Badgers & Bovine TB

OR

VICTIMS VILLIANS

Dr Margaret Stoddart

BSc BVetMed PhD DVR MRCVS

Is Bovine TB (bTb) a public health risk?

- In 1930's about 50,000 cases of bTb a year resulting in about 2,000 deaths annually

- Introduction of pasteurisation of milk and tuberculin testing to identify and remove infected cows from herds means bTb no longer a public health problem in UK

Why do we need to do anything about bTb ?

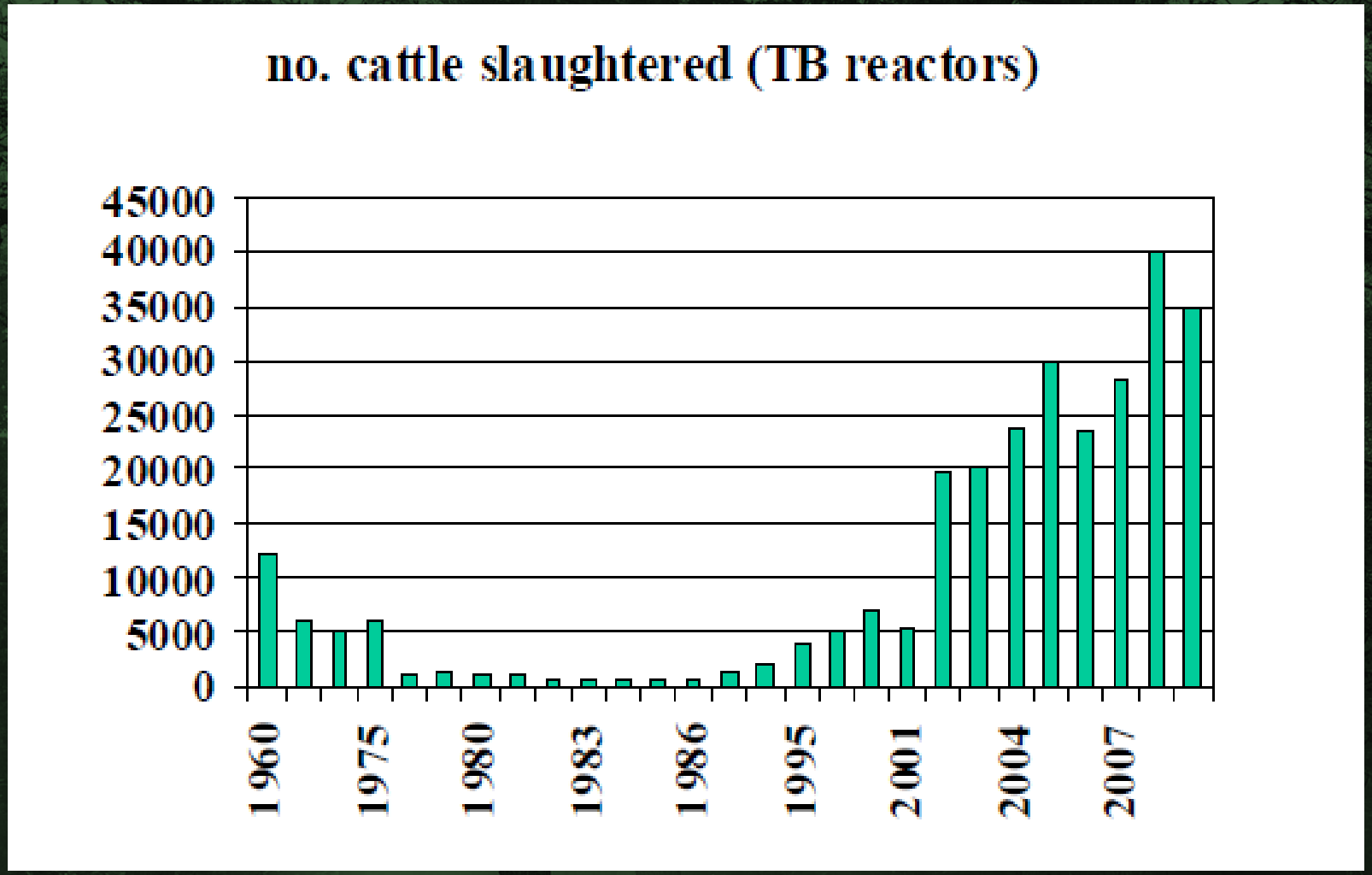
- European Legislation demands we have an eradication policy
- Problem in England and Wales v rest of UK and Europe

bTb in England and Wales

- Bovine TB is GB's biggest endemic animal health issue, costing the taxpayer around £90m in 2010/11 in England
- 3,622 new TB incidents in 2010. A 7.5% increase on 2009
- Proportion of cattle farms in England under restriction at some point in the year due to a TB incident is 10.8% The proportion was 22.7% in the South-West
- Around 25,000 cattle were slaughtered for TB control in England in 2010

bTb 1950's to 2010

- 1950's current eradication program began and by 1960 all herds had been tested at least twice and all reactors had been slaughtered
- By late 1980's incidence was very low
- Since then year on year increase


no. cattle slaughtered (TB reactors)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1960
1975
1980
1983
1986
1995
2001
2004
2007

What changed in 1980's

- Farming methods
- Badgers

Farming methods

- bTb problem mainly in high cattle density areas
- Intensification
- Cattle breeds
- Production pressure
- Interaction with other diseases BVD

Badgers

- Badger baiting made illegal 1835
- Digging for badgers made illegal 1973
- 1992 The Protection of Badgers Act made it illegal to damage, destroy or obstruct setts as well as kill badgers

Badgers

- 1971 first dead badger with bTb found in Cotswolds
- Road kill surveys
- Other wildlife

Incidence of bTb

% *M. bovis* in wildlife species

Mink	0.6	Rat	1.2
Deer	1.0	Ferret	3.8
Fox	1.0	Badger	4.0
Mole	1.2		

Is bTb transmitted between cows and badgers?

- Excreted in cow faeces, variable survival time on pasture from a few days to 2 months

- Excreted in high levels in badger urine up to 300,000 bacteria per ml of urine is not uncommon

Cow to cow transmission

- Bacteria found in saliva, urine, milk and droppings
- Infection by inhalation or ingestion
- Animals under stress from poor housing or intensive farming are also more susceptible
- More common in dairy herds than beef herds

The disease in cattle and badgers

- Various body systems can be affected, but predominantly the respiratory system in both species
- Walled off in cattle
- Disseminated in badgers
- Behavioural changes in infected badgers

Control of the disease

- Increased testing
- Pre and post movement testing
- Biosecurity
- Vaccination cattle
- Badgers culling/vaccination

More testing

- Wales annual testing
- England variable
- Pre movement testing
- Post movement testing

The TB test in cattle

- Tuberculin skin test is the primary test approved by the EU
- It measures hypersensitivity to bovine and avian TB
- An area of skin is clipped and a small volume avian and bovine tuberculin is injected intradermally
- The reaction to each injection is measured with callipers

Interpretation of the test

- If the reaction to the bovine TB exceeded that of the avian TB by a certain margin the animal is deemed a reactor and slaughtered
- If the reaction is at a certain level the animal is deemed an inconclusive reactor and is retested if positive or inconclusive on second test slaughtered
- If the reaction of the avian TB is greater than the bovine TB then the animal is negative

Problems with the test

- Handling of cattle
- Quality assurance of test
- Visible lesions on PM and culture
- Anergy
- Sensitivity v Specificity
- Screening v Diagnosis

Gamma interferon test

- Gamma interferon is produced after stimulation of the WBC's by *M. bovis*
- Good sensitivity can detect infected animals sooner than with tuberculin test
- Specificity marginally less good than tuberculin test

Gamma interferon test

- Can be repeated more frequently than 60 days
- Approved by EU as an ancillary test
- Useful used in combination with tuberculin test in breakdowns detects a different subset of infected population than the tuberculin skin test

Biosecurity

- Intensive action area in Wales
- Movement from herd to herd in different areas albeit owned by same person
- Reducing badger access
- Other diseases eg BVD
- Feeding of colostrum

Cattle vaccine

- Lead candidate BCG but will sensitise animals to tuberculin test
- Currently cannot use milk from animals that test positive, but some meat from reactors can enter food chain
- Need to alter EU legislation to allow the use of vaccine and a test that differentiates between vaccination and infection

Cattle vaccine

- Best use of vaccination still under debate? Compulsory vaccination of all animals/ selected herds, certification issues and cost and who will pay for vaccination
- Vaccine and DIVA test unlikely before 2015

Badger vaccine

- Injectable vaccine licensed March 2010
- Research into oral vaccine is ongoing
- Forms part of the control program in England

Badger vaccine recent report

- Experimental challenge with captive badgers
- Field studies with the Badger BCG vaccine

Badger culling

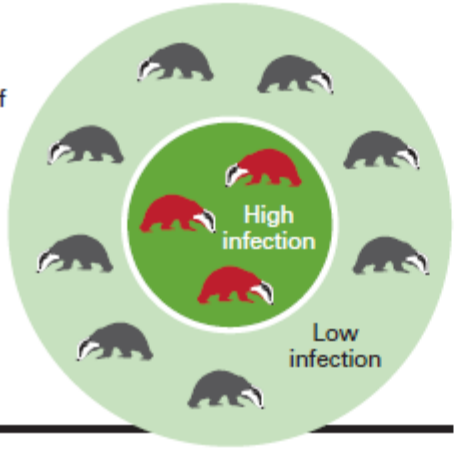
- Results of RBCT on badger culling
- Perturbation effect
- Selective use of vaccine and culling

Results of Badger culling Trials

	Area (sq km)	culling	herd outbreaks
Thornbury	104	100%	Clear for 10 years
Steeple Leaze	12	100%	Clear for 7 years
Hartland Point	64	>80%	80-90% reduction – 10y
East Offaly	738	>80%	88% reduction – 7y
Four Counties	100 x 4	>80%	60-80% reduction
RBCTs	100 x 10	30 – 70%	19 -23% reduction inside 22- 29% increase outside

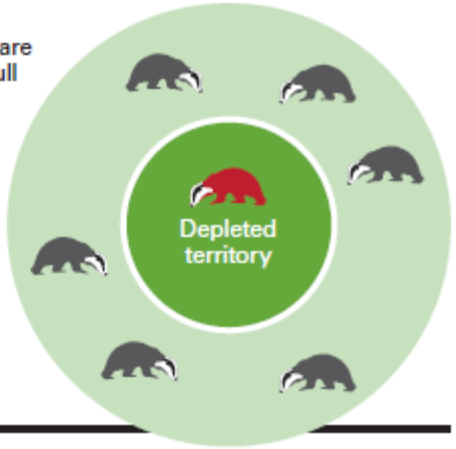
1 PRE-CULL

In a stable badger population, there is limited movement of badgers from one area to another. Badger setts harbouring high levels of bovine TB infection tend to remain relatively separate



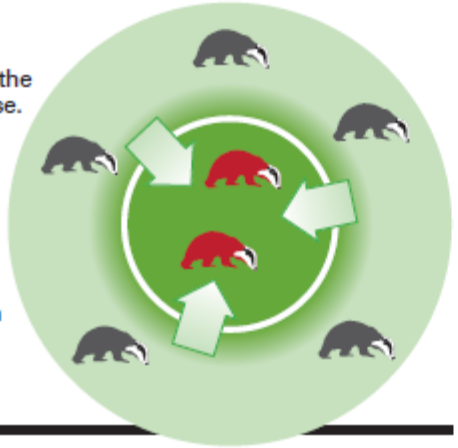
2 IMMEDIATELY POST-CULL

Once most badgers are removed from the cull area, a new territory opens up allowing badgers to come in from the surrounding areas



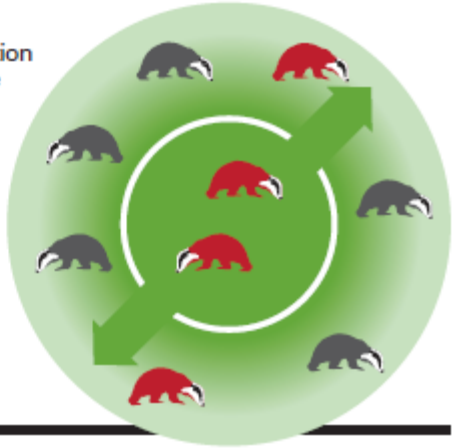
3 BADGER MOVEMENTS INCREASE

Badger movements around and beyond the infected area increase. Immigrant badgers pick up the infection from abandoned setts and unculled infected animals. Badger-to-badger transmission increases along with the likelihood of badger-to-cattle transmission

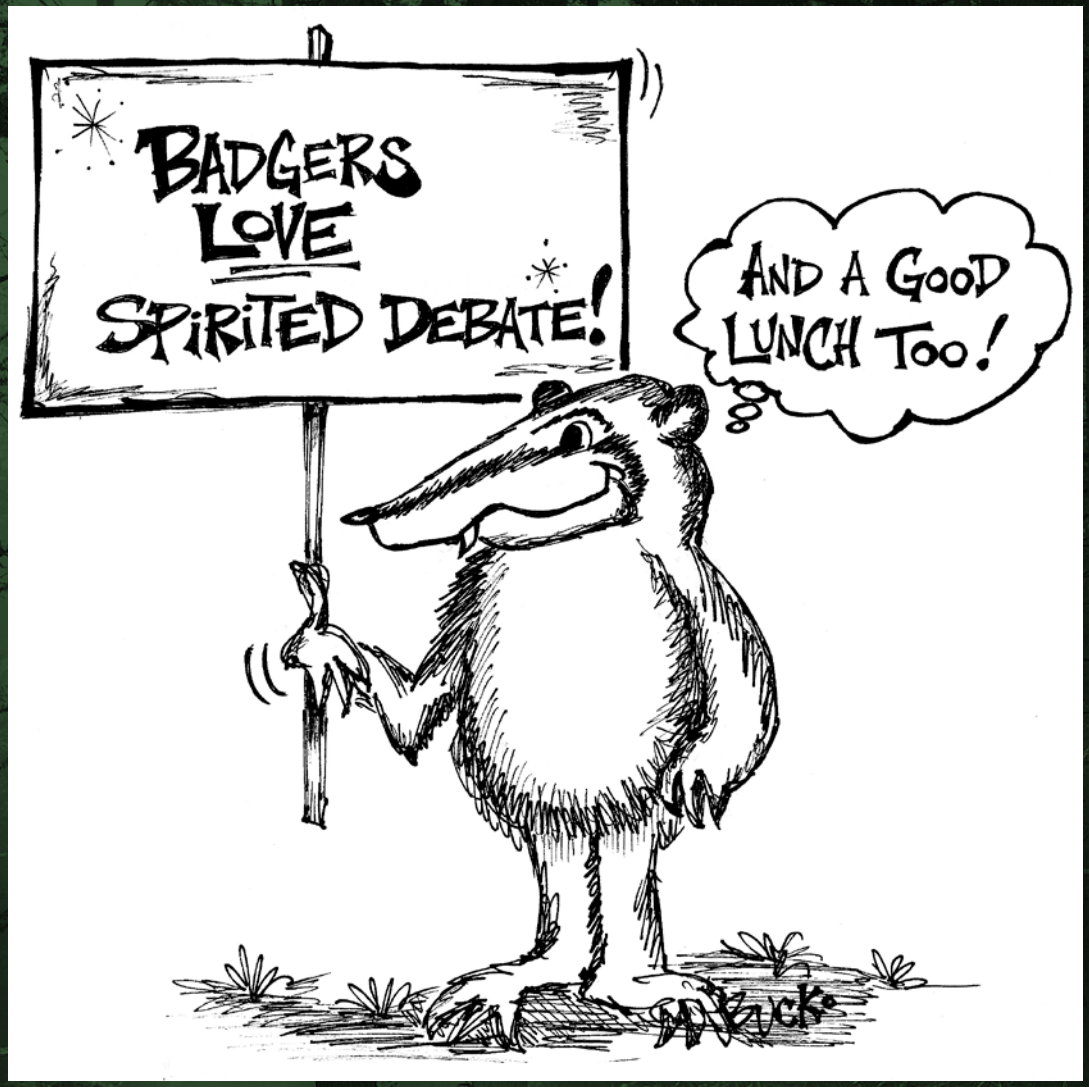


4 NEW EQUILIBRIUM

Because the population is still lower than the carrying capacity of the total area, badgers move around much more than they did before the cull. The movement distributes the original infection over a wider area



Selective use of vaccine and culling


BADGERS LOVE SPIRITED DEBATE!
AND A GOOD LUNCH TOO!