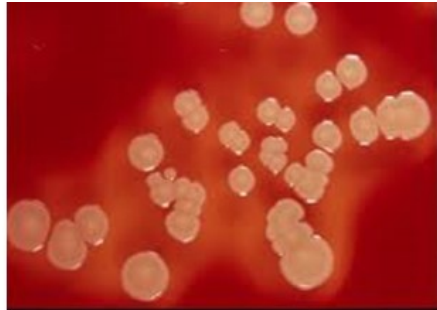


*Providing accurate and trusted information  
on antibiotic use and resistance in an  
increasingly chaotic information environment*



**Peter Davies BVSc, PhD**  
College of Veterinary Medicine  
University of Minnesota



# Rational public discourse – a quaint idea

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- Politicization of food animal production
- Internet → pandemic misinformation
- Misinformation more dangerous than ignorance
- Conviction with which ideas are held
  - Is not correlated with whether they are true
  - Is correlated with indignation when challenged
- Signal to noise ratio!

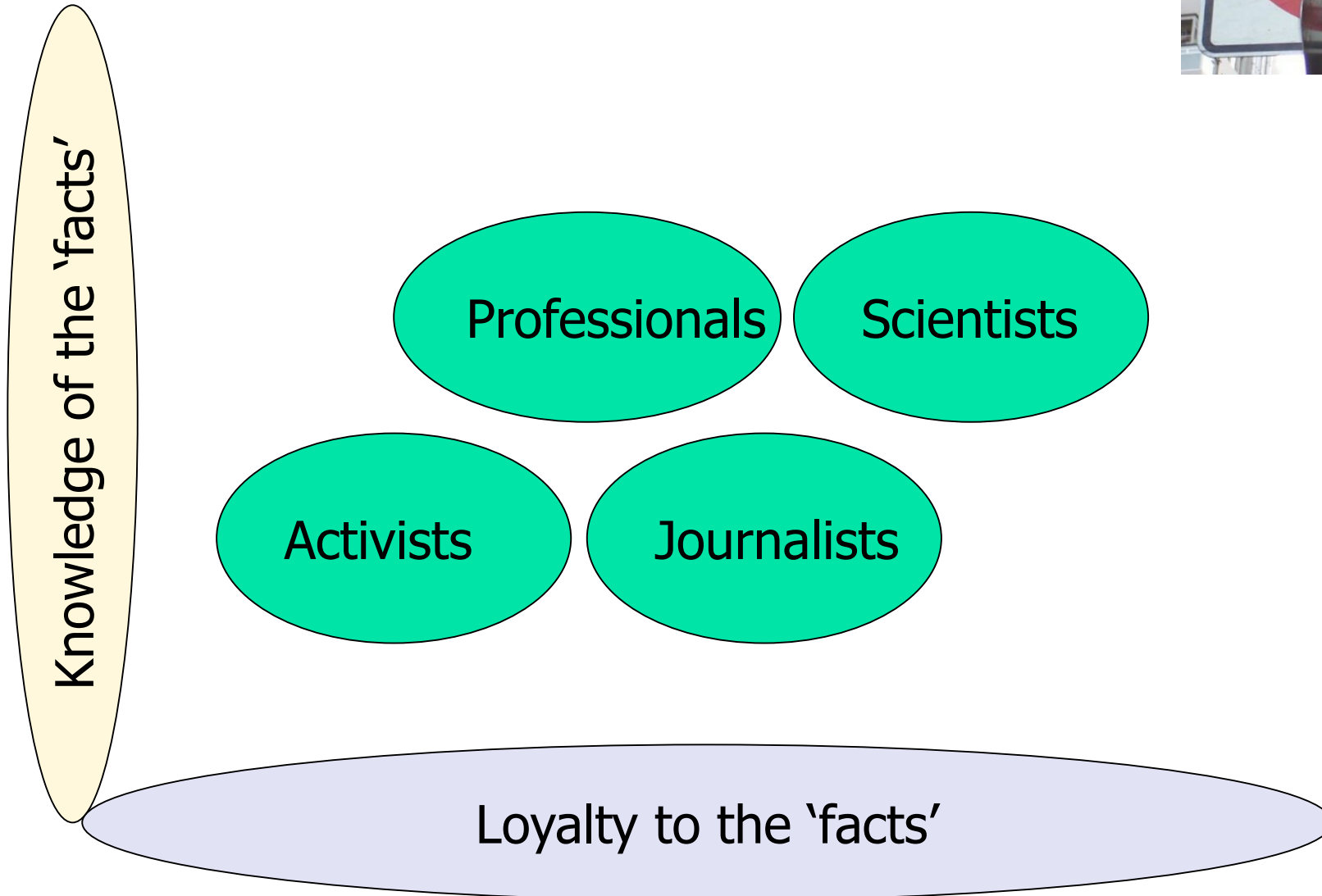


# Death by a thousand sound bites

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- Accusations are simple – realities are complex
- Sound bite culture with acute time deficiency
  - Few follow complex arguments
  - Even fewer understand them
- Detailed technical explanations do not get listened to
- Bombardment of negative sound bites will continue
- A complex defense is no defense, no matter how misinformed the accusations

# Noise polluters?





# Livestock associated MRSA

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- First identified in Holland in 2004 (ST398)
- Found in pigs and other food animals globally
  - Prevalence varies (~100% of pigs in DK, NL)
  - Other variants (ST9 in Asia; ST5 in North America, ..)
- Human cases of infection documented
  - Relatively uncommon vs. human MRSA variants
  - Mostly non-invasive SSTI
  - ~10 fatal cases globally (medically compromised)
  - Serious infections rare in healthy swine workers



# LA- MRSA

## *A threat to the neighborhood?*

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- Consideration in permitting applications
- Science divided?
- Some studies suggest risk
  - Feingold (2011), **Schinasi (2014)**, Carrell (2014), Casey (2014), Beresin (2017)
  - Flaws/limitations
    - Case/control or ecological
    - Fail to account for individual distance to farms, livestock contact, or MRSA type
- More robust studies indicate negligible risk
  - Van Cleef (2009), Cuny 2009, Bisdorff (2011), Anker (2018)

**Table 2**

Estimates of associations of methicillin resistant *Staphylococcus aureus* nasal carriage with environmental and occupational exposures among hospitalized patients at Vidant Medical Center in eastern North Carolina, 2011

	No. (%)		Conditioned on age and gender, adjusted for education	
	Controls (n = 119)	Cases (n = 117)	OR	95% CI
Permitted swine per square mile of block group				
0	72 (60.5)	59 (50.4)	1.00	-
>0-149	7 (5.9)	20 (17.1)	4.76	1.36-16.69
>149			0.95	0.53-1.72
Permitted farm mile of block group				
0			1.00	-
>0-149			1.99	0.99-4.00
>149			0.42	0.15-1.13
Permitted non farm square mile of block group				
0			1.00	-
>0-149			2.04	0.61-6.85
>149			0.95	0.54-1.68
Live within 1 mile of animal feeding operation				
No	89 (74.8)	94 (80.3)	1.00	-
Yes	30 (25.2)	23 (19.7)	0.60	0.31-1.16

**Conclusion:**

Moderate densities of swine .... were associated with MRSA nasal carriage detected by PCR. This finding is supported by past evidence of associations between MRSA nasal carriage and contact with swine production.

# Meticillin-resistant *Staphylococcus aureus* CC398 is an increasing cause of disease in people with no livestock contact in Denmark, 1999 to 2011

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# Incidence of MRSA infections in DK in 2011

(Larsen et al., 2015)

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## Pig dense areas

- All MRSA
  - 10.9/100,000 person-years
- ST398 (no pig contact)
  - 0.7/100,000 person-years

## Other areas

- All MRSA
  - 12.8/100,000 person-years
- ST398 (no pig contact)
  - 0.3/100,000 person-years



## Larsen et al. (Euro Surveill. 2015)

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- CC398 'has become **a major cause** of human disease in Europe, posing a **serious public health challenge in countries with intensive livestock production**'
- Suggests **substantial dissemination** of MRSA CC398 from livestock or livestock workers into the Danish community
- Findings strongly suggest **foodborne transmission does not play a major role** in the MRSA CC398 epidemiology



# LA-MRSA in the USA

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- Prevalence of LA-MRSA relatively low in US swine
  - ST398, ST5, ST9 (Smith 2013, Sun 2015)
- Study of human laboratories in IA (Nair, 2016)
  - LA-MRSA found in 0.24% of MRSA cases
  - LA-MSSA ~ 1% of *S. aureus* infections
- Blood stream infections in NC (Fowler pers. comm)
  - None of 1,222 MRSA cases (1995-2015)
  - 2 possible MSSA isolates (t034, t571)



# Summary

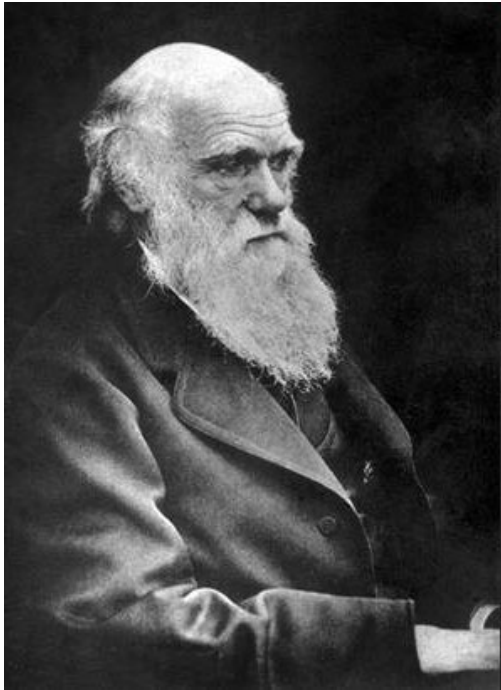
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- Livestock associated MRSA remains a difficult public relations issue for the swine industry in many countries
- Difficult to communicate when 'science' is contributing more noise than signal
  - Author responsibilities
  - Reviewing and editorial responsibilities
  - University 'Press releases'
- Potential case study in misinformation and biased inference in science



# Weighing the science?

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Charles Darwin

'It is lamentable how each man  
draws his own different  
conclusions from the very  
same fact'