

Sheep Health Pathway Meeting 5

16 December 2021

Iceberg diseases of sheep

Dr Lis King, Senior Research Scientist, Animal Health & Welfare



BEEF & LAMB

Aim

- Part 1 (45 mins):
 - Recap of the 5 iceberg diseases
 - Suggestion for flock level screening plan
 - Discussion & agreement
- Part 2 (20 mins)
 - Suggestions for a national control plan
 - Discussion & agreement



- Nicky Robinson, Summerleaze Veterinary Practice
- Dr Katie Waine, University of Nottingham
- Emily Gascoigne, Synergy Veterinary Practice
- Ben Strugnell, Farm Post Mortems Ltd
- Izzy Wilkinson, Innovis
- Fiona Lovatt, Flock Health Ltd
- Dr Peers Davies, University of Liverpool (Project Lead).

A flock level plan

- **Considerations**

- **Complex!**
- Needs veterinary involvement
- Implications of results
 - Trade
 - Available control options
- Costs
 - Vet time
 - Screening
 - Vet follow-up
 - Control costs

- **Draft plan:**

1. Safeguarding flocks critical

- Biosecurity
 - Quarantine
- } Part of review & health plan

2. Screening:

- Down to individual vet-farmer discussion
- Financial support package required for screening & vet time x 2

The 5 diseases

- 
- An iceberg floating in the ocean. The tip of the iceberg, which is visible above the water, represents the five diseases listed on the right. The much larger part of the iceberg, which is submerged below the water, represents the broader impact and economic costs of these diseases.
1. Border Disease (BD)
 2. Caseous Lymphadenitis (CLA)
 3. Maedi-Visna (MV)
 4. Ovine Paratuberculosis/Johne's (OJD)
 5. Ovine Pulmonary Adenomatosis (OPA)

Abortions



Barren ewes

Small weak lambs



Thin, wasting ewes

Higher culling rates

Reduced ewe longevity

Higher replacement costs

Border disease

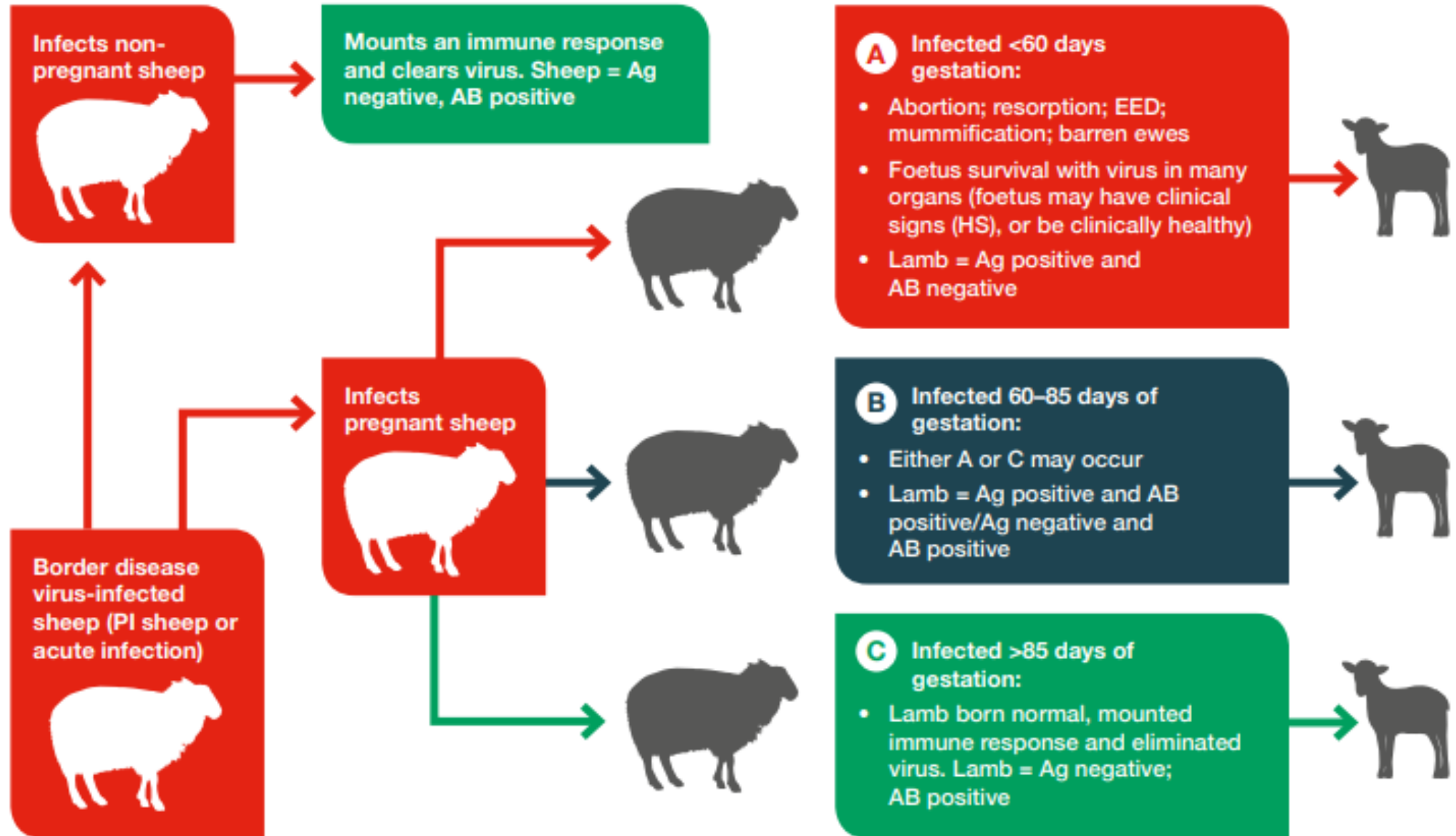
- Pestivirus – worldwide distribution
- Prevalence – estimated: 30 - 37%
- Closely related to BVD virus
- Cattle and sheep – relationship
- Implications – BVD Free England



Clinical signs

- Increased barren rate; early embryonic death; resorption; abortions
- Weak/poor/small lambs
- 'Hairy shaker' or PI lambs
- Increased lamb mortality/ reduced growth
- First year impact vs. subsequent years

BD transmission cycle



Key: Ag = antigen, AB = antibody, EED = early embryonic death, HS = hairy shaker, PI = persistently infected

The 5 diseases

1. Border Disease (BD)



Abortions
Barren ewes
Small weak lambs

2. Caseous Lymphadenitis (CLA)

3. Maedi-Visna (MV)

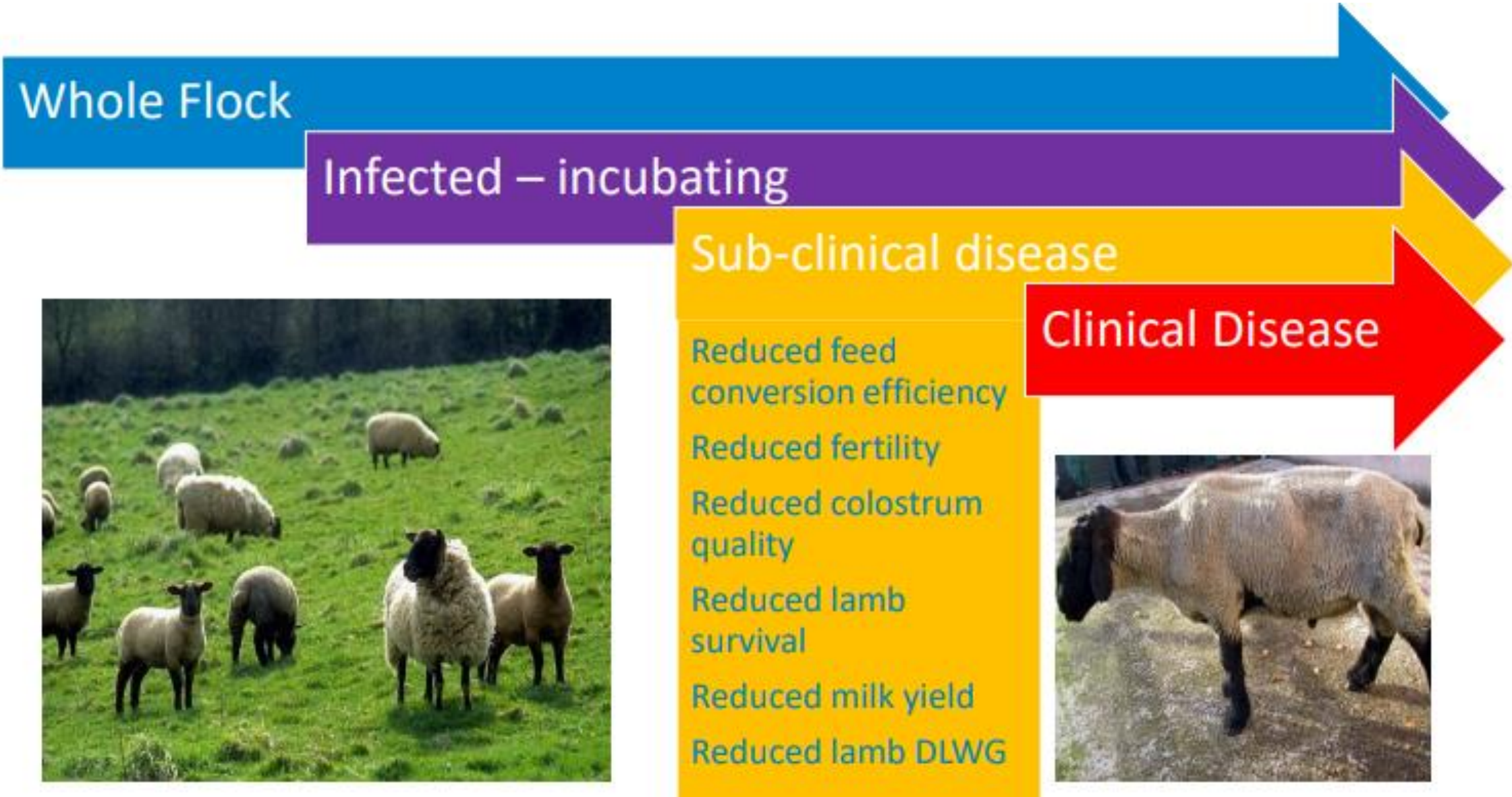
4. Ovine Paratuberculosis/Johne's (OJD)

5. Ovine Pulmonary Adenomatosis (OPA)



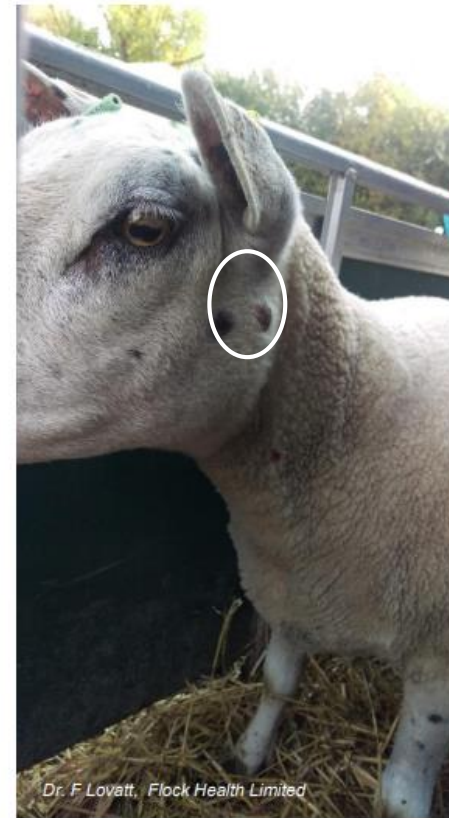
Thin, wasting ewes
Higher culling rates
Reduced ewe longevity
Higher replacement costs

Loss of production



Caseous Lymphaednitis (CLA)

- *Corynebacterium pseudotuberculosis*
– worldwide distribution
- Introduced into the UK 20-30 years ago
- Breeding rams - data suggests prevalence is highest among terminal sire breeders
- Data on impact on productivity - scarce especially in lamb production



Maedi Visna (MV)

- Retrovirus
- Very similar to CAE (goats) and OPA (sheep)
- Number of infected flocks is increasing – 2010 – 2.8%
- ‘Within flock prevalence’ – 5% - 80%
- Transmission – aerosol and milk



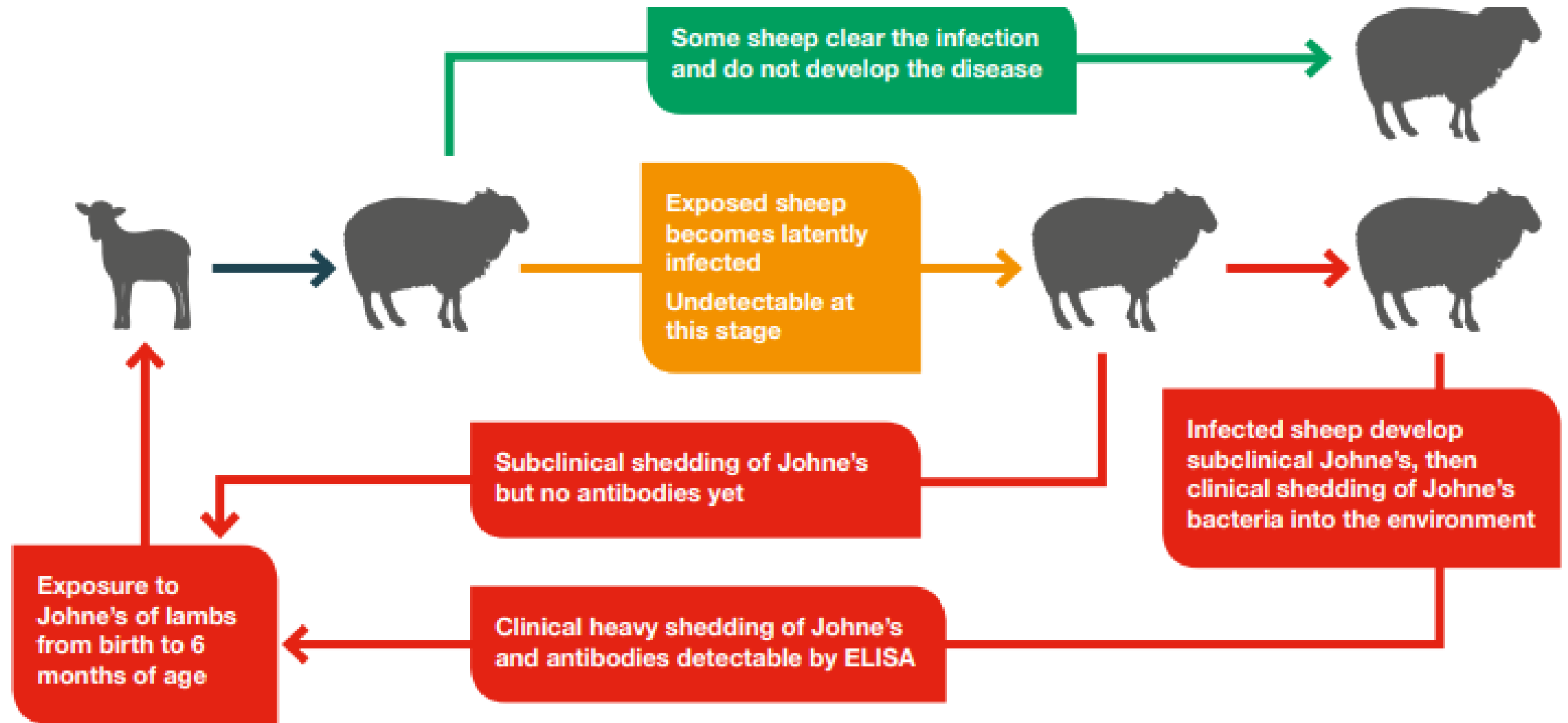
Photo source: Dr P. Davies, Pro Ovine Ltd

Ovine Johnes Disease (OJD)



- Same bacteria as the cattle form of disease
- *Mycobacterium avium* subspecies paratuberculosis (MAP)
- 'S – Type' and 'C – Type'
- Clinical signs
 - Weight loss
 - Low production
 - **NO** diarrhoea

OJD transmission cycle



Ovine Pulmonary Adenomatosis (OPA)

- Retrovirus - similar to MV
- The most difficult of all the diseases!
- Case reports - forced culling in endemically infected flocks of up to 20% in sheep as young as 2 years old
 - More commonly 4-10%
- Clinical signs
 - Respiratory signs
 - Weight loss

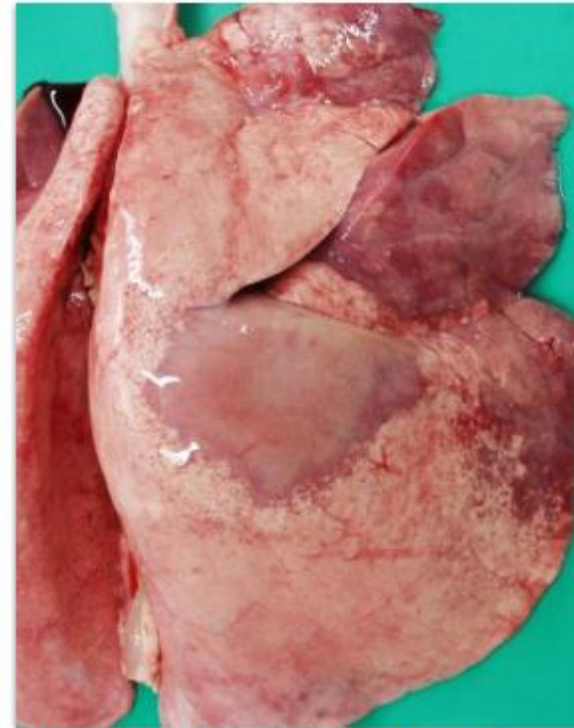


Photo source: Hal Thompson, Richard Irvine & Noelia Yusta; School of Veterinary Medicine, University of Glasgow



Most recent prevalence estimates of the proportion of infected flocks

Disease	Farm Level Prevalence
Maedi Visna	2% - 3%
CLA	4%
OPA	7%
Border Disease	30%
Johnes	> 65 %

Diagnosis and control: clinical situations

Diagnosis or Screening for Flock Health Status

What test ?
What sample size ?
What interpretation ?

Managing a flock with a recognised disease diagnosis

Eradication or Mitigation?
Test & Cull?
Vaccination?

Iceberg disease diagnosis in a **symptomatic** individual or group

BD	CLA	MV	OJD	OPA
Serology AB ELISA	Serology AB ELISA	Serology AB ELISA	Serology AB ELISA	Wheelbarrow test – definitive
PCR for antigen (blood or milk or potentially tissue)	Western Blot for confirmation	AGID for confirmation or by alternative ELISA	PCR for MAP in faeces	Transthoracic ultrasound

Post Mortem Examination

Iceberg disease screening for flock status

BD	CLA	MV	OJD	OPA
Serology AB ELISA In the most recent home bred lamb crop to detect recent exposure and viral circulation	Serology AB ELISA in a cohort of mature ewes and all rams	Serology AB ELISA in a cohort of mature ewes and all rams	Multiple pooled PCR for MAP in faeces from mature ewes esp low BCS ewes with or without culture is available	Cull ewe and fallen stock PME screening and histology Histology confirmation of lesions
PCR for antigen in purchased rams for PI status	Western Blot for confirmation	AGID for confirmation or by alternative ELISA	Serology AB ELISA is very very low sensitivity for flock screening in asymptomatic sheep so only reliable if very high proportion of ewes are sampled	Transthoracic ultrasound – with experience to help identify culls for PME

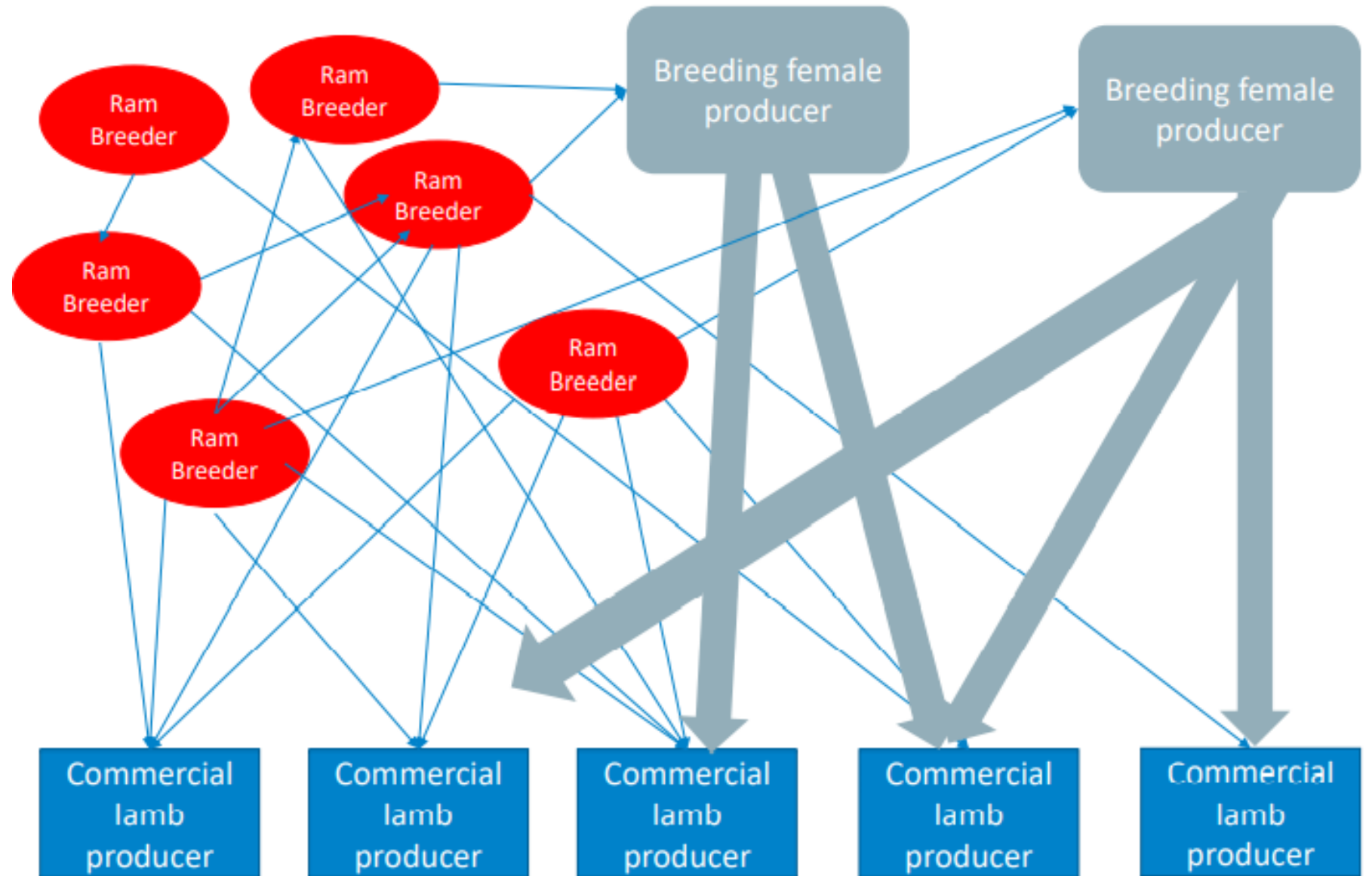
The appropriate sample size of sheep in each case depends upon:

- (1) The size of the flock
- (2) The threshold prevalence deemed to be important
- (3) The confidence required in the result by the owner

Disease control options

	BD	CLA	MV	OJD	OPA
Conservative approach will offer a level of control	Cull all lambs from crops with high incidence of disease to avoid retaining PI's	Aggressive cull on BCS and Clinical lymph node lesions	Aggressive cull on BCS and Clinical resp signs ??	Aggressive cull on BCS	Aggressive cull on BCS and Clinical resp signs
Strong Evidence for effective control or eradication		Eradication with Test and Cull using ELISA or Vaccinate with <i>Glanvac</i> as lambs	Eradication with Test and Cull using ELISA	Vaccinate with <i>Gudair</i> as lambs	
Limited or preliminary evidence for efficacy in control	Off licence use of BVD vaccine	Autogenous CLA vaccines			Transthoracic Ultrasound whole flock at 6 month intervals and cull

Sheep Breeding Network Within the UK



Currently available health schemes

Disease	Health scheme
BD	None
CLA	Discontinued due to lack of throughput
MV	PSGHS – 3200 members – 98% confidence of <5% prevalence at flock level
OJD	PSGHS – Fewer than 10 sheep members – risk based scheme
OPA	None

A flock level plan

- **Considerations**

- **Complex!**
- Needs veterinary involvement
- Implications of results
 - Trade
 - Available control options
- Costs
 - Vet time
 - Screening
 - Vet follow-up
 - Control costs

- **Draft plan:**

1. Safeguarding flocks critical

- Biosecurity
 - Quarantine
- } Part of review & health plan

2. Screening:

- Down to individual vet-farmer discussion
- Financial support package required for screening & vet time x 2

National level plan

- **Considerations**

- **Requires responsible breeders**

- Rams
 - Ewes

- But there needs to be demand / a driver ...

- **Draft plan:**

- Towards accreditation
 - Encourage breeder screening
 - Screening provides reduced risk - not 100% guarantee
- Build on existing health schemes:
 - Resource to build system
 - Financial support for breeders?
 - Industry support encouraging sales of accredited animals

A vibrant landscape photograph featuring a lush green field in the foreground, with a narrow path or furrow leading towards the horizon. The sun is setting or rising, creating a warm, golden glow across the sky and casting long, soft shadows. The sky is filled with scattered clouds, some of which are illuminated by the low sun. In the distance, rolling hills and a few small buildings are visible. The overall mood is peaceful and inspiring.

**‘Inspiring our farmers, growers
and industry to succeed in a
rapidly changing world’**

© Agriculture and Horticulture Development Board 2017 | All Rights Reserved