

The Role of Diagnostics in Herds: Availability, Challenges, and How They're Used

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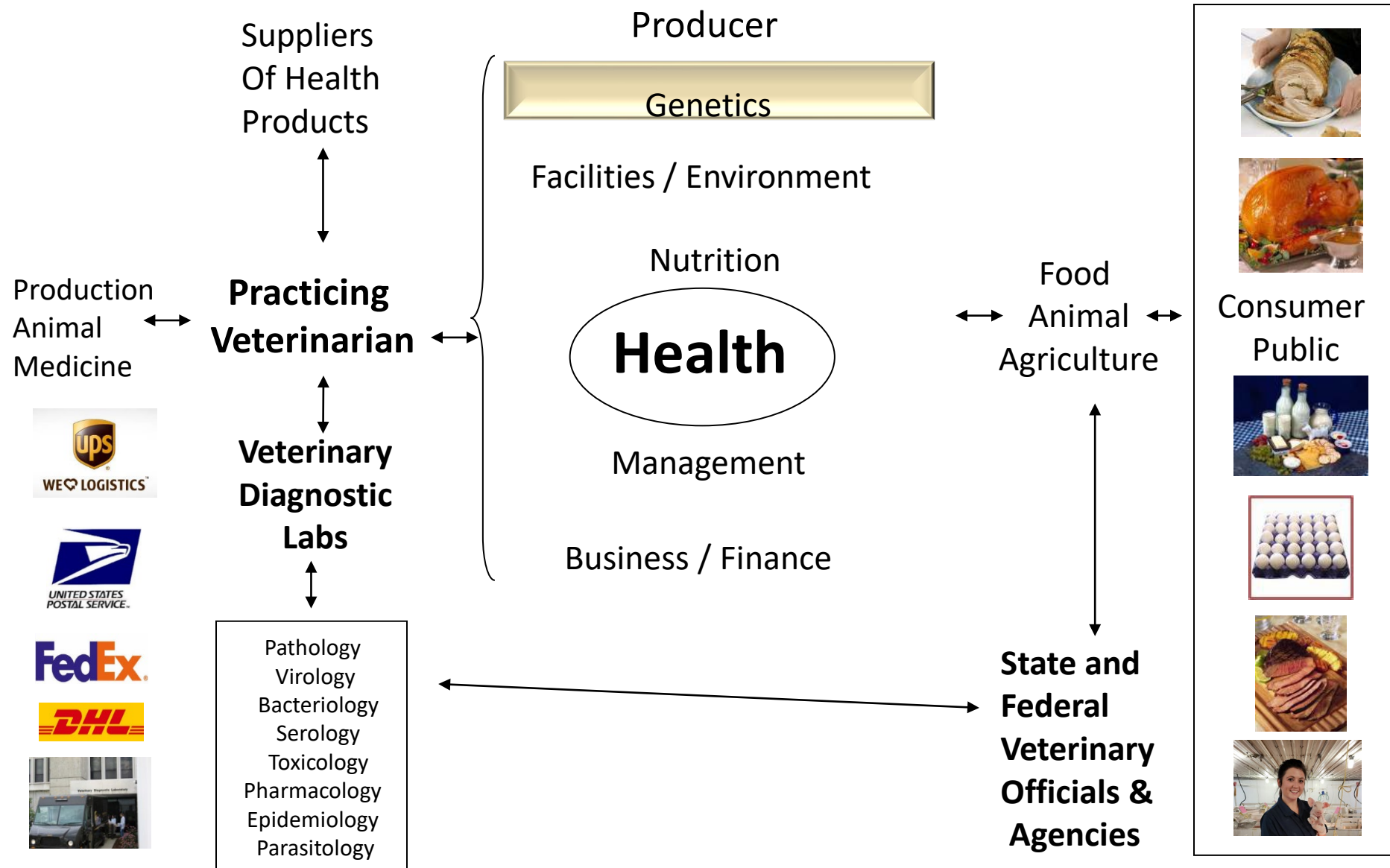
Veterinary Diagnostic Laboratories

Comprehensive Diagnostic Service, Teaching, and Discovery

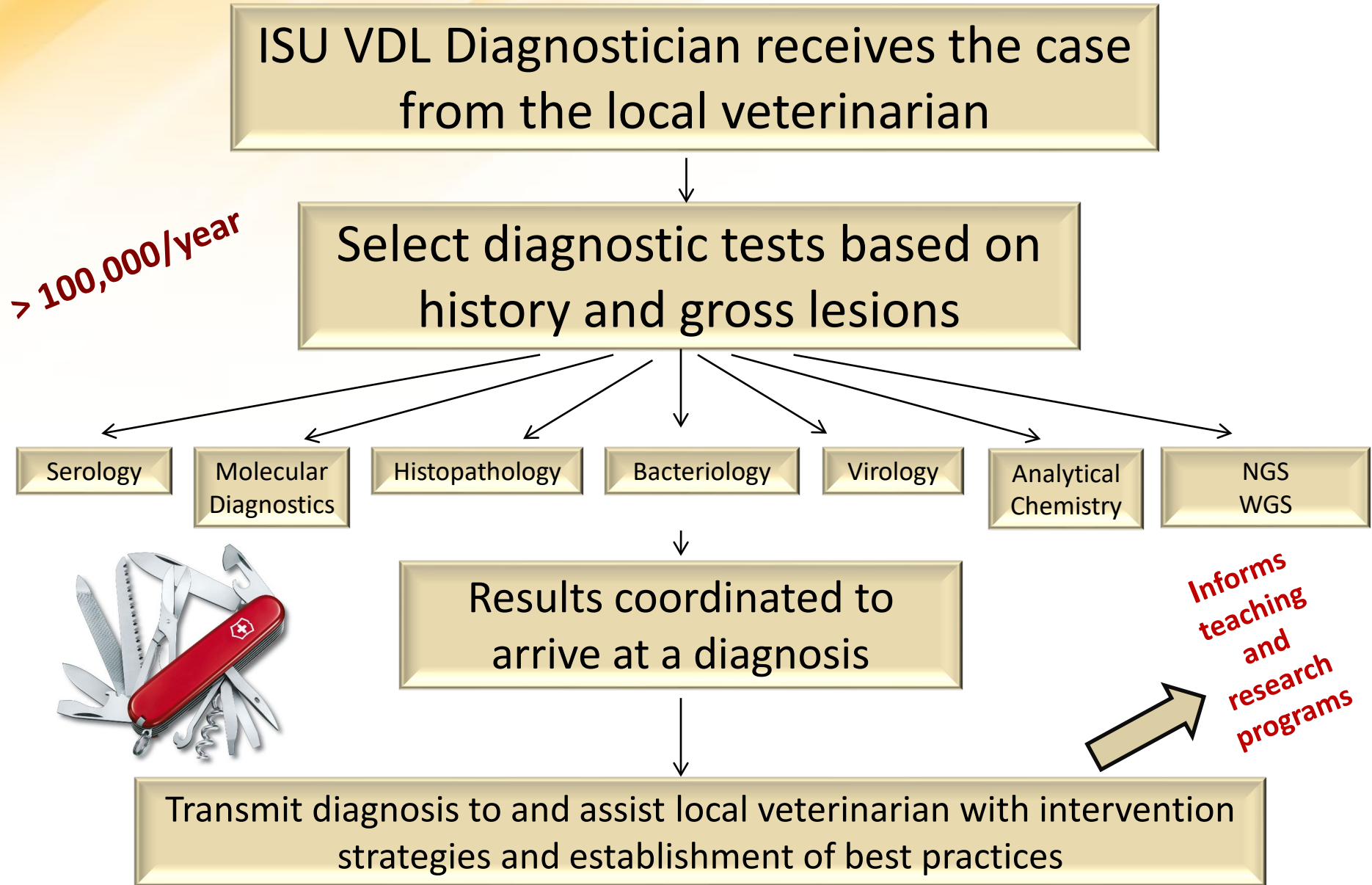
(Full-Service, Fully Accredited, Tier 1 Lab in USDA NAHLN)



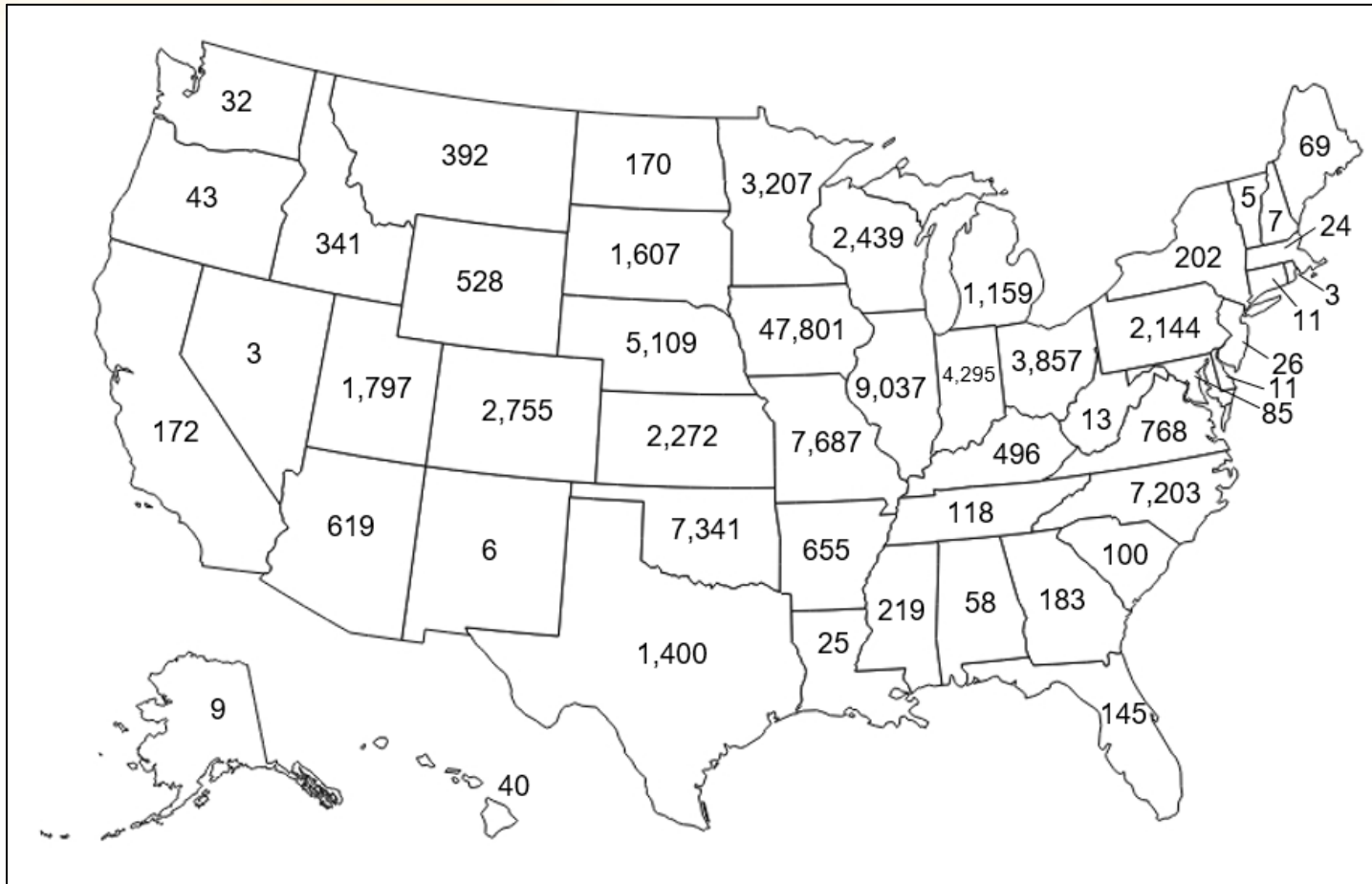
Network of Interdependent Relationships to Improve & Protect Animal Health, Public Health, and Food Supply



Strategic Alliances → Service, Innovation, & Teaching



Distribution of ISU VDL's \approx 120,000 Cases Accessions Last Year



95% of Diagnostic Services → Food Animal Agriculture

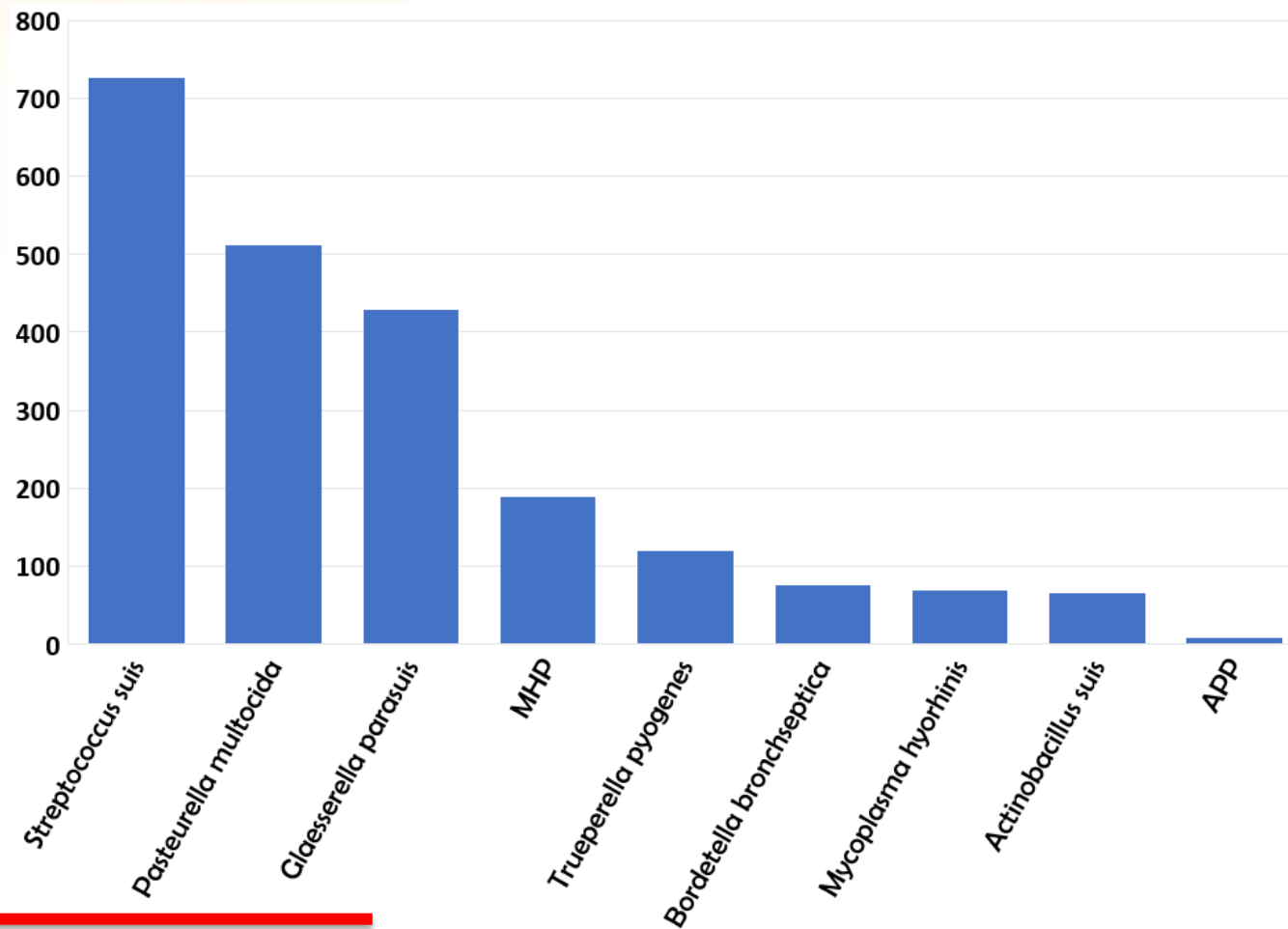
Molecular Diagnostics

- ***Influenza A***
 - Screen
 - Subtype
 - Sequence
- Bacteria / AMR
 - NGS

- Gel-based PCR
- Real-time PCR *
- Sanger (target genes)
- NGS (whole genome)



Bacterial Dx in Cases of Type A Influenza in Swine (ISU VDL 2019 – 2022)



Bacterial Diagnosis & Susceptibility (Testing Process)



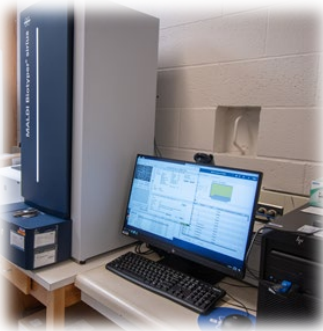
1. Samples to Plates



2 Culture & Isolate



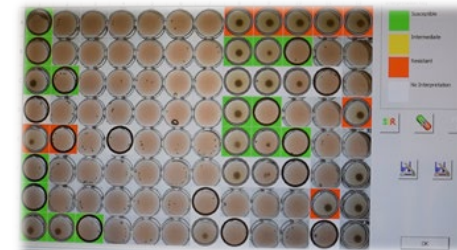
3. Maldi Prep



4. Identification



5. Sensititre™



6. Interpretation of Susceptibility

Bacterial Diagnosis & Susceptibility (Case Report)

Bacterial ID: *Streptococcus suis*.

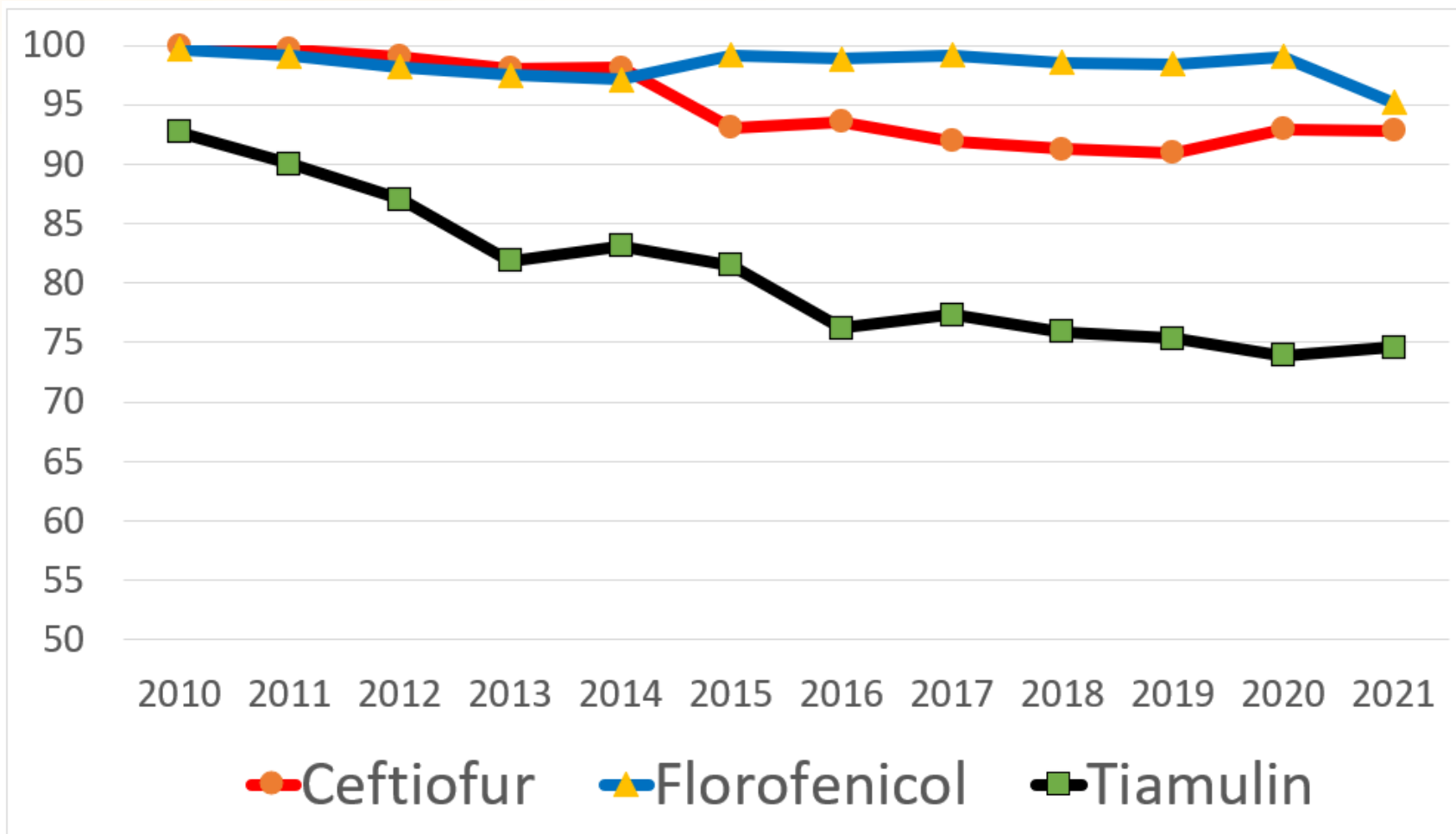
<u>Antimicrobial susceptibility Results</u>	<u>*Interpretation / MIC</u>
Ampicillin	S / <=0.2500
Ceftiofur	S / <=0.2500
Clindamycin	NI / <=0.2500
Enrofloxacin	S / 0.2500
Florfenicol	S / 2.0000
Penicillin	S / <=0.1200
Sulfadimethoxine	R / >256.0000
Tetracycline	R / >8.0000
Tiamulin	S / 2.0000
Tildipirosin	R / 8.0000
Tilmicosin	S / 8.0000
Trimethoprim/Sulphamethoxazole	S / <=2.0000
Tulathromycin	S / <=8.0000
Tylosin (Tartrate/Base)	NI / 1.0000

Sample of 2021 Susceptibility Results

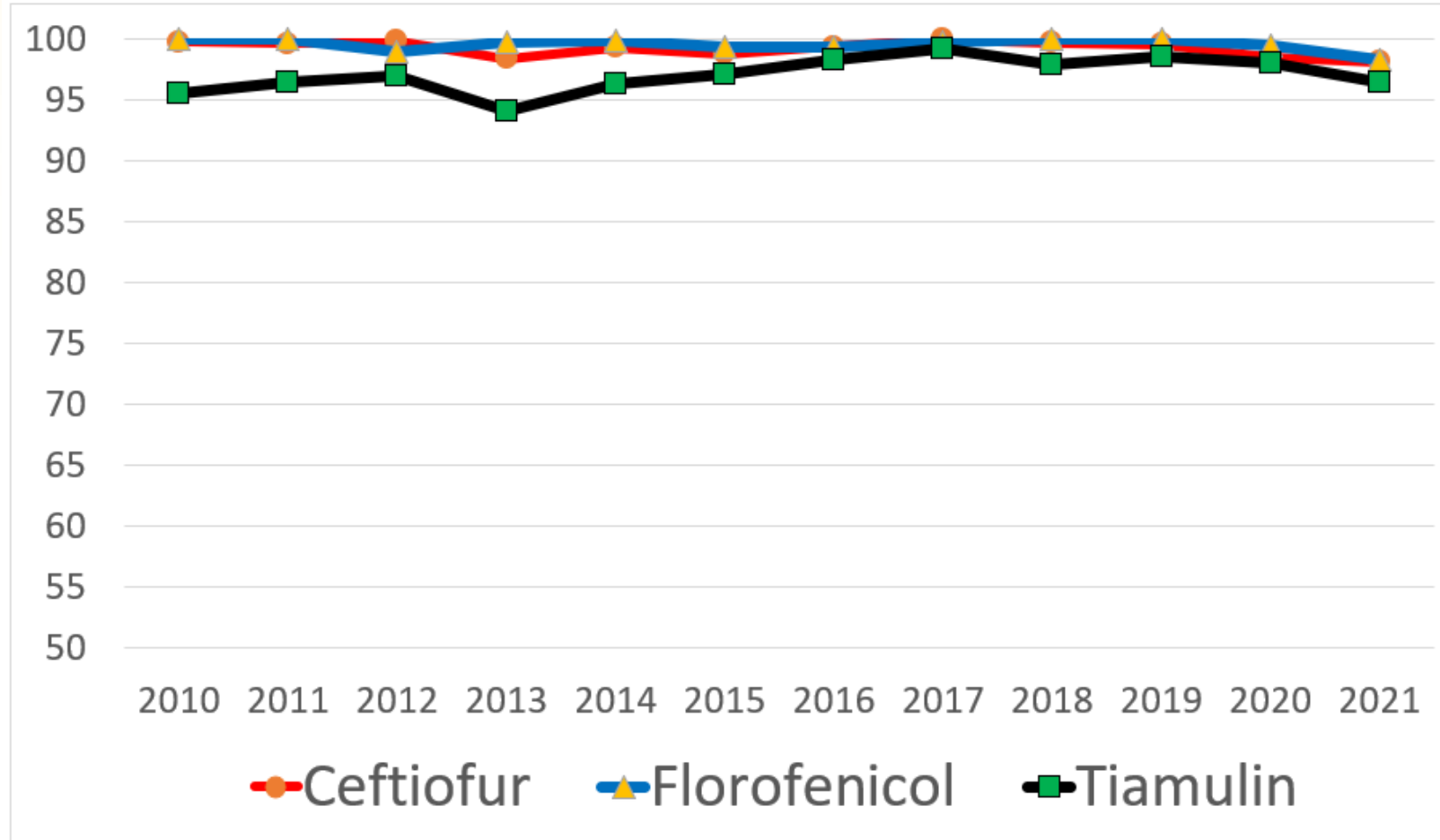
(of the 3 most commonly isolated bacteria in cases of Type A influenza in swine)

Antibiotic	Streptococcus suis	Glasserella parasuis	Pasteurella multocida (Type A)
Ampicillin	95% (1397)	94% (908)	96% (196)
Ceftiofur	93% (1396)	98% (908)	95% (196)
Clindamycin	10% (1397)	4% (908)	0% (196)
Enrofloxacin	93% (1397)	96% (908)	99% (196)
Florfenicol	95% (1396)	98% (908)	95% (196)
Gentamicin	NI	NI	NI
Neomycin	28% (1396)	39% (908)	90% (196)
Penicillin	81% (1397)	57% (908)	96% (196)
Spectinomycin	NI	NI	NI
Sulfadimethoxine	42% (1396)	71% (908)	42% (196)
Tetracycline	4% (1397)	NI	36% (196)
Tiamulin	75% (1396)	96% (908)	66% (196)
Tildipirosin	NI	NI	99% (196)
Tilmicosin	19% (1396)	88% (908)	92% (196)
Trimethoprim/Sulphamethoxazole	NI	NI	NI
Tulathromycin	NI	NI	98% (196)
Tylosin (Tartrate/Base)	NI	NI	0% (196)

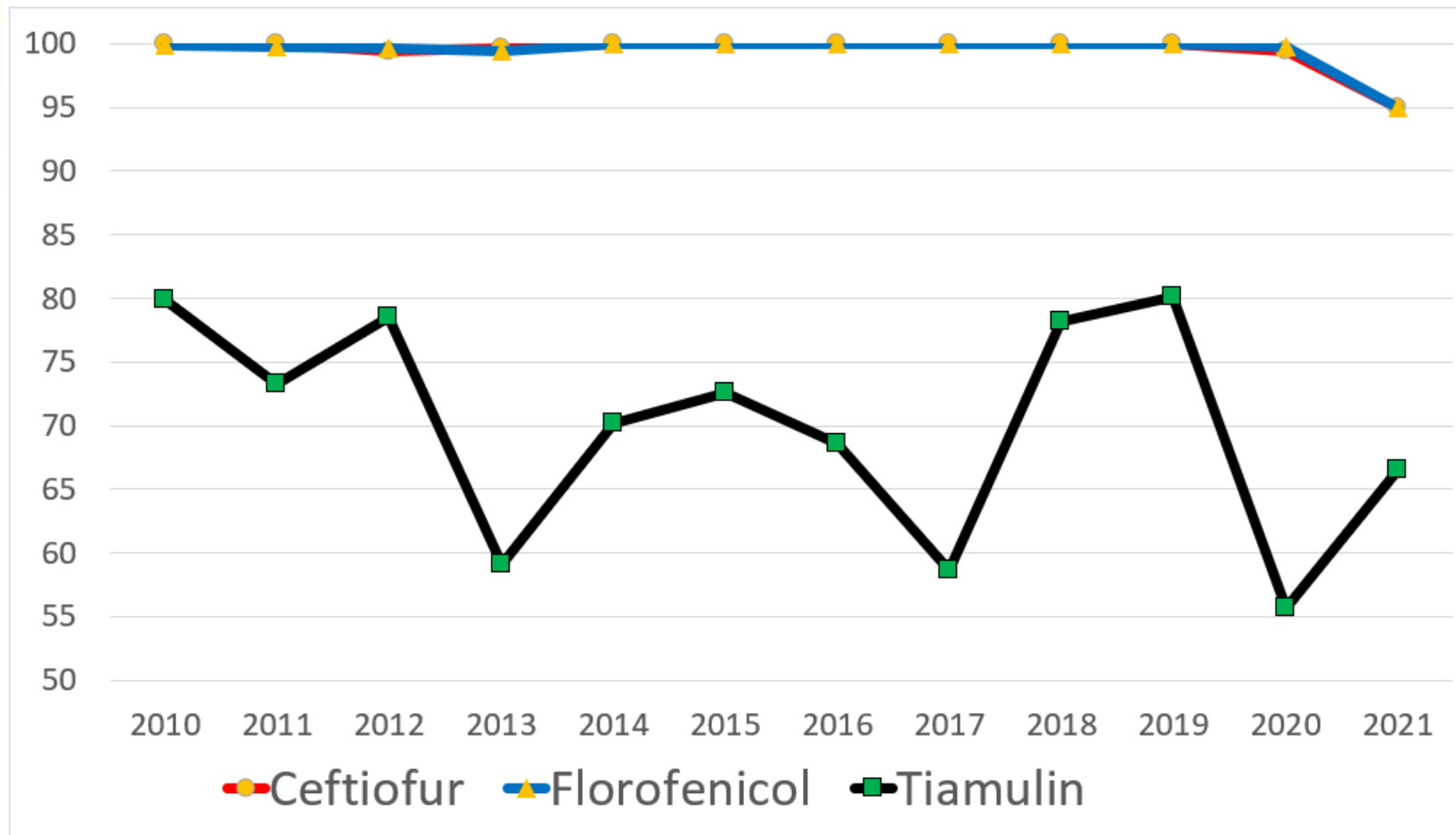
Streptococcus suis (% Susceptible)



Glasserella parasuis (% Susceptible)



Pasteurella multocida type A (% Susceptible)



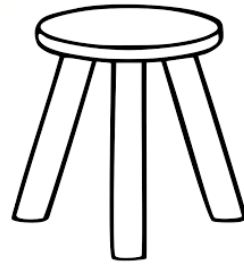
Use of Diagnostics in Swine Medicine

(Herd Health Management)

- Extensive
- Proactive
 - > 85% of dx for preventative medicine
- Drive Population Level Decision Making
 - Managing health of herds, flows, & regions
 - Inform individual treatments
- Epidemiology & Population Medicine
 - Pathogen level status & immunity
 - Sequencing & bioinformatics

Challenges & Needs in Pandemic Scenario (National in Scale)

- Industry, State, & Federal Partnerships



- Funding (Surveillance, Response, Recovery)
- Lab Infrastructure & Capacity
- National Animal Health Lab Network

Novelties: Bi-directional movement of Influenza, Susceptibility testing, Veterinary Break-Points

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Thank You!

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