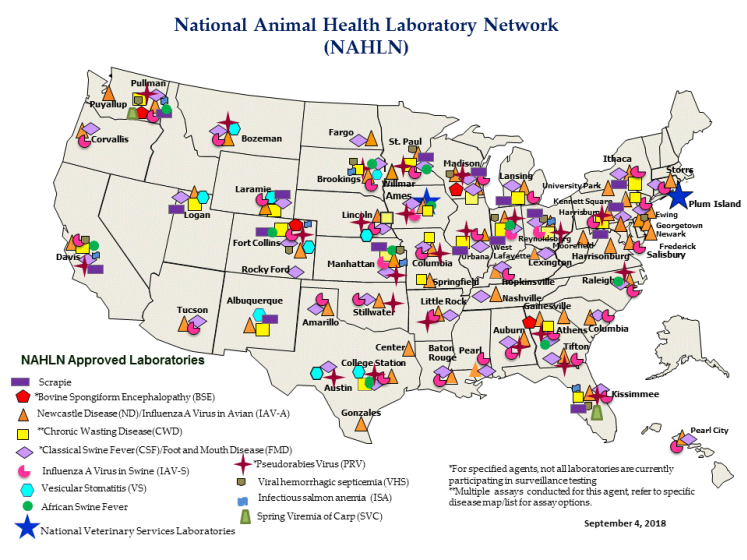
USDA

United States Department of Agriculture



UPDATE ON NAHLN ACTIVITIES

DR. CHRISTINA LOIACONO, NAHLN COORDINATOR
DR. BETH HARRIS, NAHLN ASSOCIATE COORDINATOR
U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
VETERINARY SERVICES
NATIONAL ANIMAL HEALTH LABORATORY NETWORK

OCTOBER 2018

NAHLN Hot Topics

African Swine Fever Response

vNDV outbreak

Adding assays to NAHLN

NAHLN Coordinating Council update

NAHLN Methods Technical Working Group update

AMR Pilot update

African Swine Fever Response

- NAHLN included in a meeting with swine industry in Washington DC
  - NPB, NCCP, AASV, USDA-VS, FDA
  - Discussed prevention and response
- Letter from the VS Deputy Administrator with guidance for testing in NAHLN labs
  - Discourages unofficial testing for NAHLN scope diseases using unapproved assays and/or unapproved sample types

African Swine Fever Response

NAHLN:

- Survey 11 approved labs for current capacity- 6500 PCR tests/day
  - increase PT'd analyst – 8000 PCR tests/day
- Increase sample types for approved testing (FADI)
  - Tonsil- October 1, 2018
  - Spleen- December 1, 2018
- Increased the number of approved NAHLN labs
  - All labs have been asked for interest to participate
- Supporting discussions around active surveillance plan
  - Swine staff, CEAH, FADDL, NAHLN labs

Newcastle (vNDV) Outbreak

NAHLN Response

California Animal Health and Food Safety Laboratory (NAHLN Lab)

~ 13,000 PCR tests performed

- Messaging:
  - CAHFS lab is messaging results

Laboratory capacity increased by adding administrative support from 2 other NAHLN labs

- Oregon Veterinary Diagnostic Lab
- Colorado State University Veterinary Diagnostic Lab
- Intergovernmental Personnel Act Assignment Agreement

Laboratory Electronic Messaging

43 NAHLN labs and NVSL are capable of sending an electronic message

- Additional 2-3 labs prepared to message

Messages now being received for 9 NAHLN scope diseases

- ASF, BSE, CSF, FMD, IAV-A, IAV-S, vND, PRV, VSV

Training offered to NAHLN laboratories and VS commodity staff

- Basic and HL7 specific messaging training
- LIMS Vendor specific training
- Training for commodity/program staff

2019 messaging priorities include:

- Continue to expand number of labs with capability to message
- Expand messaging to include Scrapie and AMR data
- Support implementation of NLRAD
- Integration with other internal VS systems
- Enhance utility of messaging standards

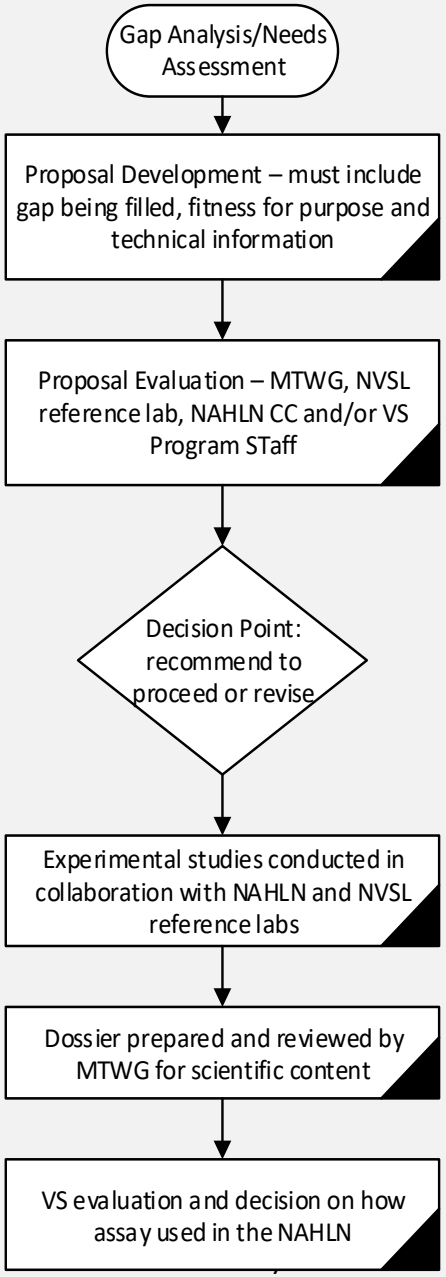
Adding a Disease/Assay to NVSL and NAHLN

Adding a disease program disease to NVSL:

- Need for a National oversight is identified
  - Determination if the disease should be under NAHLN scope
- Surveillance plan is developed
  - Active Surveillance
  - Passive Surveillance
- Proficiency test
- Funding

Adding a disease/assay to NAHLN scope

- Need identified for disease or assay to be added to NAHLN scope
- Proposal goes to the NAHLN Methods Technical Working Group (MTWG)
- If accepted, the study is completed
- Study results are presented to the NAHLN MTWG
  - MTWG makes a recommendation to NAHLN Coordinating Council (CC)
  - CC makes a recommendation to the NAHLN Executive Committee who either decides or takes the recommendation to the VS Deputy Administration if needed
- If recommended- then VS determines how the assay may be incorporated into the NAHLN



Coordinating Council- Update

Welcomed 4 new members

- Dr. François Elvinger - Cornell Animal Health Diagnostic Center
- Dr. Brett Webb North Dakota State Veterinary Diagnostic Laboratory
- Dr. Larry Forgey; Missouri Department of Agriculture:
- Dr. Peter Mundschenk - State animal health official for Arizona

Laboratory Assessment Matrix

- Time line for implementation and changes for FY2020

NAHLN Strategic Plan

- Update of the plan- completion December 31, 2018

MTWG Update

Membership

NAHLN Laboratories

Dan Bradway – WA
Beate Crossley – CA
Jane Hennings – SD
Hon Ip – WI
Donna Mulrooney – OR*
Akhilesh Ramachandran – OK*
Rachel Reams – MI (co-chair)
Susan Sanchez – GA
Jackie Smith – KY
Rebecca Wilkes – GA*
Yan Zhang - OH

*new members as of January, 2018

NVSL reference laboratories + NAHLN

Tracy Sturgill – FADDL
Nita Grause – DBRL
Beth Harris – NAHLN (Co-chair)
Mary Lea Killian – DVL
Aaron Lehmkuhl – DBPL
Christie Loiacono – NAHLN
Greg Mayr – FADDL
Monica Reising – CVB
Janet Warg - DVL

2018 Activities to Date

Methods Comparisons

- **FMD/CSF Testing**: Comparison of the Performance of the Applied Biosystems® 7500 Real-Time PCR System to the Applied Biosystems® QuantStudio 5 Real-Time PCR Detection System for the detection of FMDV and CSFV
- **FMD/CSF Testing**: Comparison of the MagMAX™ Pathogen RNA/DNA Kit, MagMAX™ CORE Nucleic Acid Purification Kit, and the Qiagen MagAttract 96 *cador* Pathogen Kit.
- **CWD Testing**: Comparison of the BioRad Precess 48 to the MP-fast prep 24 homogenizer for preparing tissue samples for use in the Bio-Rad CWD ELISA test.

2018 Activities to Date

Other activities

- **MTWG Core meeting schedule**: proposed modification to move core calls to monthly (now bi-monthly), and move general MTWG calls to quarterly (now bi-monthly).
  - Needed to ensure MTWG Core goals accomplished in designated timeframe
- **PRV testing**: Sub-committee stood up to evaluate data from available PRV PCRs for potential deployment to the NAHLN
- **IAV-A testing**: Reviewed IDEXX avian influenza A RNA real-time PCR test and nucleic acid extraction kit
- **FMD/CSF Testing**: Identified need for low throughput kit for FMD/CSF

MTWG prioritized list of activities for 2018-2019

June face-to-face meeting

1. Evaluate WGS and metagenomics technology for deployment to the NAHLN [short term-survey; mid-long term-implementation]

2. Harmonize PCR thermocycling parameters [short-term]

3. Develop NAHLN communications plan [mid-term]

4. Continue to ID 2nd manufacturer for platforms and kits/reagents where feasible [long-term]

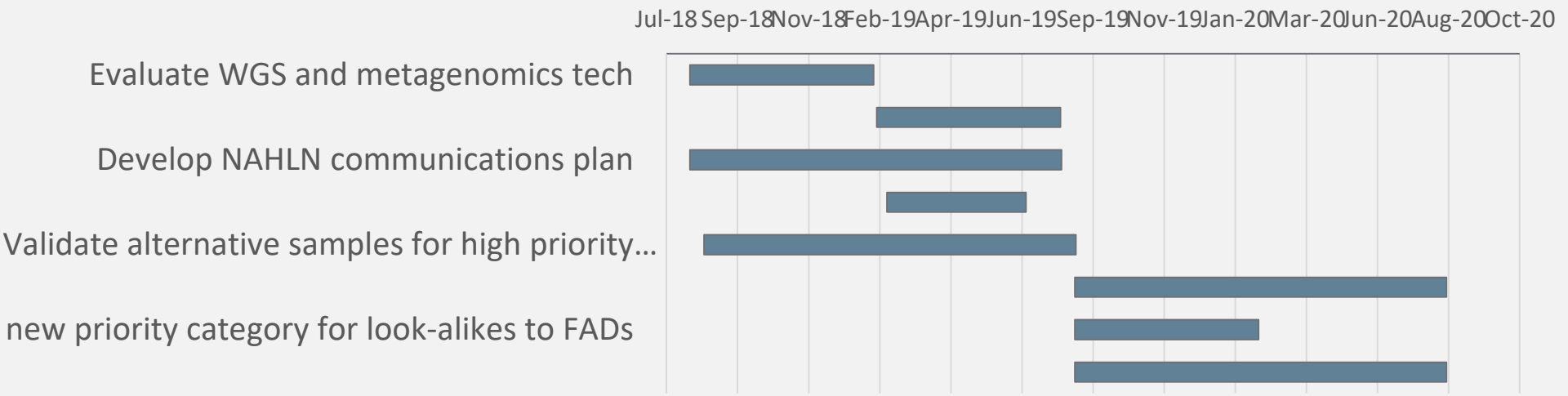
5. High priority situations – validate alternative sample types for NAHLN SOPs [long-term]

6. High priority situations – emergency validation of SOP for new disease [long-term]

7. New priority category for endemic look-alikes to FADs [short-term]

8. Share assays for endemic diseases across NAHLN [short-term]

NAHLN MTWG activity 2018-2019



AMR Pilot Project

SUMMARY OF YEAR 1

Objectives

Develop process for tracking AMR data at a national level

- standardized methodology, interpretation, and reporting mechanisms.

Deploy across multiple laboratories

Identify information important to veterinary diagnostic community regarding trends in AMR

- facilitate antimicrobial stewardship.

Pathogen/animal species – Year 1

Bacterial pathogen	Animal Species
Escherichia coli	cattle, swine, poultry, horses, dogs, cats
Salmonella enterica	cattle, swine, poultry, horses, dogs, cats
Mannheimia haemolytica	cattle
*Staphylococcus intermedius group**	dogs, cats

**Includes S. intermedius, S. pseudintermedius* and *S. delphini.*

Measures of Success

Laboratories able to meet 50% or more of project's target numbers in Year 1

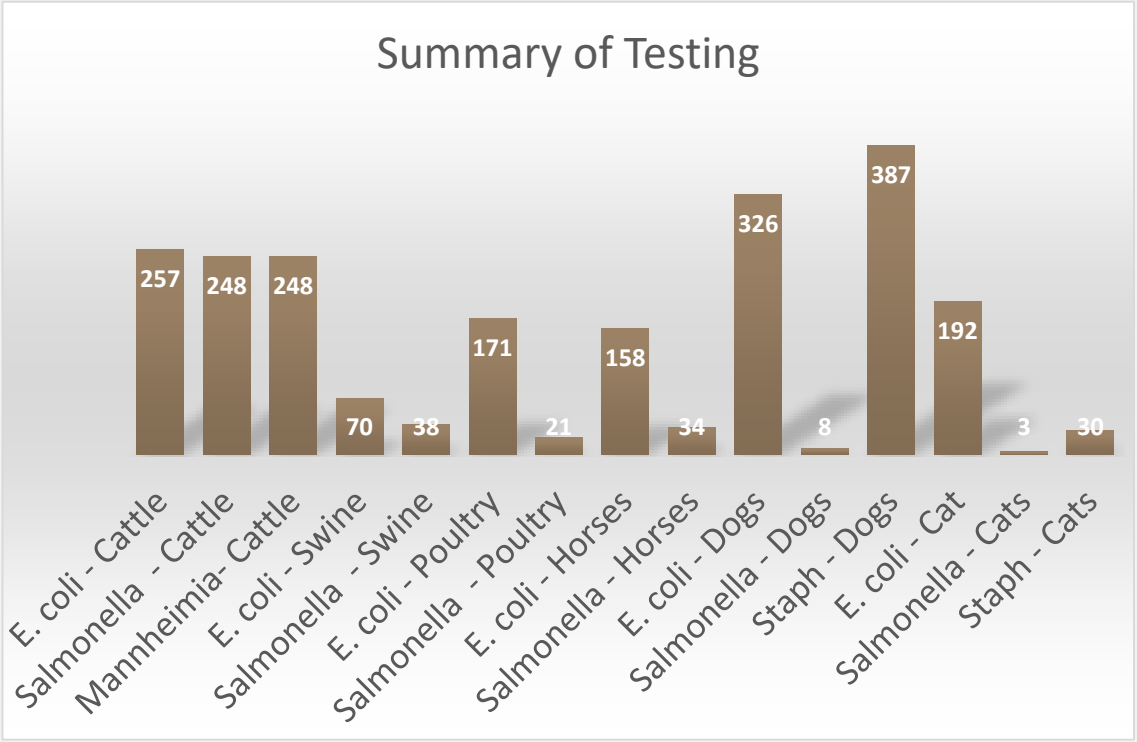
VS can develop parameters for electronically messaging AST data

- at least 20% of laboratories able to successfully message AST data during Year 1

VS develop reporting mechanism to share results from Year 1 of this pilot with laboratories, State and federal regulatory authorities, and other interested stakeholders

Measures of Success -Target numbers

Laboratories able to meet 50% or more of project's target numbers in Year 1



Total isolates – 2191 (as of 10/4/18)

6 categories – already met goal of 200 isolates

3 categories – on track to meet goal by Dec 2018

7 categories – unlikely to meet goal of 200 isolates by Dec 2018

- E. coli - swine
- Salmonella/all animal categories except cattle
- Staph – cats

Measures of Success – messaging data

VS can develop parameters for electronically messaging AST data

- HL7 messaging schema was developed for messaging AST results
  - Requirements of message structure – “all or none”. Cannot select which AST data to message if 2 or more in same accession.
  - Requirements of AMR pilot project – cannot attach accession number from original client submission to isolate. Message structure requires Accession # to be included.

    Path Forward: Script written to convert data from spreadsheet into HL7 message, then send the message to the LMS database

Measures of Success – Reporting Mechanism

VS develop reporting mechanism to share results from Year 1 of this pilot with laboratories, State and federal regulatory authorities, and other interested stakeholders

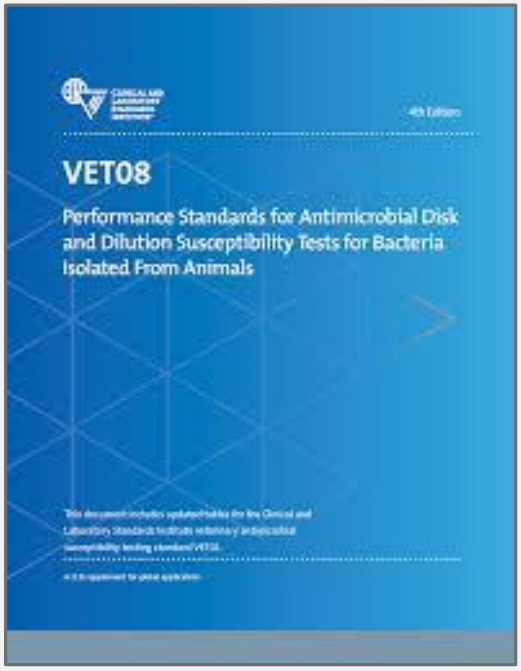
Subcommittee stood up to identify recommendations for reporting data

Tableau software in development for creating interactive website to display data

Written report in development; estimated completion date – December 2018

Sub committee: AST Data Reporting Guidance

1. Report summary data across all laboratories, by animal species and bacterial pathogen
2. Report all MIC values obtained for all antibiotics on the plate
   - Allows data to be evaluated for both therapeutic/clinical and epidemiological/surveillance applications
3. Only report breakpoints for antibiotics with animal-specific interpretive values
   - Reference: CLSI Vet08 (2018) *Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated From Animals, 4th Edition*
4. Report dog/cat UTI isolates separately
5. Report dog/cat Staph. OX-S and OX-R isolates separately

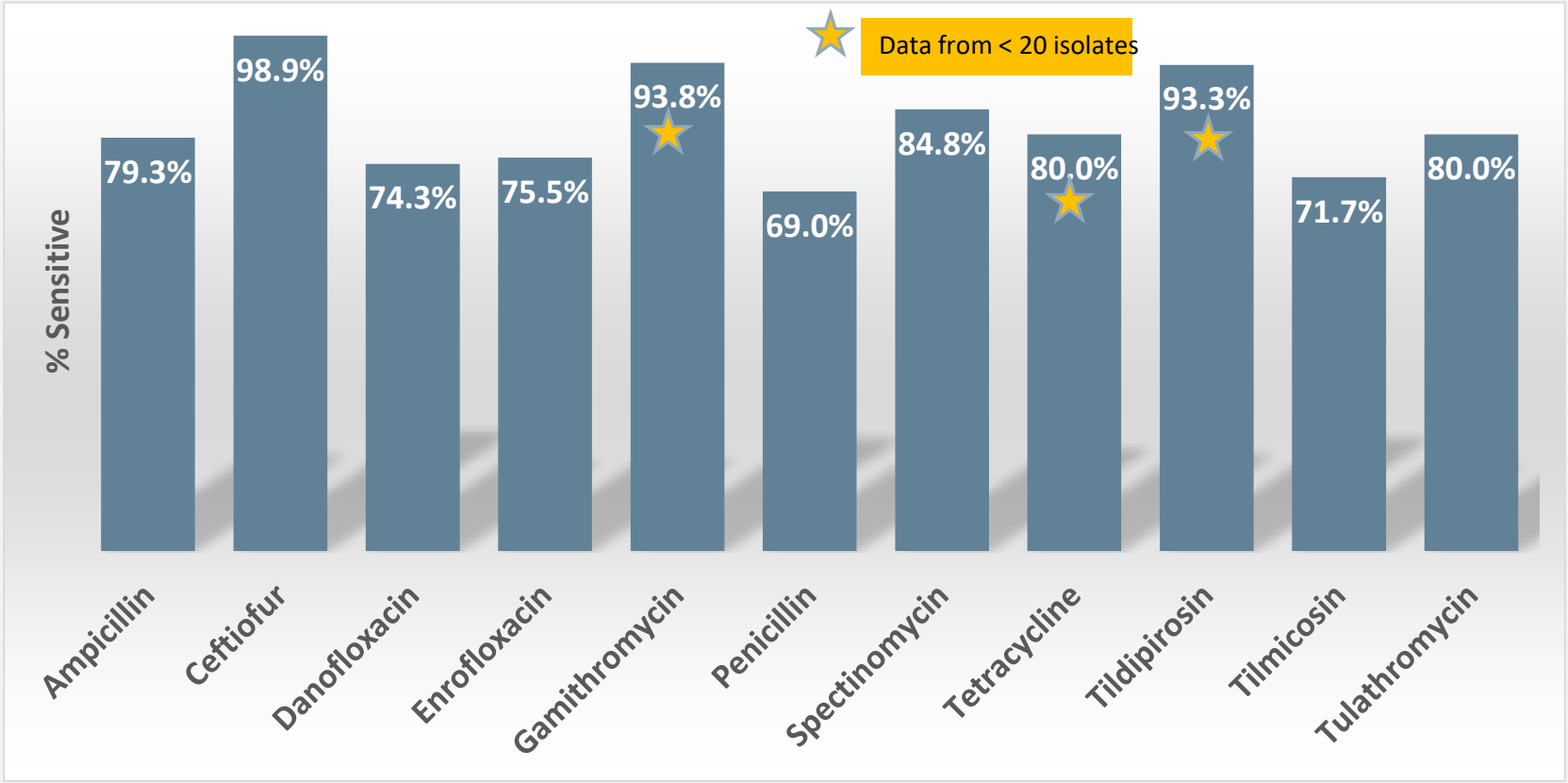


Example: Cattle – *Mannheimia haemolytica*

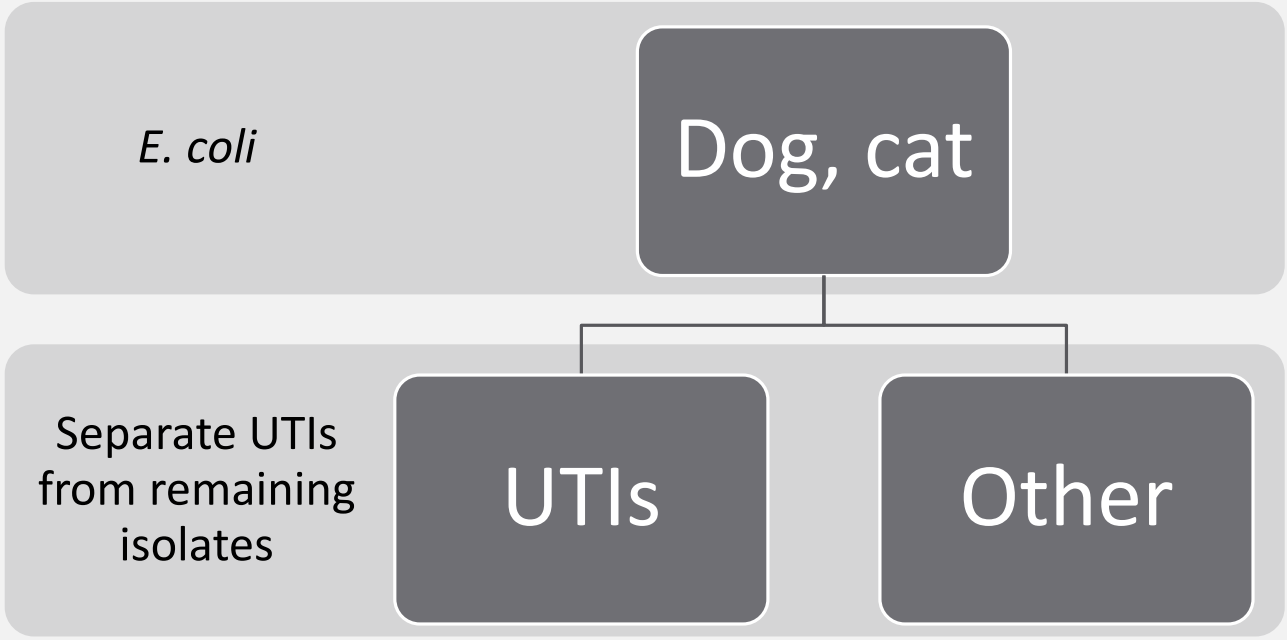
antibiotic class	MIC value (ug/ml) / Antibiotic	<=0.12	0.12	<=0.25	0.25	<=0.5	0.5	<=1	1	>1	<=2	2	>2	<=4	4	<=8	8	>8	16	>16	32	>32	64	>64	<=256	>256	Total Isolates
aminoglycoside	**Gentamicin**							23	0			126			15		2		1	15							182
aminoglycoside	**Neomycin**													99	0		29		2		2	48					180
aminoglycoside	**Sulphadimethoxine**																								119	65	184
fluoroquinolone	**Danofloxacin**	130	0		6		9		4	34																	183
fluoroquinolone	**Enrofloxacin**	133	0		6		9		2			2	32														184
folate pathdway antagonist	**Spectinomycin**															3	0		38		115		4	24			184
folate pathdway antagonist	**Trimethoprim/sulfa methoxazole**										179	0	5														184
lincosamide	**Clindamycin**			2	0		0		0			0			10		96		44	32							184
macrolides	**Ceftiofur**			177	0		3		2			0			1		1	0									184
macrolides	**Gamithromycin**							14	0			1			0		1	0									16
macrolides	**Tildipirosin**							9	0			5			0		0		1								15
macrolides	**Tilmicosin**													86	9		37		15		3		3	31			184
macrolides	**Tulathromycin**							3	0			18			81		29		5		7		3	24			170
macrolides	**Tylosin tartrate**					2	0		0			0			0		0		2		60	120					184
Penicillins	**Ampicillin**			146	0		9		3			1			1		2		7	15							184
Penicillins	**Penicillin**	77	0		50		17		12			0			3		4	21									184
phenicol	**Florfenicol**			3	0		92		57			7			2		1	22									184
pleuromutilin	**Tiamulin**					1			0			0			3		54		103		19	4					184
tetracycline	**Chlortetracycline**					57	0		53			12			15		15	17									169
tetracycline	**Oxytetracycline**					85	0		20			4			1		9	46									165
tetracycline	**Tetracycline**					10	0		2			0			2		1	0									15

Animal-specific interpretive criteria are indicated for selected antibiotics. Green shaded cells = sensitive, yellow shaded cells = intermediate and red shaded cells = resistant. Interpretive values based on CLSI Vet08, 4th ed. (2018)

Cattle – *Mannheimia haemolytica* - % sensitive



Companion animal AST reporting – *E. coli*



Dog *E. coli* – skin, soft tissue, wound

	MIC value / Antibiotic	<=0.12	0.12	<=0.25	0.25	<=0.5	0.5	<=1	1	<=2	2	>2	<=4	4	>4	<=8	8	>8	16	>16	32	>32	64	>64	Total Isolates
1st gen cephalosporin	Cefazolin*							27	0		50			8			4		0		0	25			114
1st gen cephalosporin	Cephalexin*					0	0		0		0			37			49		3	25					114
3rd gen cephalosporin	Cefovecin			9	0		45		32		3			1			0	24							114
3rd gen cephalosporin	Cefpodoxime							88	0		0			1			0	25							114
3rd gen cephalosporin	Ceftazidime												96	0			4		8	6					114
aminoglycoside	Amikacin												107	0			6		0		0	0			113
aminoglycoside	Gentamicin			3	0		65		29		4			1			1	11							114
B lactam combo	Amoxicillin/ Clavulanic acid*			0	0		0		2		10			64			15	23							114
B lactam combo	Piperacillin/ tazobactam															109	0		1		0		0	1	111
fluoroquinolone	Enrofloxacin	88	0		3		3		2		1			0	17										114
fluoroquinolone	Marbofloxacin	88	0		2		7		0		0			0	17										114
fluoroquinolone	Orbifloxacin							92	0		4			1			0	17							114
fluoroquinolone	Pradofloxacin			95	0		2		0		1	16													114
folate pathway inhibitors	Trimethoprim/ sulfamethoxazole					99	0		2		0			1	12										114
penems	Imipenem							114	0		0			0			0	0							114
penicillins	Ampicillin*			0	0		1		1		37			35			0	40							114
phenicol	Chloramphenicol									5	0			33			60		7		2	7			114
tetracyclines	Doxycycline			0	0		6		37		39			9			6	17							114
tetracyclines	Tetracycline												88	0			2		0	24					114

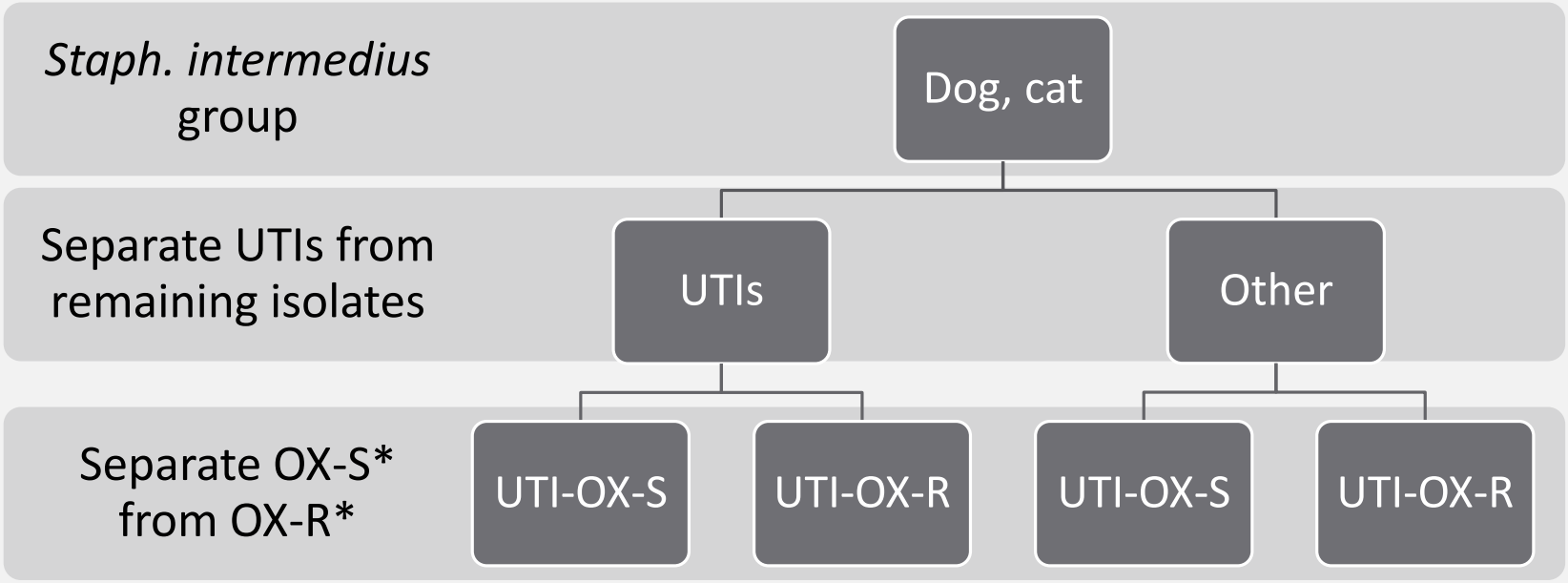
Antibiotics with separate breakpoints for dog *E. coli* UTIs.

ESBL testing is indicated for isolates with cefpodoxime MIC >= 8 ug/ml, or >2 ug/ml for ceftazidime

Dog *E. coli* – UTI

MIC value / Antibiotic	<=0.06	0.1	<=0.12	0.1	<=0.25	0.25	<=0.5	1	<=1	1	>1	<=2	2	>2	<=4	4	>4	<=8	8	>8	16	>16	>20	<=32	32	>32	64	>64	Total Isolates
Amikacin															157	0			6		0				0	0			163
Amoxicillin/ Clavulanic acid					0	0		0		1			16			85			34	**28**								164
Ampicillin					0	0		2		3			43			55			14	**47**								164
Cefazolin									38	0			79			11			5		3				1	27			164
Cefovecin					6	0		57		61			10			3			0	27								164
Cefpodoxime									131	0			2			2			1	28								164
Ceftazidime															143	0			6		7	8						164
Cephalexin							0	0		0			1			31			89		12	31						164
Chloramphenicol												1	0			32			103		20				2	6			164
Doxycycline					1	0		2		41			75			22			5	18								164
Enrofloxacin			137	0		4		4		2			0			0	17											164
Gentamicin					11	1		87		53			2			2			0	8								164
Imipenem									163	0			0			1			0	0								164
Marbofloxacin			139	0		2		5		1			0			1	16											164
Orbifloxacin									141	0			5			1			0	17								164
Piperacillin/ tazobactam																		158	0		1			4		0	1	164
Pradofloxacin					145	0		2		0			2	15														164
Tetracycline															141	0			1		1	21						164
Trimethoprim/ sulfamethoxazole							137	0		4			2			2	19											164

Companion animal AST reporting – *S. intermedius* group



* Oxacillin sensitivity/resistance based on human breakpoints

Proposed Changes-Y2

Isolates surveyed:

- Drop *Salmonella* except cattle
- Add *Strep. suis* for swine
- *Add Pasteurella multo*cida for poultry
- Add *Step. equi/zooepidemicus* for horses

Increase maximum number of isolates for some categories

Increase reimbursement pricing

Improve reporting process, move all labs to spreadsheet uploader

Whole genome sequencing of selected isolates

Bacterial pathogen + animal species	**Target no. of isolates/year per laboratory**
Mannheimia haemolytica - cattle	65*
Escherichia coli - cattle	65*
Escherichia coli – swine	40
Escherichia coli – poultry	65*
Escherichia coli – horses	65*
Escherichia coli – dogs	65*
Escherichia coli – cats	65*
Salmonella enterica - cattle	65*
Streptococcus suis – swine	40
Pasteurella multocida – poultry	40
Streptococcus equi or S. zooepidemicus – horses	40
*Staphylococcus intermedius group** - dogs*	65*
*Staphylococcus intermedius group** - cats*	40

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