



Bovine Spongiform Encephalopathy

Lisa A. Ferguson, DVM
USDA, APHIS,
Veterinary Services

BSE

- ◆ Basics
- ◆ UK situation
- ◆ Worldwide status
- ◆ US prevention/surveillance
- ◆ Canadian case and response
- ◆ ? Future

03M-0212-2/Ferguson

BSE: Clinical Signs

- ◆ Changes in behavior
- ◆ Hyperaesthesia
- ◆ Weight loss with appetite retention
- ◆ Drop in milk production
- ◆ Ataxia
- ◆ Difficulty in rising
- ◆ Down or dead
- ◆ Not all animals show all signs



03M-0212-3/Ferguson

BSE: Other Animal Species

- Feline spongiform encephalopathy
- TSE of exotic ruminants



03M-0212-4 Ferguson

BSE: Transmission



Cow eats contaminated feed and gets sick in 3-6 years

03M-0212-5 Ferguson

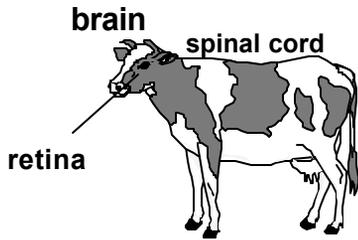
BSE Transmission: Attack Rate

- 100 gr, 10 gr, 1 gr
- 1 gram of brain orally killed 7 of 10 calves
- Studies underway:
0.1 gr, 0.01 gr, 0.001 gr



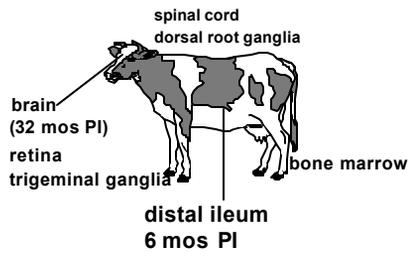
03M-0212-6 Ferguson

**Distribution of Infectivity:
Natural Cases**



03M-0212-7 Ferguson

**Distribution of Infectivity:
Experimental**



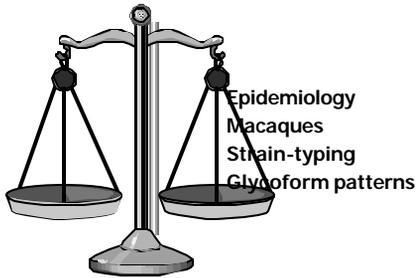
03M-0212-8 Ferguson

vCJD Cases (as of Nov 2002)

- ◆ Definite or probable cases
 - UK: 129
 - France: 5
 - Ireland: 1
 - Italy: 1
 - **USA: 1
 - **Canada: 1

03M-0212-9 Ferguson

vCJD = BSE



03M-0212 © Ferguson

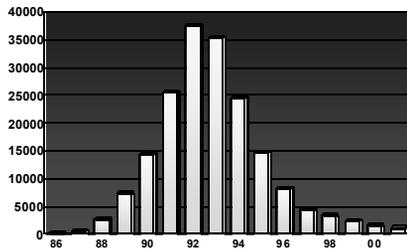
**Control Measures: Public Health
AND Animal Health**

- ◆ Protect public health – high risk tissues and/or animals
- ◆ Prevent recycling of agent to other cattle – feed bans



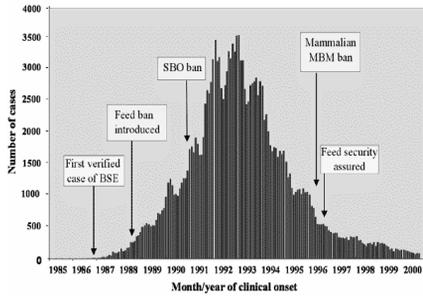
03M-0212 © Ferguson

**Confirmed Cases of BSE in
Great Britain by Year of Restriction
(1986 – 31 Dec 2001)**



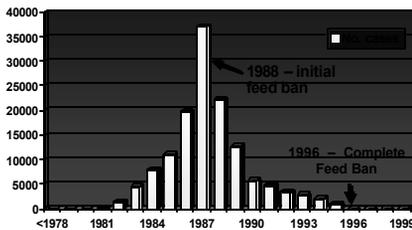
03M-0212 © Ferguson

UK BSE Epidemic



©3M-Q212, © Ferguson

UK: Confirmed Cases by Year of Birth



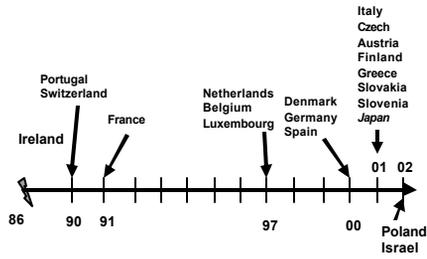
©3M-Q212, © Ferguson

UK DEFRA Control Measures

- ◆ Mammalian protein to food animal feed ban
- ◆ Over-30 month scheme
- ◆ Selective cull, offspring cull
- ◆ SRM/SBO bans

©3M-Q212, © Ferguson

BSE Occurrence Worldwide (Non-UK)



©3M-0212, © Ferguson

Total Cases Worldwide

Austria	1	Japan	7
Belgium	114	Liecht.	2
Canada	1	Luxemb.	2
Czech	9	Netherl.	60
Denmark	12	Poland	7
Finland	1	Portugal	781
France	847	Slovakia	12
Germany	247	Slovenia	3
Greece	1	Spain	310
Ireland	1262	Switz.	446
Israel	1	Total Non-UK	4208
Italy	86	UK	183,191

©3M-0212, © Ferguson

BSE: Annual Incidence Rate (No. of Cases per Million Adult Bovines)

	1992	2000	2001	2002
UK (Gr. Brit)	7596.78	298.33	258.24	247.80
Switzerland	15.5	40.6	49.1	27.93
Portugal	0	186.95	137.88	107.80
France	0	14.73	19.70	20.96
Ireland	5.14	38.17	61.80	88.39
Germany	0	1.07	19.97	17.02

©3M-0212, © Ferguson

BSE: Control Measures in EU

- ♦ SRM bans – material from sheep, goats, cattle (October 2000)
- ♦ Prohibit feeding of most processed animal proteins to farmed animals (Jan 2001)
- ♦ Test all cattle >30 months at slaughter
- ♦ Surveillance and control for other TSE's

03M-0212-2: Ferguson

EU BSE Testing: Jan–Dec 2001

- ♦ Suspect – reported as clinical suspects
- ♦ Risk animals – dead on farm, emergency slaughter, ante-mortem condemn
- ♦ Healthy animals – >30 months normal slaughter
- ♦ Eradication – birth cohorts, feed cohorts, offspring, herd culls

03M-0212-2: Ferguson

EU Testing: Jan-Dec 2001

	Samples	Positive	% Positive
Risk	776,266	756	.09%
Em sltr	96,774	324	.33%
A-m CNS	27,991	34	.12%
Fallen	651,501	397	.06%
Healthy	7,677,576	279	.0036%
Suspect	3,267	1103	33.76%

03M-0212-2: Ferguson

EU Testing: 2001-02

	2001	2002
Emer sltr	96,774	182,143
Fallen stock	651,501	984,973
Ante-mor CNS	27,991	71,501
Healthy sltr	7,677,576	9,124,887
BSE cull	59,118	57,720
BSE suspect	3,267	2,658
TOTAL	8,516,227	10,423,882

03M-0212-2 Ferguson

USDA ACTIONS: Prevention and Surveillance

- ◆ Import Regulations
- ◆ Feed Ban
- ◆ Surveillance
- ◆ Formal Risk Assessments
- ◆ Response Plan



03M-0212-2 Ferguson

Import Regulations

- ◆ Import Restrictions - countries with BSE
 - July 1989 - live ruminants
 - November 1989 - ruminant products
 - 1991 - formal regulations
- ◆ Import Restrictions - Europe
 - December 1997
 - All live ruminants and most
 - Ruminant products



03M-0212-2 Ferguson

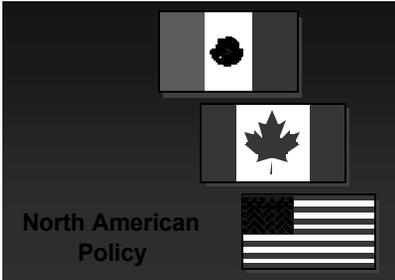
Import Regulations

- ◆ **Import Restrictions - Europe**
 - December 2000 - all meat and bone meal (MBM), etc. regardless of species
- ◆ **Evaluations of other countries underway**



03M-0212-2F Ferguson

Import Policies and Regulations



03M-0212-2F Ferguson

Feed Ban

- ◆ **FDA Authority - 1997**
- ◆ **Prohibited to feed most mammalian proteins to ruminants**
- ◆ **Exceptions:**
 - milk
 - blood
 - gelatin
 - plate waste
 - pure equine/pure porcine

03M-0212-2F Ferguson

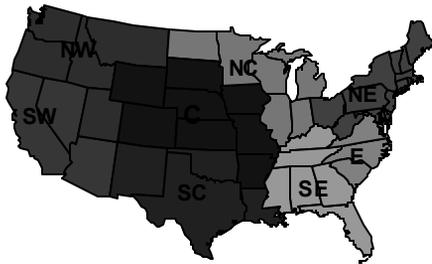
Surveillance

- ◆ Field CNS Cases
- ◆ Veterinary Diagnostic Laboratory data
- ◆ Public health laboratories
- ◆ CNS condemns at slaughter
- ◆ "Downers"
- ◆ Dead stock



03M-0212-2 Ferguson

Surveillance: US Regions



03M-0212-2 Ferguson

U.S. Surveillance

- ◆ Regional goals – OIE standards doubled for FY 2001
- ◆ FY 2002 and 2003 goals – 12,500 national total
 - 1 in 1,000,000
 - Regions distributed based on adult dairy population

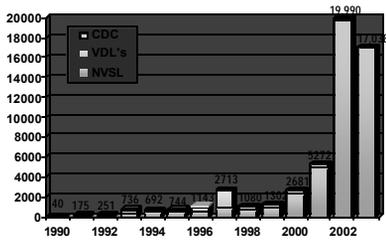
03M-0212-2 Ferguson

U.S. Regional Goals BSE Surveillance (thru 8/31/03)

	FY01 Goal	FY01	FY02 Goal	FY02	FY03 Goal	FY03 (thru 8/31)
NW	564	695	1,205	2,224	1,205	739
SW	466	564	1,976	2,753	1,976	3,262
C	766	332	1,590	2,356	1,590	2,241
SC	734	872	1,509	1,810	1,509	1,177
NC	606	620	2,561	3,780	2,561	4,617
NE	462	805	2,140	2,190	2,140	2,173
E	312	401	363	1,381	363	424
SE	644	953	1,005	3,156	1,005	2,402

03M-0212-3 Ferguson

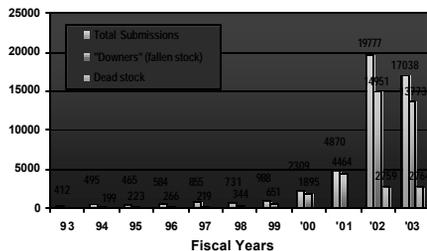
BSE Surveillance: Yearly totals May 1990 – FY 2003 (Aug 31, 2003)



Total since 1990 = 53,857 No evidence of BSE detected

03M-0212-3 Ferguson

Surveillance: NVSL Bovine Brain Submissions FY 93-03 (through Aug 31, 2003)



No Evidence of BSE Detected

03M-0212-3 Ferguson

Formal Risk Assessments



**USDA : Veterinary
Services – 1991
Harvard School of
Public Health
Tuskegee University
– 1998**

03M-0212-3 Ferguson

Harvard / Tuskegee Risk Assessment

- ◆ Describe potential pathways of BSE infectivity into national herd or food supply
- ◆ Characterize and quantify steps in pathways
- ◆ Identify key steps for research or risk management
- ◆ Computer simulation model to predict spread if BSE entered USA

03M-0212-3 Ferguson

Harvard / Tuskegee Risk Assessment - Outcomes

- ◆ U.S. is very resistant to BSE
- ◆ Little human exposure potential
- ◆ If BSE did enter U.S., would die out and not result in outbreak situation
- ◆ Feed ban is key to protection

03M-0212-3 Ferguson

Canada: BSE, May 2003

- ♦ **May 20, 2003 – confirmation that a single cow positive for BSE**
- ♦ **Commercial cow-calf – northern Alberta**
- ♦ **Part of targeted surveillance program**

03M-0212-3 Ferguson

Canada – BSE, May 2003

- ♦ **May 20, 2003**
 - **Imposed import restrictions – live ruminants and most ruminant products prohibited**
 - **Published in Federal Register, May 29**
- ♦ **August 8, 2003**
 - **Allow imports of 'low-risk' products**
 - **Hunter harvest wild ruminant – immediately**
 - **Accept import permit applications for others**

03M-0212-3 Ferguson

Canada – BSE, May 2003

- ♦ **Low-risk products – Aug 8 announcement**
 - **Finished pet chews – bone, ligaments, hides, hooves**
 - **Bovine liver**
 - **Veal (include carcasses) from animals 36 weeks of age or less**
 - **Boneless sheep/goat meat from animals 12 months of age or less**
 - **Boneless bovine meat from animals 30 months of age or less**
 - **Cervine meat**
- ♦ **Future rulemaking process**

03M-0212-3 Ferguson

U.S. Actions - ? Future

- ◆ **Response to Canadian situation**
 - **Consider domestic policy options, including surveillance, SRM removal, feed ban, animal identification**
 - **Surveillance options**
 - Existing levels
 - Double (40,000)
 - Major increase (380,000)

03M-0212-4 Ferguson

www.aphis.usda.gov/lpa/issues/bse/bse.html

03M-0212-4 Ferguson
