Antibiogram Creation – The Requirements

- Joint Commission

EP 20 (revised): The antibiotic stewardship program collects, analyzes, and reports data to hospital leadership and prescribers.
Note: *Examples of antibiotic stewardship program data include antibiotic resistance patterns, antibiotic prescribing practices, or an evaluation of antibiotic stewardship activities.*

- College of American Pathologists

MIC.21946 Cumulative Susceptibility Data

Phase	1
Requirement	For hospital based microbiology laboratories, cumulative antimicrobial susceptibility test data are maintained and reported to the medical staff at least yearly.

Antibiogram Creation – The Requirements

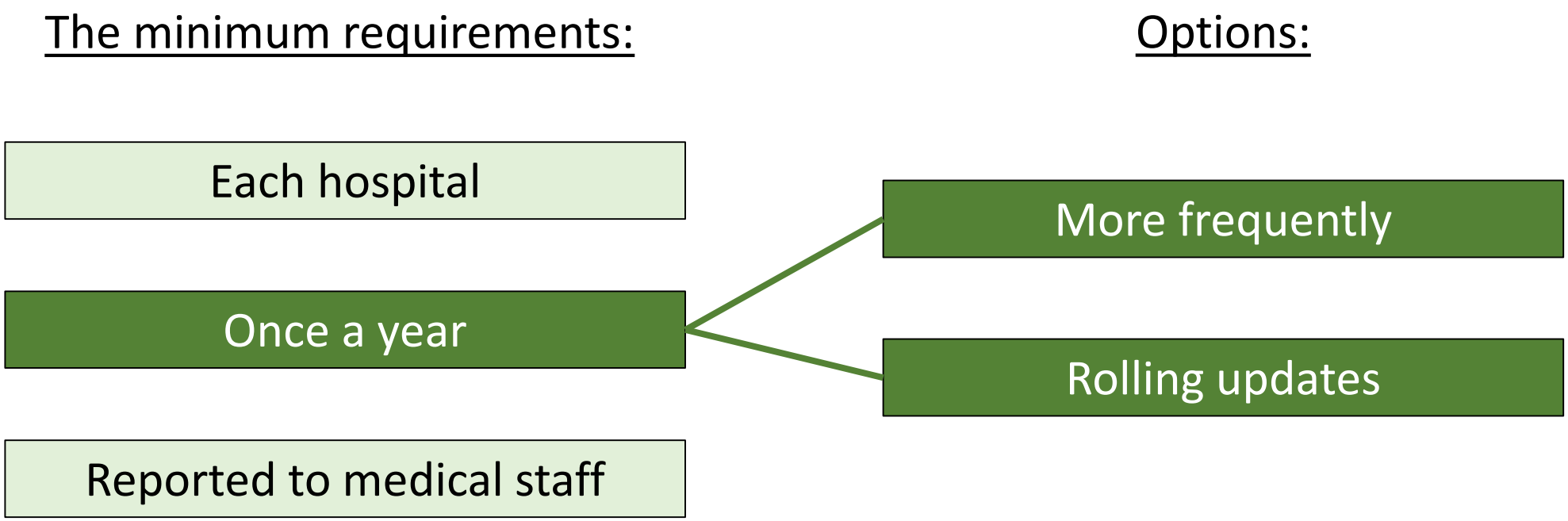
<u>The minimum requirements:</u>

- Each hospital
- Once a year
- Reported to medical staff

<u>Options:</u>

- Whole hospital
- Unit type
- Unit specific

Antibiogram Creation – The Requirements



Antibiogram Creation – The Requirements

<u>The minimum requirements:</u>

Each hospital

Once a year

Reported to medical staff

<u>Options:</u>

Printed

Electronic

Antimicrobic % Interpretive Report
NORTON HEALTHCARE

2021 Audubon

Organism	(# of iso)		CFT/CA	CFTE	CFX	CFZ	CL	CN	CP	CP-S	CPD	CPE	CRM	CTN	CZ	CZA	DOR	ECAZ	ESA	ESB	ETP	FD
C. farmeri	(2)	S	--	--	--	0%	--	--	100%	--	--	100%	0%	100%	--	--	--	--	--	--	100%	100%
		I	--	--	--	0%	--	--	0%	--	--	0%	0%	0%	--	--	--	--	--	--	0%	0%
		R	--	--	--	100%	--	--	0%	--	--	0%	100%	0%	--	--	--	--	--	--	0%	0%
			0	0	0	2	0	0	2	0	0	2	1	1	0	0	0	0	0	0	2	1
C. freundii	(16)	S	--	--	0%	0%	--	--	100%	--	--	100%	100%	92%	--	100%	100%	--	--	--	100%	93%
		I	--	--	0%	0%	--	--	0%	--	--	0%	0%	8%	--	0%	0%	--	--	--	0%	7%
		R	--	--	100%	100%	--	--	0%	--	--	0%	0%	0%	--	0%	0%	--	--	--	0%	0%
			0	0	2	16	0	0	16	0	0	16	4	12	0	1	1	0	0	0	16	14
C. freundii cplx	(17)	S	--	--	11%	0%	--	--	100%	--	--	100%	80%	86%	--	100%	100%	--	--	--	94%	100%
		I	--	--	11%	0%	--	--	0%	--	--	0%	0%	0%	--	0%	0%	--	--	--	6%	0%
		R	--	--	78%	100%	--	--	0%	--	--	0%	20%	14%	--	0%	0%	--	--	--	0%	0%
			0	0	9	17	0	0	17	0	0	17	10	7	0	9	9	0	0	0	17	8
C. indologenes	(2)	S	--	--	--	--	--	--	100%	--	--	0%	--	--	--	--	--	--	--	--	--	--
		I	--	--	--	--	--	--	0%	--	--	0%	--	--	--	--	--	--	--	--	--	--
		R	--	--	--	--	--	--	0%	--	--	100%	--	--	--	--	--	--	--	--	--	--
			0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0
C. koseri	(30)	S	--	--	86%	100%	--	--	100%	--	--	100%	78%	100%	--	100%	100%	--	--	--	100%	50%
		I	--	--	14%	0%	--	--	0%	--	--	0%	11%	0%	--	0%	0%	--	--	--	0%	45%
		R	--	--	0%	0%	--	--	0%	--	--	0%	11%	0%	--	0%	0%	--	--	--	0%	5%
			0	0	7	30	0	0	30	0	0	30	9	21	0	7	7	0	0	0	30	20

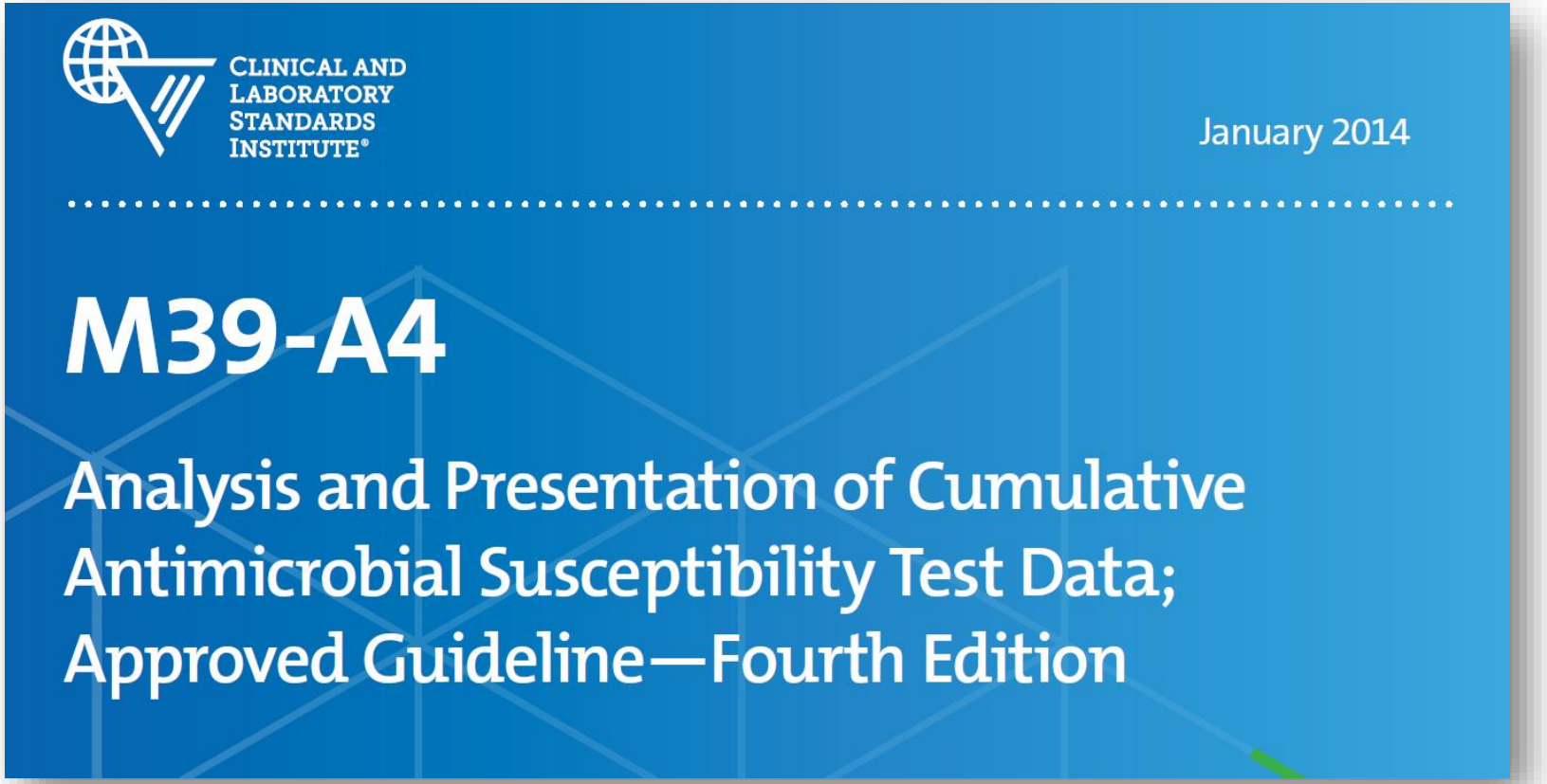
Manual

Automated

The microbiology laboratory database software

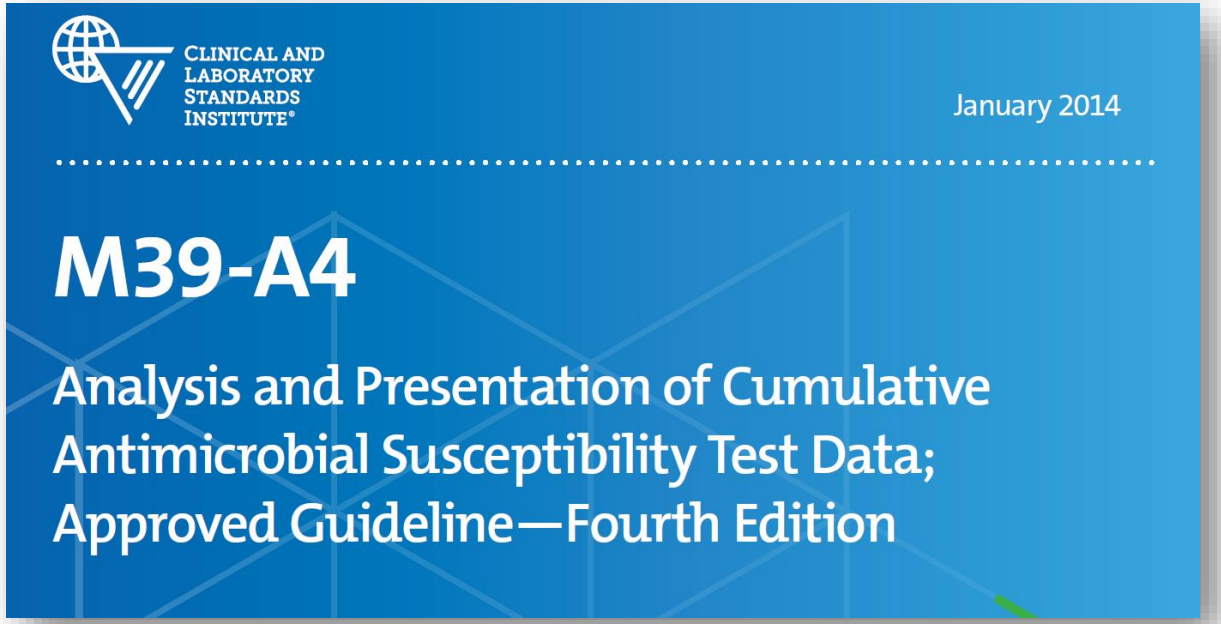
WHONET is a free desktop Windows application for the management and analysis of microbiology laboratory data with a particular focus on antimicrobial resistance surveillance developed and supported by the WHO Collaborating Centre for Surveillance of Antimicrobial Resistance at the Brigham and Women's Hospital in Boston, Massachusetts. WHONET, available in 44 languages, supports local, national, regional, and global surveillance efforts in over 2,300 hospital, public health, animal health, and food laboratories in over 130 countries worldwide.

The How-To Rules



The How-To Rules

- Which isolates to include
  - Those collected from human specimens for diagnostic purposes
    - No surveillance cultures (MRSA, VRE, CRE, etc.)
    - No environmental cultures
    - No non-human critters
  - Obviously only those you do susceptibility testing on



- Only the first isolate of a given species per patient, per analysis period (eg, one year), irrespective of body site, antimicrobial susceptibility profile, or other phenotypic characteristics

Date of Collection	Isolate	Specimen Type	In the Antibiogram?
2/14/2021	*Klebsiella pneumoniae*	BAL	YES
2/15/2021	*Klebsiella pneumoniae*	Blood	NO
2/20/2021	*Klebsiella pneumoniae*	Sputum	NO
2/20/2021	*Staphylococcus aureus*	Sputum	YES
4/8/2021	*Citrobacter freundii*	Wound	YES
4/8/2021	*Staphylococcus aureus*	Wound	NO
7/7/2021	*Klebsiella pneumoniae*	Sputum	NO
12/31/2021	*Staphylococcus aureus*	Blood	NO
1/2/2022	*Staphylococcus aureus*	Blood	YES
1/5/2022	*Staphylococcus aureus*	Wound	NO

What's your best source of information in deciding on an empiric therapy for these isolates?

Well, what about this one?

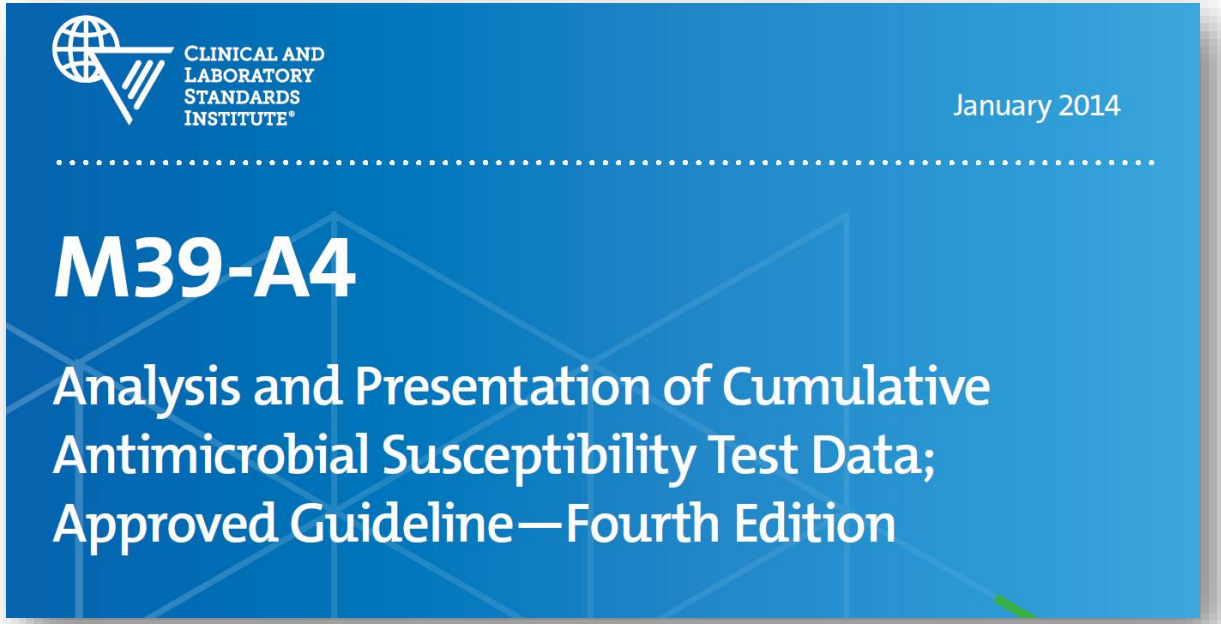
Mrs. Winter*

In a laboratory that creates one antibiogram for each calendar year

*HIPAA-compliant fake name and a picture I stole from the internet

The How-To Rules

- Which antibiotics to include
  - Only those you routinely <u>test</u> on all isolates of this species, even if you don't routinely <u>report</u> them
  - None that are "supplemental" testing



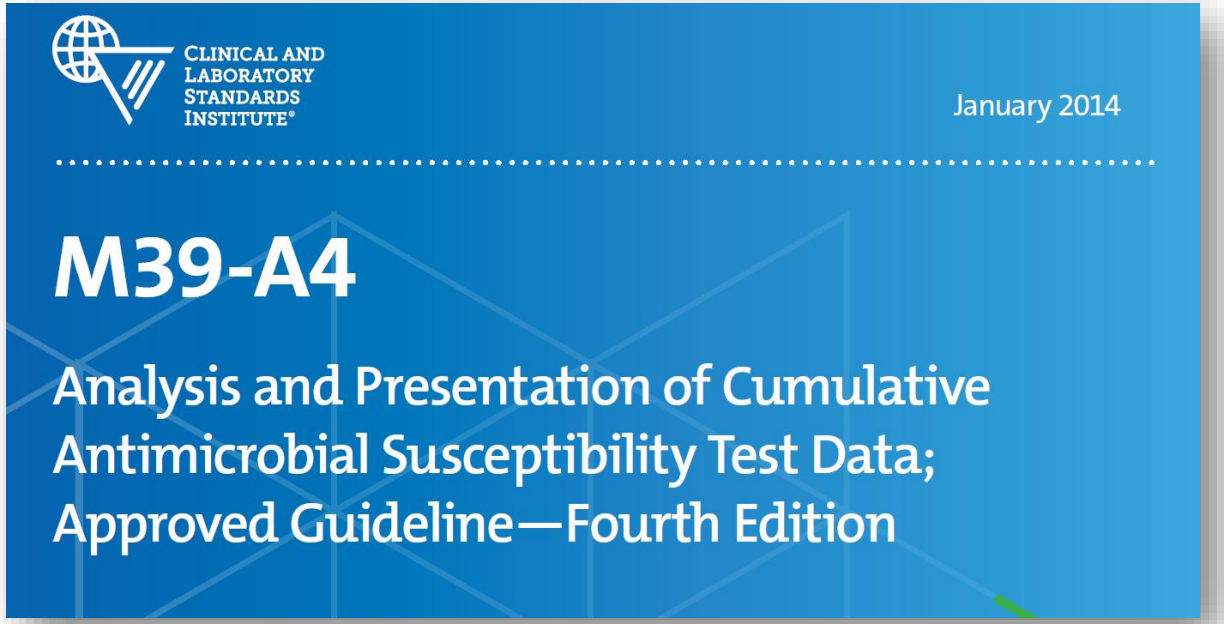
- Only antibiotics that may be appropriate or recommended for empiric therapy

Drug Tested	Reporting Rules	%S of all isolates*	%S of reported isolates*
Cefazolin	Always reported	80%	80%
Ceftriaxone	Only reported if cefazolin NS	92%	5~~0~~%
Ceftazidime/avibactam	Only reported if CRE	9~~2~~%	6~~6~~%

**Made up numbers for illustration only, don't take them too seriously*

The How-To Rules

- What to report in the antibiogram
  - Only those species with 30 or more isolates (okay, maybe 10)
  - Group similar organisms? Such as
    - Viridans streptococci
    - Coagulase-negative staphylococci
    - *Citrobacter freundii* complex
  - For those with lower numbers, include a longer time frame?



- Report as percent susceptible
  - That's fully susceptible, not I, not R
- For those antibiotics with susceptible dose-dependent interpretations, report that percentage separately

Norton Hospital 2021	Number Tested	Penicillins						Cephalosporins					Monobactam	Carbapenems		Aminoglycosides				Gram + Coverage					Others				
		Amoxicillin/Clavulanate	Ampicillin	Ampicillin/Sulbactam	Oxacillin	Penicillin	Piperacillin/Tazobactam	Oral cephalosporins for uncomplicated UTI	Cefazolin	Cefepime	Ceftazidime	Ceftriaxone	Aztreonam	Ertapenem	Meropenem	Amikacin	Gentamicin	Gentamicin Synergy	Tobramycin	Clindamycin [1, 2]	Erythromycin [2]	Vancomycin	Linezolid	Daptomycin	Ciprofloxacin	Levofloxacin	Nitrofurantoin [2]	Tetracycline	Trimeth/Sulfa
Acinetobacter baumannii complex [3]	20	0	0	75	0	0			0	65	80		0	0	75	85	75		85	0	0	0	0	0	85	75			75
Citrobacter freundii complex [4]	29	0	0	0	0	0	93		0	97	83	79	83	97	97	100	90		93	0	0	0	0	0	90	93	89		83
Citrobacter koseri	19	89	0	84	0	0	95		89	100	100	89	95	100	100	100	100		100	0	0	0	0	0	89	100	62		95
Enterobacter cloacae complex [5]	89	0	0	0	0	0	79		0	88	71	56	65	82	97	100	99		98	0	0	0	0	0	97	100	21		94
Escherichia coli	965	85	47	55	0	0	97	86	66	92	91	87	88	99	99	99	91		91	0	0	0	0	0	74	75	97		72
Klebsiella aerogenes	41	0	0	0	0	0	88		0	98	85	80	83	95	100	100	100		100	0	0	0	0	0	95	95	18		98
Klebsiella oxytoca	53	98	0	81	0	0	100		15	98	94	96	94	100	100	100	100		96	0	0	0	0	0	98	98	80		96
Klebsiella pneumoniae	224	88	0	77	0	0	94	88	79	94	90	89	90	98	99	100	96		95	0	0	0	0	0	92	95	37		89
Morganella morganii	17	0	0	0	0	0	100		0	94	53	53	71	100	100	100	94		94	0	0	0	0	0	88	94	0		94
Proteus mirabilis	125	92	79	90	0	0	99	87	66	94	95	92	89	99	100	100	90		90	0	0	0	0	0	75	78	0	0	79
Proteus vulgaris	12	92	0	92	0	0	100		0	100	92	50	33	100	100	100	100		100	0	0	0	0	0	100	100	0	0	100
Pseudomonas aeruginosa	166	0	0	0	0	0	84		0	83	80	0	70	0	89	96	81		94	0	0	0	0	0	81	83	0	0	0
Serratia marcescens	47	0	0	0	0	0	57		0	98	43	53	38	100	100	98	96		91	0	0	0	0	0	100	100	0		98
Stenotrophomonas maltophilia	33	0	0	0	0	0	0		0		45	0	0	0	0	0	0		0	0	0	0	0	0		88		0	94
Staphylococcus aureus	682	47			47				47				0							77	33	100	100	99				91	98
Methicillin-resistant S. aureus	391	0			0				0				0							74	13	100	100	99				94	97
Methicillin-susceptible S. aureus	331	100			100				100				0							81	56	100	100	100				89	99
Staphylococcus capitis	10	100			100				100				0							*	*	100	100	100			*	100	100
Staphylococcus epidermidis	126	37			37				37				0							56	34	100	100	100			100	81	65
Staphylococcus haemolyticus	15	27			27				27				0							*	*	100	100	100			*	93	60
Staphylococcus lugdunensis	36	83			83				83				0							71	63	100	100	100			*	92	97
Other coagulase-negative staphylococci	25	50			50				50				0							46	40	100	100	100			*	80	84
Enterococcus faecalis	119		99			99			0	0	0	0	0			0	0	71	0	0	26	91	100	99			*	33	0
Enterococcus faecium	38		29			29			0	0	0	0	0			0	0	79	0	0	3	39	100	97			*	29	0

[NHC Quality Report (nortonhealthcare.org)]