PRRS Herd Specific Decisions

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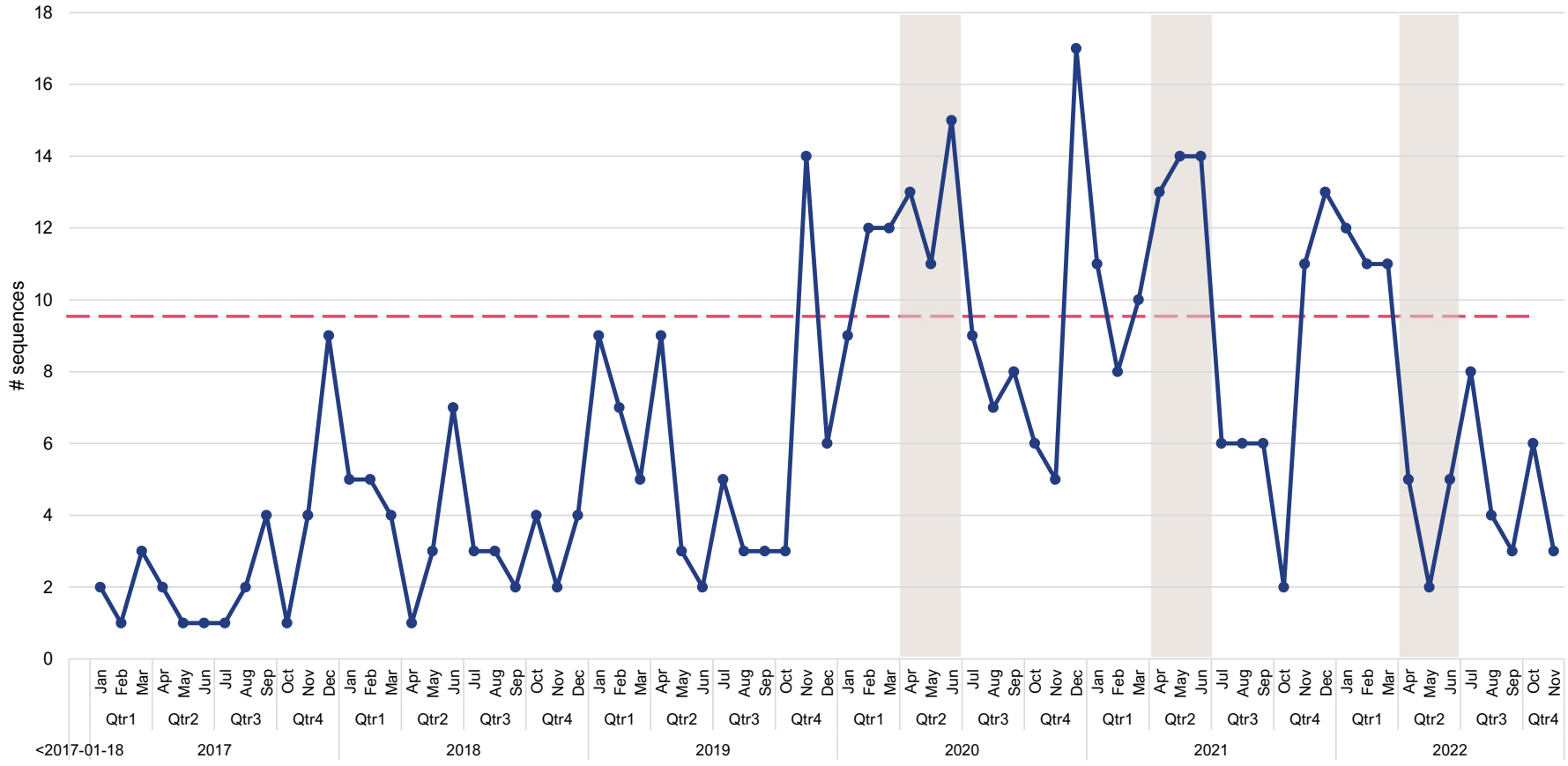
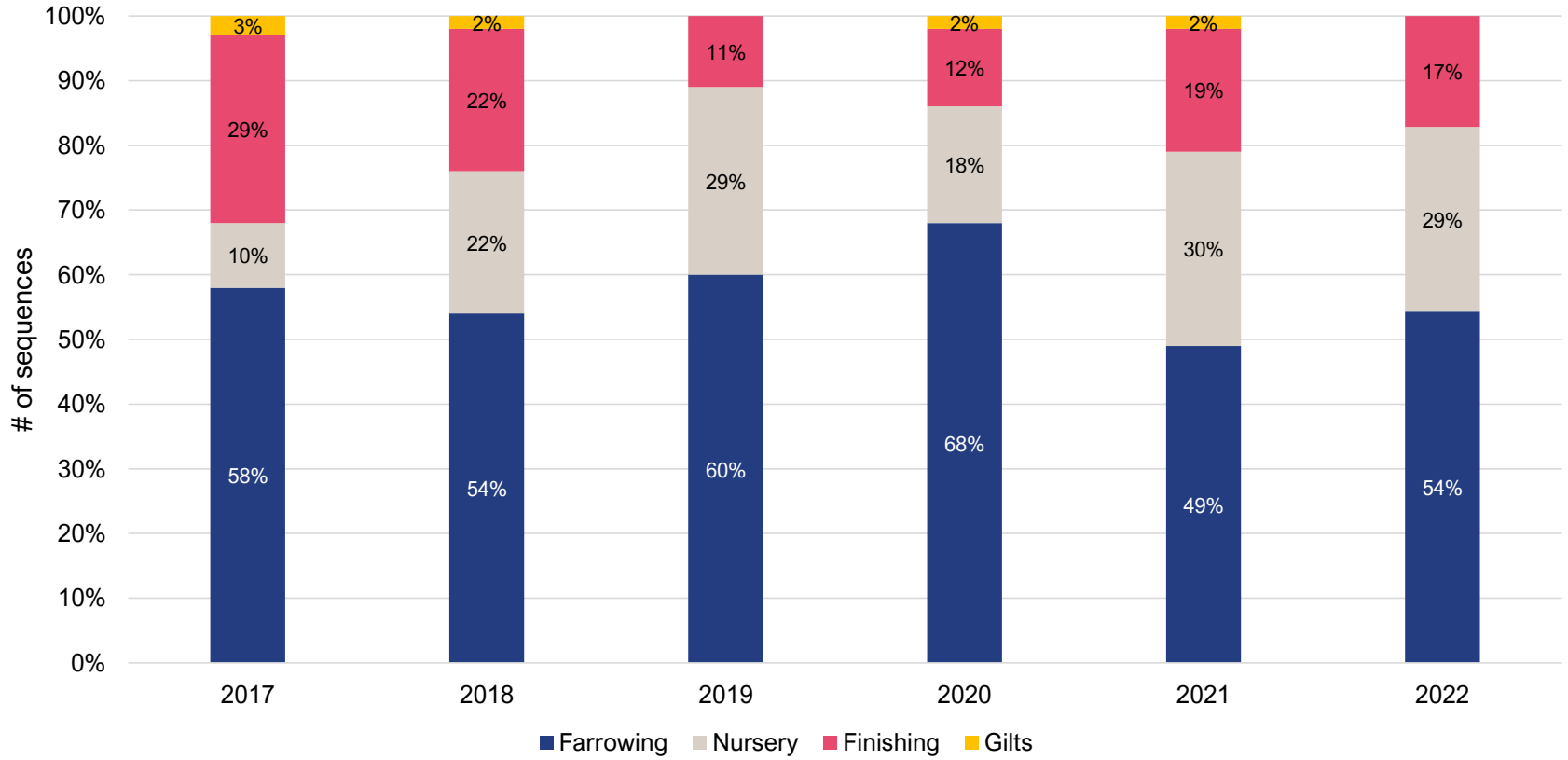
Key Points for Today

- Trends in PRRS
- What has changed?
- Choices to be made
- Why can we eliminate some pathogens and not others?
- What factors guide our decisions?
- PRRS real life stories
- Tale of two PRRS breaks – PRRS case study

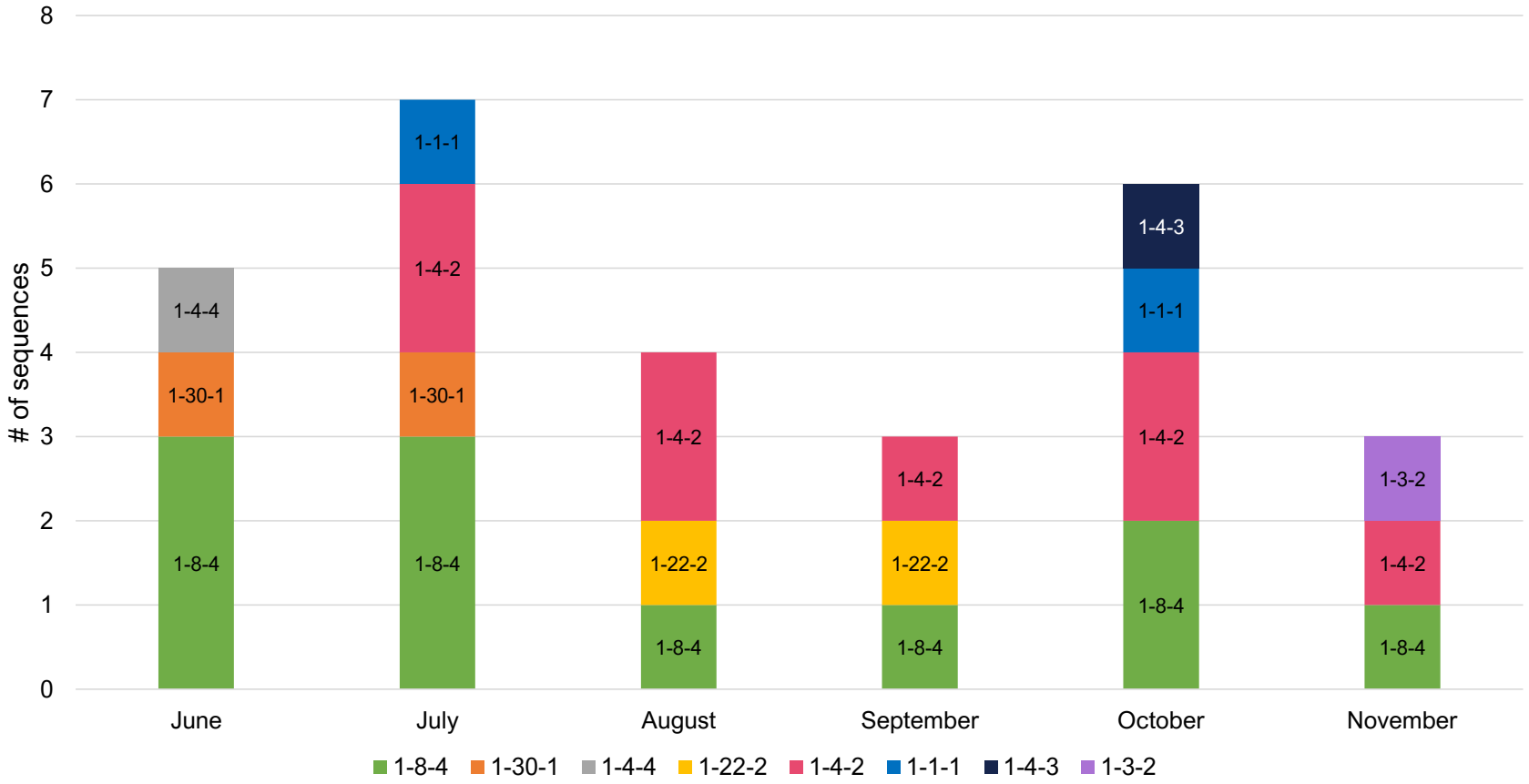
Total Count of Submitted Sequences, by Month



Site Types, Yearly

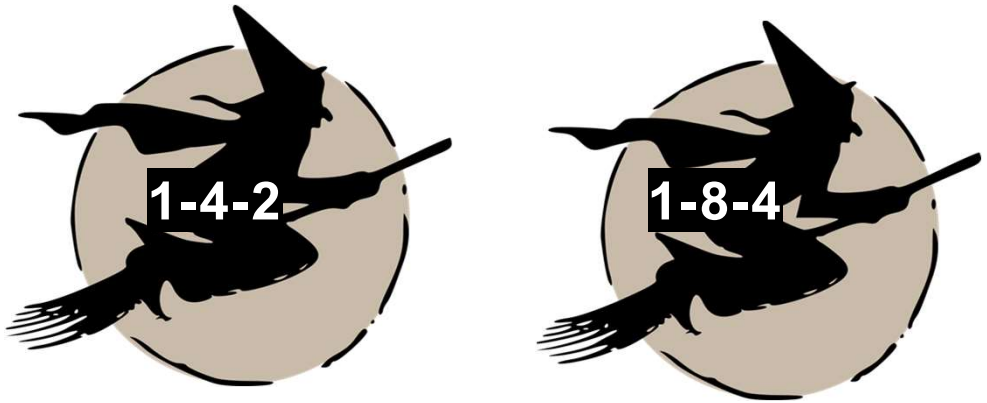


RFLP Types, Monthly (2022)



What has changed about PRRS?

- More virulent strains, with extended timelines for elimination
- More modified live vaccine use in growing pigs
  – with economic benefits in some situations
- A philosophical shift:
  - *"we can and should eliminate PRRS from all sites"*
    to
    "one size doesn't fit all – consider the factors in your situation"



The thought algorithm has evolved

- PRRS elimination is still very important and highly effective
  - Less virus circulating within the industry is good!

AND

  - Sometimes the realistic cost-benefit of a PRRS elimination is not beneficial

General Disease Economics

Estimates

- Depop/repop $275/sow (varies with cull and gilt value)
- PRRS break in a naïve herd $305 - $415 per sow
- Most of the financial loss is due to a reduction in units of output
- Most of the output is lost in the first 3 months after the PRRS break

General Disease Economics

Units of output X value of unit / total cost to produce those units = profit/loss

- Variable cost is mostly based on globalized commodities
- Fixed cost generally cannot be changed much in the short term
- Price taker at sale of output

One's greatest control and influence over economic success at the farm level is over production!

Growing pig vaccination

Impact on nursery mortality

Farm	Mortality (%)	
	Before vaccination	After vaccination
1	11.6	2.1
2	8.3	4.0
3	5.4	2.0
4	17.4	1.4
5	13.0	2.4
Average	**11.1**	**2.4**

Impact on finisher mortality

	# batches	# pigs	% mortality
Before PRRS	4	5636	3.53
PRRS no vaccine	2	2673	8.14
PRRS with vaccine	6	8388	3.82

Data kindly provided by Robert Desrosiers

Yeske, AASV 2022 'Vaccination continues to be a very useful tool in wean to finish population and today even more widely adopted.'

Timing and PRRS Status Matters

- If the pig is naïve and vaccinated at least 3-4 weeks before the time when it is infected with the field strain, there is a benefit in most cases

- If the pig is in presence of maternal immunity at the time of vaccination, the benefit is not consistent. Sometimes excellent, sometimes disappointing

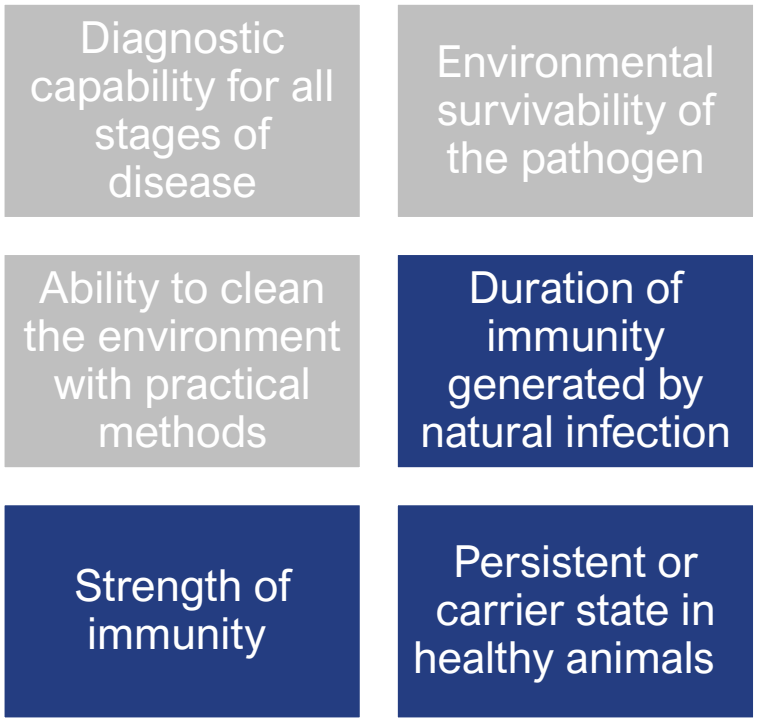
- For best results, the goal should be to be able to produce seroconversion before the time when the pig is infected with the field strain. For that, the older the pig the better…but, in keeping with our situational approach, there are cases where vaccination at processing produces a better results than at weaning

What makes elimination possible?

- Diagnostic capability for all stages of disease
- Environmental survivability of the pathogen
- Ability to clean the environment with practical methods
- Duration of immunity generated by natural infection
- Strength of immunity
- Persistent or carrier state in healthy animals

What makes elimination possible?

- Natural selection pressure favors evasion of immunity
- Higher mutation rates increase odds of clinically meaningful change in viral makeup
- Mutation happens in the pig not the environment, longer duration in the pig is bad
- More pigs in one place, more mutation capacity
- PRRS elimination relies heavily on excellent immunity
- Homologous strain, sterilizing immunity is required



PRRS Decisions

Stabilize

- How will you acclimate gilts?
- Vaccine/serum time

Eliminate

- Logistically feasible
  Expected survivability
- Serum vs MLV exposure

Depop

- Financial impact
- Other diseases to clean up

Should we eliminate?

Depends…

- Expected time to baseline production
- How severe is the impact expected to be?
- What are the odds of remaining negative after elimination?
- Regional demographics of pig flow pyramid
- What are the parallel production impacts of elimination plans?
- Farm design and layout
- Labor impact of advanced biosecurity
- Impact of a positive herd on the neighborhood

Should we Eliminate/Stabilize/Depop? – Real life examples

Elimination

Mr. D

- Good health history
- Small herd farrow to wean
- Stable staffing situation
- Strong barn management, follow through capacity
- Good parity distribution
- "No way PRRS is gonna win, attitude"

Should we Eliminate/Stabilize/Depop? – Real life examples

Depopulation

Mr. N

- Bad timing, just finished eliminating another disease.
- Small herd, farrow to wean
- Rather take a financial hit than the mental strain of elimination plans and failure risk.
- Need negative piglets to maintain buy/sell

Should we Eliminate/Stabilize/Depop? – Real life examples

Stabilize

Mr. J

- Hard to clean facility
- Small herd, farrow to finish under one roof
- Mild strain of PRRS
- Excellent ability to acclimate gilts prior to breeding

Should we Eliminate/Stabilize/Depop? – Real life examples

Stabilize

Mr. S

- Second PRRS infection in as many years
- Medium sized herd, farrow to wean site
- Challenging farm layout for elimination
- Minimal staffing
- Herd aging out due to previous elimination attempt
- Need to focus on production and pig flow not more disruption due to herd closure

Theory Meets Reality

What is behind the change?

- PRRS is a continuously evolving entity
- A virus is basically a genetic terrorist focused on self-replication
- Billions of biological copy cycles make copying mistakes inevitable
- Rate of relevant change is different between incident populations
- Larger herds have more units of viral replication and mutation potential

Theory Meets Reality

Pathogens evolve and we need to adapt

Where we've been

- PRRS once was an emerging disease too
- Eliminate PRRS provincially
- **PRRS eliminations are very helpful**
- Focus provincial elimination on all strains
- Follow elimination recipe and win
- Limit vaccine use to minimize mutation

Where we are

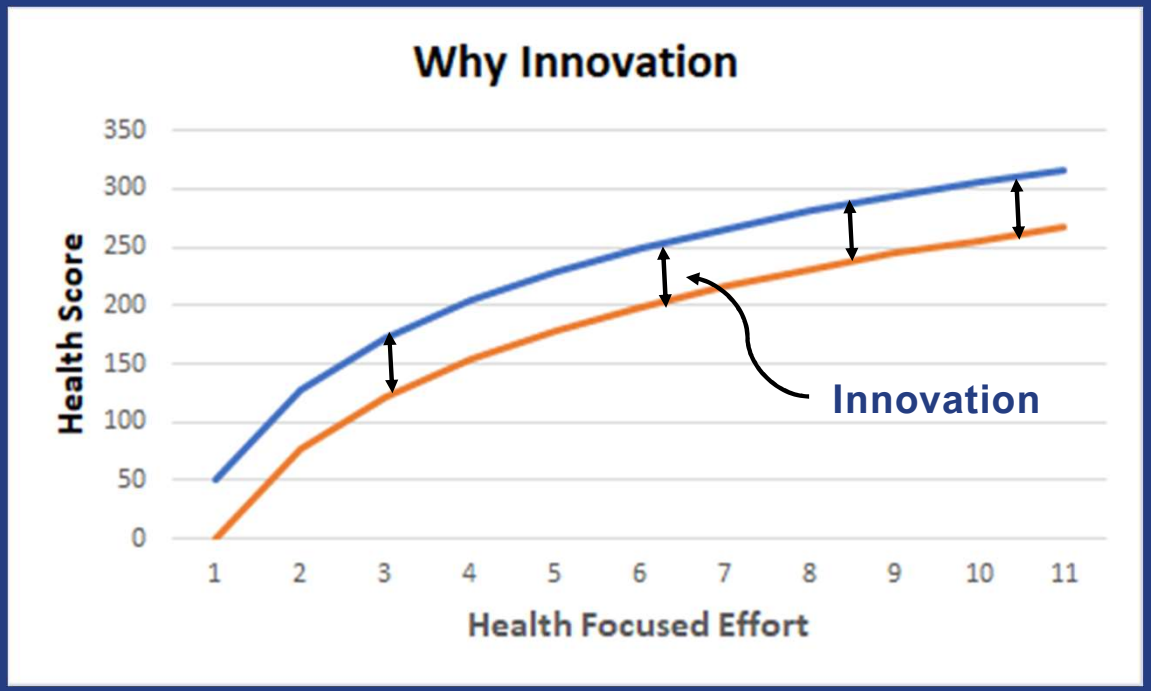
- PRRS is distinctly endemic
- Not presently a realistic goal
- **PRRS eliminations still very useful**
- Special focus on most virulent strains
- Same recipe not as sure to succeed
- Strategic vaccine application is a cost/benefit

Theory Meets Reality

What is next in the PRRS battle?

- We will learn more about what influences bad mutations
- We will be able to better predict what genetic bits are clinically relevant
- Understanding more will lead to new and probably better vaccines
- Genetic engineering on the pig side is promising (PRRS-resistant pigs?)
- We need to reimagine how the spread of disease is prevented
- We need commitment to innovative solutions

Practical Innovation Is Revolutionary



Example from the past, PCR testing

Imagine a world where pig transport was a negligible risk due to innovative cleaning solutions!

A world with convenient, affordable air purification etc.!

We can and we should!

Bottom Line

- The Ontario pig industry is very diverse
- Success comes in many forms so there's more than 1 answer
- Efficiency = Margin = Sustainability
- Tailor made solution drive efficiency
- Innovation is necessary to reposition our battle against PRRS

Thank You!

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