

Emergency measures for endemic disease control programs



Jean-Pierre Vaillancourt

Université 
de Montréal

Partial list of emerging/reemerging diseases since 1978

- | | |
|------------------------------------|------------------------------------|
| 1. Bordetellosis | 14. Myeloid Leukosis |
| 2. Avian Nephritis | 15. Turkey Rhinotracheitis |
| 3. Avian Influenza | 16. Cryptosporidiosis |
| 4. H.V. Infec. Bursal Dis. | 17. Spiking Mortality Syn. |
| 5. Variant Infec. Bursal. Dis. | 18. V.V. Marek's Disease |
| 6. Variant Infec. Bronchitis | 19. Pulmonary Hypertention |
| 7. <i>Ornithobacterium</i> | 20. <i>Sal. Enteritidis</i> type 4 |
| <i>rhinotracheale</i> infection | 21. Big liver & Spleen Disease |
| 8. Angara Disease | 22. Equine Encephalitis |
| 9. Runting Stunting Syndrome | 23. Stunting Syn. (turkeys) |
| 10. Chicken Infectious Anemia | 24. Poult Enteritis Mort. Syn |
| 11. Trans. Viral Proventriculitis | 25. Multicentric Histiocytosis |
| 12. Variant Mycoplasma G & S | 26. Osteomyelitis complex |
| 13. Dermal Squamous Cell Carcinoma | 27. Reovirus.... |

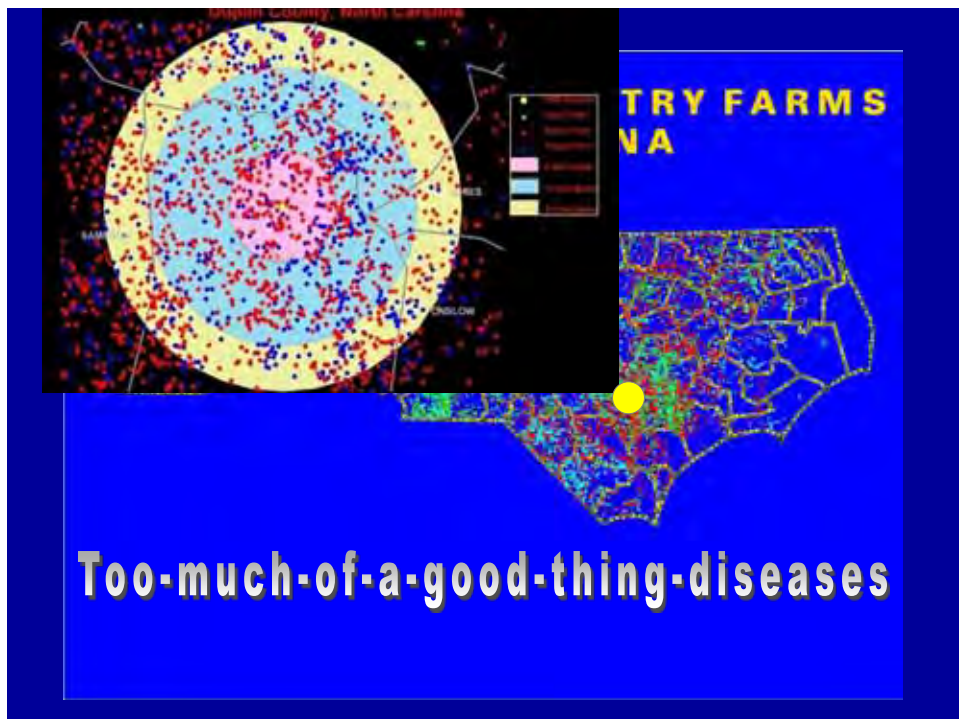
About ~150 years ago ...



“Not a single year passes without [which]...we can tell the world: here is a new disease!”

Rudolf Virchow, 1867

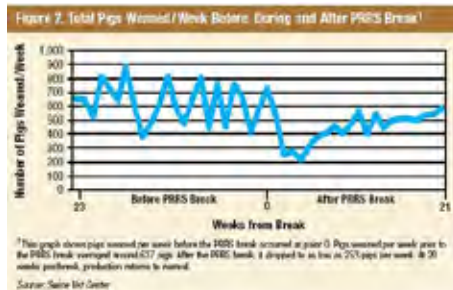
“...these disease agents insure their continued existence by adapting themselves to a broader host spectrum...” Dr James H. Steele, 1979






The current challenge

A new study, ...estimates that PRRS continues to be a major drag on the U.S. pork industry – costing the pork industry \$664 million per year. This translates into \$1.8 million per day or \$114.71 per sow annually or roughly \$6.00 per pig in lost opportunity and cost.



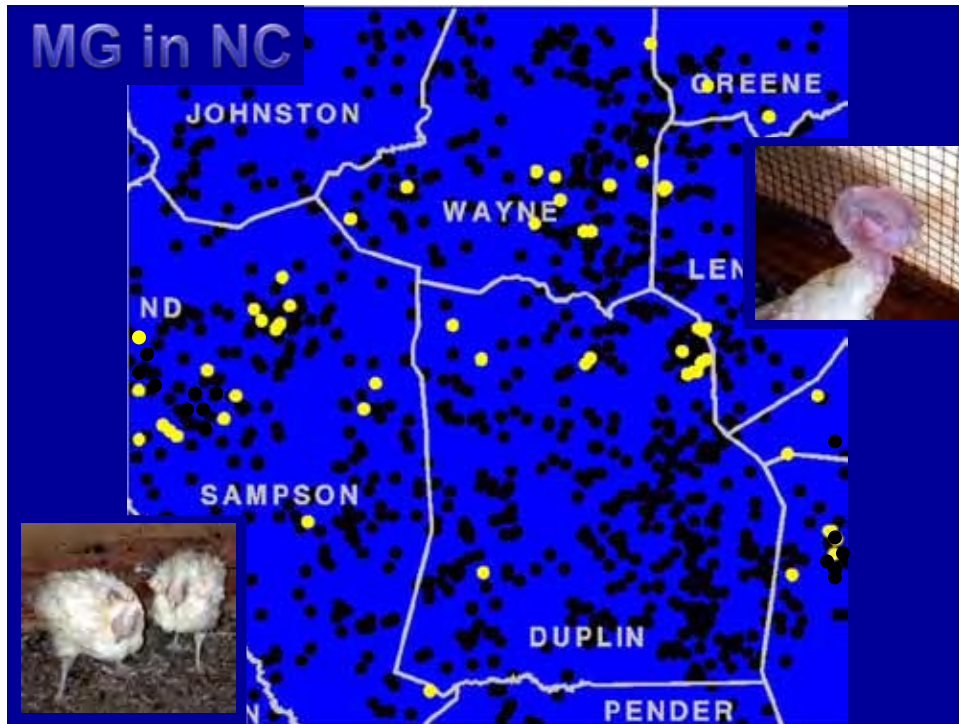


Predictors associated with PRRS positive status  using multivariable logistic regression model (52 breeding sites)

Description of predictors	Odds ratio	95% (CI)
Heat producing unit >300 (HPU) ^c	10.7	1.6-72.6
Distance from closest pig site ≤ 2.5 (km)	7.3	1.7-30.6
No shower at the entrance	8.7	1.9-39.6
Access to the site by rendering truck	7.0	1.2-41.0

^c 1 HPU= 1000 watts at 20°C; calculated using the following equation, $HPU=0.17*(\text{weaners and/or finishers}) + 0.30*(\text{gilts or sows})$ (Flori et al., 1995)

Epidemiological investigations in regard to porcine reproductive and respiratory syndrome (PRRS) in Quebec, Canada. Part 2: Prevalence and risk factors in breeding sites by Marie-Ève Lambert^a, Julie Arsenault^b, Zvonimir Poljak^b, and Sylvie D'Allaire ^a



"If the growers are not brought into the effort to upgrade the biosecurity situation in the U.S. poultry industry, very little will be accomplished. The grower level is where the biosecurity effort needs to be concentrated because that is where the birds are."

Dr Charles Beard, 1999





“We need a paradigm shift!”

Dr Charles Beard, 2004



Paradigm shift

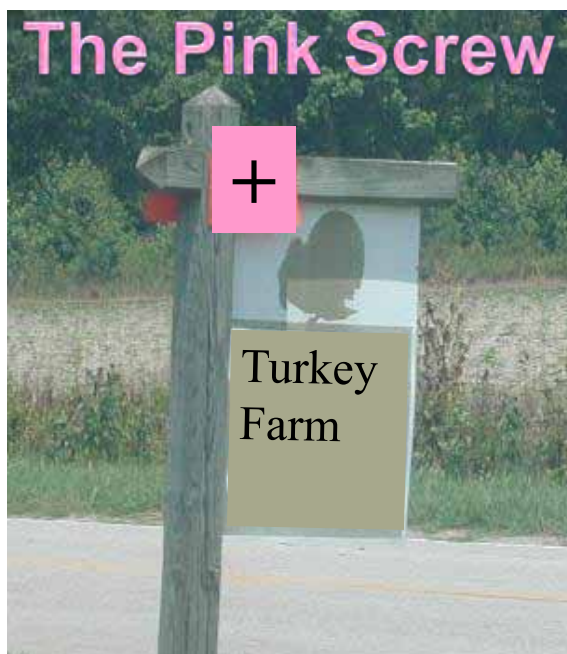
A group of people, or even a whole society, undergoing a change of world view.

Scientific progress occurs, not by slow incremental accumulation alone, but also by occasional "revolutions," in which "an older paradigm is replaced in whole or in part by an incompatible new one"

The Structure of Scientific Revolutions, Thomas Kuhn (1962)

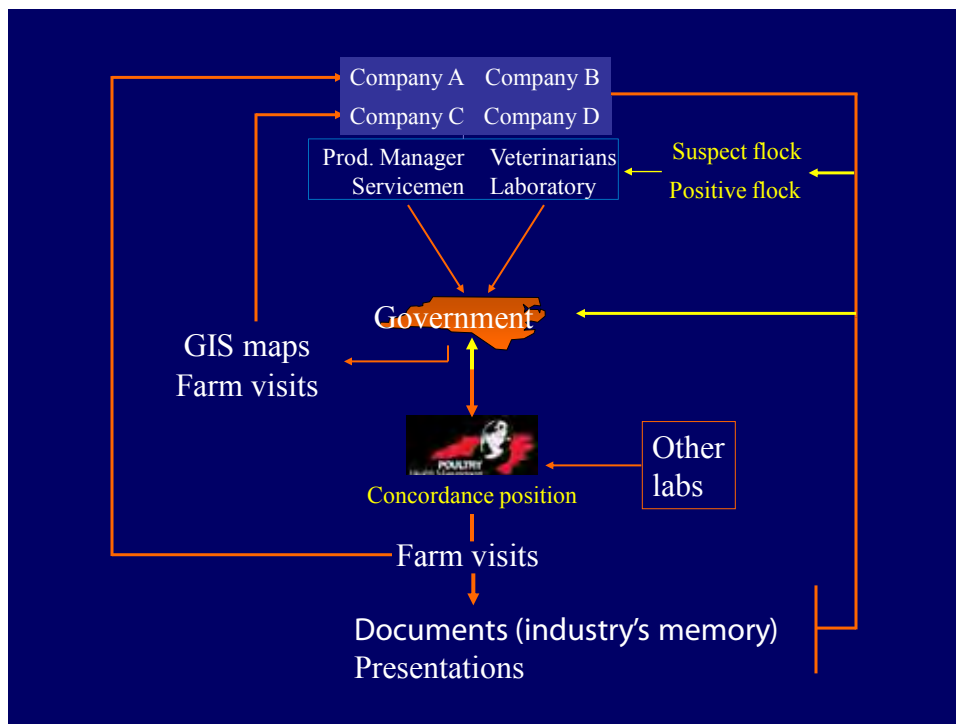


www.read-the-bible.org/glossary.html



1. The grower involved and his/her employees
2. President
3. Vice-presidents (mainly the VP in charge of production)
4. Production manager
5. All veterinarians within the company
6. All service people
7. Feedmill manager
8. Feed truck drivers/handle through dispatcher
9. Utilities company that may have field workers in the area (electric; gas; phone)
10. Live haul manager and personnel, including loading/chasing personnel, if separate
11. Vaccination crew
12. Artificial insemination crew
13. Dead bird disposal company
14. Individuals responsible for used litter removal
15. Individuals responsible for new litter delivery
16. Hatchery manager and poult delivery personnel
17. Maintenance crews (electricians; plumbers; construction crews that may work on this farm)
18. Pest control crew, if such a crew exists within the company
19. Growers under contract with the company and others depending on disease and species affected
20. Processing plant
21. Person in charge of live-haul equipment sanitation
22. Breeder managers
23. Motor fleet manager – fleet maintenance
24. Nutritionists
25. Local or state poultry organization and/or health group.
26. State Veterinarian

Contact list



Control Measures

ILT Outbreaks in Georgia

- First response: communications and biosecurity zone
 - The index case is immediately mapped using GIS, and a 5-mile zone is drawn around it for biosecurity measures to be enhanced immediately for all identified farms within the zone.
 - Enhanced biosecurity for all the broiler farms means a minimum down time of 2 weeks, limiting the visits to the essential (stop service visits) and stopping clean-out of houses and litter spreading.

If litter is to be taken out of the zone, it must be heat treated at 38C (100F) for 100 hours or composted inside or outside of the house for a minimum of 5 days before being taken out of the zone to areas where

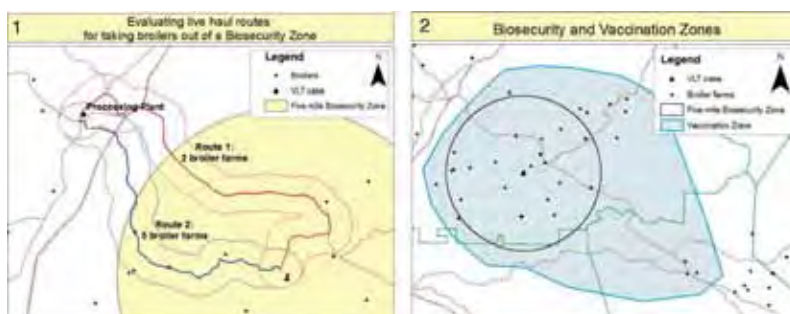


Ref: Dufour-Zavala, 2008

Control Measures ILT Outbreaks in Georgia

Use of geographic information systems (GIS) for:

- disease surveillance
- outbreak control
 - routing of live haul trucks
 - creation of quarantine, vaccination, and surveillance zones
- emergency management



Dufour-Zavala, 2008

"Many times it'll become much clearer what's going on risk-wise if you just wait a couple days instead of moving birds that aren't quite right just because the schedule says so."

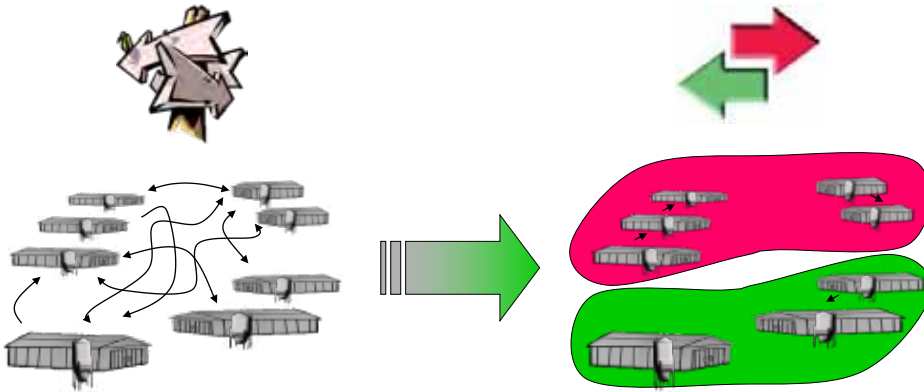
**Movement
management**

**Communication
management**

"I'm willing to give up the index case in most situations - if we had an effective way to prevent all index cases, we'd have been out of the infectious disease business years ago. What's worked well for us is concentrating on rapid reporting of unusual situations"

Dr Eric Gonder, Goldsboro Milling, Co

Paradigm shift



- ✓ Individual farm measures
- ✓ Variable traffic flow
- ✓ Minimal communication

- ✓ Integrated farm measures
- ✓ Managed traffic flow
- ✓ Established communications
- ✓ Audit of compliance



Logical



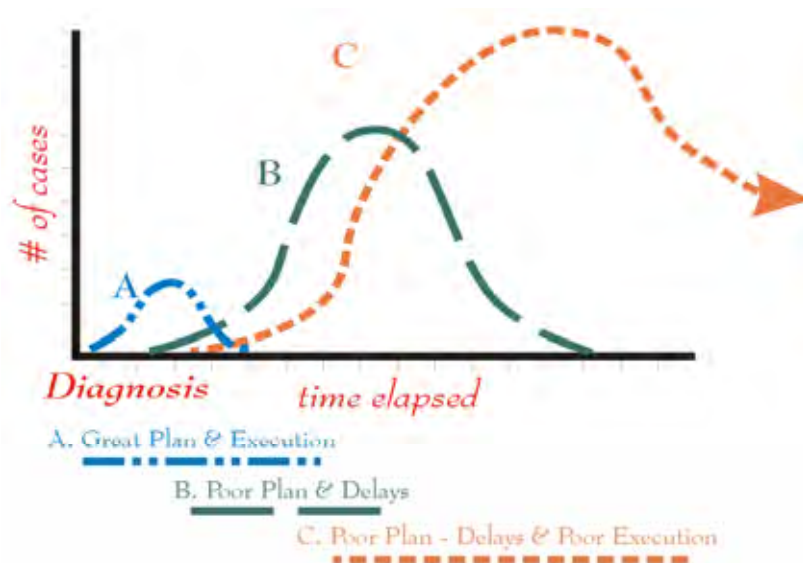
Effective



Applied



Time is of the Essence!!!



Collaboration

- ✓ Evaluate opportunities for collaboration
- ✓ Spot barriers to collaboration
- ✓ Tailor collaboration solutions



M. Hansen, 2012
UC Berkeley



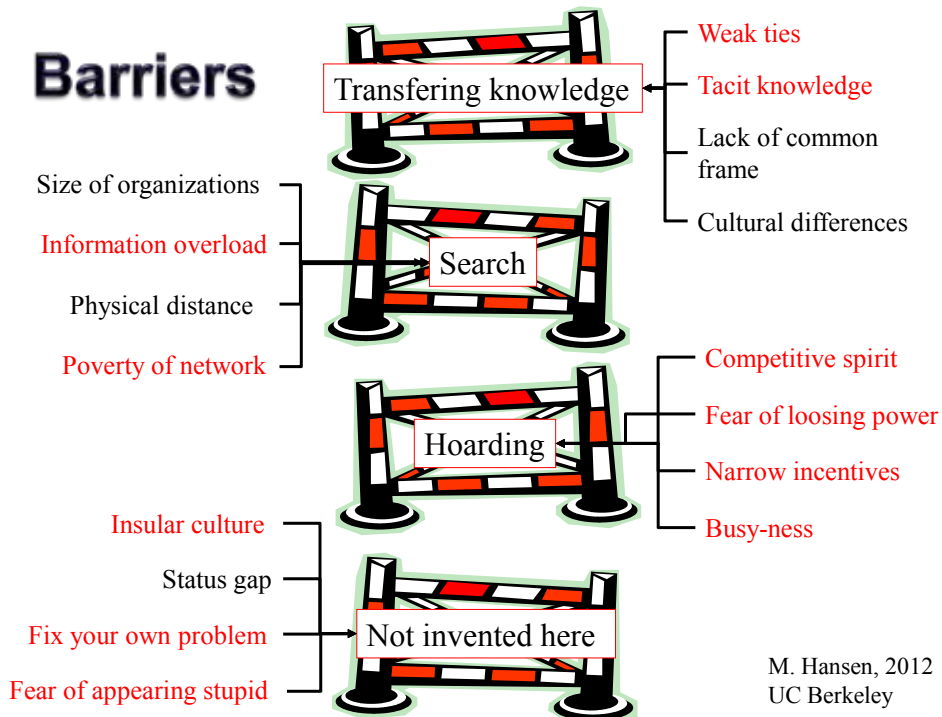
Collaboration

- ✓ Evaluate opportunities for collaboration
- ✓ Spot barriers to collaboration
- ✓ Tailor collaboration solutions



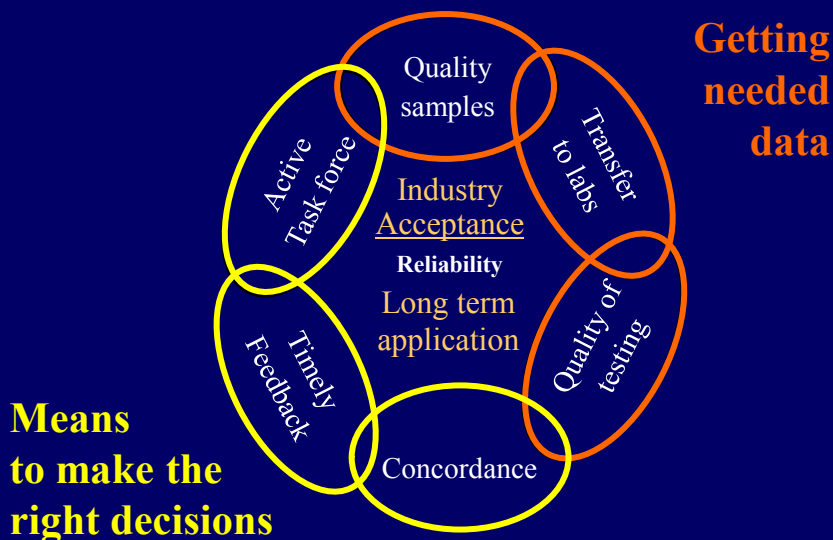
M. Hansen, 2012
UC Berkeley

Barriers



M. Hansen, 2012
UC Berkeley

Effective Disease Control Chain



Issues that won't go away...

- ⚡ Early reporting system
- ⚡ Confidentiality (signed agreements)
- ⚡ Mapping of all farms & basic info.
- ⚡ Early response funding
- ⚡ Human resources (concordance)
- ⚡ Coordinated industry central command
- ⚡ Sales barns
- ⚡ Individual and organizational susceptibilities versus what needs to happen to get the job done



Issues that won't go away...

- ⚡ Early reporting system
- ⚡ Confidentiality (signed agreements)
- ⚡ Mapping of all farms & basic info.
- ⚡ Early response funding
- ⚡ Human resources (concordance)



1. "Address biology first"

2. Time is of the essence: "the virus certainly does not care, and will not wait for politics" ... yet, many issues are political. But current rules, regulations, or precedents cannot be justifications to avoid issues.

McNabb, 2005

Building Disease Barriers by Breaking Collaboration Barriers

" The governments (statisticians) are very keen on amassing statistics. They collect them, add them, raise them to the n th power, take the cube root and prepare wonderful diagrams. But what you must never forget is that every one of these figures comes in the first instance from the village watchman, who puts down what he damn pleases."

Sir J. Stamp, 1929



Jean-Pierre Vaillancourt

Université 
de Montréal