Session 3: Overcoming obstacles to on-farm biosecurity improvements.

9:00 – 9:20 Costs and benefits of biosecurity measures – George Gunn, Scotland’s Rural College Scotland’s Rural College (SRUC)

9:20 – 9:50 Concrete examples of joint initiatives for implementation and improvement of biosecurity:
- Bovine tuberculosis in France - Célia Lesage, GDS Dordogne (FESASS)
- Poultry sector in the United Kingdom - Daniel Pearson, Aviagen Ltd. (AVEC Poultry)
- Improved biosecurity on Spanish pig farms by innovative rodent control - Carlos Piñeiro, PigCHAMP Pro Europa S.L. (U.E.C.B.V.)

9:50 – 10:30 Breakout sessions
Three breakout sessions on actions to overcome obstacles and to stimulate innovation

10:30 – 11:00 Coffee break

11:00 – 11:45 Breakout sessions (continuation)

11:45 – 12:15 Reporting from the breakout sessions

Session 4: Relating the workshop outcomes to future activities

12:15 – 12:30 EIP-AGRI and Horizon 2020 - Pilar Gumma Solernou and Jean-Charles Cavitte, DG Agriculture and Rural Development

12:30 – 13:00 Plenary session to discuss the group work and follow up in view of future EIP-AGRI activities

13:00 – 13:15 Summary and next steps - Jean-Charles Cavitte, DG Agriculture and Rural Development

13:15 – 14:00 Lunch and end of the workshop
Costs and Benefits of Biosecurity Measures

Professor
George J Gunn

Epidemiology Research Unit
Inverness, Scotland
UK

Leading the way in Agriculture and Rural Research, Education and Consulting
Introduction

- Head of SRUC Epidemiology Research Team in Inverness; Director of EPIC; SRUC Professor of Population Medicine & Zoonoses; University of Glasgow Professor of Epidemiology

- One of five leaders of European project on BVD control & economics (2003-2006)

- Led several UK level projects on BVD and Biosecurity and Behaviour (2001 – 2010)

- One of five leaders (risk) of European project on developing Paratuberculosis (Johne’s disease) tests (2007-2010)

- Director of virtual Centre of Expertise on Animal Disease Outbreaks (EPIC) (2011- 2016)
Research evolved out of outbreak investigation for Veterinary Investigation Service

BVD V potentiating pneumonia; enteritis and reproductive problems in dairy and beef herds

Worked with Swedes, Danes and Norwegians on their BVD schemes. MSc at Guelph, Canada

Wrote original BVD programme for CHeCS and remain on technical committee

Research very applied ….. How to instigate change exploring control; prevalence; economics; behaviour
1. Prevalence
- Brulisauer 2010
- Humphry 2012
- Booth 2013

2. Economics
- Santarossa 2005
- Humphry 2004
- Saatkamp 2001
- Stott 2003
- Santarossa 2005
- Stott 2008
- Weldegebriel 2009

3. Disease Control
- Lindberg 2006
- Gunn 1994
- Gunn 2002
- Heffernan 2009
- McCormick 2009
- Gunn 2012

4. People Behaviour
- Duncan 2012
- Gunn 2008
- Heffernan 2008
- Gunn 2005
- Gunn 2002
- Stott 2003
- Gunn 2008
- Toma 2008
- Toma 2012
- Gunn 2004
- Humphry 2004
- Varo 2008
- Stott 2009
Vital Elements for Disease Control

1. Prevalence
2. Economics
3. Disease Control
4. People Behaviour
Risk Analysis - Generic

Risk Communication

Hazard Identification → Risk Assessment

Review → Risk Management

Risk Assessment → Risk Management
Risk Analysis - Generic

1. Prevalence
2. Economics
3. Control
4. Human Behaviour

Hazard Identification → Risk Assessment → Risk Management

Risk Communication

Review
Knowledge exchange for BVD control

Cost-benefit comparison for BVDV control options

BVD Risk Management

Review range of disease risks

Estimate size of BVD disease risk

Risk Analysis & Management of BVD
Knowledge exchange for BVD control

Cost-benefit comparison for BVDV control options

BVD Risk Management

Estimate size of BVD disease risk

Scottish Government-funded prevalence study

Review range of disease risks
BVD V prevalence
Exposure Assessment - BVDV

BVDV seroprevalence in young stock on Scottish beef suckler herds

Distribution of spot test results taken from young stock

Proportion of seroprevalence categories
Knowledge exchange for BVD control

Cost-benefit comparison for BVDV control options

BVD Risk Management

Scottish Government-funded cost-benefit study

Review range of disease risks

Estimate size of BVD disease risk

Risk Analysis & Management of BVD
Farm Level BVD Costs
BVD Ten Year Outbreak Losses

- Beef Herd no Intervention

£
Beef herd breakdown of losses

Total Cost = £38 per cow p.a.

- Reproductive Loss in Cows (17%)
- Reproductive Loss in Heifers (28%)
- Abortions (9%)
- PI Calves (18%)
- PI Cows & Heifers (16%)
- Calf Immune Suppression (7%)
- Other Calf Losses (5%)
Economic evaluation dairy herd

- 8% (4% - 11%) gross margin
- Cost of BVD outbreak over 10 years in large herd with low death rate for PI s and high milk price = £99K
- Range of £47K to £133K
- Cost of £33 per cow p.a.
Knowledge exchange for BVD control

UK Government-funded (DEFRA) biosecurity study

BVD Risk Management

Cost-benefit comparison for BVDV control options

Review range of disease risks

Estimate size of BVD disease risk

Risk Analysis & Management of BVD
Longitudinal Survey for Control Options
BVD review of progress in Orkney 2010
Risk Analysis & Management of BVD

Knowledge exchange for BVD control

Cost-benefit comparison for BVDV control options

DEFRA/QMS funded BVD longitudinal study

Estimate size of BVD disease risk

Review range of disease risks

BVD Risk Management
Risk Management Programme
Knowledge exchange for BVD control

Cost-benefit comparison for BVDV control options

BVD Risk Management

Review range of disease risks

Estimate size of BVD disease risk

BVD Risk Management funded disease priority study

Meat industry (QMS) funded disease priority study
Review Process
Perspectives on control of bovine viral diarrhoea virus (BVDV) in Europe – today and in the future. *OIE Scientific and Technical Review* 25 (3)

Farmer Behaviour linked to problems with BVD Risk Management on Farms
Vets’ opinions on what barriers are:

• “Lack of understanding of BVD; ignore warnings; no biosecurity”

• “Farmers are unaware of BVD infections in their herds until screened for and they are not aware of secondary issues i.e. poor production, fertility and increased pneumonia cases.”

• “Replacement policy is key. PI's need to be removed; In 95% of farms a correctly implemented vaccination protocol will lead to, and maintain freedom from disease.”

• “Over reliance on vaccination only as control of BVD. Need for cohort sampling and awareness of ongoing cost of BVD even in vaccinated herds.”
Farmers and biosecurity: determinants of behaviour

Luiza Toma¹, Alistair W. Stott¹, Claire Heffernan², Sian Ringrose¹, George J. Gunn³
Background

- Work commissioned by DEFRA - ‘An integrated approach to biosecurity on UK cattle and sheep farms; evaluating existing measures for endemic diseases against exotic threats - Extension’ (2009-2010)

- Quantitative analysis of determinants of biosecurity behaviour of cattle and sheep farmers in England, Wales and Scotland
Overall the structural equation model explains 64% of the variance in biosecurity behaviour.

Factors significantly influencing farmers’ biosecurity behaviour are:

- perceived importance of specific biosecurity strategies;
- organic certification of farm;
- **KNOWLEDGE ABOUT BIOSECURITY MEASURES**;
- attitudes towards animal welfare;
- **PERCEIVED USEFULNESS OF BIOSECURITY INFORMATION SOURCES**;
- perceived effect on business during the past five years of severe outbreaks of animal diseases;
- membership in a cattle/sheep health scheme;
- attitudes towards livestock biosecurity;
- **INFLUENCE ON DECISION TO APPLY BIOSECURITY MEASURES**;
- Age/experience;
- Herd size.
What about poultry?
Catcher (chicken) survey

- At least 30% of catchers did not know what was meant by biosecurity although ~80% could describe the procedures.

- Disinfection of vehicles at the farm gate, use of clean PPE, disinfection of footwear on entering/leaving poultry house (max ~50% compliance).

- Disinfection of forklift when leaving farm or factory (>90%).

Sparks et al., 2011
Campylobacter study

- **Campylobacter** positive:
  - 47.1% pre-thin,
  - 79.9% post-thin (P<0.0001)

- Analysis indicates that prior to thinning fewer negative farms and fewer positive farms (P=0.046) (Sparks et al., 2014)

- Canadian data: <50% compliance unless observed by camera (Racicot et al., 2012)

- Medical hand-hygiene compliance rates (Erasmus, 2012)
  - Intensive Care Units = 40-50%
  - Non-ICU wards = 50-60%
Economics of biosecurity

• For the *Campylobacter* study…
• *Campylobacter*-negative farms (at thin) had better (p<0.01) FCRs than farms that were positive (1.666 vs 1.690)
• Causal or is absence of *Campylobacter* indicative of better biosecurity overall and hence reduced disease challenge?
• Either way it equates to £20/1000 birds or typically £600+/house (typical margin for a chicken farm = 2p/bird)
What about exotic diseases?
Numbers of holdings affected by diseases of the former OIE List A in GB in 1938 to 2007 and major disease control measures introduced.
Exotic Disease Threats?

Described by: Prevalence x Impact

- Calculated for diseases identified at cattle and sheep industry workshops
- Data gathered from existing sources
- Validated with industry workshops
Horizon scanning matrix

[Graph showing a matrix with impact scores and risk of incursions for different diseases represented by various symbols and colors.]
Horizon scanning matrix
SBV Risk - A normal year
Arbovirus range limit analysis

BTV -8 bluetongue v 8
Conclusions 1

• There are a few main points from my presentation that I would like to emphasise again.

• Farmers and veterinarians often reject the concept of risk analysis but although it is something we all do every day

• We already have a great deal of information about BVD V infection with excellent tests and proven control methods
Conclusions 2

• We can all benefit from the structured framework offered by risk analysis

• It is a valuable way of organising results from complementary studies and identifying the most important knowledge gaps

• We have presented BVD V infection in Europe as an example of this
Conclusions 3 - the major points:

- Frequent review with farmers /other stakeholders **essential**
- Understanding stakeholder **behaviour and biosecurity critical**
- Reinforced need for **fantastic** knowledge exchange **effort**
- Farmers behave differently in different countries
  - find out the issues for country/region
- Our **Centre of Expertise for Animal Disease Outbreaks EPIC** is going to develop this **integrated research approach** for important infectious diseases