic prescribing grounded in local susceptibility and resistance trends

Data Foundation

- **Labcorp processes more than 700,000 micro testing specimens each year for North Carolina**
- The antibiogram report data is compiled and presented based on CLSI guidelines
- Excluded from the community dataset are hospitals, prisons and nursing homes



Clinical Governance & Quality Assurance

- Conduct biannual data extraction to support ongoing reporting needs
- Partner with internal technical directors to maintain high standards of data cleanliness and accuracy
- Oversee final review, sign-off and distribution of completed reports

Designed for Real-World Clinical Decision-Making

- Dynamic filtering by specimen type, county, organism, drug class and drug name – allowing clinicians to mirror real-world scenarios
- Interactive tooltips that surface organism–drug susceptibility details without leaving the report
- Intuitive color-coding to quickly identify high and low susceptibility rate

Novant has a large number ambulatory clinics across North Carolina

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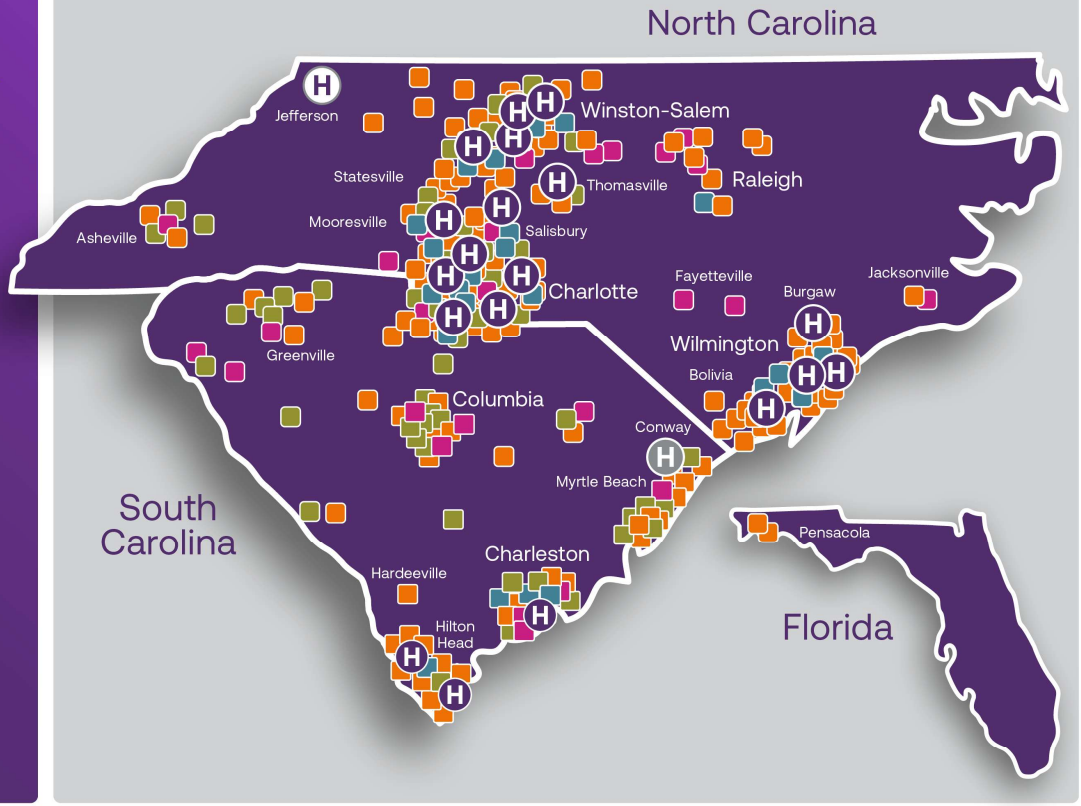
- Medical centers
- Managed medical center
- Partially owned medical center
- Medical offices
- Ambulatory surgery centers
- Urgent cares
- Imaging centers

Note: Markers are for geographic illustration only and do not necessarily represent individual clinics.



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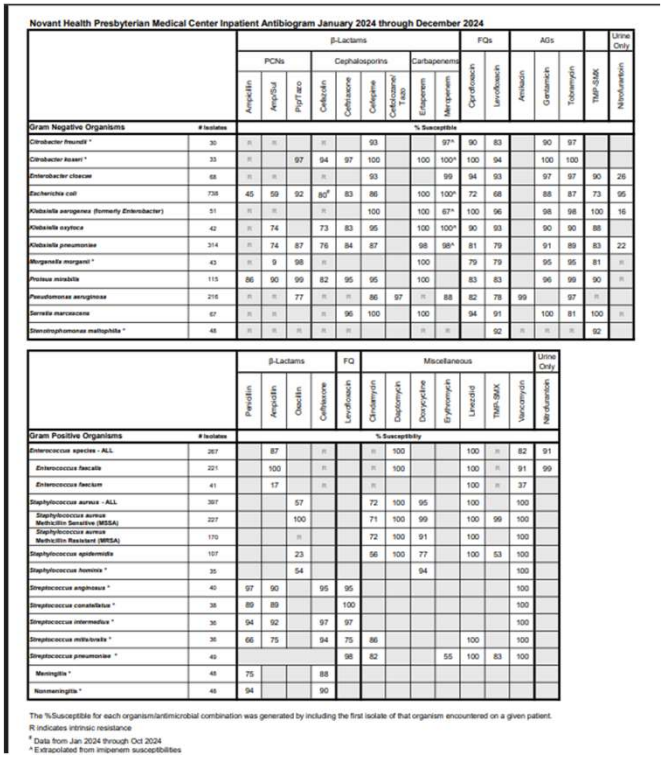
Antimicrobial stewardship program has been involved in building and distributing antibiograms for inpatient facilities

- Novant has 19 medical centers
- Annual inpatient facility antibiograms generated from Novant Health microbiology lab services data
- Each acute facility and emergency department has an antibiogram
- Flagship facilities also have unit antibiograms, such as pediatric and intensive care units
- Some utilize biennial data for isolates with limited annual numbers
- Accessible via intranet site or Sanford Guide with Novant Health (web or mobile)



Novant Health Presbyterian Medical Center Inpatient Antibiogram January 2024 through December 2024

Gram Negative Organisms	# Isolates	β-Lactams								FQs		AGs				Urine Only
		PCNs			Cephalosporins				Carbapenems							
		Ampicillin	Amp/Sul	Pip/Tazo	Cefazolin	Ceftazone	Cefepime	Ceftolozane/ Tazo	Ertapenem	Meropenem	Ciprofloxacin	Levofloxacin	Amikacin	Gentamicin	Tobramycin	TMP-SMX	Nitrofurantoin
		% Susceptible															
Citrobacter freundii *	30	R	R		R		93			97*	90	83		90	97		
Citrobacter koseri *	33	R		97	94	97	100		100	100*	100	94		100	100		
Enterobacter cloacae	68	R	R		R		93			99	94	93		97	97	90	26
Escherichia coli	738	45	59	92	80[#]	83	86		100	100*	72	68		88	87	73	95
Klebsiella aerogenes (formerly Enterobacter)	51	R	R		R		100		100	67*	100	96		98	98	100	16
Klebsiella oxytoca	42	R	74		73	83	95		100	100*	90	93		90	90	88	
Klebsiella pneumoniae	314	R	74	87	76	84	87		98	98*	81	79		91	89	83	22
Morganella morganii *	43	R	9	98	R				100		79	79		95	95	81	R
Proteus mirabilis	115	86	90	99	82	95	95		100		83	83		96	99	90	R
Pseudomonas aeruginosa	216	R	R	77	R	R	86	97	R	88	82	78	99		97	R	
Serratia marcescens	67	R	R		R	96	100		100		94	91		100	81	100	R
Stenotrophomonas maltophilia *	48	R	R	R	R	R			R	R		92	R	R	R	92	

Gram Positive Organisms	# Isolates	β-Lactams			FQ	Miscellaneous							Urine Only
		Penicillin	Ampicillin	Oxacillin	Ceftaroline	Levofloxacin	Clindamycin	Daptomycin	Doxycycline	Erythromycin	Linezolid	TMP-SMX	Vancomycin	Nitrofurantoin
		% Susceptibility												
Enterococcus species - ALL	287		87		R		R	100			100	R	82	91
Enterococcus faecalis	221		100		R		R	100			100	R	91	99
Enterococcus faecium	41		17		R		R				100	R	37	
Staphylococcus aureus - ALL	397			57			72	100	95		100		100	
Staphylococcus aureus Methicillin Sensitive (MSSA)	227			100			71	100	99		100	99	100	
Staphylococcus aureus Methicillin Resistant (MRSA)	170			R			72	100	91		100		100	
Staphylococcus epidermidis	107			23			56	100	77		100	53	100	
Staphylococcus hominis *	35			54					94				100	
Streptococcus anginosus *	40	97	90		95	95							100	
Streptococcus constellatus *	38	89	89			100							100	
Streptococcus intermedius *	36	94	92		97	97							100	
Streptococcus mitis/oralis *	36	66	75		94	75	86				100		100	
Streptococcus pneumoniae *	40					98	82			55	100	83	100	
Meningitis *	48	75			88									
Nonmeningitis *	48	94			90									

The %Susceptible for each organism/antimicrobial combination was generated by including the first isolate of that organism encountered on a given patient.
R indicates intrinsic resistance
[#] Data from Jan 2024 through Oct 2024
* Extrapolated from imipenem susceptibilities

Overview of creation and distribution of ambulatory antibiogram

Create Antibiogram

- Susceptibility testing and antibiogram preparation performed by Labcorp (Burlington, NC) based on CLSI guidelines (M39 A4 and M100 S28).
- Novant antimicrobial stewardship program provided feedback and data review

Review Data

- Data reviewed across initial 2 years to determine need for regional susceptibility reporting
- Novant and statewide data compared

Disseminate Data

- Formatting into table and creation of PDF
- Distribution and creation of guidelines

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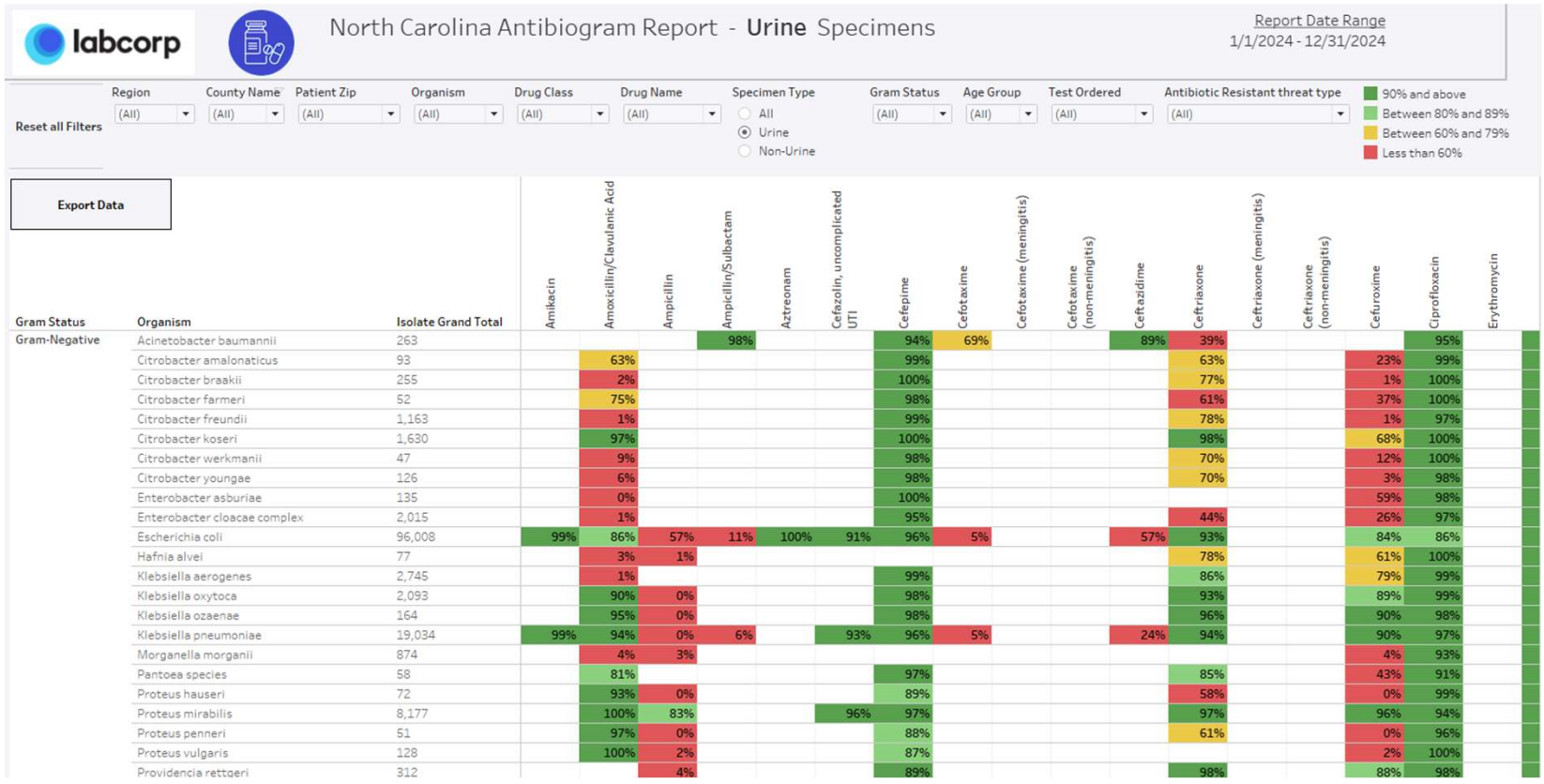
Creation of Antibiogram



labcorp

North Carolina Antibiogram Report - **Urine** Specimens

Report Date Range
1/1/2024 - 12/31/2024

Reset all Filters

Region (All) | County Name (All) | Patient Zip (All) | Organism (All) | Drug Class (All) | Drug Name (All) | Specimen Type: All / Urine / Non-Urine | Gram Status (All) | Age Group (All) | Test Ordered (All) | Antibiotic Resistant threat type (All)

90% and above
Between 80% and 89%
Between 60% and 79%
Less than 60%

Export Data

Gram Status	Organism	Isolate Grand Total	Amikacin	Amoxicillin/Clavulanic Acid	Ampicillin	Ampicillin/Sulbactam	Aztreonam	Cefazolin, uncomplicated UTI	Cefepime	Cefotaxime	Cefotaxime (meningitis)	Cefotaxime (non-meningitis)	Ceftazidime	Ceftriaxone	Ceftriaxone (meningitis)	Ceftriaxone (non-meningitis)	Cefuroxime	Ciprofloxacin	Erythromycin
Gram-Negative	Acinetobacter baumannii	263				98%			94%	69%			89%	39%				95%	
	Citrobacter amalonaticus	93		63%					99%					63%			23%	99%	
	Citrobacter braakii	255		2%					100%					77%			1%	100%	
	Citrobacter farmeri	52		75%					98%					61%			37%	100%	
	Citrobacter freundii	1,163		1%					99%					78%			1%	97%	
	Citrobacter koseri	1,630		97%					100%					98%			68%	100%	
	Citrobacter werkmanii	47		9%					98%					70%			12%	100%	
	Citrobacter youngae	126		6%					98%					70%			3%	98%	
	Enterobacter asburiae	135		0%					100%								59%	98%	
	Enterobacter cloacae complex	2,015		1%					95%					44%			26%	97%	
	Escherichia coli	96,008	99%	86%	57%	11%	100%	91%	96%	5%			57%	93%			84%	86%	
	Hafnia alvei	77		3%	1%									78%			61%	100%	
	Klebsiella aerogenes	2,745		1%					99%					86%			79%	99%	
	Klebsiella oxytoca	2,093		90%	0%				98%					93%			89%	99%	
	Klebsiella ozaenae	164		95%	0%				98%					96%			90%	98%	
	Klebsiella pneumoniae	19,034	99%	94%	0%	6%		93%	96%	5%			24%	94%			90%	97%	
	Morganella morganii	874		4%	3%												4%	93%	
	Pantoea species	58		81%					97%					85%			43%	91%	
	Proteus hauseri	72		93%	0%				89%					58%			0%	99%	
	Proteus mirabilis	8,177		100%	83%			96%	97%					97%			96%	94%	
	Proteus penneri	51		97%	0%				88%					61%			0%	96%	
	Proteus vulgaris	128		100%	2%				87%								2%	100%	
	Providencia rettgeri	312			4%				89%					98%			88%	98%	

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Creation of Antibiogram

Ambulatory Urinary Antibiogram - Adult

Data from ambulatory sites, January - December 2022

Gram-negative	Total Isolates	Amoxicillin	Amox/clav	Cephalexin#	Ceftriaxone^	Nitrofurantoin	TMP/SMX	Ciprofloxacin*
Citrobacter koseri	1,481	NS	98%	NS	98%	91%	99%	100%
Enterobacter cloacae complex	1,532	NS	NS	NS	NS	70%	92%	97%
Escherichia coli	88,223	60%	87%	93%	95%	98%	82%	87%
Klebsiella aerogenes	5,199	NS	NS	NS	89%	22%	98%	99%
Klebsiella oxytoca	1,474	NS	93%	--	94%	88%	95%	99%
Klebsiella pneumoniae	15,772	NS	96%	96%	96%	36%	93%	98%
Morganella morganii	771	NS	NS	NS	NS	NS	86%	91%
Proteus mirabilis/penneri	7,467	85%	100%	96%	97%	NS	92%	94%
Pseudomonas aeruginosa	2,716	NS	NS	NS	NS	NS	NS	92%
Serratia marcescens	663	NS	NS	NS	93%	NS	100%	98%

Gram-positive	Total Isolates	Amoxicillin	Oxacillin	Nitrofurantoin	TMP/SMX	Ciprofloxacin*	Levofloxacin*
Coag-neg *Staphylcoccus* spp.	6,315	NS	56%	99%	81%	77%	78%
Enterococcus faecalis	13,529	99%	NS	99%	NS	93%	94%
Enterococcus faecium	344	42%	NS	37%	NS	41%	42%

Textured shading denotes preferred agent for uncomplicated cystitis

The first-line recommendations for adults with uncomplicated UTI (e.g. cystitis in women) are trimethoprim-sulfamethoxazole or nitrofurantoin.

If a cephalosporin is needed, cephalexin is an appropriate choice based on susceptibility and pharmacokinetic data and should be given for 5-7 days.

#Cefazolin susceptiblity may be used as surrogate for cefaclor, cefdinir, cefpodoxime, cefprozil, cefuroxime, cephalexin, and loracarbef for uncomplicated UTIs

^Ceftriaxone susceptibility should not be used to infer cefdinir susceptibility

*FDA recommends avoiding fluoroquinolones for uncomplicated UTI unless no other treatment options available because of the risk of serious side effects outweighing benefit

NS = non-susceptible; UTI = urinary tract infection

NOVANT HEALTH

Creation of Antibiogram

Ambulatory Urinary Antibiogram - Pediatric

Data from ambulatory sites, January - December 2022

Gram-negative	Total Isolates	Amoxicillin	Amox/clav	Cephalexin#	Ceftriaxone^	Nitrofurantoin	TMP/SMX	Ciprofloxacin*
Escherichia coli	1858	63%	90%	95%	97%	98%	84%	93%
Klebsiella pneumoniae	177	NS	94%	94%	95%	28%	89%	99%
Proteus mirabilis/penneri	79	90%	100%	99%	100%	NS	92%	97%

Gram-positive	Total Isolates	Amoxicillin	Oxacillin	Nitrofurantoin	TMP/SMX	Ciprofloxacin*	Levofloxacin*
Coag neg *Staphylcoccus* spp.	184	NS	61%	100%	89%	95%	96%
Enterococcus faecalis	232	97%	NS	100%	NS	97%	98%

Textured shading denotes preferred agent for uncomplicated cystitis

#Cefazolin susceptiblity may be used as surrogate for cefaclor, cefdinir, cefpodoxime, cefprozil, cefuroxime, cephalexin, and loracarbef for uncomplicated UTIs

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NS = non-susceptible; UTI = urinary tract infection

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Review of Data

Comparison to inpatient susceptibilities

- Inpatient facilities showed a broader range of susceptibilities compared to regional ambulatory data.

Antibiotic	Novant Hospital Susceptible (range)	Novant Ambulatory Susceptible
Cefazolin	85 (80-91)%	93%
Ceftriaxone	87 (83-92)%	95%
Ciprofloxacin	74 (70-79)%	87%

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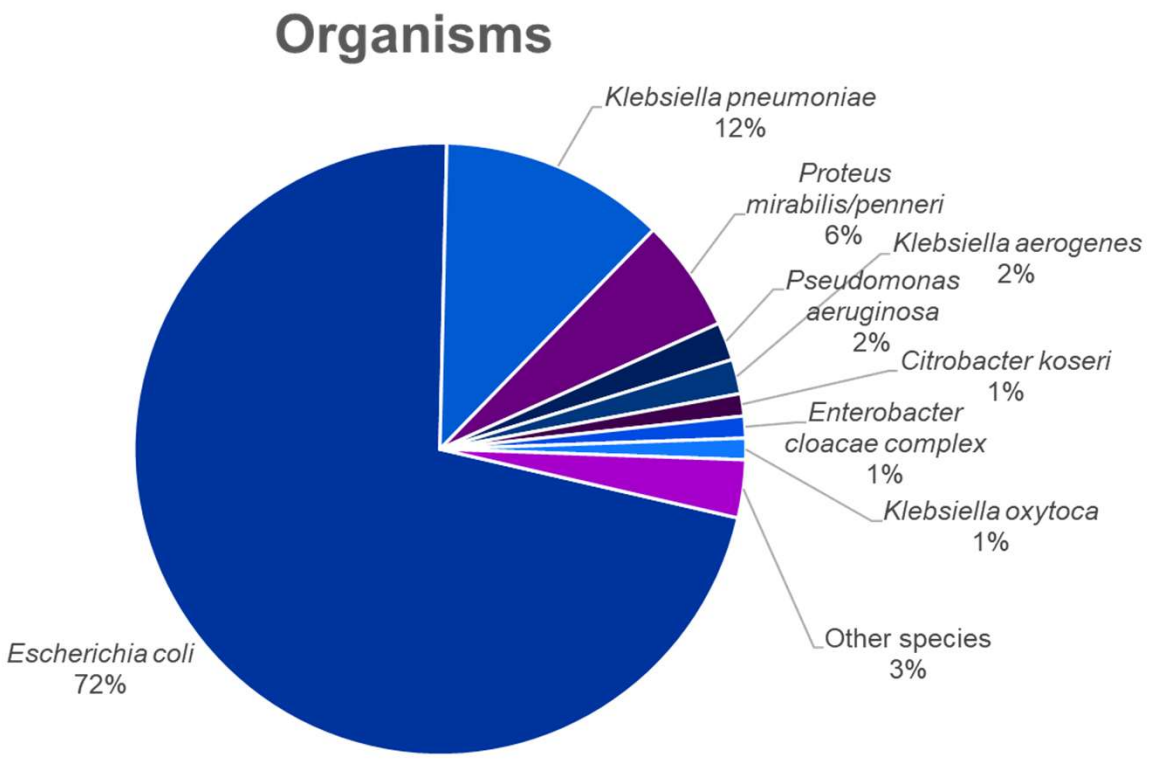
Review of Data



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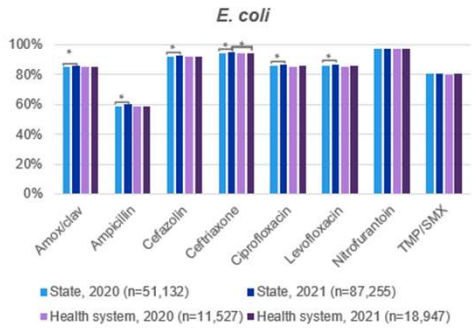
Review of Data

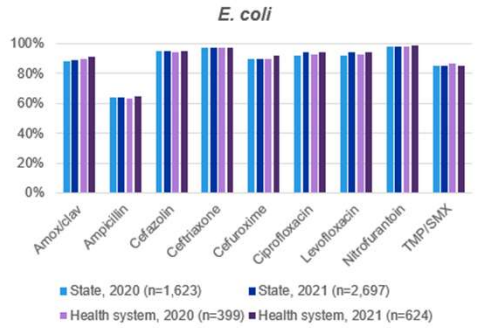
Comparison of state-wide vs. institutional isolates across 2 yrs

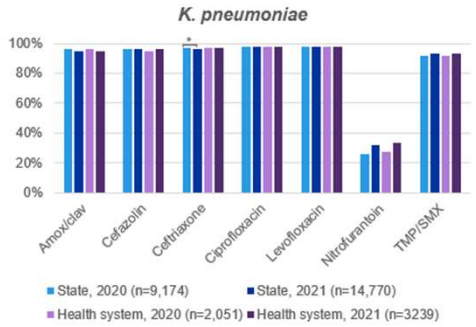
Labcorp team member provided statistical analysis of data

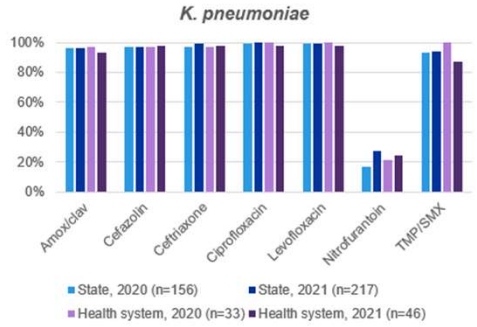
Isolates from 700+ Novant Health Clinics represented 22% of total samples

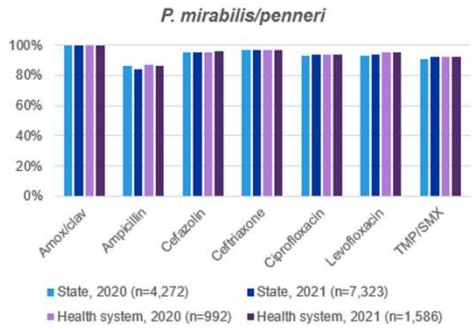
Susceptibility was similar between NH and state-wide data except for ceftriaxone (94% vs. 95%; p<.001) in *E.coli*

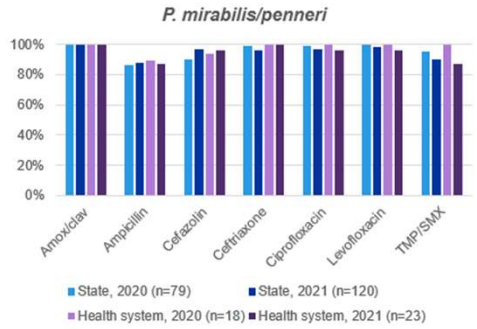












Review of Data

Analyzing Regional Differences

Susceptibility rates by region were similar in NH and state-wide data for *E. coli, K. pneumoniae,* and *P. mirabilis*

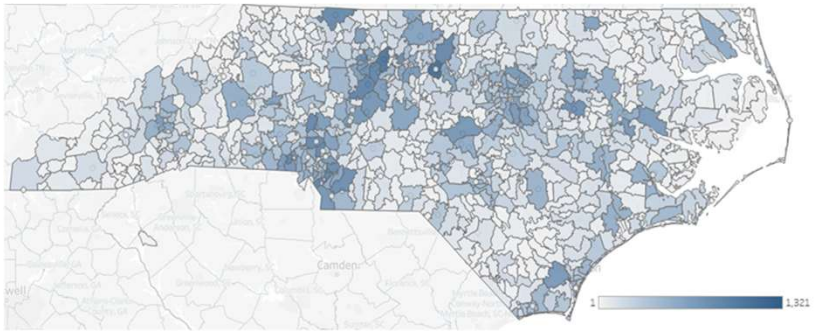
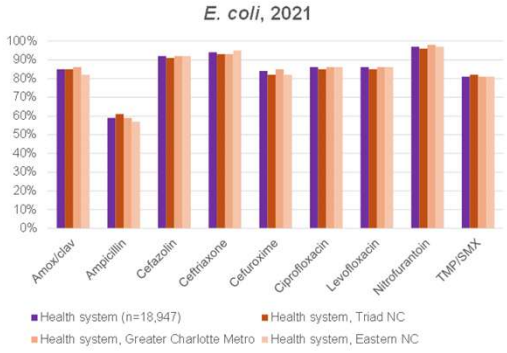
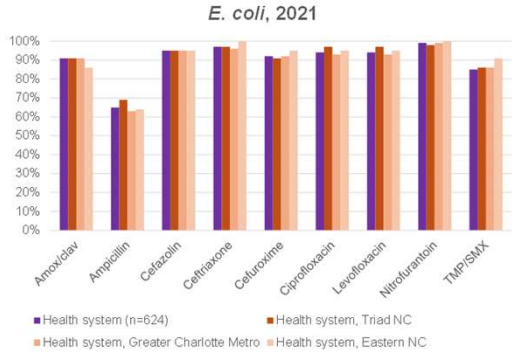
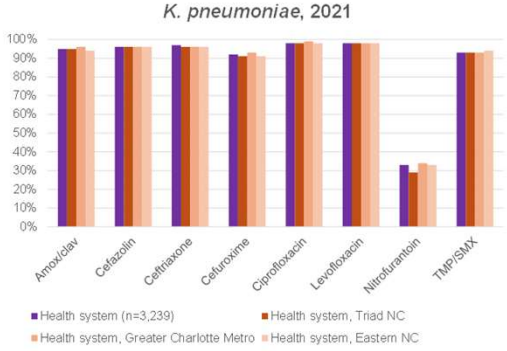
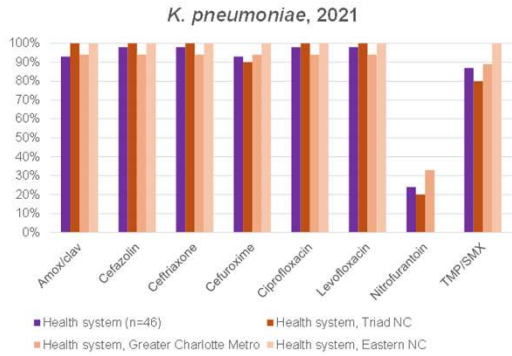


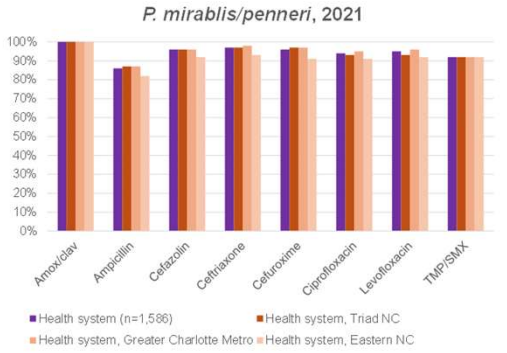
Figure 2. *Heat map of urine culture isolates processed by Labcorp in 2021*

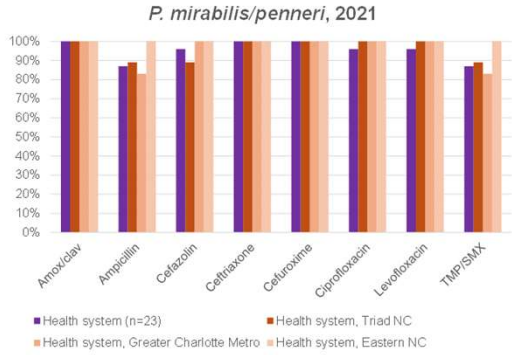








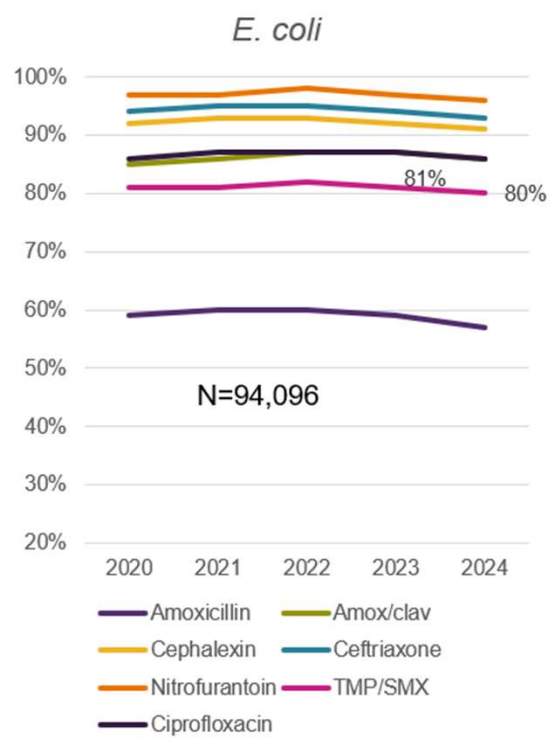


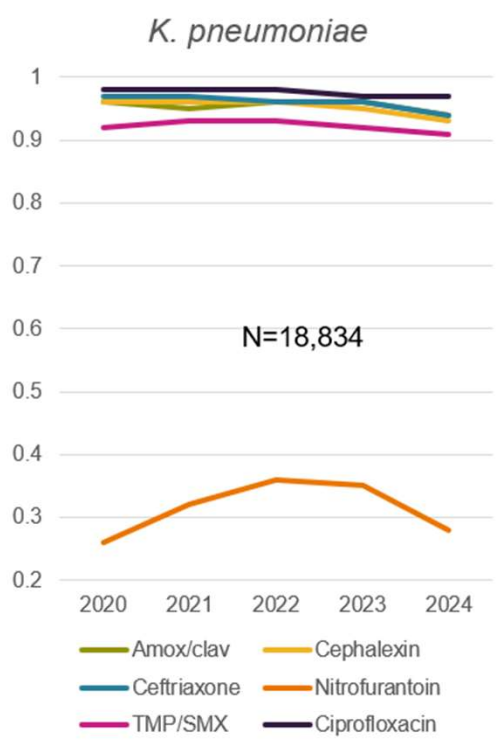


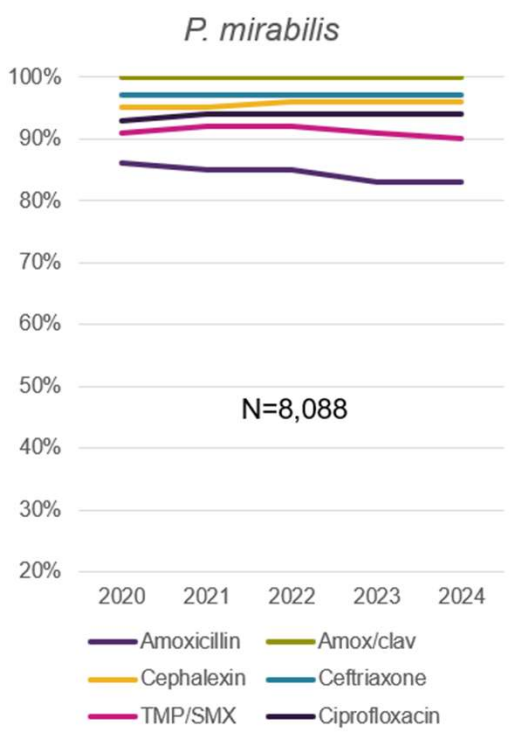
Review of Data

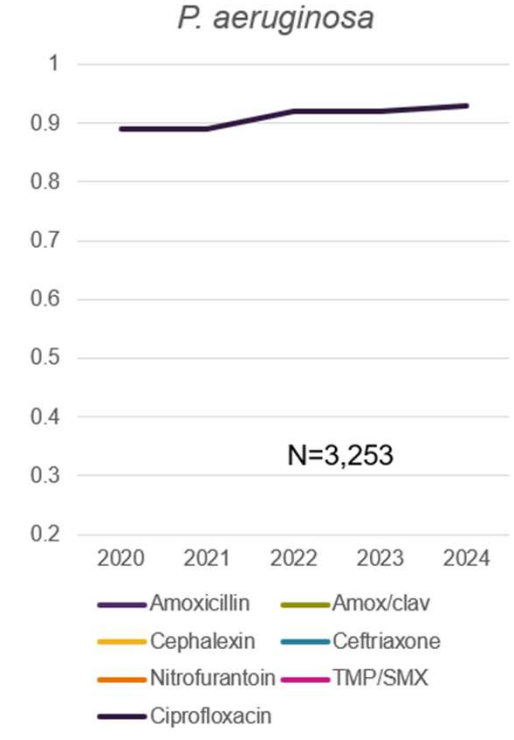
Annual analysis of ambulatory susceptibility data by ASP

Adult Susceptibility Trends









NOVANT HEALTH

Review of Data

Evaluating non-urinary samples

Goal to incorporate local susceptibilities into recommendations for SSTI and respiratory infections

Regional differences in gram positive organisms may be more significant than urinary pathogens

- In a compiled antibiogram from 9 hospitals, S. pneumoniae susceptibility to penicillin still differed locally compared to regional data (49% vs. 62%)[1]

Non-urinary isolates require additional analysis

- Consider site / specimen source
- Differences in MSSA vs. MRSA
- Consideration of adult vs. pediatric

[1]Halstead DC. JCM 2004

NOVANT HEALTH

Review of Data

Ambulatory Non-urinary Antibiogram

Data from North Carolina ambulatory sites submitted to Labcorp, January - December 2024

Gram-positive	Total Isolates	Amoxicillin	Cephalexin[1]	Ceftriaxone (IV/IM only)[2]	Clindamycin	Azithromycin	Levofloxacin	Linezolid	Penicillin	Tetracycline	TMP/s
Enterococcus faecalis	790	99%	NS	NS	NS	–	–	–	–	–	NS
Enterococcus faecium	30	53%	NS	NS	NS	–	–	–	–	–	NS
Staphylococcus aureus, all	15,509	–	61%[3]	–	80%	–	–	100%	–	89%	86%
Methicillin susceptible *S. aureus* (MSSA)	9,446	–	100%[3]	–	80%	–	–	100%	–	90%	96%
Methicillin resistant *S. aureus* (MRSA)	6,081	–	NS	–	79%	–	–	100%	–	88%	see note
Staphylococcus aureus, all *adult*	13,807	–	60%[3]	–	79%	–	–	100%	–	89%	85%
Methicillin susceptible *S. aureus* (MSSA)	8,276	–	100%[3]	–	79%	–	–	100%	–	90%	96%
Methicillin resistant *S. aureus* (MRSA)	5,547	–	NS	–	79%	–	–	100%	–	87%	see note
Staphylococcus aureus, all *peds*	1,702	–	69%[3]	–	84%	–	–	100%	–	89%	89%
Methicillin susceptible *S. aureus* (MSSA)	1,170	–	100%[3]	–	84%	–	–	100%	–	87%	96%
Methicillin resistant *S. aureus* (MRSA)	534	–	NS	–	84%	–	–	100%	–	92%	see note
Streptococcus agalactiae (Group B Strep)	168	S	S	100%	50%	–	–	–	S	–	–
Streptococcus anginosus	36	–	–	100%	81%	69%	97%	–	100%	–	–
Streptococcus pneumoniae (non-meningitis)	265	98%[4] high dose	–	97%	–	68%	99%	–	–	83%	82%

In progress!

NOVANT HEALTH

Review of Data

Gram-negative	Total Isolates	Amoxicillin	Amox/clav	Cefazolin	Ceftriaxone (IV/IM only)[2]	Ciprofloxacin	Levofloxacin	Tetracycline	TMP/SMX
Escherichia coli	1,863	54%	83%		92%	87%	80%	77%	80%
Klebsiella aerogenes	321	NS	NS		–	100%	97%	95%	100%
Klebsiella oxytoca	521	NS	97%		97%	100%	97%	95%	100%
Klebsiella pneumoniae	773	NS	91%		92%	97%	91%	83%	90%
Morganella morganii	187	NS	NS		–	96%	95%	63%	93%
Proteus mirabilis	1,016	84%	100%		97	93%	97%	NS	91%
Pseudomonas aeruginosa	1,916	NS	NS		NS	95%	87%	NS	NS
Serratia marcescens	590	NS	NS		96%	99%	93%	22%	100%

In progress!

NOVANT HEALTH

Disseminate Data

Disseminating Antibiogram Data

Health system resources

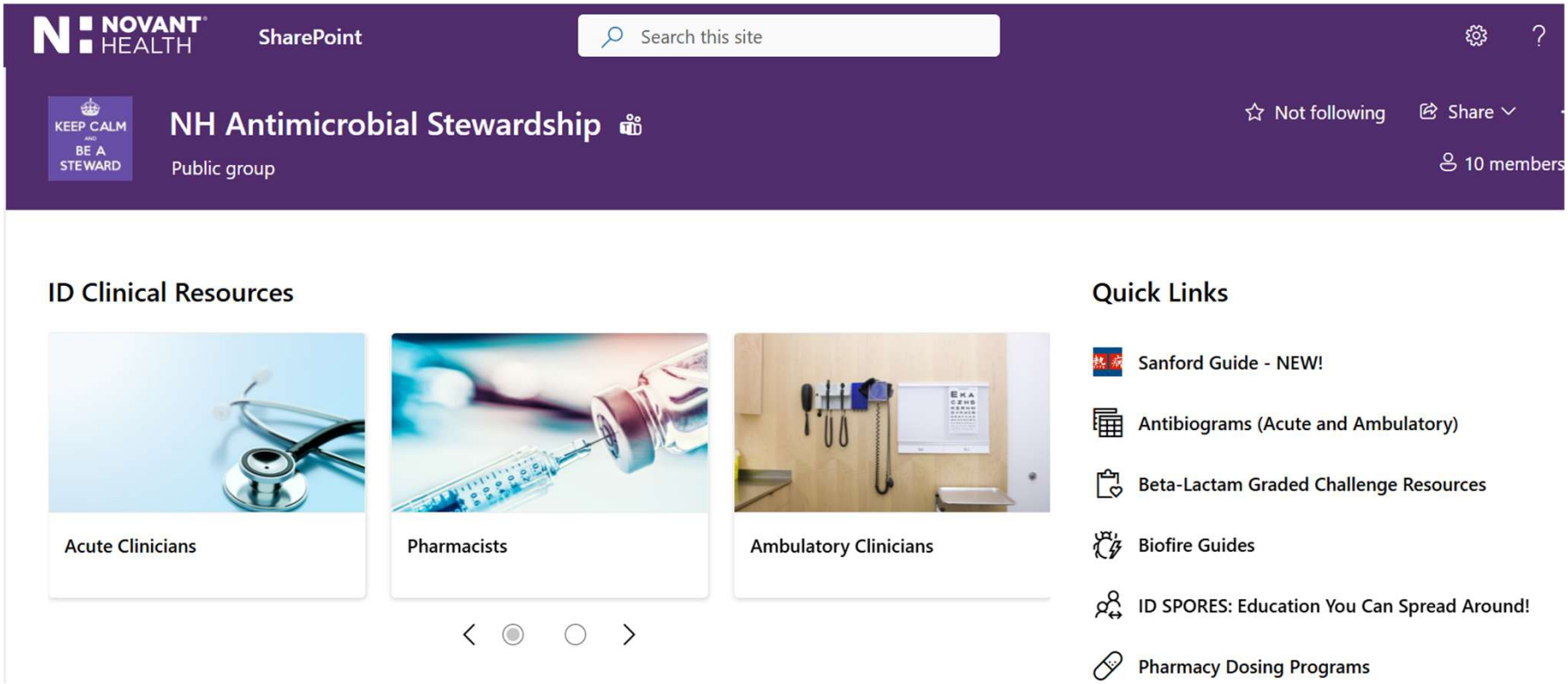
Commercial platforms

Labcorp resources

NOVANT HEALTH

Disseminate Data

Facility specific platforms: I-connect and Epic link to ASP website



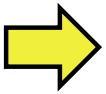
NOVANT HEALTH

Disseminate Data

Clinical guidelines: Quick Reference PDF

Infectious Disease

Antibiotic Treatment Guide (Adult)
Antibiotic Treatment Guide (Pediatric)



Novant Health ADULT Ambulatory Empiric Antibiotic Treatment Guide

These guidelines are based on local and national published guidelines and the antibiogram at Novant Health. Guidelines cannot account for all factors in an individual patient and should be used in conjunction with clinical judgement. All doses reflect normal renal and hepatic function. Durations listed assume improvement within 48-72h of starting antibiotics.

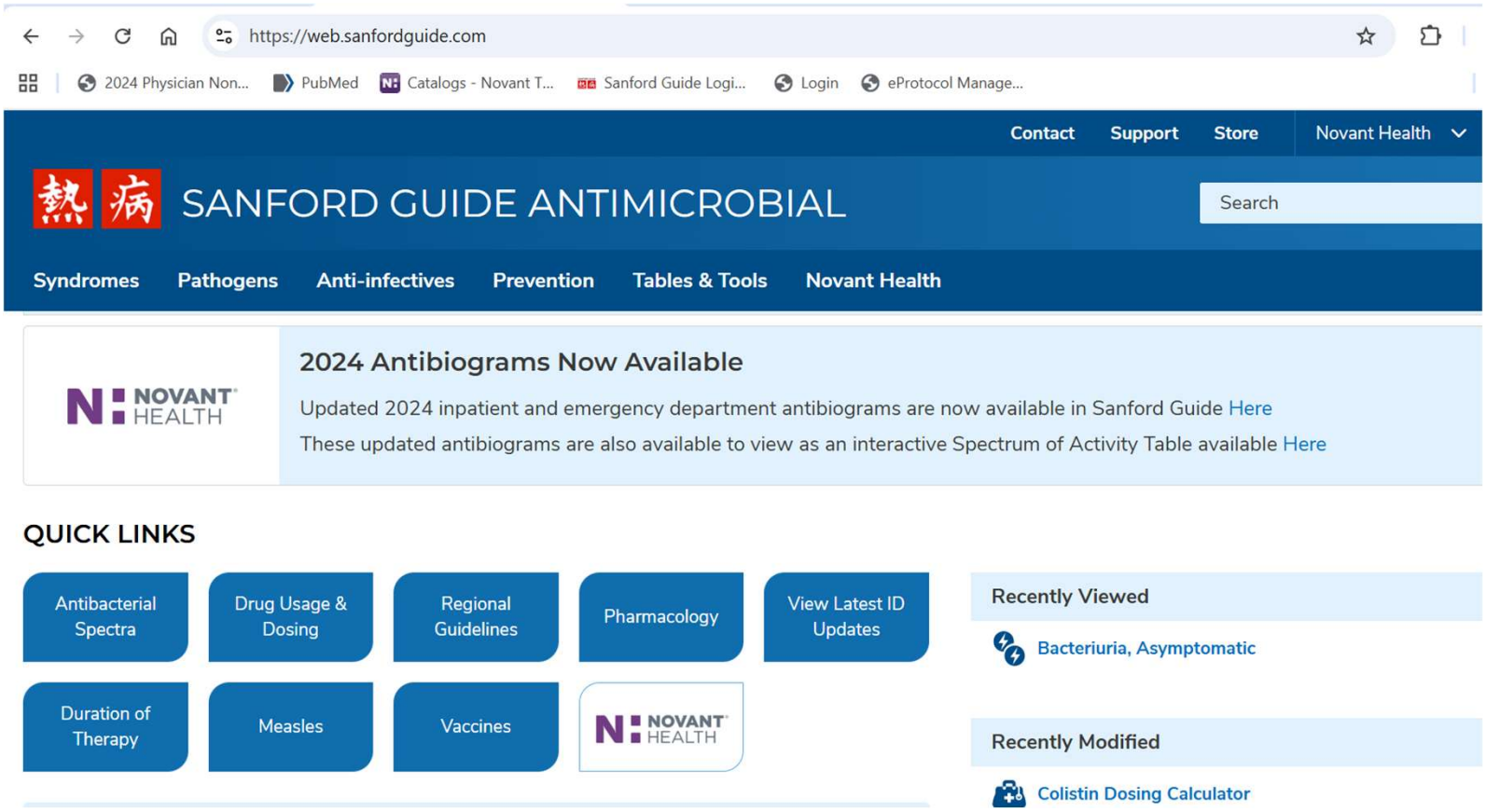
Diagnosis	First-Line Therapy	Alternative Therapy	Clinical Pearls
Acute Sinusitis	Amoxicillin 875 mg – 2 g BID x 5-7 days OR *Comorbidity**, > 65y, severe sinusitis, antibiotics in the past 30d: Amoxicillin/clavulanate 875 mg/125 mg BID x 5 – 7 days **Duration:** 5-7 days	PCN allergy: Doxycycline 100 mg BID or 200 mg daily x 5 – 7 days ***Comorbidity:** Alcoholism; asplenia; chronic heart/lung/liver/kidney disease; DM; immunosuppression; malignancy*	Consider Intranasal steroid +/- intranasal saline irrigation if history of allergic rhinitis. Avoid azithromycin due to local *S. pneumoniae* resistance >25%. Avoid trimethoprim-sulfamethoxazole due to *S. pneumoniae* and *H. influenzae* resistance
Community Acquired Pneumonia (CAP)	Amoxicillin 1 g TID x 5 days *Comorbidity** (see above), tobacco use or antibiotic in past 3 months: Amoxicillin/clavulanate (875/125 mg or 2 g/125 mg) BID PLUS doxycycline 100 mg BID OR azithromycin 500 mg x 3 days (for atypical coverage) **Duration**: 5 days (except azithromycin)	Mild PCN allergy (non-type 1) Use 2nd or 3rd gen cephalosporin (cefuroxime, cefdinir, cefpodoxime) in place of amoxicillin or amoxicillin/clavulanate Mod/Severe PCN allergy OR high concern for **atypical pneumonia**: Doxycycline 100 mg BID	Avoid azithromycin monotherapy due to local *S. pneumoniae* resistance >25%. Avoid trimethoprim-sulfamethoxazole due to *S. pneumoniae* and *H. influenzae* resistance
Group A strep (GAS) pharyngitis	Amoxicillin 1 g daily or 500 mg BID OR penicillin 500 mg BID Not tolerating PO or concern for compliance: Penicillin G benzathine (Bicillin L-A) 1.2 million units IM x 1 **Duration:** 10 days	Mild PCN allergy: Cephalexin 500 mg BID OR cefadroxil 1 g daily Mod/severe PCN allergy: Azithromycin 500 mg on day 1 then 250 mg daily on day 2-5 OR clindamycin 300 mg TID x 10 days OR	Testing should be performed prior to treatment since 35-50% of patients identified by scoring systems (e.g. Centor) will have viral etiology
Skin/Soft Tissue Infection (SSTI)	Impetigo: Mupirocin 2% ointment TID or cephalexin 500 mg TID Non-purulent cellulitis (including ecthyma and erysipelas): Cephalexin 500 mg TID Purulent cellulitis / abscess: I&D +/- Trimethoprim-sulfamethoxazole 160 mg TMP (1 DS) BID OR doxycycline 100 mg BID **Duration:** Cellulitis or Impetigo (topical therapy): 5 days Ecthyma or Impetigo (oral therapy): 7 days	PCN allergy: Clindamycin 450 mg TID OR (purulent) Doxycycline 100 mg BID Human/Animal Bite: Amoxicillin/clavulanate 875 mg BID PCN allergy: Clindamycin 450 mg TID + TMP/SMX 160 mg BID Antibiotic prophylaxis (3-5 days): hand/facial wounds, penetrating cat bite wounds, crush/deep tissue wounds, joint penetration, or immunocompromise	Oral antibiotics are recommended for most abscesses based on improved clinical resolution and reduced risk of recurrence. It is reasonable to withhold oral antibiotics for small, single abscesses (<2cm) in patients who have complete I&D and have no comorbidity, signs of systemic illness, or risk factors for transmission.
UTI (does not include pregnant women, renal transplant or prostatitis/STI treatment)	Uncomplicated UTI (Cystitis) Nitrofurantoin (Macrobid) 100 mg BID OR cephalexin 500 mg BID **Duration:** Nitrofurantoin 5 days, TMP/SMX 3 days, cephalexin 3-7 days Complicated UTI / Pyelonephritis Ciprofloxacin 500mg BID or Levofloxacin 750mg daily **Duration:** Cipro/Levo 7 days, Cephalosporin 10 days, TMP/SMX 14 days	Uncomplicated UTI (Cystitis): TMP-SMX 160 mg TMP (1 DS) BID Complicated UTI/Pyelonephritis Ceftriaxone 1g IM x 1 may be given prior to starting oral therapy For mild illness, can consider cephalexin 500 mg TID	*E. coli* were 93% sensitive to cephalexin, 97% sensitive to nitrofurantoin, and 81% sensitive to TMP/SMX in 2021 ambulatory adult urine cultures.

November 2022

NOVANT HEALTH

Disseminate Data

Commercial Platforms



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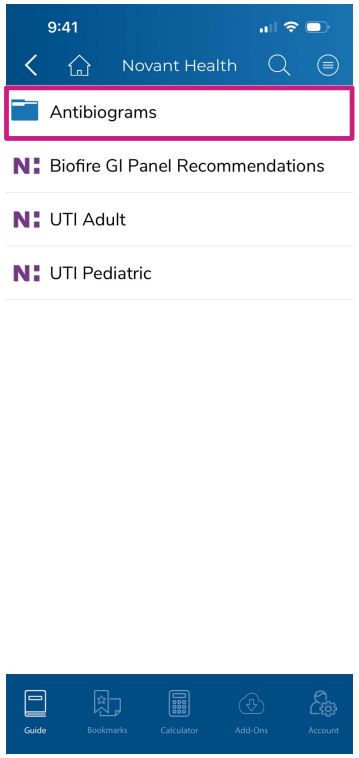
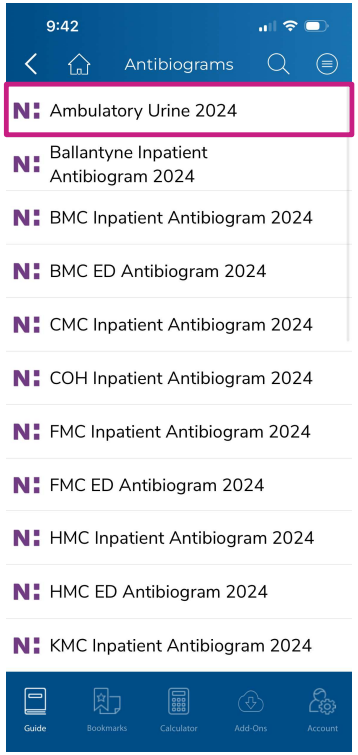
Disseminate Data

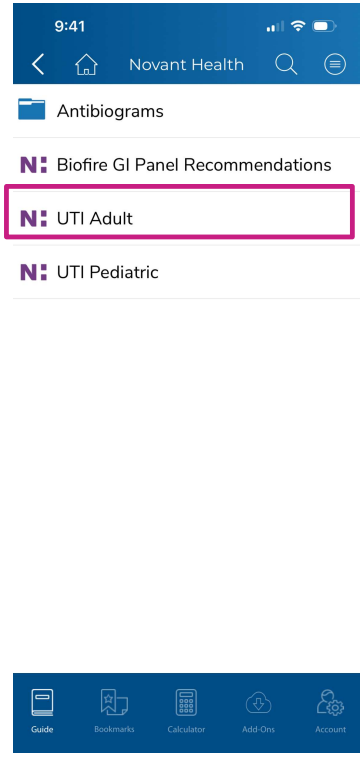
Antibiogram on commercial platform





Disseminate Data

Viewing guideline on commercial platform



LABCORP INSIGHT ANALYTICS

Supporting stewardship, surveillance and prescribing decisions

Practical use cases across stewardship, surveillance and clinical care

Stewardship & prescribing policy

- Informing antimicrobial stewardship programs – by empiric prescribing in local resistance trends to improve care and antibiotic appropriateness
- Establishing evidence-based prescribing protocols

Epidemiology & community surveillance

- Identifying organisms circulating within a specific county
- Monitoring geographic variation in pathogen prevalence

Clinical decision support

- Determining susceptibility of a specific drug
- Reviewing organism susceptibility across all tested agents

Building empiric therapy with real-world, local resistance data.

Acknowledgements

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Thank you!!!

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