OHA Antibiogram Project Update: 2015 Statewide Antibiogram is Available!

OHA Webinar

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Background

- Guidelines exist regarding best practice for creation and dissemination. If guidelines were followed:
  - Local utility would likely improve
  - Cross-facility & regional comparison would be possible
- Guideline adherence not previously evaluated in our region
- No Oregon statewide antibiogram previously available

Why the Antibiogram?

- "…prove useful to clinicians in the selection of the most appropriate agents for initial empirical antimicrobial therapy".
  - Other analysis for clinicians, infection control, epidemiologists, pharmacists, others*

*CLSI M39-A4, page 11

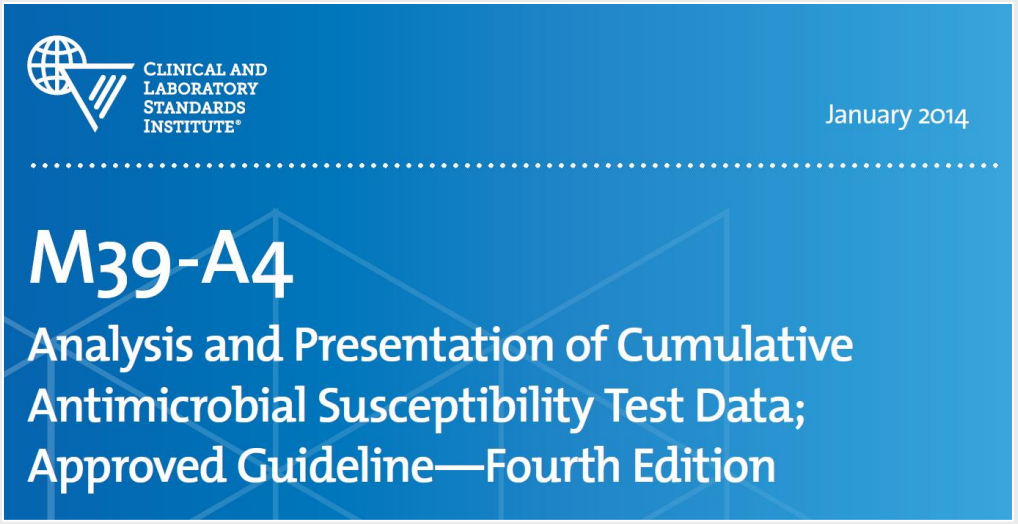
What's Possible: Statewide Antibiogram

- Offer regional perspective of empiric treatment for UTI, community-acquired intraabdominal infection, community-acquired bloodstream infection, etc.

So, where do we start in Oregon?

- Create an accurate, standardized local Antibiogram!
- Collate an Oregon Statewide Antibiogram

How to Standardize Across Oregon?



- "Recommendations for the collection, analysis, and presentation of cumulative antimicrobial susceptibility test data."

Methods- Inclusion Criteria

- Laboratories that create cumulative Antibiograms for Oregon hospitals with available contact information via the Oregon Health Authority

- Infection Prevention Programs of Oregon hospitals with available contact information via the Oregon Health Authority

Results

Response Rates Lab Survey: 25/25 (100%)

Response of Confirmatory Phone calls: 25/25 (100%)

Antibiogram Collection Rate: 22/25 (88%)

Response Rates Infection Prevention Survey: 53/62 (85%)

Summary of **Survey** Results (1)

- Oregon laboratories reported & demonstrated **inconsistent adherence** to CLSI M39A4 *and* only **partial adoption** of updated Gram-negative CLSI M100-27 breakpoints
  - Each issue compounds to complicate cross-facility comparison
- ~75% of laboratories employed Enhanced Antibiogram
  - ~50% of those only stratified MSSA vs. MRSA.

Survey Summary (2)

- IP survey: only 50-60% of hospitals used the Antibiogram to impact relevant clinical operations such as clinical decision pathways, antibiotic stewardship.

Recommendations

- **To create accurate and standardized Antibiograms, all facilities should adopt updated CLSI-recommended guidelines.**
  - ✓ Adhere to "routine Antibiogram" recommendations in M39A4
  - ✓ Employ "enhanced Antibiogram" techniques as appropriate for the clinical needs of the facility/health system
    - ✓ E.g., syndromic (outpatient UTI, ICU sepsis), by organism (MRSA vs MSSA)
  - ✓ Adopt updated CLSI breakpoints

- **Facilities should publicize the Antibiogram in ways that impact clinical operations (locally and regionally)**

Statewide Antibiogram - Methods

- Drug-bug susceptibility data from the individual facility report were calculated to create #organisms/#susceptible (not %) and entered into Excel.
- Data from each facility's antibiogram were merged.
- Data were stratified by Portland Tri-County area vs. not.

Oregon – 1 January- 31 December 2015 Cumulative Antimicrobial Susceptibility Report *

Gram-Positive Isolates: % Susceptible														
	n= †	Penicillin	Ampicillin	Oxacillin	Ceftriaxone	Tetracycline	Linezolid	Daptomycin	Meropenem	Trimethoprim-Sulfamethoxazole	Vancomycin	Clindamycin	Erythromycin	Nitrofurantoin
S. aureus ‡	28471			60%										
MRSA	8858			0%		96%	100%	100%		97%	100%	66%	8%	98%
MSSA	13854	20%		100%		96%	100%	100%		99%	100%	87%	66%	100%
S. pneumoniae	1144					87%	100%		95%	84%	100%	90%	76%	
Meningitis	254	81%			95%									
Non-Meningitis	254	99%			100%									
E. faecalis	7421	99%	99%			21%	99%	100%			99%		32%	99%
E. faecium	578	50%	37%			37%	100%	93%			55%		16%	32%
S. agalactiae	391	100%	100%		100%					100%	100%	56%	54%	

S. aureus

	n= †	Penicillin	Ampicillin	Oxacillin	
S. aureus ‡	28471			60%	
MRSA	8858			0%	
MSSA	13854	20%		100%	

Other Gram-Positive Highlights

- Staph & *E. faecalis* – high degree of Nitrofurantoin susceptibility for UTI (unlike *E. faecium*)
- *S. pneumo* - ~25% of isolates had mening vs. non-mening breakpoints published
- GBS: relatively low clinda/erythro susceptibility

Oregon – 1 January- 31 December 2015 Cumulative Antimicrobial Susceptibility Report*

Gram-Negative Isolates: % Susceptible																		
	n= †	Ampicillin	Ampicillin Sulbactam	Amoxicillin - Clavulanic Acid	Piperacillin-Tazobactam	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Ertapenem	Imipenem	Meropenem	Ciprofloxacin	Trimethoprim-Sulfamethoxazole	Tetracycline	Gentamycin	Tobramycin	Amikacin	Nitrofurantoin
E. coli	78574	59%	64%	94%	95%	87%	93%		95%	100%	100%	100%	84%	79%		92%	92%	100%	94%
K. pneumoniae	10866		88%	96%	97%	94%	97%		98%	100%	100%	100%	96%	92%		98%	97%	100%	41%
E. aerogenes	1134				87%		83%		99%	98%	85%	100%	98%	98%		99%	99%	100%	17%
E. cloacae complex	2810				86%		80%		97%	96%	97%	99%	96%	89%		98%	98%	100%	30%
S. marcescens	879				93%		92%		99%	100%	97%	99%	93%	98%		99%	93%	99%	
P. aeruginosa	6134				94%				92%		89%	92%	82%			90%	98%	97%	
A. baumanii complex	322		93%		66%		30%	77%	86%		100%	97%	91%	88%	96%	90%	94%	94%	
H. influenzae ‡	619	78%																	
S. maltophilia	778							50%						92%					

	n= †	Ertapenem	Imipenem	Meropenem
E. coli	78574	100%	100%	100%
K. pneumoniae	10866	100%	100%	100%
E. aerogenes	1134	98%	85%	100%
E. cloacae complex	2810	96%	97%	99%
S. marcescens	879	100%	97%	99%
P. aeruginosa	6134		89%	92%
A. baumanii complex	322		100%	97%
H. influenzae ‡	619			
S. maltophilia	778			

	n= †	Ceftriaxone	Ceftazidime	Cefepime
E. coli	78574	93%		95%
K. pneumoniae	10866	97%		98%
E. aerogenes	1134	83%		99%
E. cloacae complex	2810	80%		97%
S. marcescens	879	92%		99%
P. aeruginosa	6134			92%
A. baumanii complex	322	30%	77%	86%
H. influenzae ‡	619			
S. maltophilia	778		50%	

	n= †	Trimethoprim-Sulfamethoxazole	Amoxicillin - Clavulanic Acid	Nitrofurantoin
E. coli	78574	79%	94%	94%
K. pneumoniae	10866	92%	96%	41%
E. aerogenes	1134	98%		17%
E. cloacae complex	2810	89%		30%
S. marcescens	879	98%		
P. aeruginosa	6134			
A. baumanii complex	322	88%		
H. influenzae ‡	619			
S. maltophilia	778	92%		

P. aeruginosa

- **Pip-tazo 94% (91% tri-county, 97% outside tri-county)**
- **Cefepime 92%**
- Meropenem 92% & Imipenem 89%
- Cipro 82%

- Gent 90%
- **Tobra 98%**
- Amikacin 97%

Conclusions

- 2015 Statewide Antibiogram offers new insights into Oregon antimicrobial susceptibility data
- 60% of *S. aureus* are MSSA
- Relatively low rate of Gram-negative resistance –
  - Eg TMP-SMX above 80% threshold for UTI treatment; nitrofurantoin highly susceptible for most bugs
  - Eg. *P. aeruginosa* highly susceptible to pip-tazo & cefepime

Future Directions

- Re-survey laboratorians and IPs this fall – update Oregon antibiogram creation & distribution/use practices
- Update the statewide Antibiogram with 2017 data
- Conduct qualitative interviews to better understand potential utility & implementation of statewide antibiogram
- Explore "raw data" collection from the laboratories for improved understanding of statewide antimicrobial resistance.

Special Thanks

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  - Zintars Beldavs MS
  - And Others