



IOM Forum on Microbial Threats 2005

Incentives and disincentives for disease surveillance and reporting

The BSE case study

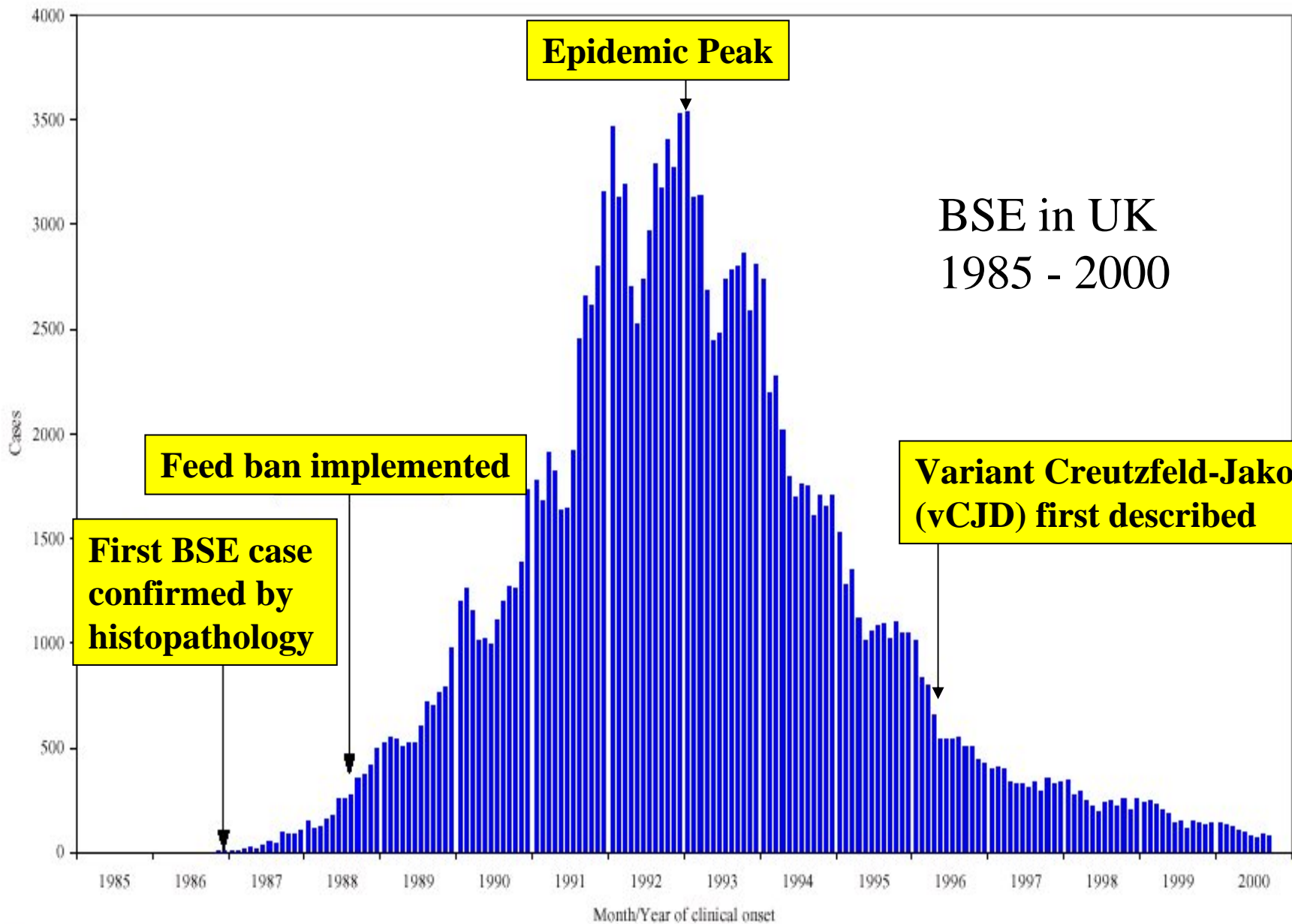
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“Communicating Science, Managing Risk”

Bovine Spongiform encephalopathy

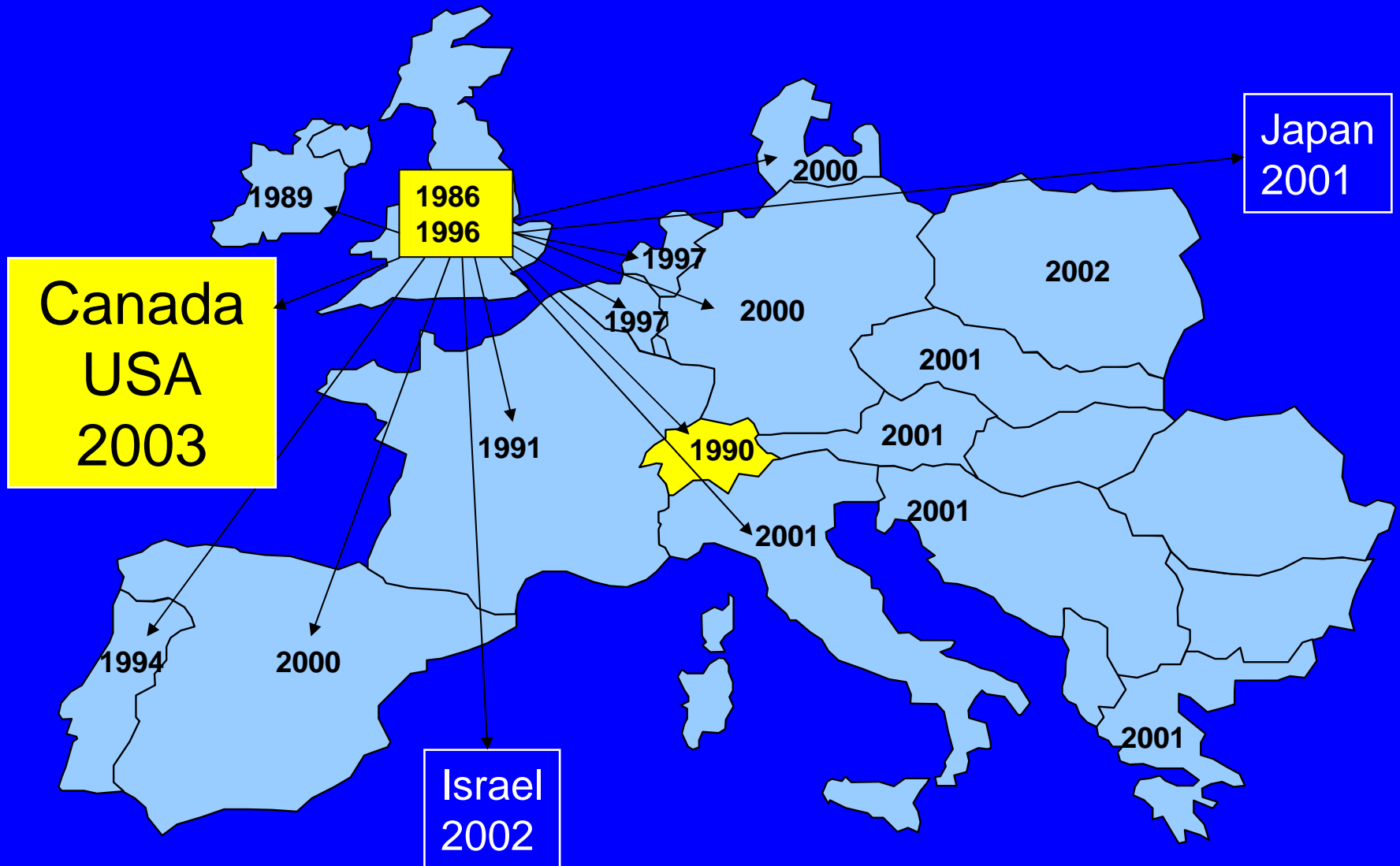
- Neurologic disease of cattle associated with accumulation of abnormal prion protein (PrP^{Sc})
- Transmitted through contaminated feed (rendered animal protein source)
- Years between exposure and disease
- No treatment, invariably fatal
- Zoonotic – linked to variant CJD

CONFIRMED CASES OF BSE PLOTTED BY MONTH AND YEAR OF CLINICAL ONSET



Data valid to end of September 2000. Produced 04 December 2000.

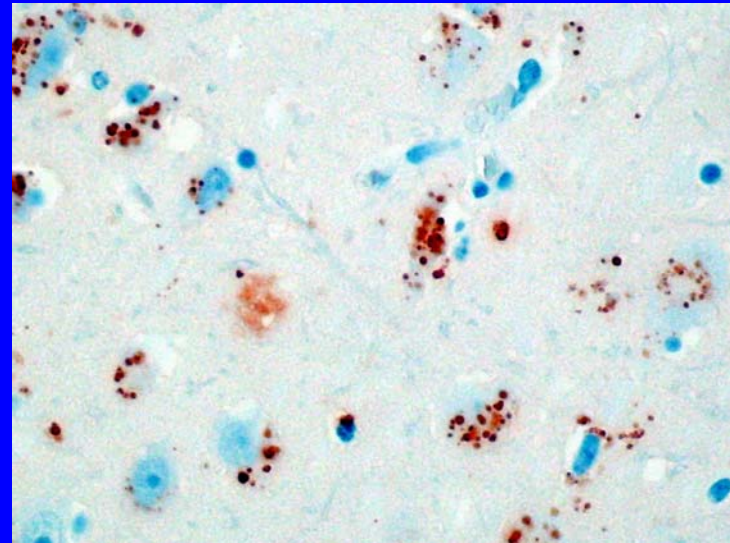
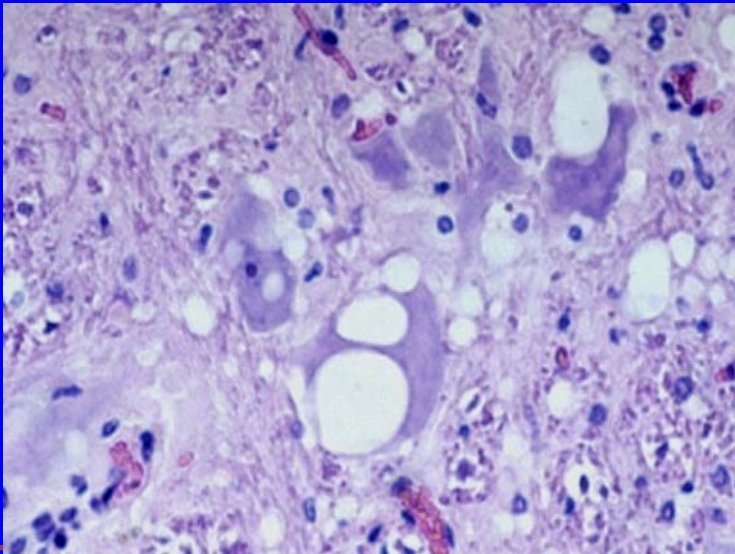
The Global Spread of BSE



Diagnosis of BSE

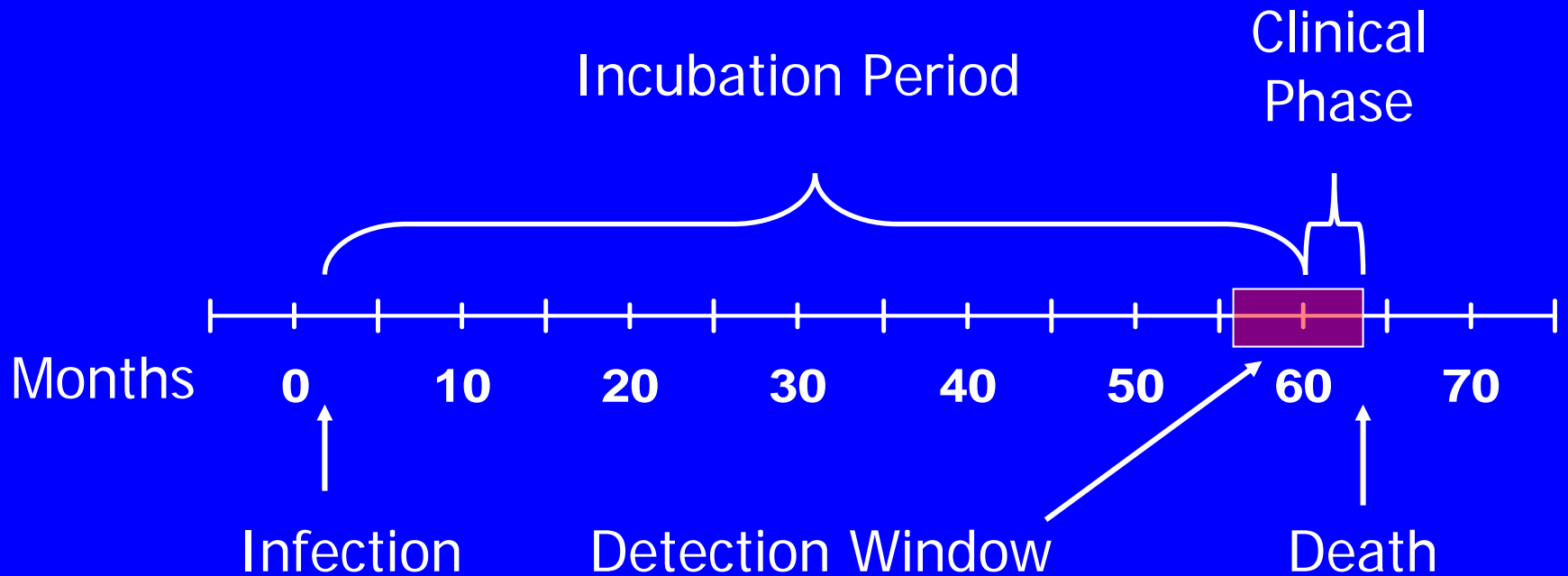
Brain damage or accumulation of PrP^{Sc}

- No unique clinical signs
- Brain grossly normal
- Microscopic changes – vacuoles (holes) and accumulation of abnormal protein



BSE surveillance challenges

Can only detect brain damage or prions close to clinical disease onset



Typical BSE case diagnosed in Great Britain epidemic

Certain cattle have greater likelihood of testing positive

- Older cattle
- Cattle showing neurologic signs
- Cattle not able to walk
- Cattle dying or ill on farms
- Collectively, these are called high risk populations
 - a population screening tool for increasing prior probability of disease and therefore, surveillance yield (positives/animals tested)

Lesson # 1:

Detecting a new animal disease difficult

- Most individual animal disease treated on farm based on clinical diagnosis
 - Sell, eat or bury non-responsive animals
- Most animal disease diagnostic workup is fee-for-service
 - Not usually seen as public good unless foreign animal disease suspect

Difficult to detect signals of emerging animal disease

- Limited national monitoring of disease signs or syndromes
 - National Animal Health Monitoring System
- Variability of terminology and records
 - Standardized nomenclature not widely adopted
 - Record-keeping systems designed for business purposes, not epidemiology

Limits of US animal health diagnostic laboratory capacity

- Federal laboratory system limited: NVSL and Plum Island
- Federal focus on program diseases, NOT detection of emerging animal diseases
- State diagnostic laboratories variable quality and capacity
- Weak national laboratory system

Lesson # 2: Recognizing BSE in a low incidence country is difficult

- Most countries focus first on passive surveillance – evaluation of clinical suspects
- Absence of evidence often represented as evidence of absence (eg BSE free)
- ‘BSE free’ paradigm reduces effectiveness of passive surveillance

Disincentives for expanding national surveillance

- BSE surveillance expensive
- Don't want to discover new diseases unless plan in place to address them
- Discovery of BSE is evidence that prevention programs have not worked
- New diseases don't look good politically
- BSE detection has HUGE economic consequences

Lesson # 3: Most farmers are honest, but BSE reporting disincentives >> incentives

- Historically, focus on animal units produced, not food as an end product
 - Producers raise animals
- The global cheap food policy has driven the focus on cost of production
 - Disease incurs costs but no disease not always the optimal economic strategy
- Disease reporting weighed in light of cost of production for animal units

Producer incentives for surveillance and disease reporting

- Diagnostic support to aid disease control and prevention
- Opportunity to reduce cost-of-production for economically important diseases
- Potential for certification of health status with repeated negative tests

Producer incentives for BSE reporting



- No treatment available
- Controls mandated by government actually raised the cost-of-production
- Government certifies national status, not individual herd

Producer disincentives

- Ostracism by fellow producers
- Shunned by consumers (and buyers)
 - Loss of markets
- Disruption of business
- Difficulty of disposal (headless cow crisis)
- Investigation and destruction of additional animals (offspring and cohort)

“Shoot, shovel, shut up”

Quote from Alberta Prime Minister
taken out of context as mantra by
some cattle producers

Lesson # 4: Testing can become an end unto itself

- Must clarify the purpose of the testing:
 - Disease detection (disease status)
 - or Case finding
 - or Monitoring prevention/control effectiveness
- The purpose of testing may change over the course of the epidemic
 - Disease status early
 - Monitoring prevention/control later

Testing is NOT the panacea

- Testing is meaningless if animal health and public health measures are not implemented
- Testing wrong populations can create false sense of security (may be politically expedient, however)
- Testing alone does not assure safety

Lesson # 5: Focus needs to be on RISK, not presence/absence of disease

- The key for human and animal health protection is risk management, not disease status of country
- Most countries have disproportionately focused on disease status
- Easier to project “zero risk” image of total trade bans
- **NO BORDER IS IMPERMEABLE!**

Lesson # 6: Must consider opportunity costs

- Every dollar we spend on BSE is not available for other purposes
- The cost of BSE testing now disproportionate to public health benefit as compared to other pressing issues
- When focus on risk management, surveillance can be adjusted accordingly
- What will we tell our grandchildren?

Lesson # 7: The curse of high health status

- When achieve high animal health status for a nation, then impetus for maintaining infrastructure is gone
- Struggle to manage emerging issues with limited resources
- Takes a long time to rebuild physical and human resources after depletion

Recommendations (1)

- Reframe surveillance discussions – focus on purpose and scientific basis
- Consider entire farm-to-table food system when designing surveillance systems (no one size fits all)
- Create more incentives for reporting diseases to pull in samples
- National identification system critical

Recommendations (2)

- Strengthen the national animal health laboratory network
 - Build capacity, tie resources to performance requirements and reporting
- Foster more collaboration between biological, medical and social sciences
 - Must understand the sociology and psychology of disease reporting and compliance

Recommendations (3)

- Focus on risk management
- Walk the talk of ‘science-based’ regulation
 - BSE trade issues demonstrate disregard for science and international standards
- Must build public-private partnerships to successfully address emerging diseases

Recommendation (4)

- All animal health issues are public health issues in the broadest sense
 - They impact human health directly (zoonoses)
 - They impact human health indirectly (production-limiting, ecologically disruptive)
- Break down the silos
 - Must aggressively foster trans-disciplinary public health teams