

# SWVS 2018

*The FUTURE of CARE*

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# Food Animal Topics

## Case-based Review of Diagnostic Medicine

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September 23, 2018

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# Bovine Syndromic Testing

- Respiratory Disease Testing
- Abortion
- Calf Diarrhea

# TVMDL Bovine Syndromic Plans

- Tests clustered by syndrome
- Easier test selection
- Entire plan will increase result interpretation potential
- Can add serology panels to most diagnostic plans
- Can customize plans based on pre-test clinical suspicion

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Click below to view each plan:

[Bovine BRD Diagnostic Plan](#)

[Bovine Sudden Death Diagnostic Plan](#)

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[Bovine Neurological \(CNS\) Disease Diagnostic Plan](#)

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[Bovine Biosecurity Diagnostic Plan](#)

### **Bovine BRD Diagnostic Plan**

This plan was created to assist with the investigation of the pathophysiology and etiologic agents involved the death of cattle with clinical signs or post mortem findings consistent with respiratory disease. Follow the links attached to each test name to see more detailed information from the TVMDL test catalog.

Recommended initial testing:

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Test	Samples	Turnaround Time	Section	Lab	Schedule
Histopathology (up to 8 tissues)	tissues fixed in NBF	2-5 days	Histopathology	AM	MTWRF
				CS	MTWRF
Aerobic & Anaerobic Culture – Livestock	tissues or swabs in Amies media	2-7 days	Bacteriology	AM	MTWRFSa
				CS	MTWRFSa
Susceptibility Test-Food Animal(please indicate MIC or KB preference)	pure isolate	1 day	Bacteriology	AM	MTWRF
				CS	MTWRF
Bovine Basic BRD Bacterial PCR Panel	lung, TTW, BAL, nasal/pharyngeal swab	1-3 days	Molecular	AM	TWRF
			Diagnostics	CS	TWRF
Bovine Basic BRD Viral PCR Panel	lung, trachea, TTW, BAL, nasal/pharyngeal swab	1-4 days	Molecular	AM	MTWRF
			Diagnostics	CS	TWRF

Schedule: M=Monday, T=Tuesday, W=Wednesday, R=Thursday, F=Friday, Sa=Saturday

^ View secondary or additional tests



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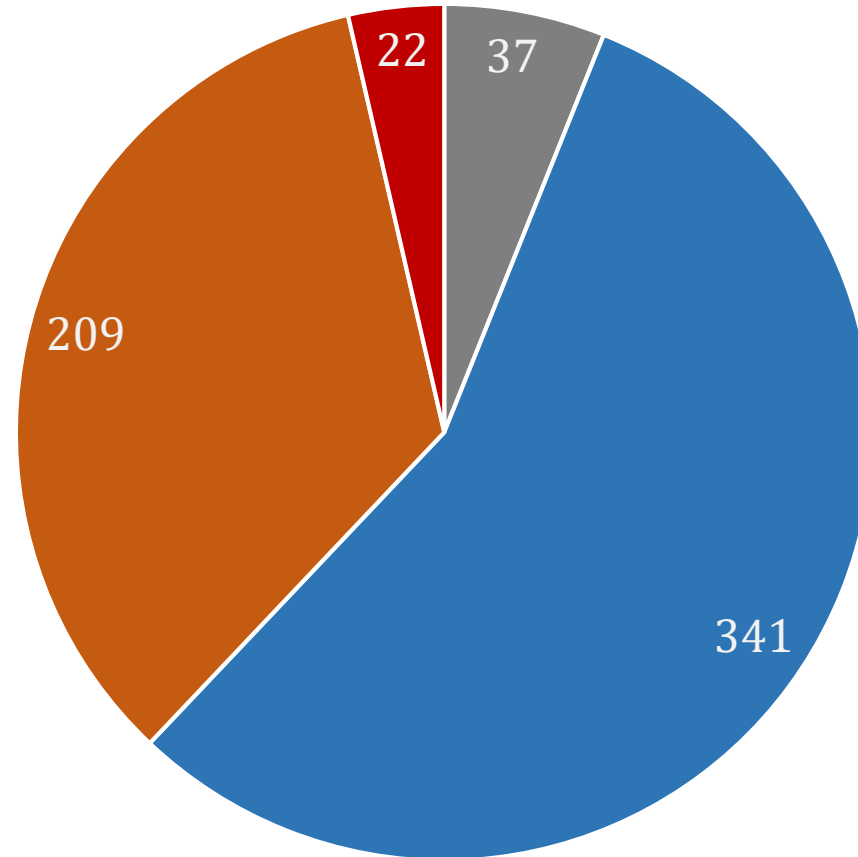
Test	Samples	Turnaround Time	Section	Lab	Schedule
Histopathology (> 8 tissues)	tissues fixed in NBF	2-5 days	Histopathology	AMA	MTWRF
				CS	MTWRF
Mycoplasma culture – Livestock	tissues or charcoal swabs in Amies media	14 days	Bacteriology	AMA	MTWRFSa
				CS	MTWRFSa
Bovine Basic BRD Serology Panel	serum	3-5 days	Serology &	AMA	TF
			Virology	CS	TF
Bovine Comprehensive BRD Serology Panel	serum	3-5 days	Serology &	AMA	TF
			Virology	CS	TF
Bovine Coronavirus IHC	TVMDL tissue blocks	-	Referral	Michigan	-
Bovine Coronavirus qPCR	lung, TTW, BAL, nasal/pharyngeal swab	-	Referral	KSVDL	-
Bovine Influenza Virus qPCR	lung, TTW, BAL, nasal/pharyngeal swab	-	Referral	KSVDL	-

# BRD Case Submission Pointers

- Do not submit swabs for PCR in gel
- PCR has enhanced sensitivity for viruses and *M. bovis*
- Send second swab if you need culture for AST (susceptibility)
  - 3 swabs if you want Mycoplasma culture
- PCR and VI can detect MLV for up to 4 weeks after vaccination (IBR, BVD)
- BRSV detection LRT samples > URT samples (BAL, TTW)
- Coronavirus detection URT samples > LRT samples (NS, NPS)
  - Be familiar with population benchmarks for shedding vs. clinical syndrome
- Send at least 5 mL serum if asking for numerous BRD antibody tests
  - Comprehensive BRD Serology Panel

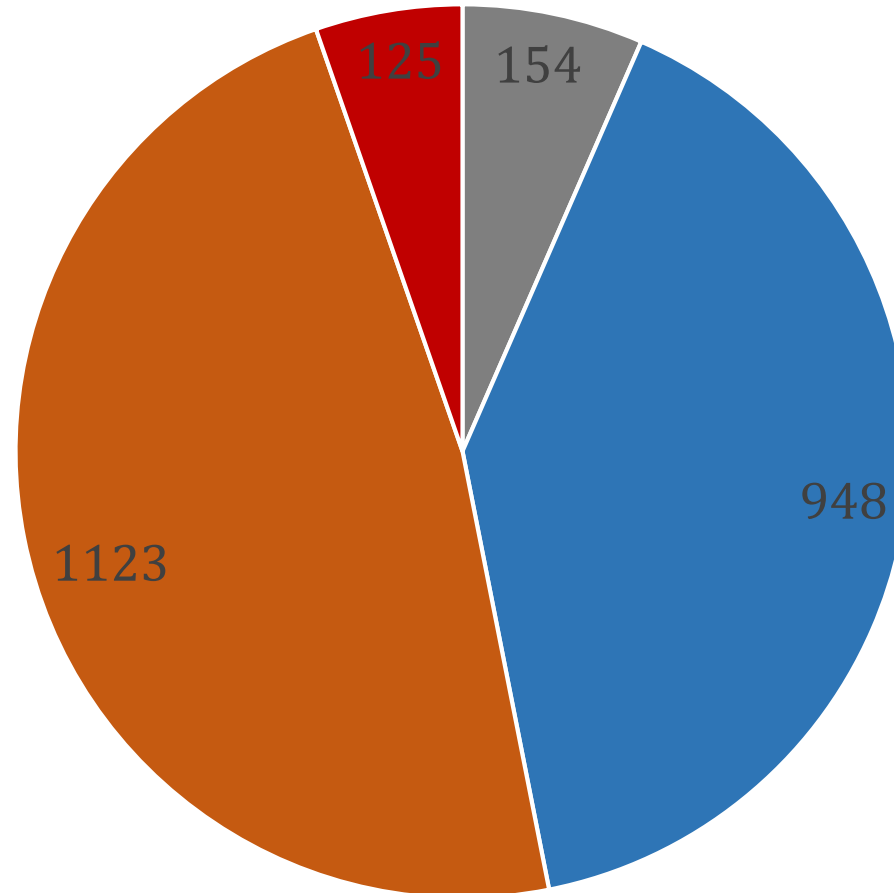
## URT Routine Culture Results (n=609)

- No growth
- No BRD pathogens
- Single Pathogen
- Multiple Pathogens



## LRT Routine Culture Results (n=2350)

- No growth
- No BRD pathogens
- Single Pathogen
- Multiple Pathogens

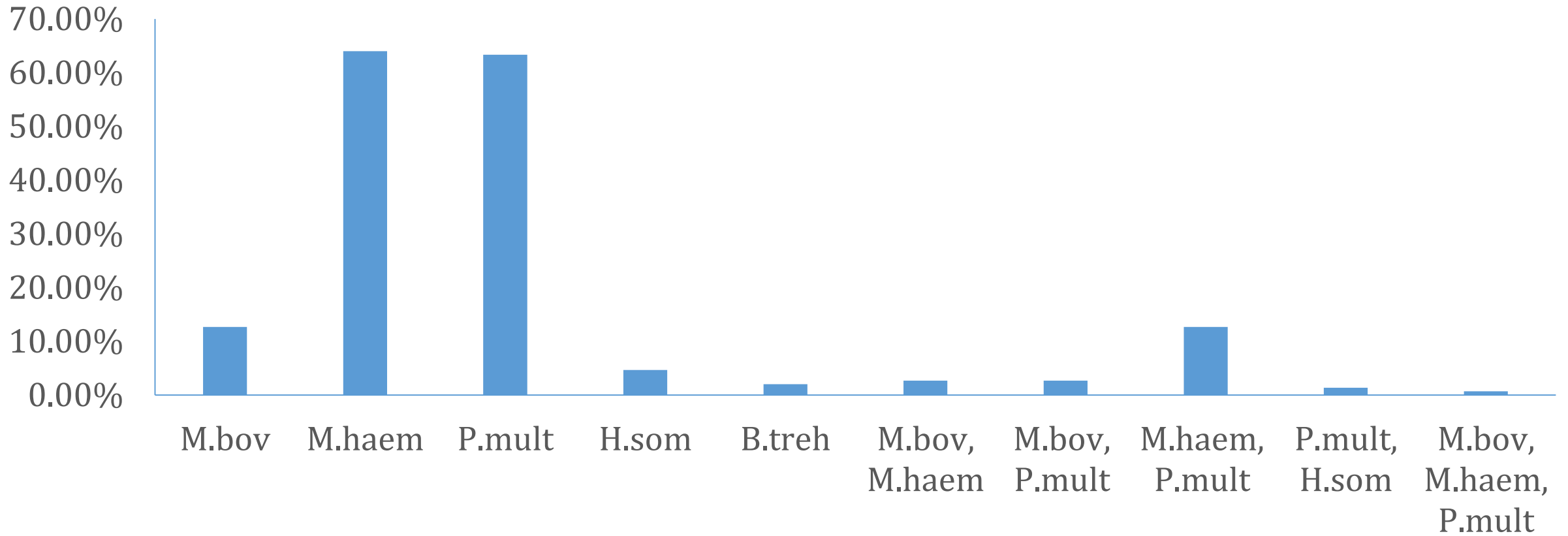


# TVMDL BRD Culture 2017 URT vs. LRT

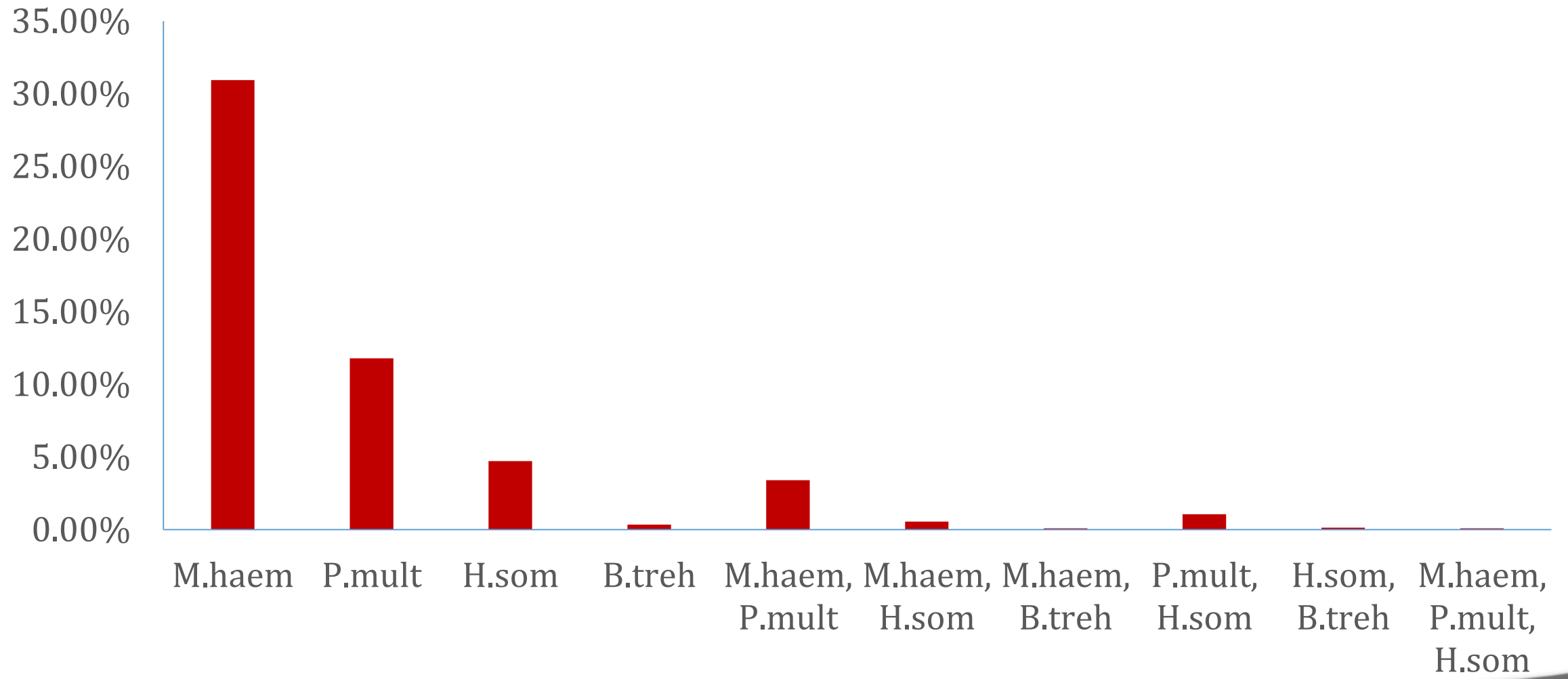
	URT			LRT		
Pathogen	Total #	# POS	Raw Prev	Total #	# POS	Raw Prev
Mycoplasma	201	28	13.93%	2150	761	35.40%
Mannheimia haemolytica	609	120	19.70%	2350	824	35.06%
Pasteurella multocida	609	121	19.87%	2350	384	16.34%
Histophilus somni	609	9	1.48%	2350	154	6.55%

Total raw prevalence – does not account for pathogens isolated in combination

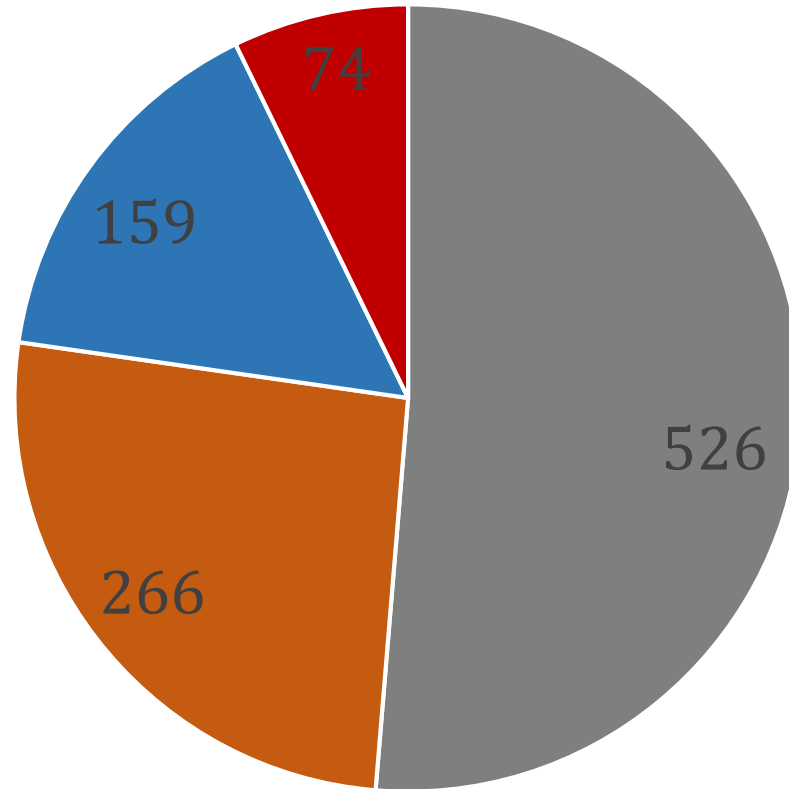
## URT Pathogen Recovery Mycoplasma + Routine Culture



## LRT Pathogen Recovery Routine Culture



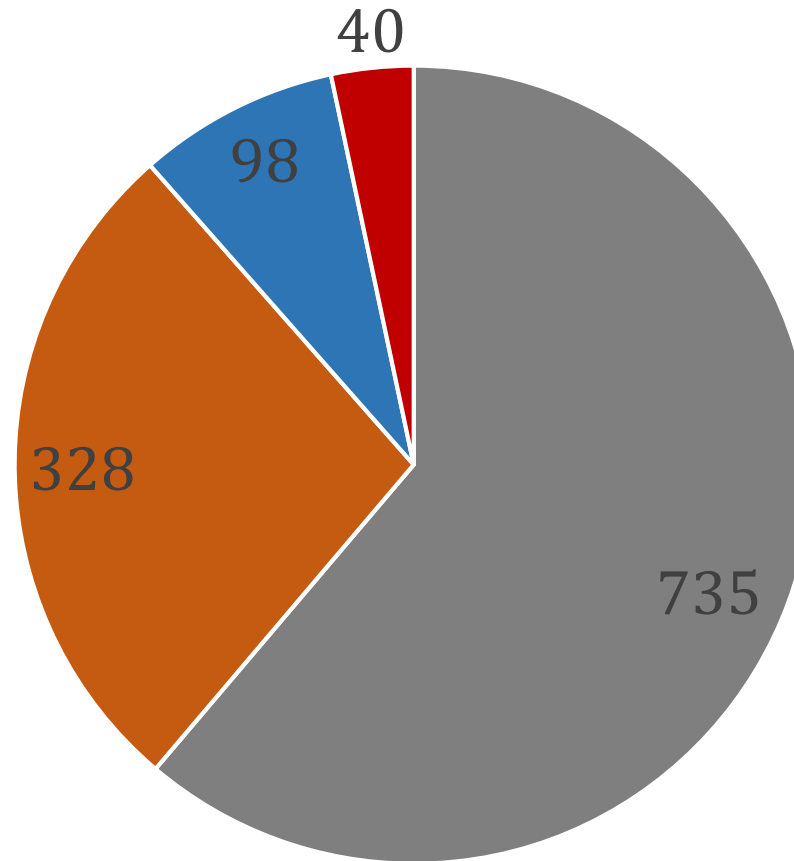
## URT Viral PCR Panel Results (n=1025)



■ No Virus Detected ■ Single Pathogen ■ Two Pathogens ■ 3 or 4 Pathogens



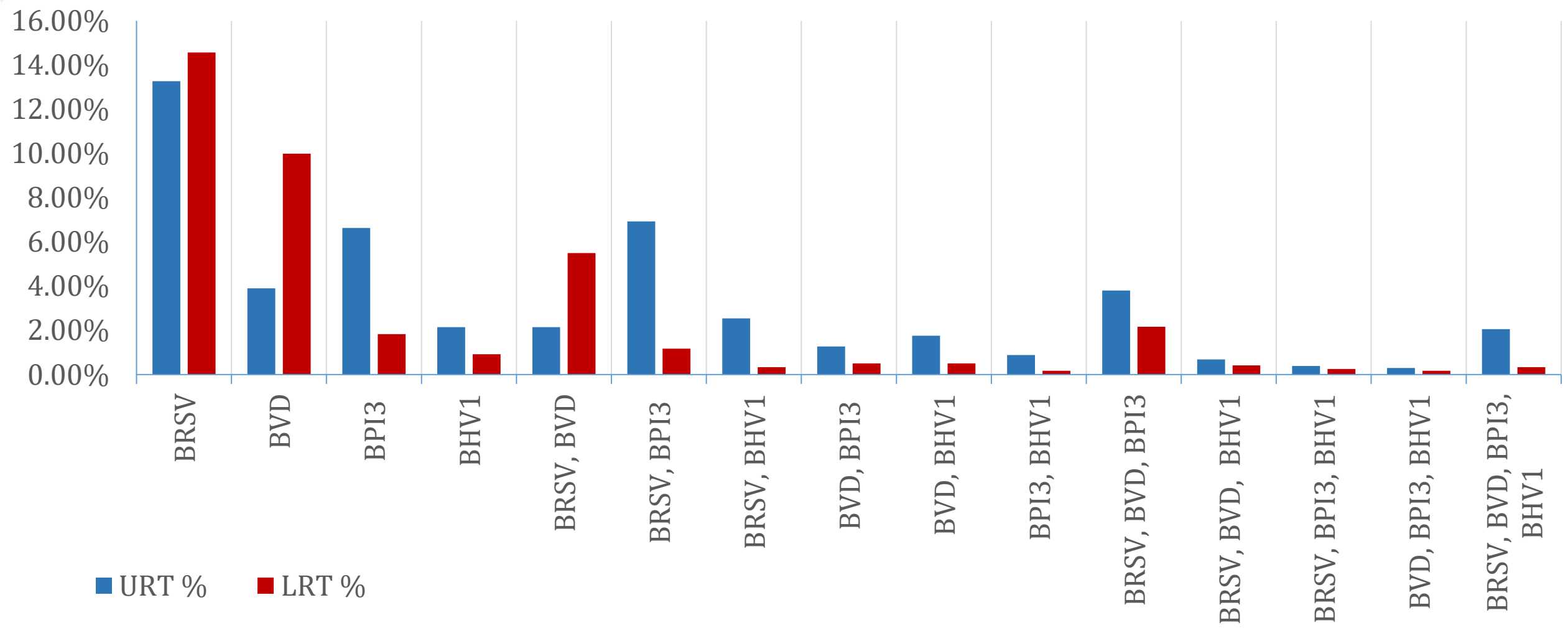
## LRT Viral PCR Panel Results (n=1201)



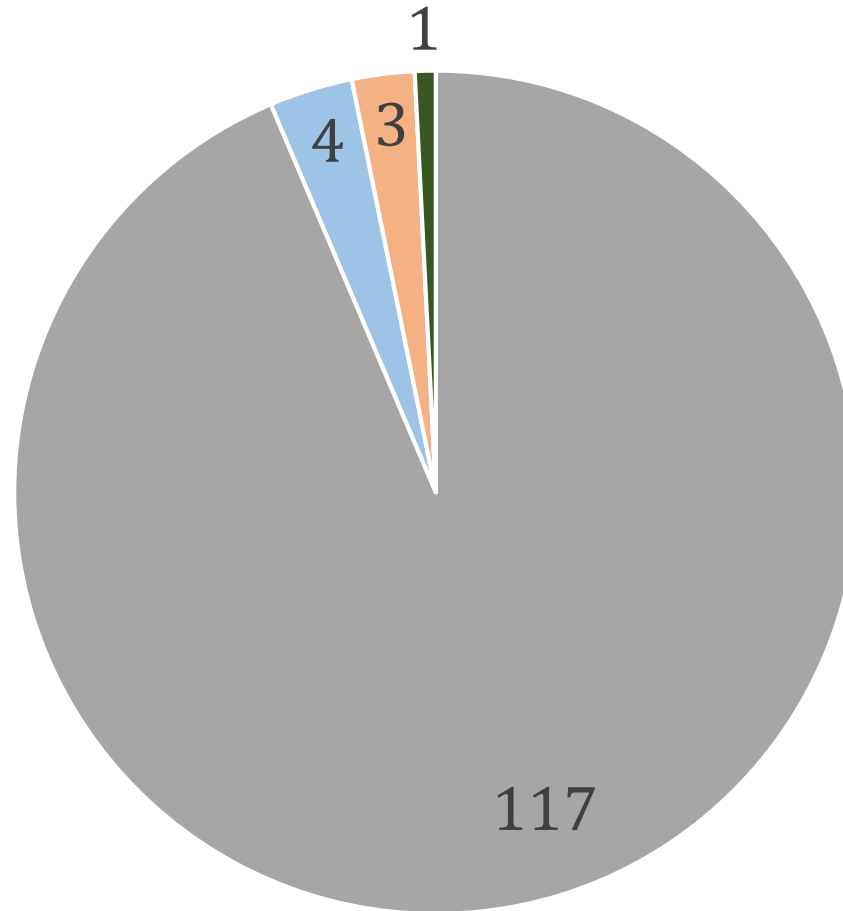
■ No Virus Detected ■ Single Pathogen ■ Two Pathogens ■ 3 or 4 Pathogens

	URT			LRT		
<u>Pathogen PCR</u>	Total #	# POS	Raw Prev	Total #	# POS	Raw Prev
Mycoplasma bovis	52	26	50.00%	118	77	65.25%
Mycoplasma spp.	18	13	72.22%	21	14	66.67%
BRSV	1027	327	31.84%	1221	300	24.57%
BVD	1037	163	15.72%	1259	240	19.06%
PI3	1025	228	22.24%	1202	79	6.57%
BHV1	1044	112	10.73%	1247	45	3.61%

## BRD Viral PCR Pathogen Recovery

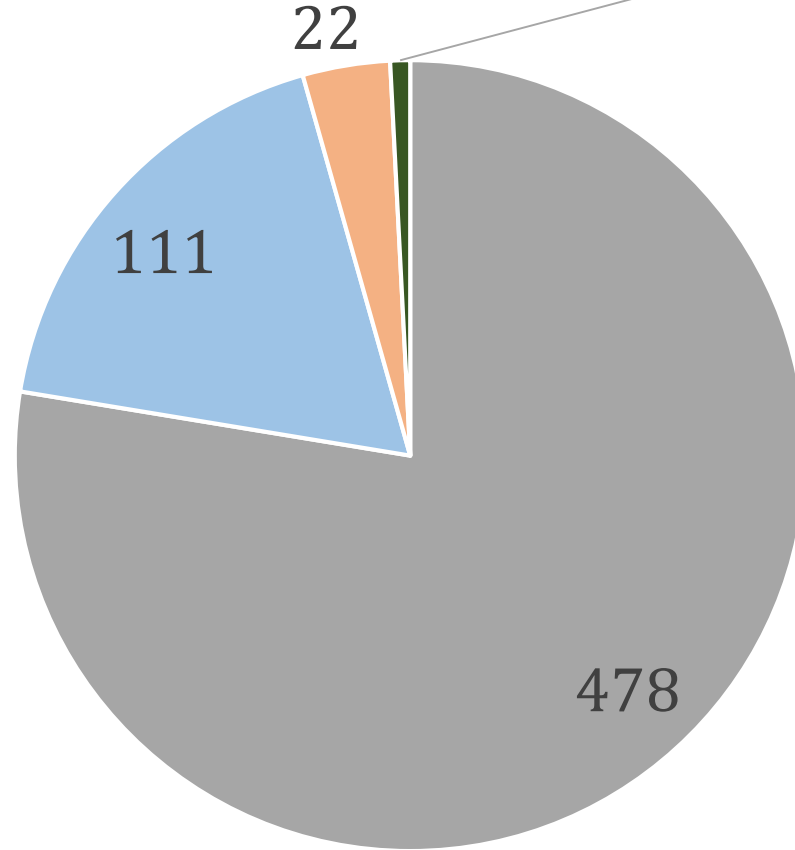


## URT Virus Isolation (n=125)



■ Not Isolated ■ BVD ■ IBR ■ BVD + IBR

# LRT Virus Isolation (n=616) 5



■ Not Isolated   ■ BVD   ■ IBR   ■ BVD + IBR

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Histopathology (up to 8 tissues)	tissues fixed in NBF	2-5 days	Histopathology	AM CS	MTWRF MTWRF
Abortion Culture - Livestock	fetal tissues, fetal stomach contents, placenta	10 days	Bacteriology	AM CS	MTWRF Sa MTWRF Sa
IBR (BHV-1) qPCR	lung, trachea, nasopharyngeal swab	1-4 days	Molecular Diagnostics	AM CS	MTWRF TWRF
BVD qPCR	lung, trachea, nasopharyngeal swab, ear notch	1-4 days	Molecular Diagnostics	AM CS	MTWRF TWRF
Leptospira spp. qPCR	kidney, liver, placenta	1-4 days	Molecular Diagnostics	CS	TWRF
Neospora caninum qPCR	brain, placenta, liver, lung, heart	2-3 days	Molecular Diagnostics	CS	TWRF
Liver Vitamin A quantification	10 g liver	1-7 days	Toxicology	CS	R
Liver Tissue Mineral Panel	10 g liver	1-4 days	Toxicology	CS	TR

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Test	Samples	Turnaround Time	Section	Lab	Schedule
Histopathology (up to 8 tissues)	tissues fixed in NBF	2-5 days	Histopathology	AM	MTWRF
				CS	MTWRF
B4 qPCR Panel (IBR, BVD, BLV, BTV)	spleen, liver, lung, lymph node	1-4 days	Molecular Diagnostics	CS	TWRF
Bovine Basic BRD Viral Panel (IBR, BVD, BRSV, PI3)	lung, respiratory swabs	1-4 days	Molecular Diagnostics	AM	MTWRF
				CS	TWRF
Anaplasma marginale PCR	spleen, lung, liver, kidney	1-4 days	Molecular Diagnostics	AM	MTWRF
				CS	TWRF
Liver Vitamin Panel (Vitamin A & E)	10 g liver	1-7 days	Toxicology	CS	R
Liver Single Mineral quantification	10 g liver	1-4 days	Toxicology	CS	TR
Nitrates Qualitative	fetal ocular fluid or eyeball	1-2 days	Toxicology	AM	MTWRF
				CS	MTWRF
Fungal Culture/Identification	tissues, placenta, swabs in transport media	21 days	Bacteriology	AM	MTWRFSa
				CS	MTWRFSa



Bovine Basic Abortion Serology	2 mL serum or fetal effusions	2-3 days	Serology	AM	MTWRF
		2-4 days		CS	MR
Bovine Comprehensive Abortion Serology	2 mL serum or fetal effusions	3-5 days	Serology & Virology	AM	MTWRF
Tritrichomonas foetus qPCR	1-2 mL fetal abomasal contents or cow cervical wash in trich pouch	2-4 days	Molecular	AM	MTWRF
			Diagnostics	CS	MTWRF
Campylobacter spp. qPCR	placenta, lung, 1-2 mL abomasal contents or cervical/uterine wash	1-3 days	Molecular	AM	TWRF
			Diagnostics	CS	TWRF
Campylobacter fetus differentiation qPCR	placenta, lung, 1-2 mL abomasal contents or cervical/uterine wash	1-3 days	Molecular	AM	TWRF
			Diagnostics	CS	TWRF
Listeria monocytogenes PCR	brain, liver, spleen	-	Referral	KSVDL	-

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# Abortion cases

- Basic Abortion Serology Panel is for herd screening
- Comprehensive Abortion Serology Panel is for investigations
  - Need at least 3 mls of serum
- History helps the case coordinators
- Brain is preferred sample type for *Neospora* testing
- Vitamin and mineral abnormalities have been very common this year – might consider testing if infectious disease testing was unrewarding
- Make sure the organs are in the fetus before submitting to necropsy
- If you submit an entire fetus, there will be a necropsy fee
- Send ear notches for BVD Ag ELISA

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Basic Calf Diarrhea Panel (Bovine Coronavirus, rotavirus, cryptosporidium)	feces, GI contents, intestines	1-4 days	Molecular Diagnostics	CS	TWRF
Aerobic & Anaerobic Culture – Livestock	feces, fresh tissue	2-7 days	Bacteriology	AMA CS	MTWRFSa MTWRFSa
Salmonella genus qPCR	1 g feces, intestine, fecal swabs	1-4 days	Molecular Diagnostics	CS	TWRF
Salmonella serotyping	salmonella isolate	-	Referral	NVSL	-
E. coli PCR	E. coli isolate	4-6 days	Molecular Diagnostics	AMA	R

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Histopathology (> 8 tissues)	tissues fixed in NBF	2-5 days	Histopathology	AMA	MTWRF
				CS	MTWRF
Susceptibility Test-Food Animal (please indicate MIC or KB preference)	pure isolate	1 day	Bacteriology	AMA	MTWRF
				CS	MTWRF
Clostridium perfringens typing PCR	pure isolate	1-4 days	Molecular Diagnostics	AMA	R
Ruminant Chemistry Profile	0.5 mL serum	1 day	Clinical Pathology	AMA	MTWRF
				CS	MTWRF
CBC – Livestock	1 mL EDTA blood + blood film	1 day	Clinical Pathology	AMA	MTWRF
				CS	MTWRF
Fecal Flotation Qualitative	3-5 g fresh feces	1-2 days	Parasitology	AMA	MTWRF
				CS	MTWRF
Fecal McMaster EPG (Quantitative)	3-5 g feces	1-2 days	Parasitology	AMA	MTWRF
				CS	MTWRF
Electron Microscopy	feces, GI contents, intestines	5-7 days	Virology	CS	Varies
BVD Antigen Capture ELISA	ear notch, 1 mL serum	1-2 days	Virology	AMA	MTWRF
				CS	TF

# Calf Diarrhea Cases

- PCR (Basic Calf Diarrhea PCR Panel) is preferred test for rotavirus, coronavirus, and cryptosporidium
- VI will not isolate (find) coronavirus
- EM will detect rotavirus but it is not as sensitive (or quick) as PCR
- E. coli PCR will type isolates by presence or absence of virulence and toxin genes
  - Will help correlate clinical findings with ETEC, invasive, or other E. coli
- Salmonella PCR + culture with enrichment will increase sensitivity of Salmonella detection in high suspicion cases
- Older calves may need McMaster's EPG and/or additional Clostridium perfringens testing

# Questions?

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