



**Annual Scientific Conference and
Annual General Meeting of the
European College of Veterinary Public Health**

***"Membership of the European Union – Challenges for
Veterinary Public Health"***

Edinburgh, 2nd – 4th October 2019



Proceedings of the Annual Scientific Conference and the Annual General Meeting of the European College of Veterinary Public Health, 2-4 October 2019 , Edinburgh, UK

Editors: Alessandro Seguino and Bojan Blagojevic

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Programme

Scientific Conference and Annual General Meeting

“Membership of the European Union: Challenges for Veterinary Public Health”

The Royal (Dick) School of Veterinary Studies
University of Edinburgh
Edinburgh, United Kingdom

2nd to 4th October 2019

PROGRAMME

Wednesday 02.10.19

Venue: [John McIntyre Conference Centre, the University of Edinburgh](#)

17:00– 19:00 **Residents meeting** (all residents and interested diplomates are welcome)

Venue: [John McIntyre Conference Centre, the University of Edinburgh](#)

18:30 – 20:00 **Conference registration opening**

19:00 – 21:00 **Welcome evening: networking and standing dinner**

Thursday 03.10.19

Venue: [John McIntyre Conference Centre, the University of Edinburgh](#)

08:30 – 09:00 **Conference registration**

09:00 – 09:15 **Welcome and opening address**

- Prof David Argyle Head of the Royal (Dick) School of Veterinary Studies and Roslin Institute, The University of Edinburgh
- Prof Susan Rhind Director of Veterinary Teaching and Deputy Head of the Royal (Dick) School of Veterinary Studies, The University of Edinburgh

09:15 – 10:15 **Keynote Lecture 1**

- 09:15 – 10:00 Dr Robert Huey (Chief Veterinary Officer for Northern Ireland, DARD)
 - *‘Delivering SPS Controls in uncertain times’*
- 10:00 -10.15 Open Session for discussion (Chair: Dr Ed Van Klink)

10:15 – 10.45 **Coffee break and poster viewing**

10:45 – 11:30 **Selected oral presentations from posters** (Chair: Dr Bojan Blagojevic)

- 10.45-10.55 Dr Brian Friker *'Assessing the microbiological quality of raw goat's and ewe's bulk-tank milk samples in Switzerland'*
- 10.55-11.05 Dr Lisa Guardone *'The slaughterhouse as an epidemiological observatory: analysis of inspection data from a pig abattoir serving North and Central Italy'*
- 11.05-11.15 Dr John Tulloch *'An audit of animal-related injuries at UK veterinary schools'*
- 11.15-11.25 Dr Julie Pont *'Assessment of income of veterinary practices due to sales of antimicrobials to veal calf producers in Switzerland'*

11:30– 12:30 **Keynote Lecture 2**

- 11:30– 12:15 Prof Geoff Simm (Director of the Global Academy for Agriculture and Food Security, The University of Edinburgh)
 - *'Towards Global Food Security – challenges and opportunities'*
- 12.15 – 12.30 Open Session for Discussion (Chair: Prof Len Lipman)

12:30 – 14:00 **Lunch**

14:00 – 16:00 **Workshops**

1. *"One health game; crossing the borders within the EU"* (Prestonfield Seminar Room)
 - Prof Jeroen Dewulf and Dr Moniek Ringenier, Ghent University
2. *"Risk-based meat inspection and integrated meat safety assurance at abattoir level"* (Holyrood Seminar Room)
 - Dr Dragan Antic, University of Liverpool and Prof Kurt Houf, Ghent University
3. *"Insight into the wild game sector and challenges to deliver safe and quality product"* (Salisbury Seminar Room)
 - Dr Cristina Soare, University of Edinburgh and Prof Dominic Mellor, University of Glasgow

16:00 – 16:30 **Coffee break and poster viewing**

16:30 – 18:00 **ECVPH Annual General Meeting** (restricted to ECVPH members)

Venue: [South Hall, Pollock Halls](#)

19:30 – 23.59 **Conference Gala Dinner with Ceilidh (traditional Scottish dance)**

Friday 04.10.19

Venue: [John McIntyre Conference Centre, The University of Edinburgh](#)

09:00 – 10.30 **Challenge session - Sustainability for Livestock Production** (Chair: Dr Lisa Boden)

- Dr Derk Oorburg – *"The Industry perspective on sustainable livestock production"* (Director of Quality Assurance, Vion Food Group).
- Prof Bruce Whitelaw - *"Genome editing for fitter, healthier and more productive farmed animals"* (Professor of Animal Biotechnology, The Roslin Institute).
- Dr Kirsten Shields - *"The International Law perspective on food security"* – (Lecturer at The Global Academy of Agriculture and Food Security, The University of Edinburgh).

10:30 – 11:00 **Coffee break and poster scoring**

11.00 – 12.00 **Keynote Lecture 3**

- 11.00 – 11.45 Dr Klaus Depner (Friedrich-Loeffler-Institut)
 - *“African swine fever and lessons learned in affected countries (what is being done, what is working and why something is not working”*
- 11:45– 12.00 Open session for discussion (Chair: Dr Søren Saxmose Nielsen)

12:00 – 13.00 **Closing Ceremony**

- Feedback from Workshops
- Poster prize
- Diploma Ceremony and pictures taken
- Presentation of the next year’s venue
- Closing session.

13:00 – 14:00 **Packed Lunch and fair well**

ECVPH Scientific Conference and AGM Local Organisers:

- Dr Alessandro Seguino (alex.seguino@ed.ac.uk)
- Dr Cristina Soare (cristina.soare@ed.ac.uk)

The ECVPH Scientific Conference is supported by:



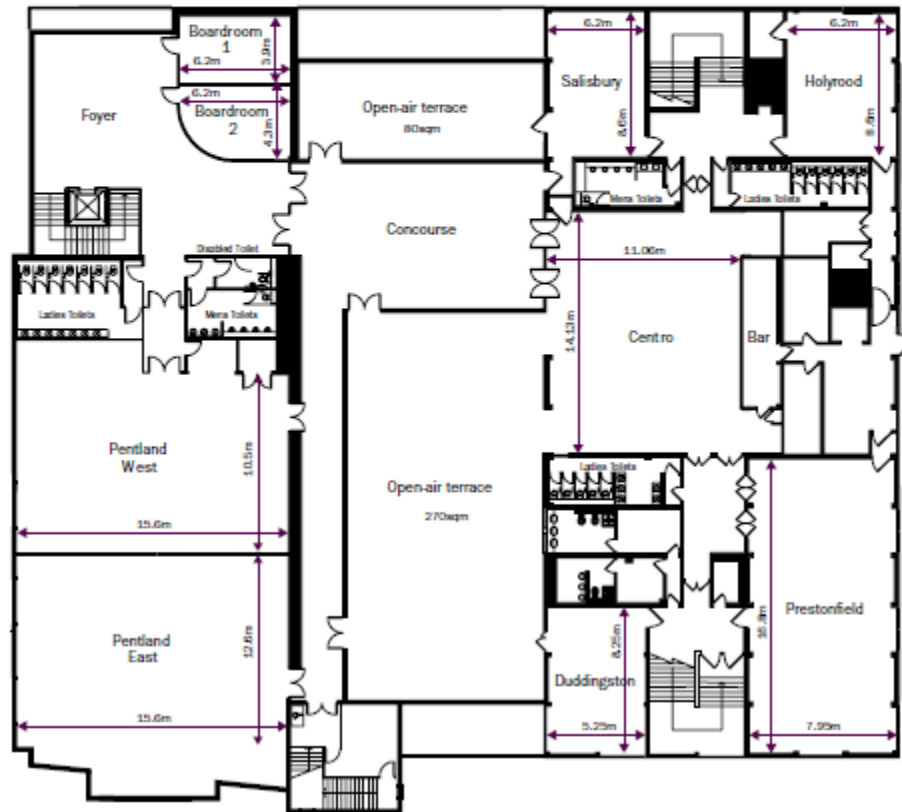
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<https://ecvph.org/>

JOHN McINTYRE CONFERENCE CENTRE

First-floor space



Presidential foreword

Dear Colleagues and Friends,

I would like to welcome you to this year's Annual Scientific Conference and the Annual General Meeting of the European College of Veterinary Public Health here in Edinburgh. We have drafted an interesting scientific programme which I am very much looking forward to. The theme of the conference seems particularly appropriate for the current times. The keynote addresses, on sanitary and phytosanitary controls, global food security and lessons learned from the African swine fever outbreak speak volumes on this theme and will provide us with ample opportunity for discussion. We have an impressive range of posters, as usual, with several being presented. As you are used to, our challenge session has three interesting and relevant topics as well.

I am looking forward to an interesting and inspiring conference and I hope to meet many of you during the days and of course during the conference dinner.

Yours,

Ed van Klink

ECVPH President

Scientific Committee

Ed van Klink, School of Veterinary Science, University of Bristol, United Kingdom

Jeroen Dewulf, Department of Reproduction Obstetrics and Herd Health, Ghent University, Belgium

Søren Saxmose Nielsen, Section of Animal Welfare and Disease Control, University of Copenhagen, Denmark

Kurt Houf, Department of Veterinary Public Health and Food Safety, Ghent University, Belgium

Eleni Iosifidou, Department of Hygiene and Technology of Food of Animal Origin, Aristotle University of Thessaloniki, Greece

Lisa Boden, EPIC- Centre of Expertise on Animal Disease Outbreaks, University of Glasgow, United Kingdom

Bojan Blagojevic, Department of Veterinary Medicine, University of Novi Sad, Serbia

Len Lipman, Institute for Risk Assessment Sciences, Utrecht, the Netherlands

Gerty Vanantwerpen, Dierengezondheidszorg Vlaanderen, Belgium

Andreas Wunsch, Veterinary Food Safety Expert, FS Training & Consultancy, Austria

Alessandro Seguíno, The Royal (Dick) School of veterinary Studies, The University of Edinburgh, United Kingdom

Organising Committee

Dr Alessandro Seguíno (alex.seguino@ed.ac.uk)

Dr Cristina Soare (cristina.soare@ed.ac.uk)

Sponsors

The ECVPH Scientific Conference is supported by:



THE UNIVERSITY of EDINBURGH
The Royal (Dick) School
of Veterinary Studies



Abstracts

Key note lectures



Biography – Dr Robert Huey

Robert Huey took up the position as Chief Veterinary Officer for Northern Ireland on the 11 November 2013.

He joined Veterinary Service in 1989, having spent five years in general mixed veterinary practice in Maghera, County Londonderry. After a period in general field duties, there followed a period teaching 'Animal Health' in Loughry Agricultural College, a general emersion in meat hygiene issues and promotion various policy and delivery roles. From 2002 to 2009 he was responsible for the delivery of DAERA meat hygiene services for the Food Standards Agency Northern Ireland.

He holds the RCVS Diploma in Veterinary Public Health (Meat Hygiene), and is co-author of the textbook 'Meat Hygiene'.

Robert has been involved in veterinary politics for many year. He has held the positions of President of the North of Ireland Veterinary Association, the Veterinary Public Health Association and the Union of European Veterinary Hygienists, a specialist section of the Federation of Veterinarians of Europe. He chaired the FVE Working groups on food hygiene and on the welfare of animals at slaughter, and held the position of Vice-President of the Federation of Veterinarians of Europe for 4 years.

He has participated in 10 EAEVE evaluation visits to veterinary faculties as food hygiene expert, the last three as chairman

In 2017 he was awarded a Fellowship by the RCVS and in 2018 an Associate Fellow of the Royal Agricultural Society. He is a Liveryman of the Worshipible Company of Butchers and a Freeman of the City of London.

Robert is married with two grown up children, and four grand-children. He and his wife own a small holding of 13 acres on which they keeps a few horses, cattle and sheep. Robert enjoys general pottering around the yard and garden and will watch just about any game involving a ball.

Title of the presentation: *"Delivering SPS Controls in uncertain times"*

Abstract

The talk will outline the challenges presented when contingency planning to deliver official controls in an uncertain environment. The speaker will describe, from his own experience and perspective, the last three years of planning and preparations and the unique challenges and opportunities which have emerged for the government veterinary services.



Biography – Prof Geoff Simm

Professor Geoff Simm is Director of the Global Academy of Agriculture and Food Security at the University of Edinburgh. This is one of five Global Academies in the University that aim to galvanize interdisciplinary teaching, research and translation on key global challenges. BSc and MSc programmes led by the agrifood academy aim to equip graduates to contribute to global food and nutritional security and wider Sustainable Development Goals. Geoff's research is in sustainable farm animal breeding and sustainable agri-food systems. He is a Senior Fellow of the Higher Education Academy, a Fellow of the Royal Agricultural Societies and a Fellow of the Royal Society of Biology.

Title of the presentation: *“Towards Global Food Security – challenges and opportunities”*

Abstract

Feeding the world's growing population well - while protecting the natural systems on which we all depend - is one of the greatest challenges facing humanity. Around a third of the global population is affected by one or more forms of malnutrition – be that hunger, obesity or micronutrient deficiency. Achieving sustainable, healthy diets underpins many of the Sustainable Development Goals – especially those concerned with hunger, poverty, health, gender equality, responsible consumption and production, and climate action. Geoff Simm outlines the challenges and some opportunities, including the scientific, policy and educational interventions most likely to achieve impact and change, and highlights the role of European Veterinary Public Health professionals.



Biography – Dr Klaus Depner

Doctor Klaus Depner graduated from the School of Veterinary Medicine Hannover, Germany in 1987 followed by a PhD at the Institute of Virology, School of Veterinary Medicine Hannover and at the Central Veterinary Laboratory in Windhoek, Namibia.

After his PhD he was employed as Head of the Virology Unit at the Central Veterinary Laboratory in Windhoek, Namibia and after as Senior scientist at the Community Reference Laboratory for Classical Swine Fever (CSF) at the School of Veterinary Medicine Hannover.

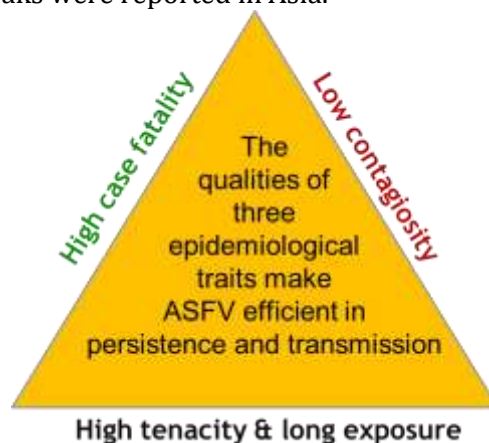
In 1998 he was appointed Head of the German National Swine Fever Laboratory at the Friedrich-Loeffler-Institut (FLI), Federal Research Institute for Animal Health, Insel Riems and after that he worked as an advisor for International Animal Health Advisor for Eastern Europe and

Caucasus within the Animal Health Service of the Food and Agriculture Organization of the United Nations (FAO), Rome, and for the European Commission, Health and Consumers Directorate-General, D1- Animal Health and Standing Committees, Disease manager pig diseases. From 2010 is back to the Friedrich-Loeffler-Institut (FLI), International Animal Health Team.

Title of the presentation: *“African Swine Fever and lessons learned in affected countries (what is being done, what is working and why something is not working”*

Abstract

Twelve years ago, African swine fever (ASF) was a so-called exotic animal disease with minor impact on global pig production. Nowadays the picture has changed drastically: ASF is considered as one of the most important threats to the pig-farming sector and no drugs or vaccines are available to cure or prevent the disease. The ongoing epidemic started in Georgia in 2007 and spread subsequently throughout the Caucasus and the Russian Federation. In 2014, ASF reached the European Union and four years later the first outbreaks were reported in Asia.



Chenais et al.2019

Fig. 1: The persistency triangle

The ASFV strain in the current epidemic belongs to genotype II and is highly virulent. Consequently, in Europe, the disease was expected to either spread rapidly within the wild boar population or fade out due to high case fatality rate and the absence of long term carriers¹. The current situation, where the disease has become endemic in several countries, shows that none of these predictions held true. In wild boar populations, ASF shows a pattern of habitat bound persistence lacking a tendency of dynamic spatial spread². The infection survived locally in the wild boar population independently from outbreaks in domestic pigs, with steady and low prevalence below 5% and local transmission speed of 2-5 km/month³. In addition to local transmission within the wild boar population, long distance jumps into disease-free areas occur. The latter are connected to human activities that also have been identified as main drivers of disease transmission in the domestic pig epidemiological cycle of ASF.⁴ In textbooks, high contagiousity and high mortality are often attributed to the disease. However, field data as well as findings in experimental studies indicate a rather low contagiousity (Fig. 2). The case fatality rate (proportion of infected individuals that succumb to the disease within a certain time period) related to highly virulent ASFV in affected populations of domestic pigs and wild boar is indeed high, often reaching 90-100%. However, the initial mortality within an epidemiological unit is rather low regardless of the generally high case fatality rate. In domestic swine populations this pattern can be considered an advantageous feature reducing the urgency in the implementation of control measures. At the same time, it is complicating early disease detection as the initially low mortality rates can easily get unnoticed in larger farms. For wild boar however, in combination with

the environmental stability of the virus and high population densities, the low contagiousity represents a major challenge for effective disease control.

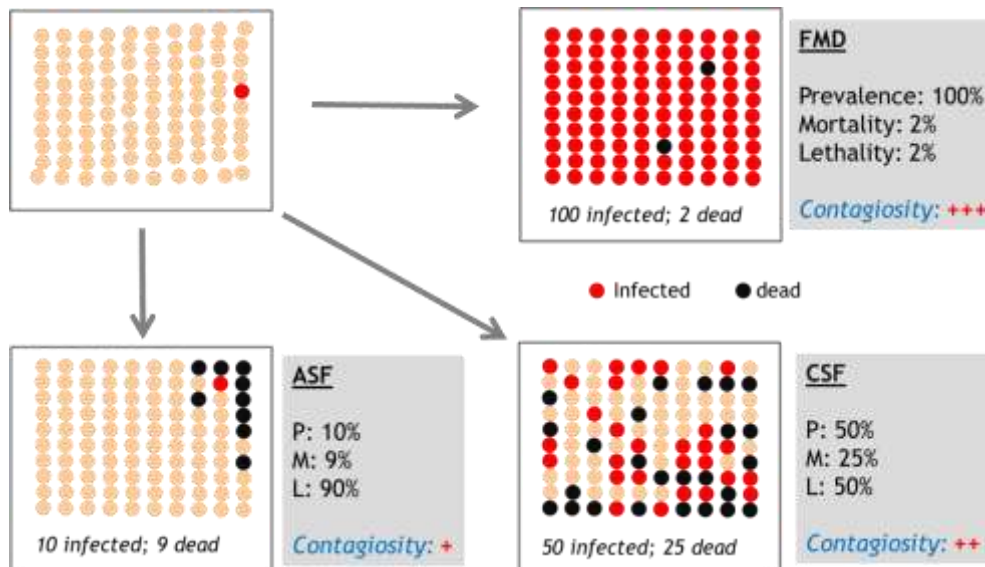


Fig.2: Exemplary disease spread of three major pig diseases highlighting the differences between Foot-and-moth disease (FMD), Classical swine fever (CSF) and African swine fever (ASF)

The qualities of the three epidemiological traits contagiousity, tenacity, and case fatality rate make ASFV efficient in both persistence and transmission⁴. The combination of high tenacity and a high case fatality rate makes the virus largely available and ensures long-term persistence in the environment; meanwhile the relatively low contagiousity prevents complete depletion of the host population. The interaction of these three parameters maximize both local persistence and geographical spread of the virus making its eradication a challenge (Fig. 1). Humans are recognized as the main cause of both long distance transmission and virus introduction into domestic pig farms. Thus, it has become crucial to include social science when planning prevention-, control-, or eradication-measures. By considering only the biological particularities of the disease, contagiousity, tenacity and case fatality rate, but ignoring the human aspects, the epidemic will not be controlled.

1 Petrov, A., *et al.* No evidence for long-term carrier status of pigs after African swine fever virus infection. *Transboundary and emerging diseases* 65, 1318-1328, doi:10.1111/tbed.12881 (2018).
 2 Chenais, E., *et al.* Identification of Wild Boar-Habitat Epidemiologic Cycle in African Swine Fever Epizootic. *Emerging infectious diseases* 24, 810-812, doi:10.3201/eid2404.172127 (2018).
 3 European Food Safety, A. *et al.* Epidemiological analyses of African swine fever in the Baltic States and Poland. *EFSA Journal* 15, e05068-n/a, doi:10.2903/j.efsa.2017.5068 (2017).
 4 Chenais, E. *et al.* Epidemiological considerations on African swine fever in Europe 2014–2018. *Porcine Health Management* 5, 6, doi:10.1186/s40813-018-0109-2 (2019).

Workshops

Workshop n. 1: One health game; crossing the borders within the EU

Tutors: Prof Jeroen Dewulf and Dr Moniek Ringenier (University of Ghent)

Learning objectives:

- Learning from others expertise and how cooperation leads to better solutions
- Risk communication: How to handle the media during outbreaks
- Outbreak management in a cross-border situation; rules and regulations in different countries
- Understanding the importance of involving different health care facilitators in a species crossing problem

Abstract:

The one health game is an interactive game where you learn to deal with an outbreak in a cross border situation. To solve all the questions in time you need the input of every team member. This is also why this game is a great way to get to learn all your fellow residents and diplomates and their field of expertise.

The game starts with the announcement that carbapenem resistant bacteria were found on pig carcasses in the slaughterhouse. The team has to find where this outbreak comes from, which problems need to be solved to tackle this issue, but they also have to deal with difficult questions from the media. What do you do with the animals on the farm which are positive for carbapenem resistant bacteria? What are the consequences for public health? What do you do when such an issue crosses the borders between countries? Which regulatory agencies play an important role? The game is not only involving the veterinary sector, but also hospitals and the public health sector, which makes it a true one health game.

During the first hour the participants will be divided into groups of around 8 people and each team will play the game. The group with the most points and the fastest time will win.

During the second hour a plenary session takes place where the questions from the game will be discussed. E.g. : What is the best practice to tackle this outbreak? What do we still miss in terms of policy; what can be improved?

Workshop n. 2: Risk-based meat inspection and integrated meat safety assurance at abattoir level

Tutor: Dr Dragan Antic (Institute of Veterinary Science, University of Liverpool) and Prof Kurt Houf (Ghent University)

Learning objectives:

The main aim of the workshop and the RIBMINS network is to combine and strengthen European-wide research efforts on modern meat safety control systems. At the workshop, we will present the ongoing work from the RIBMINS project, discuss about the main knowledge gaps of the most important hazards to be controlled at the abattoir level; the means for these controls, including tools for detection of carcass contamination and available interventions; and the performance of food safety management systems. Ultimately, the aim of the workshop is to trigger further interest among ECVPH community, diplomates and residents, to join the RIBMINS action and contribute to the further work. This is especially important for future 'risk managers' in the risk-based meat safety assurance who will need to be trained in the new system, for which we anticipate our college will have important advisory and more active role. This is also in line with the RIBMINS long-term strategic impact, to stimulate early career researchers to actively participate in related research, trainings, meetings, dissemination, etc., which will help in producing the next generation of experts on this field.

Abstract:

The European Food Safety Authority has recently proposed a generic framework for a modern, flexible and dynamic risk-based meat safety assurance system to modernise the current official meat inspection. Implementation of such a system is expected to be a slow and careful process that will involve its thorough development, fine-tuning and testing its practical feasibility and general impacts. Consequently, the COST action CA18105 RIBMINS ('Risk-based meat inspection and integrated meat safety assurance') was initiated in March 2019 and will last for four years. The main aim of the RIBMINS network is to combine and strengthen European-wide research efforts on modern meat safety control systems (<https://www.cost.eu/actions/CA18105/#tabs|Name:overview>). The Working group 3 in this project is looking at abattoir level segment with objectives to assess the contribution of the tools for the detection of carcass contamination and interventions to control this contamination, as well as the performance of food safety management systems in abattoir. Therefore, it is important and timely to present and discuss the ongoing work at the RIBMINS project within the ECVPH community. This is also important as many project participants are ECVPH Diplomates, and we aim to further trigger the interest among colleagues to join the project and participate in its further workshops, training schools and short term scientific missions. At the workshop, we will exchange of ideas, experience and results of various country-level research studies and ongoing work, in line with the mentioned RIBMINS

objectives for the abattoir level work. We will also discuss the knowledge gaps related to such a new meat safety assurance system.

Workshop n. 3: "Insight into the wild game sector and challenges to deliver safe and quality product"

Tutors: Dr Cristina Soare (University of Edinburgh) and Prof Dominic Mellor (University of Glasgow)

Learning objectives:

- Describe the commercial and regulatory background of the EU wild game industry
- Highlight main challenges in terms of food hazards related to wild game product in EU and beyond
- Evaluate public health risks related to wild game products and determine how to mitigate these risks in a domestic and cross border commercial context

Abstract:

The workshop will include aspects of foodborne hazards and will discuss how these directly affect the safety of food intended for the consumer and determine whether it have wider implications, affecting trade. The activities will involve decision-making, taking into account the cost and benefits of interventions and highlighting the role of veterinary public health specialist in wild game sector to deliver safe and wholesome food.

The workshop will include:

- Introductions and presentation of wild game food chain from field to fork, including EU regulatory aspects applicable the wild game sector to deliver safe and quality product (20 min)
- Presentation expanding on a sample of current food hazards that relate to wild game products (20 min)
- Introduction to the scenarios for the second and main part of the workshop (5 minutes)
- Allocation of participants into groups of 8-10 members to work on scenarios and outlined questions related to specific food hazards and associated risks (35 min).
- Whole group discussion, covering opinions to the questions outlined in the scenarios, debate and conclusions (40 min).

Challenge session

Sustainability for Livestock Production – Open Discussion

Panel Members:

- Dr Derk Oorburg - “The Industry perspective on sustainable livestock production” (Director of Quality Assurance, Vion Food Group).
- Prof Bruce Whitelaw - “Genome editing for fitter, healthier and more productive farmed animals” (Professor of Animal Biotechnology, The Roslin Institute).
- Dr Kirsten Shields - “The International Law perspective on food security” (Lecturer at The Global Academy of Agriculture and Food Security, The University of Edinburgh).

Poster abstracts

P1: Assessing the microbiological quality of raw goat's and ewe's bulk-tank milk samples in Switzerland

Brian Friker¹, Marina Meret Morach², Sabina Puntener², Nicole Cernela², Roger Stephan²

¹University of Bern, Switzerland, ²University of Zürich, Switzerland.

Background

In recent years, popularity of raw milk has increased in many industrialized countries. Consumers tend to prefer raw milk due to better taste, believe in better nutritional values or supposed health benefits. On the other hand, there is a well-established association between raw milk consumption and infection with pathogenic bacteria as e.g. *Salmonella* or Shiga toxin-producing *Escherichia (E.) coli* (STEC).

Objective

This study aimed to i) enumerate total viable counts (TVC) and *E. coli* counts, ii) generate up-to-date prevalence data for *Staphylococcus (S.) aureus*, *Salmonella* spp., STEC, iii) screen for Methicillin resistant *S. aureus* (MRSA) and Extended-spectrum β -lactamases (ESBL)-producing *Enterobacteriaceae*.

Materials and Methods

124 bulk tank milk samples (100 from goats and 24 from ewes) from 116 farms throughout Switzerland were analysed. Standard plate counts and *E. coli* counts were performed on each sample. Furthermore, the prevalence of *S. aureus*, STEC, *Salmonella* spp., MRSA and ESBL-producing *Enterobacteriaceae* was studied.

Results

The median TVC was 3.8 log cfu/ml. Farms with more animals had significantly higher TVC ($p = 0.0031$). *E. coli* was detected in 16 (13.0%) and *S. aureus* in 18 (14.6%) samples. *Stx* PCR was positive in 14 (11.4%) samples. MRSA were isolated from 4 (3.3%) samples. *Salmonella* spp. and ESBL-producing *Enterobacteriaceae* were not isolated.

Discussion and Conclusion

Only 2 (1.6%) samples failed to comply with the Swiss legal limits for milk used to manufacture raw milk products. Compared to the last such study in Switzerland, TVC and the prevalences of the studied pathogens have decreased. The prevalences also tend to be lower than reported in studies from other countries.

Perspectives

These results form the basis for determining the microbiological quality standards for goat's and ewe's milk.

P2: Identifying key factors for the successful application of a One-Health approach at the mining-farming interface

Bruce Gummow¹

¹*James Cook University, Townsville, Queensland, Australia.*

Background

Much has been published on the merits of the One-Health (OH) approach but much less on its successful application, particularly with respect to its use at the mining-farming interface, where non-infectious diseases are an issue. Legal battles in this interface drain the economy and are often based on little scientific evidence.

Objective

Identifying key factors for the successful application of a OH approach at the vanadium mining-farming interface.

Materials and Methods

A herd health study integrating mine management with independent environmental, public and animal health experts was created to resolve ongoing disputes between the mining and farming industry. A sentinel cattle herd was farmed on mining property surrounding a vanadium mine, but managed by the farming community. The herd was monitored over 7 years for signs of vanadium poisoning and metal residues in conjunction with monitoring of environmental concentrations of heavy metals. The herd served as an early warning sentinel system that was incorporated into the mines pollution control and occupational health strategies and simultaneously facilitated research on chronic vanadium poisoning.

Results

A OH approach mitigated against further litigation, which dropped from 5 cases in the 5 years prior to the study to 1 during the period of the study. At the same time extensive information was gathered on the effects of chronic vanadium exposure and its public health implications.

Discussion and Conclusion

The success of the OH approach was attributed to 1. all parties having a vested interest in solving the problem, 2. having a dedicated project driver, 3. employing a transdisciplinary team with specialist skills being provided as needed, 4. providing a risk-communication tool that all parties had a stake in and could relate to, 5. there being a cost to all players.

Perspectives

Key factors for the successful application of a OH approach.

P3: DEFEND: Developing tools to control the lumpy skin disease and African swine fever epidemics in Europe and neighbouring countries

Pip Beard¹, Kris De Clercq², Carola Sauter-Louis³, Franz J. Conraths³, David B. Wallace⁴, Steven van Borm², Michelle Nori⁵, Giorgia Angeloni⁶, Dirk J. de Koning⁷, Chris Netherton¹, Andy Haegeman², Silvia Bellini⁸, Loic Comtet⁹, Bryan Charleston¹

¹The Pirbright Institute, UK, ²Sciensano, Belgium, ³Friedrich-Loeffler-Institut, Germany, ⁴Agricultural Research Council-Onderstepoort Veterinary Institute, South Africa, ⁵European University Institute, Italy, ⁶SIVtro Veterinari Senza Frontiere, Italy, ⁷Swedish University of Agricultural Sciences, Sweden, ⁸Instituto Zooprofilattico Sperimentale della Lombardia e dell'Emilie Romagna, Italy, ⁹IDvet, France.

Background

African swine fever (ASF) is a highly fatal disease of domestic pigs and wild boar. After its introduction into Georgia in 2007, it has spread through large parts of Eastern Europe, but also jumped into the Czech Republic (2017) and Belgium (2018). Lumpy Skin Disease is affecting cattle and has spread steadily north over the past 20 years from Africa through the Middle East and the eastern Mediterranean region, and entered the European Union in 2014-2016. DEFEND receives funding from the European Union's Horizon 2020 research and innovation programme.

Objectives

DEFEND is a consortium of 30 scientific partners. The objective of the project is to control the ASF and LSD epidemics in Europe and neighbouring countries by understanding the drivers of ASFV and LSDV emergence, generating research outputs, which underpin novel diagnostic tools and vaccines, and authenticate appropriate and rapid responses of decision-makers.

Materials and Methods

Within 11 scientific work packages, the drivers for emergence of ASF and LSD in Europe will be identified, the fundamental biology of LSDV examined and tools for managing ASF and LSD developed.

Results and Discussion

Literature reviews identified risk factors for the introduction of ASFV into farms and new regions/countries. Experimental investigations into LSDV are underway, examining the survival of LSDV in different matrices and investigating the extent of insects involved in the transmission of LSDV.

Discussion and Conclusion

The project has started in July 2018 and will continue until June 2023. The timeliness and importance of our research programme has been highlighted in recent months by the spread of ASFV to China and neighbouring countries in East Asia, and by the cost calculations arising from LSDV outbreaks in the European Union in 2016-2018.

Perspectives

New ways of controlling ASF and LSD and other emerging animal diseases are clearly needed and addressed by the project.

P4: Comparative Exposure Assessment of ESBL-Producing *Escherichia coli* through Seafood Consumption

Catherine McCarthy¹, Clazien de Vos¹, Eric G. Evers², Thomas Hagenaars¹

¹Wageningen Bioveterinary Research, The Netherlands, ²National Institute for Public Health and the Environment (RIVM), The Netherlands.

Background

Extended-Spectrum β -Lactamase (ESBL) producing *Escherichia coli* (EEC) are a significant veterinary and human public health concern. Seafood is likely to be a significant source for EEC exposure due to the frequent consumption of raw products, heavy use of antibiotics in aquaculture and extensive international trade. Although previous studies have calculated the exposure through meat consumption, the risk from seafood has not been quantified.

Objective

To quantify the exposure risk to EEC through seafood consumption.

Materials and Methods

A simplified Quantitative Microbiological Risk Assessment (sQMRA) model was produced for the Risk And Disease burden of Antimicrobial Resistance (RaDAR) One Health EJP. The model examines differences in EEC concentration and prevalences on seafood products at retail. It models changes through pre-retail processing, storage at the consumers' home and preparation in the kitchen (including the risk of contamination).

Results

Preliminary results suggest that the EEC exposure of the Dutch population through the consumption of seafood was much higher for salmon (98.0% contribution) than for eel (0.9%), herring (0.5%), mackerel (0.3%) and anchovy (0.3%) products. The three individual products with the highest contribution were sushi / sashimi (59.6% of total EEC exposure) followed by smoked salmon (38.3%) and smoked eel (0.9%). Differences in portion sizes and consumption frequencies affected the probability of being exposed to EECs. The probability of exposure (rather than EEC concentrations) were highest for sushi / sashimi (0.19 / portion), soured herring (0.12 / portion) and smoked eel (0.06 / portion).

Discussion and Conclusion

Seafood provides a significant contribution to EEC exposure. The high contribution from salmon products should be investigated through a full-scale QMRA where EEC concentrations are modelled from farm-to-fork. Interventions should be designed to reduce EEC concentrations in seafood.

Perspectives

Aquaculture and fish farming receives little veterinary attention in modern Veterinary Public Health training but yet can pose a significant risk to human health.

P5: Social network analysis of free-roaming dog contact networks in Indonesia and Guatemala

Charlotte Warembourg¹, Danilo Alvarez², Monica Berger-González^{2,3}, Filipe Maximiano Alves De Sousa¹, Ewaldus Wera⁴, Salome Dürr¹

¹*Veterinary Public Health Institute, University of Bern, Switzerland;* ²*University del Valle, Guatemala city, Guatemala;* ³*Swiss Tropical and Public Health Institute, Basel, Switzerland;* ⁴*Kupang State Agricultural Polytechnic (Politeknik Pertanian Negeri Kupang), East Nusa Tenggara, Indonesia.*

Background

Although often beneficial, close proximity between dogs and humans can be detrimental. Transmission of zoonoses, and rabies in particular, are striking examples for public health problems related to domestic dogs. Worldwide, around 60'000 people die of canine mediated rabies every year. The World Health Organization (WHO), the World Organization for Animal Health (OIE) and the Food and Agriculture Organization (FAO) aim to globally eradicate canine-mediated human rabies by 2030. However, current control programs do not consider the variability of behavior between individual dogs and between dog populations, which may help to refine rabies control.

Objective

Our objective is to study and compare dog contact networks from different origins.

Materials and Methods

This study focuses on owned free-roaming domestic dogs. We collected contact sensor data in a rural and urban area in each of Guatemala and Indonesia to generate four contact networks. For each study area, a one-kilometer square zone was defined. We aimed to include in the study all the dogs whose owner's household is located in the four defined study areas. Each dog was equipped with a georeferenced contact sensor during four days. In addition, we collected information on the dog, the owner and the environment using a questionnaire. Social network analysis for performed for all networks.

Results

In total, 341 dogs have been included in the study. We identified the differences and similarities between dog contact networks from different origins. Within the rural Indonesian network, we identified 36% of dogs having a higher degree and betweenness than the other dogs.

Conclusions

Focusing on dogs with a higher degree and betweenness could improve the effectiveness of control program, for example rabies vaccination campaigns.

Perspectives

The next step is to identify dog and owner-related factors associated with having a high number of contacts and high betweenness, using regression models accounting for the network structure.

P6: Microbial spoilage evaluation of an egg-based pastry product

Márcio Moura-Alves¹, Carolina Machado¹, José A. Silva^{1,2}, Cristina Saraiva^{1,2}

¹Department of Veterinary Sciences, School of Agrarian and Veterinary Sciences, ECAV, University of Trás-os-Montes e Alto Douro, 5000-801 Vila Real, Portugal, ²Veterinary and Animal Research Centre (CECAV), University of Trás-os-Montes e Alto Douro, 5000-801 Vila Real, Portugal.

Background

The evaluation of the microbiological characteristics of pastry products is important for food safety control and to establish their shelf life.

Objective

The aim of this study was to evaluate pathogenic and deteriorative bacteria of a Portuguese egg-based pastry product, *Cavacas de Resende*, over time (0 days, 6 hours, 1, 2, 4, 7 and 10 days) and storage temperatures (7 and 22°C).

Materials and Methods

Samples were collected from 4 different producers, in a total of 168 samples. For each temperature and storage time, microbiological analyses were carried out according to ISO standards for *Salmonella* spp., *B. cereus*, *S. aureus*, *L. monocytogenes*, *E. coli*, Enterobacteriaceae, moulds and yeasts, mesophilic and psychrotrophic microorganisms.

Results

No counts for pathogenic bacteria were detected in all analysed samples, except for *S. aureus* which was present in 86% samples. A slight increase were observed in counts of mesophilic from 2.50 (day 0) to 2.80 log cfu/g (day 10) at 7°C, however at 22°C, an increase of almost 3 log cfu/g were observed in the end of storage, from 2.50 (day 0) to 5.41 log cfu/g (day 10), with unsatisfactory values since day 7. For moulds and yeasts, unsatisfactory results were obtained at 22°C, respectively 3.78 and 4.72 log cfu/g at days 7 and 10 of storage. On contrary at 7°C, the levels remained below to 2 log cfu/g during the time of storage. For Enterobacteriaceae, the no differences were obtained according the temperature of storage over the time, with maximum of 0.54 log cfu/g.

Discussion and Conclusion

A better preservation of the product was observed at 7°C. At 22°C, the increase of counts of spoilage microorganisms, mainly from day 7 of storage decreases the shelf life. Based on the microbiological determinations, the shelf life is 10 and 4 days for samples stored at 7 and 22°C respectively.

P7: Antimicrobial activity of *Myrtus communis* L. and *Rosmarinus officinalis* L. essential oils against *Listeria monocytogenes* in fresh cheese

Ana Catarina Silva¹, Juan García-Díez^{1*}, Miguel Ribeiro¹, José Manuel Almeida^{2,3}, Filipe Monteiro-Silva³, Gerardo González-Aguilar³, [Cristina Saraiva](#)¹

¹CECAV – Animal and Veterinary Research Centre. University of Trás-os-Montes e Alto Douro, Quinta de Prados, 5001-801 Vila Real, Portugal; ²Department of Physics, School of Sciences and Technology, University of Trás-os-Montes e Alto Douro, Quinta do Prados, 5001-801 Vila Real, Portugal; ³CAP /INESC TEC -Technology and Science and FCUP - Faculty of Sciences, University of Porto, Rua do Campo Alegre, 687, 4169-007 Porto, Portugal.

Background

Foodborne outbreaks linked to *L. monocytogenes* (LM) in fresh cheese manufacture are usually associated to cross-contamination that may occur at several stages of cheese production and originate from multiple sources from ingredients to facilities.

Objective

The present work assesses the antimicrobial effect of myrtle and rosemary EO against LM in fresh cheese during 28-day storage period.

Materials and Methods

To verify the antimicrobial effect of myrtle and rosemary EO, sheep fresh cheese made from sheep raw milk (added with 0.02% myrtle EO or rosemary EO; and control cheese) was contaminated with LM to achieve an initial value of 6 Log CFU/ml.

Results

In control samples LM increased 24.9% from 5.03 to 6.28 Log CFU/g. Counts of LM in cheese made with rosemary EO presented a slight increase along the storage period from 4.96 Log CFU/g to 5.05 Log CFU/g (about 2%). Regarding cheese made with myrtle EO, LM counts were about 0.5 log CFU/g less than cheese made with rosemary EO. Also, LM decreased about 4% after 28 days of storage, from 4.69 to 4.54 Log CFU/g. In both cases (cheese made with myrtle or rosemary EO), counts of LM increase decreased about 5% from 14th to 28th day of storage.

Discussion and Conclusion

According to the Regulation 1441/2007, maximum level of 2 Log CFU/g in RTE products able to support the growth of LM is allowed. Although the level of inoculation was higher than defined by law in the present work, the addition of selected EOs prevents the growth of LM and may control a potential *Listeria* growth in case of cross contamination along the food chain. The addition of myrtle or rosemary EO during the manufacturing of cheese was an effective method to control the growth of LM along the storage period.

P8: Evaluation of hygienic quality of food served in universities canteens of Northern Portugal

Kamila Soares¹, Ana Teresa Moura¹, Juan García-Díez¹, Irene Oliveira², Alexandra Esteves¹, Cristina Saraiva¹

¹CECAV – Animal and Veterinary Research Centre. University of Trás-os-Montes e Alto Douro, Quinta de Prados, 5001-801 Vila Real, Portugal; ²School of Science and Technology, DM, CM-UTAD, University of Trás-os-Montes e Alto Douro, Apart.1013, 5001-801 Vila Real, Portugal.

Background

Mass catering services have increased in the last years since people need to eat outside mainly for work or study reasons.

Objective

Microbiological quality of foodstuffs (n=156) was evaluated in 20 food establishments of two universities in northern Portugal.

Materials and Methods

A total of 156 ready-to-eat food samples from university canteens were analysed for *Salmonella* spp., *L. monocytogenes*, *S. aureus*, *B. cereus*, *E. coli*, total plate count, yeast, mould, LAB and Enterobacteriaceae, by routine microbiological procedures. For study purpose, foodstuffs were cold meals (i. e. salads, cakes and sandwiches) and hot meals (cooked dishes mainly composed by rice, chicken, fish, meat, pasta or soup). Differences regarding the microbiological counts among of foodstuffs were analysed by one-way ANOVA. Also, quality of foodstuffs was classified in a 4-level quality scale (satisfactory, acceptable, unsatisfactory or unacceptable).

Results

Results revealed foods served at canteens displayed a high level of microbiological quality. In overall, hot meals displayed lower microbiological counts than cold meals. Also, microbiological results revealed no safety risks for the consumers due to the absence of foodborne pathogens. Regarding cold meals, salads displayed the highest microbiological counts. Regarding hot meals, no differences were observed among different types. According to the classification of foodstuffs, 91 were considered as satisfactory, 48 acceptable and 17 not satisfactory. Statistical differences were observed among the quality of foodstuffs considered “cold” and “hot” (p<0.05).

Discussion and Conclusion

The present study showed that foodstuffs served at university canteens presented a high level of microbiological quality. Regarding cold meals, the highest counts for hygiene indicators and foodborne in salads could be explained by poor hygiene procedures, cross-contamination and absence of thermal processing. Regarding hot meals, thermal processing (i.e. cooking) guarantees its safety, but counts of total plate counts and Enterobacteriaceae indicate that special attention should be taken regarding cross-contamination.

P9: Microbiological quality of cooked meals sold at retail level in Portugal

Rita Maio¹, Juan García-Díez¹, Cristina Saraiva¹

¹CECAV – Animal and Veterinary Research Centre. University of Trás-os-Montes e Alto Douro, Quinta de Prados, 5001-801 Vila Real, Portugal.

Background

The consumption of cooked meals has increased in the last years due to a shorter time for cooking.

Objective

The objective was to determine the microbiological quality of foods sold at retail level on expiration date in Portugal.

Materials and Methods

Microbial evaluation of cooked meals was carried out in samples obtained in supermarkets with takeaway service. Samples (n=27) include traditional Portuguese dishes (fish, meat, rice and pasta), pizza, hot-dogs and soups. All of them were analysed for total microbial count (TMC), Enterobacteriaceae (ENT), lactic acid bacteria (LAB), *E. coli* (EC), yeast and moulds (Y&M), Pseudomonads (PSE), *L. monocytogenes* (LM), *Bacillus cereus* (BC), *Salmonella* spp. (SAL) and *S. aureus* (SA). Samples were classified as satisfactory, acceptable and unsatisfactory according to microbiological counts based on food policy and literature.

Results

Cooked meals displayed the following microbiological counts (CFU/g): TMC: 4.05±2.01, ENT: 0.58±1.20, M&Y: 1.82±1.91 and PSE: 2.93±2.21. No foodborne pathogens were detected. According to the TMC, 4 (15%) samples were satisfactory ($\leq 10^2$ CFU/g), 14 (52%) were acceptable ($>10^2$ CFU/g $\leq 10^3$) and 9 (34%) were unsatisfactory ($>10^3$ CFU/g). Regarding ENT, 22 (81%) samples were considered satisfactory and 5 (19%) unsatisfactory. Also, counts of M&Y revealed 14 (52%) samples unsatisfactory. Only 1 sample was considered unsatisfactory for PSE ($>10^6$ CFU/g). In overall, 10 cooked meals showed at least 1 unsatisfactory microbiological result, 6 samples fails at 2 microbiological criteria and only 2 sample fails at three and four microbiological criteria respectively.

Discussion and Conclusion

Over of 75% of cooked meals sold on expiration date displayed unsatisfactory microbiological results. The absence of foodborne pathogens decreases the potential risk for consumers. The hygienic indicators above the recommended limits indicate: i) the expiration date is not optimized by manufacturer or ii) the storage conditions along the food chain (i.e. temperature) is not correctly achieved.

P10: Consumers' knowledge about food labelling and food fraud

Maria João Moreira¹, Juan García-Díez¹, José Manuel Almeida^{2,3}, Cristina Saraiva¹

¹CECAV – Animal and Veterinary Research Centre, University of Trás-os-Montes e Alto Douro, Quinta de Prados, 5001-801 Vila Real, Portugal; ²Department of Physics, School of Sciences and Technology, University of Trás-os-Montes e Alto Douro, Quinta do Prados, 5001-801 Vila Real, Portugal; ³CAP /INESC TEC -Technology and Science and FCUP - Faculty of Sciences, University of Porto, Rua do Campo Alegre, 687, 4169-007 Porto, Portugal.

Background

Food labelling may influence consumers' preferences at the time of purchase, then consumers are advised to read the information displayed on labels to verify if foodstuffs meet their preferences and needs.

Objectives

This work aimed to assess the consumers' knowledge about food labelling and food fraud.

Materials and Methods

A bespoke online questionnaire was designed to obtain information regarding the respondent's opinion about the usefulness of information and confidence about the information displayed on food labels and ingredients and their knowledge about consequences derived from food mislabelling and food fraud. A total of 308 respondents answered the online survey.

Results

Two hundred of respondents considered compulsory mentions on food labels useful, although almost 65% declared information displayed on it hardly to understand. Only 52% of respondents stated that the information provided is reliable. Over 60% declared information provided on food labels neither prevents food fraud nor guarantee the traceability. Regarding food ingredients, over 55% of respondents declared distrust in the information provided by food manufacturers. However, they showed more confidence in less processed products and in those labelled with quality schemes. Regarding food fraud, over 75% of respondents not considered food fraud derived from mislabelling neither a health risk nor economic benefit for food industry.

Discussion and Conclusion

The recent food fraud scandals, due to mislabeling practices, have increased the consumer distrust in the food industry since information displayed on food labels does not reflect the real characteristics declared. Compulsory information displayed in food label is useful however the way the information is presented may decrease the consumer interest and also difficult its understanding. Thus, education programs to increase consumer knowledge about food labelling and fraud and addition of enough information in a clear way by food manufacturers may improve the consumer trust.

P11: An audit of animal-related injuries at UK veterinary schools

John Tulloch¹, Kate Fleming¹, Carri Westgarth¹

¹University of Liverpool, United Kingdom.

Background

Injuries due to interactions with animals are an accepted part of the veterinary profession. However, there is limited data about these injuries, the subsequent health impact to the individual, and what veterinary activities pose the most risk of injury. These data are needed to propose appropriate injury prevention strategies.

Objective

An audit to understand animal-related injuries in UK veterinary schools.

Materials and Methods

Official accident books from UK veterinary schools were requested for the period 2008-2018. Information about the demographics of the animal-related injury (pertaining to the individual, injury and health impact) were extracted and coded.

Results

(Caveat: These are preliminary results as recruitment and data analysis are in progress. The results presented here will differ to the results presented at the ECVPH conference).

The top three causes of injuries were; dog bites (22%), needlestick injuries (11%), and horse kicks (5.6%). Four species represented 82% of all injuries; dogs, cats, horses and cows. Sedation and clinical examinations were the most common interaction that resulted in injury. 15% of injuries needed medical treatment. However, 12% of all injuries required a hospital visit. An injury caused by a horse or a cow were more likely to require medical treatment, or a hospital visit, compared to other species.

Discussion and Conclusion

The results highlight that companion animals were the most commonly implicated species in animal-related injuries in UK vet schools. However, large animals posed the greatest danger as their injuries more commonly led to medical treatment and hospital attendance. Sedation and clinical examinations require further investigation to understand what injury prevention activities will reduce their risk. Many injuries were never seen by a health care professional, highlighting that national incidence figures, based on health records, will be an underestimate.

Perspectives

Animals will always pose a risk to those working with them. However, some of these risks could be reduced or eliminated. These results suggest areas where injury prevention or risk reduction strategies could be explored and implemented.

P12: Characteristics of bruises in carcasses in cattle slaughtered in Portugal

Pedro Teixeira¹, Dina Moura², Juan García-Díez¹, Alexandra Esteves¹

¹CECAV – Animal and Veterinary Research Centre. University of Trás-os-Montes e Alto Douro, Quinta de Prados, 5001-801 Vila Real, Portugal; ²Food and Veterinary unit of Vila Real and Douro Sul - Food and Veterinary authority of Portugal (DGAV). Lugar de Codeçais. 5000-421, Vila Real, Portugal.

Background

Bruises in cattle develop after the application of force and can be used for welfare at farm and transportation indicators.

Objective

The aim of this study was to describe the number and characteristics of bruises on cattle carcasses as welfare indicators.

Materials and Methods

The number of bruises and their distribution on the carcass were assessed according on the Australian Carcass Bruising Scoring System.

Results

226 from 462 cattle carcasses presented (1 at least) bruises (49%). Among them, a total of 413 bruises were found (1.79 ± 0.92). Bruises were more frequently observed in the back ($n=47/11.4\%$), pin ($n=232/56.2\%$) and hip ($n=61/16.8\%$) region of the carcass. According to the size, bruises were classified (in cm) as small ($\geq 2 \leq 8$; $n=197/47.7\%$), medium ($>8 \leq 16$; $n=182/44.1\%$) and large (>16 ; $n=34/8.2\%$). Regarding the shape (n), 211 (51.1%), 154 (37.3%) and 48 (11.6%) were irregular, circular and linear respectively. With regard of colour of bruises (n), 273 (65.6%) were bright red (recent), 100 (24.2%) were bluish (old) and 40 (9.7%) yellowish (very old).

Discussion and Conclusion

The main location and colour of bruises indicates that movement operations of cattle, such as truck loading and unloading are carried out by roughly methods. The fact that over half of bruises were medium or large sized together with the shape indicated that cattle could be traumatized also during transportation to the slaughterhouse, highlighting potential structural deficiencies of livestock trucks or also to the type of the drive and/or roads. Results may be use to improve training and education programs in cattle movement and transport operations.

P13: Multivariate analysis of risk factors of bovine brucellosis in Northeast Portugal

Renata Cruz¹, Dina Moura², Juan García-Díez¹, Ana Cláudia Coelho¹

¹CECAV – Animal and Veterinary Research Centre, University of Trás-os-Montes e Alto Douro, Quinta de Prados, 5001-801 Vila Real, Portugal; ²Food and Veterinary unit of Vila Real and Douro Sul - Food and Veterinary authority of Portugal (DGAV), Lugar de Codeçais. 5000-421, Vila Real, Portugal.

Background

Cattle brucellosis is a serious contagious disease that has profound economic impact and public health significance because of its zoonotic characteristics.

Objective

Identification of risk factors of cattle brucellosis in northern Portugal.

Materials and Methods

Data obtained from the national animal health database (farm identification, main animal production, birth date, sex, existence of small ruminants commingled with cattle in the same farm, number of cattle farms in the same location and number of small ruminant farms in the same area) from 2001 to 2016 of Trás-os-Montes e Alto Douro were studied. Also, geographical characteristic (sea level, mean annual pluviosity and mean annual temperature) were included. For logistic regression, previous variables with $p < 0.05$ in the univariable analysis were used to construct a multivariable model.

Results

Multivariable logistic regression analysis showed the five variables associated ($p < 0.05$) with the prevalence of antibodies for brucellosis. Thus, herd size (large vs small OR=1.48), age (≤3 years vs >3, OR=1.45), existence of commingling small ruminants (yes vs no, OR=1.59), season (hot vs cold, OR=1.85) and altitude (>800m vs ≤800m, OR=2.38) resulted as a risk factor for positive results for bovine brucellosis.

Discussion and Conclusion

In the study area, cattle production is characterized by small herds of family type management. The risk factors identified are compatible with contact between cattle from different farms and also by contact with small ruminant flocks. Despite the efforts made in the control of bovine brucellosis, results showed that there are other factors that are difficult to control, such as contact with game or the persistence of *B. abortus* in the environment. Although this type of production is essential to local economy and avoids rural desertification, implementation of biosecurity measures adapted to this type of production is necessary.

P14: Microbiological survey of raw products from animal origin sold at retail level on expiration date in Portugal

Rita Maio¹, [Juan García-Díez](#)¹, Cristina Saraiva¹

¹CECAV – Animal and Veterinary Research Centre, University of Trás-os-Montes e Alto Douro, Quinta de Prados, 5001-801 Vila Real, Portugal.

Background

Evaluation of microbiological quality of foods sold at expiration date can be use as an important measure to decrease food waste.

Objective

The objective of this study was to determine the microbiological quality of raw beef, pork, chicken and fish sold at retail level on expiration date in Portugal.

Materials and Methods

A total of 25 raw foods were randomly purchased and analysed for total microbial count (TMC), Enterobacteriaceae (ENT), lactic acid bacteria (LAB), *E. coli* (EC), yeast and moulds (Y&M), *L. monocytogenes* (LM), *Bacillus cereus* (BC) and *S. aureus* (SA). Samples were classified as satisfactory or unsatisfactory according to microbiological criteria defined in Regulation (CE) 1441/2007 and literature.

Results

Raw products from animal origin displayed the following microbiological counts (CFU/g) on average: TMC: 6.26 ± 1.82 , ENT: 3.42 ± 2.18 , EC: 0.52 ± 1.11 , M&Y: 3.48 ± 1.81 . Regarding foodborne pathogens, only 1 sample accounted over 2 log/CFU for LM. According to the microbial criteria, 56% of samples were unsatisfactory for TMC ($>10^6$ CFU/g) and MY ($>10^5$ CFU/g); 76% of them for ENT ($>10^2$ CFU/g) and also 20% for EC (>10 CFU/g). In overall, only 2 (8%) samples accounted satisfactory levels for all the microbial criteria.

Discussion and Conclusion

The study of raw foods from animal origin sold on expiration date showed concern results. Although the safety of raw foods analysed did not represent a public health concern (with exception of one sample), the potential sale of these expired products, as a measure to reduce food waste, would not be recommended since they exceed the recommended microbiological criteria for TMC and hygienic indicators (EC, ENT).

P15: Assessment of income of veterinary practices due to sales of antimicrobials to veal calf producers in Switzerland

Julie Pont¹, Anaïs Léger², Isabel Lechner², Martin Kaske³, Katharina D. C. Stärk² and Maren Feldmann³

¹VPHI, University of Bern, Switzerland; ²SAFOSO AG, Liebefeld, Switzerland; ³Swiss Bovine Health Service, University of Zurich, Switzerland.

Background

At present, antimicrobial usage (AMU) in veal calves is a well-established and proven cost-effective practice. At the same time, many campaigns were launched to reduce AMU and to tackle antimicrobial resistance. In Switzerland, selling antimicrobials is part of veterinary practice income but has rarely been quantified. However, knowing the financial contribution of AM sales to veterinary practice income could help to customize incentives for AMU reduction in the veterinary profession.

Objective

Based on veal calf production, the objectives were to investigate the turnover generated through antimicrobial sales in large animal practices in Switzerland and to estimate the impact of income losses due to antimicrobial reduction.

Materials and Methods

A study was conducted in Swiss veterinary practices supervising veal calf producers. Data collection was organised in two parts: use of a questionnaire with general questions about the veterinary practice and its activity, including knowledge assessment about AMR. Secondly, veterinary invoices for veal calf clients were evaluated.

Results

The response rate in this study was 24.2%. Based on the yearly veterinary invoices to 84 farms, 54% of the total veterinary turnover from veal calf producers was generated by sales of antibiotics. The revenues due to advisory work and diagnostic measures constituted 0.5% and 0.1%, respectively of the total turnover. The rest of the turnover was due to drugs, vaccines, treatments and visits.

Discussion and Conclusion

As 54% of the total turnover was generated through antimicrobial sales, antimicrobial reduction measures would have a significant financial impact on the income of veterinary practices servicing veal calf operations. Income generated through advisory work and diagnostic measures was negligible with large potential for expansion.

Perspectives

To compensate the losses in income, new income sources need to be investigated (e.g. remuneration of advisory services, implementation of diagnostic measures) as well as potential incentives from the government.

P16: Evaluation of Veterinary Public Health Policies – Why and how?

Katharina D.C. Stärk^{1,2}, Anna Fahrion², Barbara Haesler³

¹Federal Food Safety and Veterinary Office, Switzerland, ²SAFOSO AG, Bern-Liebefeld, Switzerland, ³Royal Veterinary College, London, UK.

Background

Policies relevant to veterinary public health are developed, implemented and reviewed following standardised processes. Increasingly, this is expected to include a formal or informal review to answer the questions such as "Can it be improved?", "Is it worth it?" or "Should it be continued?"

Objective

The paper will describe the role of evaluation in the veterinary public health policy cycle. It will summarise good practice of evaluation and refer the reader to useful resources and tools for evaluation in the veterinary public health field.

Materials and Methods

Based on a range of completed national and international evaluation projects, guidance will be provided as to how best plan, implement and report evaluation results.

Results

Quantitative and qualitative evaluation methods are illustrated using a range of examples of completed evaluation projects (e.g. biosecurity, antimicrobial resistance policies, early warning programmes, high-level animal health strategy). These examples originate mainly from Europe.

Discussion and Conclusion

Frameworks in support of the practical implementation of evaluation have become available. However, in order to assure access to the information and data that are required, prospective planning is essential. Capacity in designing and running of evaluations should become a core competency of ECVPH specialists.

Perspectives

As resources available for risk management policies in veterinary public health are increasingly limited, the pressure to verify the utility of interventions, programmes and policies gains in relevance. Evaluation provides an established process and tools. ECVPH specialists should promote and lead evaluation activities.

P17: Rodents as a potential wildlife reservoir of human enteropathogenic *Yersinia enterocolitica*

Kurt Arden¹, Ellen Murphy,¹ Dragan Antic¹, Naomi Fox²

¹University of Liverpool, United Kingdom, ²University of Edinburgh, United Kingdom.

Background

Yersinia enterocolitica has been identified as one of the four main food-borne public health hazards associated with swine. However, there is a lack of information on whether other animals form a wildlife reservoir of *Y. enterocolitica* in relation to domestic swine.

Objective

This study examined prevalence and possible transmission of *Yersinia enterocolitica* at the livestock-wildlife interface. The aim was to generate data on the prevalence of this pathogen in a range of rodent species, from wild, rural and urban environments in Britain.

Materials and Methods

The methodology was developed to extract and grow *Y. enterocolitica* from rodent faeces. Following on ISO microbiological isolation and identification methods, PCR was also used to target specific virulence genes (Yst, VirF and Ail) and serotypes O:3 and O:9. Antisera were used for serotypes O:5, O:8 and O:27. The sample size consisted of 331 rodent samples from six species of common wild rodents found in Britain.

Results

The overall prevalence of *Yersinia enterocolitica* in samples collected from wild rodents in areas surrounding pig farms was 12.4% (41/331). The prevalence in brown rats was 5.7% (4/70), house mouse 9.3% (8/86), wood mouse 25.3% (19/75), bank vole 2.1% (1/47), field vole 29.4% (5/17) and grey squirrels 11.1% (4/36). Most frequently isolated serotypes were O:5, O:3 and O:9.

Discussion and Conclusions

The methodology including PCR technique have had to be modified to achieve optimum growth and identification of *Yersinia enterocolitica*. The results indicate frequent presence of *Y. enterocolitica* in rodents. Rodents from urban environments and farms had a higher perceived prevalence of this pathogen in comparison to wild caught specimens.

Perspectives

This study gives the first indication of the prevalence of *Yersinia enterocolitica* within wild rodents in the UK. The outcomes of this pilot study could affect the management of wild rodents in areas surrounding pig farms.

P18: The human resistome and microbiome within the Dutch meat production chain, a metagenome-wide cross-sectional study among farmers and slaughterhouse workers

Liese Van Gompel¹, Roosmarijn EC Luiken¹, Rasmus B Hansen², Patrick Munk³, Martijn Bouwknegt⁴, Lourens Heres⁴, Gerdit D Greve¹, Peter Scherpenisse¹, Betty Jongerius-Gortemaker¹, Silvia García Cobos⁵, Wietske Dohmen¹, Eri van Heijnsbergen¹, Monique HG Tersteeg-Zijderveld¹, Jaap A Wagenaar^{1,6}, Alejandro Dorado-García¹, Bert AP Urlings⁴, Frank M Aarestrup³, Dik J Mevius^{1,6}, Dick JJ Heederik¹, Heike Schmitt^{1,7}, Alex Bossers^{1,6}, Lidwien AM Smit¹

¹Utrecht University, the Netherlands; ²Intomics, Denmark; ³Technical University of Denmark, Denmark; ⁴Vion Food Group; ⁵University of Groningen, the Netherlands; ⁶Wageningen Bioveterinary Research, the Netherlands; ⁷National Institute for Public Health and the Environment.

Background and Objective

Culture-based studies have shown associations between occupational exposure to livestock and carriage of antimicrobial resistant bacteria. Studying the faecal resistome provides a more comprehensive overview of antimicrobial resistance gene (ARG) loads in occupationally exposed populations. The present study investigates the abundance and diversity of the faecal resistome and microbiome of Dutch pig and poultry farmers and pig slaughterhouse workers compared to a control population, and identifies determinants for their resistome and microbiome.

Materials and Methods

In total, 194 faecal samples and questionnaires were collected from persons working or living on pig and broiler farms, working in a pig slaughterhouse (N=148) and from the general population (Lifelines cohort, N=46). Total faecal DNA was extracted and sequenced using shotgun metagenomics (Illumina HiSeq). ARGs (resistome) and bacterial genomes (microbiome) were classified by mapping reads to the ResFinder and NCBI bacterial reference genome databases. Alpha-diversity indices and Bray-Curtis (BC) dissimilarities were calculated and multivariate analyses were performed (NMDS, PERMANOVA, SIMPER, DESeq2 analysis).

Results

Pig slaughterhouse workers and pig farmers carried higher overall ARG loads compared to broiler farmers and Dutch controls. Tetracycline, β -lactam and macrolide resistance gene clusters dominated the resistome of all groups. No significant resistome alpha-diversity differences were found between the four populations, while ordinating the BC-dissimilarities identified a separation of the mean resistome composition of pig exposed workers from broiler farmers and controls. We demonstrated within-group resistome dissimilarities based on slaughter line position, type of farm (pigs versus broilers), and farm work (farmers and employees versus household members). Overall, we found a significant correlation between the microbiome and resistome, and significant differences in the bacteriome composition between and within groups.

Conclusions

In conclusion, our results suggest an increased ARG carriage in persons working in the Dutch pork production chain, and differences in resistome composition compared to a control population.

P19: Visible parasites in fresh cephalopods sold on the Italian market: impact on consumers' perception on safety and quality

Lisa Guardone¹, Ewa Bilska-Zajac², Daniele Castiglione¹, Alice Giusti¹, Renato Malandra³, Andrea Armani¹

¹University of Pisa, Italy, ²National Veterinary Institute, Pulawy, Poland, ³Fish Market, Milan, Italy.

Background

Visible parasites in seafood may represent a hazard, in the case of zoonotic species, and a defect, in the case of obvious contamination, making products unsafe and unfit for human consumption.

Objective

To evaluate the presence of visible parasites in fresh cephalopod products sold in Italy.

Materials and Methods

Data on the species most commonly commercialized as fresh in Italy were collected. Based on literature data *Doryteuthis pealeii* (Atlantic squid) and *Eledone* spp., comprising *E. cirrhosa* and *E. moschata* (horned octopus and musky octopus, respectively) were selected, considering that these commercial species had been rarely investigated. 55 *Eledone* spp. caught in the Mediterranean Sea (FAO area 37) and 54 *D. pealeii* from the Northwest Atlantic (FAO area 21) were examined by visual inspection and artificial digestion (viscera and mantle separately). Parasites were morphologically identified, counted and molecularly analysed. Prevalence (P) and mean abundance (MA) were calculated.

Results

7 specimens of *D. pealeii* (P: 12.7% ±8.8 95%CI; MA: 0.2) were positive for plerocercoid larvae of *Clistobothrium* sp. (n=11) which were found in the viscera; in 2 other specimens 2 nematodes identified as *Anisakis simplex* were found in the viscera and in the mantle. In *Eledone* spp. 6 nematodes not belonging to *Anisakis* spp., for which morphological and molecular identification is ongoing, were found in the mantle of 4 specimens (P: 7.3% ±6.87 95%CI; MA: 0.1).

Discussion and Conclusion

Outcomes from this study show the possible presence, also in the mantle, of visible zoonotic parasites (*A. simplex*). In addition, the presence of large (1.5-2 cm), mobile plerocercoid larvae was detected. Such findings influence products' safety and quality, as well as consumers' related perception.

Perspectives

The study will provide data for better implementing Food Business Operators inspection procedures aimed at guaranteeing products' quality and consumers' safety.

P20: The slaughterhouse as an epidemiological observatory: analysis of inspection data from a pig abattoir serving North and Central Italy

Lisa Guardone¹, Alessio Vitali¹, Andrea Maneschi¹, Stefano Pardini², Alessandra Guidi¹, Andrea Armani¹

¹University of Pisa, Italy, ²Azienda Usl Toscana Centro, Pistoia, Italy.

Background

Inspection at the slaughterhouse is fundamental to ensure meat safety and as an animal health and welfare surveillance tool. However, the systematic use of inspection data for epidemiological surveillance is not frequently implemented in the European Union.

Objective

To evaluate the causes of total and partial condemnation in a commercial pig slaughterhouse in Tuscany, Central Italy.

Materials and Methods

Inspection data recorded by the Official Veterinarians over the last 3 years (2016-2018) were analysed to assess the total number of slaughtered pigs and the total number and causes of condemnation of whole carcasses and organs.

Results

384701 pigs from 6 different regions of North and Central Italy were slaughtered. Totally 108 carcasses were condemned (0.03%), mainly due to swine erysipelas (49.1%) and generalized jaundice (21.3%). In the remaining cases (29.6%) generalized abscesses, organoleptic alterations, peritonitis and enteritis were reported. Moreover, 181 carcasses were seized due to death during transport. As regards partial condemnations, the most commonly seized organ was the liver (condemned in around 29% of the pigs), followed by lungs (13%), heart (5.2%) and kidney (1.2%). Main reasons for condemnations were: parasitic hepatitis, perihepatitis and pericarditis for the liver; pneumonia, pleurisy and polyserositis for lungs; pericarditis, polyserositis and pleural pneumonia for the heart and polycystic kidney, nephritis and hydronephrosis for kidneys.

Discussion and Conclusion

The results showed that partial condemnations were much more common than total ones and agree with similar studies, confirming the liver as the most commonly condemned organ, largely due to parasitic hepatitis. Data confirm the pivotal role of the slaughterhouse as an epidemiological observatory and of the Official Veterinaries in protecting consumers' health.

Perspectives

The systematic analysis of meat inspection data will be enlarged to previous years to reinforce epidemiological outcomes. Patterns related to the geographical origin and seasonal trends will also be investigated.

P21: Three epidemiological surveillance platforms: A unique approach towards “One Health” surveillance in France

Lucie Collineau^{1,5}, H  l  ne Amar^{2,6}, Didier Calavas^{3,5}, Pauline de Jerphanion^{3,7}, Gaud Dervilly^{1,7}, Renaud Lailler^{3,6}, Yves Lambert^{2,5}, Melanie Picherot⁴, Samuel Soubeyrand^{1,7}, Martin Strugarek^{2,7}, Isabelle Tapie^{2,5}, C  line Dupuy^{3,5}

¹*French National Institute for Agricultural Research, France*; ²*French Ministry of Agriculture, France*; ³*French Agency for Food, Environmental and Occupational Health and Safety, France*; ⁴*French Ministry of Health*; ⁵*Animal Health Epidemiological Surveillance Platform, France*; ⁶*Food Chain Surveillance Platform, France*; ⁷*Plant Health Epidemiological Surveillance Platform, France*.

In the recent years, France has been developing a unique “One Health” approach for epidemiological surveillance based on a combination of three platforms, each focusing on a specific area: animal health, plant health or food chain surveillance. The platforms have a common governance approach and involve private and public organisations responsible for monitoring health hazards: the French government, scientific support organisations, agricultural technical institutes and representatives of farmers and professionals from the production, processing, distribution and catering sectors. Partnership between private and public organisations optimises activities and surveillance costs by pooling resources, skills and tools.

The way the three platforms monitor microbiological and chemical hazards and implement early detection systems aims to be both harmonious and coordinated. There are significant similarities between platforms, and there are numerous interactions through food, feed and the environment. An inter-platform organisation was thus established to facilitate synergies and continuity in inter-platform collaboration. This organisation aims to i) develop a collective culture common to all three areas about cross-cutting notions and concepts such as “One Health” and data quality, ii) identify health issues that require the development of an integrated surveillance approach for all three domains, iii) establish the cooperation needed in order to work together on transversal issues such as surveillance evaluation and iv) foster technology transfers and share experience and skills.

A first application of inter-platform collaboration will focus on *Salmonella* surveillance all along the food chain and particularly within the cattle, pig and poultry sectors. Joint activities will include, among others, an evaluation of the national *Salmonella* surveillance system performed by a mixed team of members from both animal health and food chain surveillance platforms. The potential for synergies, including the development of health indicators and the use of whole genome sequencing for *Salmonella* characterization and epidemiological investigations will also be explored.

P22: Duration of bulk milk antibody positivity following *Salmonella* Dublin and Typhimurium outbreaks in dairy herds

Maarten F. Weber¹, Manon M.C. Holstege¹, Kristy J. Kornegoor-Gotink¹

¹GD Animal Health, Deventer, the Netherlands.

Background

Salmonellosis in dairy cattle impacts animal welfare, farm economy and public health. The infection dynamics differ between *Salmonella* serotypes. Typically, *S. Dublin* and Typhimurium infections have been described as endemic and epidemic, respectively. However, it was unknown whether this applies to Dutch dairy herds as well.

Objective

The aim of this study was to quantify the time that Dutch dairy herds remain bulk milk ELISA positive after an initial salmonella outbreak, depending on serotype.

Materials and Methods

Triannual bulk milk results of 418 Dutch dairy herds, from which *Salmonella enterica* subsp. *enterica* was isolated at our laboratory between 2010 and 2017, were analysed retrospectively. Milk samples were tested by in-house ELISA, detecting antibodies against serogroups B and D. Data analysis was restricted to bulk milk samples collected after the first isolate (index case) from previously test-negative herds that were infected with a single serotype and had a first positive bulk milk ELISA result within 12 months after the index case. The time until herds subsequently became bulk milk ELISA negative was analysed with a Cox proportional hazards model.

Results

In comparison to herds with a Typhimurium outbreak (N=146), herds with outbreaks caused by other serotypes from serogroup B (N=94), Dublin (N=167) or other serotypes (N=11) had hazard ratios of becoming bulk milk ELISA negative of 1.30 (95%CI: 1.00; 1.70), 1.60 (1.28; 2.02) and 1.81 (0.97; 3.35), respectively.

Discussion and Conclusion

Herds with a *Salmonella* Typhimurium outbreak remained bulk milk ELISA positive substantially longer than herds with a *Salmonella* Dublin outbreak. Possibly, differences between serotypes in persistence in the environment (including other species), rate of transmission, control measures taken by farmers or diagnostic test characteristics of the ELISA play a role.

Perspectives

The results might raise the question whether on farm control measures need to be differentiated between *Salmonella* serotypes.

P23: Can Ultraviolet (UV-C)light eliminate *Campylobacter* spp. on transport crates for chickens?

Madeleine Moazzami¹, Ingrid Hansson¹

¹Swedish University of Agricultural Sciences.

Background

Campylobacter causes the most commonly reported foodborne disease in humans in most European countries. The number of human campylobacteriosis cases has increased during the last years in Europe. An important risk factor for chicken getting *Campylobacter* is contaminated transport crates. Cleaning of the crates is performed automatically at the abattoir, which includes the application of a disinfectant. It has been observed that the cleaning of the crates is insufficient. The aim of the study was to evaluate if UV-C irradiation could reduce the number of bacteria on the crates.

Objective

Can UV-C light eliminate *Campylobacter* and other bacteria on chicken transport crates?

Materials and Methods

The transport crates were swabbed before and after irradiation of 1 respectively 3 min with LED array. Transport crates were sampled 52 times before and after UV-C treatment. The samples were analyzed regarding *Campylobacter* (ISO10272-2), *Enterobacteriaceae* (NMKL 144) and total number aerobic bacteria (NMKL 86).

Results

A reduction of the amount of bacteria on the crates after the treatments was observed. The mean of *Campylobacter* was 4.8 before and 2.9 log cfu after 1 min and 5.9 before and 2.8 log cfu after 3 min. The mean of *Enterobacteriaceae* was 4.4 before and 2.9 log cfu after 1 min and 4.2 before and 2.4 log cfu after 3 min. The mean of the total number aerobic bacteria was 5.7 before and 4.2 log cfu after 1 min and 5.3 and 3.6 log cfu after 3 min.

Discussion and Conclusion

The results of the study indicate a reduction of bacteria on contaminated transport crates after UV-C treatment.

Perspectives

The reduction of bacteria with UV-C treatment was insufficient to avoid transmission of bacteria, this means that the LED disinfection box must be modified if it should be used.

P24: Italian surveillance on Chronic Wasting Disease: present situation and response by National Reference Centre for Animal Encephalopathies (CEA)

Barbara Iulini¹, Giuseppe Ru¹, Daniela Meloni¹, Andrea Loria¹, Maria Mazza¹, Maria Gabriella Perrotta², Cristina Casalone¹, [Maria Caramelli](#)¹

¹*Istituto Zooprofilattico Sperimentale del Piemonte, Liguria e Valle d'Aosta, Italy*, ²*Ministero della Salute, Italy*.

Background

Chronic wasting disease (CWD) is part of a group of transmissible spongiform encephalopathies and affects cervids. The first case of CWD was reported in a mule deer raised in captivity at the US National Wildlife Research Center of Colorado in 1967 but it was recognized as the first case of a prion disease in 1978. In Europe the first case was reported in 2016 in Norway and since the beginning of the emergency, a total of 27 cases of CWD have been identified.

Objective

In the frame of Italian surveillance plan for CWD, CEA in 2017 began a neuropathological study on the brains of the wild ruminants. The aim was to investigate the main patterns of lesions and possible correlated pathogens.

Materials and Methods

A total of 113 brains from 62 deer and 51 roe deer have been studied with histopathological examination.

Results

Neuropathological lesions were observed in 20 animals; 10 were unsuitable for examination due to autolysis or tissue freezing, while 83 were without lesions. In most cases, the lesions were attributable to nonsuppurative meningoencephalitis (84%); among the remaining samples, aspecific alterations were observed.

Discussion and Conclusion

Wild animals are often affected by emerging diseases responsible of central nervous system lesions. Except for sporadic reports of specific cases, the current literature on neuropathological diseases in wild animals is scarce therefore it difficult to gain a clear picture of the situation.

Perspectives

The evolution of CWD over the past two years in Europe raises cause for concern about the risk of spread of the disease. Data from North America indicate that once CWD has penetrated an area, it becomes endemic and difficult to eradicate. Furthermore, the current uncertainty regarding its zoonotic potential must be settled with effective prophylactic measures in order to prevent its introduction and spread.

P25: Microarray based genetic profiling of *Staphylococcus aureus* isolated from abattoir byproducts of pork origin

Marina Morach¹, Sophia Johler¹, Nadine Käppeli¹, Jérôme Julmi¹, Mirjam Hochreutener¹, Roger Stephan¹, Danai Etter¹

¹University of Zurich, Switzerland.

Background

Many parts of pork meat processing are currently not used for human consumption in Switzerland, although they are of great nutritional value. Therefore, data on the occurrence of pathogenic organisms on byproducts is extremely scarce and the prevalence and population structure of *Staphylococcus aureus* on meat processing sidestreams is unknown.

Objective

Therefore, abattoir byproducts of pork origin including ear, forefoot, heart, intestine, liver, rib bone, sternum, bladder, stomach, hind foot and tongue originating from six abattoirs were screened for *S. aureus*.

Materials and Methods

The obtained isolates were investigated by *spa* typing and DNA microarray analysis to reveal their genomic profile and population structure.

Results

The prevalence of *S. aureus* was generally low with a mean of 0.08%. In total, 40 *S. aureus* strains were detected and assigned to 12 *spa* types (t015, t1491, t1778, t091, t337, t899, t2922, t7439, t1333, t208, t4049, t034) and seven clonal complexes (CC1, CC7, CC9, CC30, CC45, CC49, CC398). Detected enterotoxin genes included *sea*, *seb*, *sec*, *seh*, *sel* and *egc* encoded toxin genes *seg*, *sei*, *sem*, *sen*, *seo*, and *seu*. None of the isolates harbored genes conferring methicillin resistance, but *blaZ/I/R* genes causing penicillin resistance were frequently found. In addition, strains from CC398 exhibited *tetM* and *tetK*, conferring tetracycline resistance. Similarity calculations based on microarray profiles revealed no association of clonal complexes with particular body parts, but revealed a certain correspondence of clonal complex and originating abattoir.

Discussion and Conclusion

Overall, the study demonstrates that these pork byproducts do not pose a greater health risk to consumers than conventional pork meat in terms of *S. aureus* and are suitable for human consumption.

Perspectives

Our findings suggest that occurrence of *S. aureus* on byproducts was linked to contamination during the slaughtering process in some abattoirs. Adequate handling of these processing sidestreams should ensure proper quality and therefore minimize product loss.

P26: Phenotypic and genotypic characteristics of *Escherichia coli* with non-susceptibility to quinolones isolated from environmental samples on pig farms

Marina Morach¹, Patrick Kindle¹, Katrin Zurfluh¹, Magdalena Nüesch-Inderbinnen¹, Sereina von Ah¹, Xaver Sidler¹, Roger Stephan¹, Dolf Kümmerlen¹

¹University of Zurich, Switzerland.

Background

In the last decade, the growth of the pig-farming industry has led to an increase in antibiotic use, including several used in human medicine, e.g. (fluoro)quinolones. Data from several studies suggest that there is a link between the agricultural use of antibiotics and the prevalence of antibiotic-resistant bacteria in the pig farm environment, including (fluoro)quinolone resistance. This poses a threat to human and animal health.

Objective

Our goal was to phenotypically and genotypically characterise 174 *E. coli* showing non-susceptibility to quinolones isolated from environmental samples from pig farms.

Materials and Methods

Antimicrobial susceptibility testing (AST) was performed using the disk diffusion method. PCR and sequence analysis were performed to identify chromosomal mutations in the quinolone resistance-determining regions (QRDR) of *gyrA* and the isolates were screened for the presence of different plasmid-mediated quinolone resistance (PMQR) genes. Strain relatedness was assessed by phylogenetic classification and multilocus sequence typing (MLST).

Results

Of 174 isolates, 81% (n=141) were resistant to nalidixic acid, and 19% (n=33) were intermediately resistant. Overall, 68.4% (n=119) were multidrug resistant. This study revealed a prevalence of 79.9% (n=139) for *gyrA* QRDR mutations, and detected 21.8% (n=38) isolates with at least one PMQR gene.

Discussion and Conclusion

E. coli with non-susceptibility to quinolones are widespread among the environment of Swiss pig farms and are often associated with an MDR phenotype. In several cases these isolates possess at least one PMQR gene, which could spread by horizontal gene transfer. *E. coli* from pig farms have diverse STs, some of which are associated with human and animal disease.

Perspectives

In order to preserve the usefulness of fluoroquinolones and to protect animal and human health, surveillance of antimicrobial resistance is warranted. Measures for prudent use of (fluoro)quinolones as provided by the European Union's guidelines for use of antimicrobials in veterinary medicine are of utmost importance.

P27: Biocheck.UGent: A risk based tool to quantify the level of biosecurity

Merel Postma¹, Bo Vanbeselaere^{1,2}, Nele Caekebeke¹, Moniek Ringenier¹, Elise Bernaerdt¹, Bert Damiaans¹, Philip Joosten¹, Steven Sarrazin¹, Jeroen Dewulf¹

¹Ghent University, faculty of veterinary medicine, Veterinary Epidemiology Unit, Salisburylaan 133, 9820, Merelbeke, Belgium; ²CID Lines, Belgium.

Background

A positive association between antimicrobial usage (AMU) and selection of antimicrobial resistance (AMR) has been proven in several studies. Antimicrobial stewardship in combination with optimal animal health will be key to slow down the resistance development.

Objective

A perceived highly effective and feasible alternative to improve overall animal health and reduce the necessity of AMU is the improvement of the level of biosecurity. Biosecurity is as well an important measure to reduce the introduction and spread of epidemic and endemic diseases.

Materials and Methods

To quantify the level of biosecurity Ghent University developed the online free available risk based tool Biocheck.UGent. From this system herds receive a score for their internal, external and overall level of biosecurity and areas for improvement are highlighted.

Results

At the moment over 11000 registrations have been collected and the tool has been used in over 50 countries worldwide. The Biocheck.UGent is currently available for poultry and pig production and is soon for cattle production as well. Large variation between and within herds and countries, as well as room for improvement in the level of biosecurity has been seen in several studies making use of the biosecurity quantification capabilities of Biocheck.UGent.

Discussion and Conclusion

Associations of improved biosecurity levels with reduced AMU and increased production results were published in several publications. Improving the level of biosecurity can be economically beneficial as well, resulting in a net benefit of around 2 euro per finisher per year.

Perspectives

Improvement of the level of biosecurity fits into a holistic approach to tackle the world wide problem of antimicrobial usage and resistance and can help us to reduce the risk of introduction of epidemic diseases.

P28: Respiratory health effects and atopic sensitization in non-farming residents associated with particulate matter and endotoxin emitted by livestock farms

Myrna M.T. de Rooij¹, Lidwien A.M. Smit¹, Hans J. Erbrink², Thomas J. Hagenaars³, Gerard Hoek¹, Nico W.M. Ogink⁴, Albert Winkel⁴, Dick J.J. Heederik¹, Inge M. Wouters¹

¹*Institute for Risk Assessment Sciences, Utrecht University, the Netherlands;* ²*Erbrink Advies, Arnhem, the Netherlands;* ³*Wageningen Bioveterinary Research, Wageningen University and Research, the Netherlands;* ⁴*Wageningen Livestock Research, Wageningen University and Research, the Netherlands.*

Background

Health effects have been associated with living in livestock dense areas, suggesting airborne exposures to livestock farm emissions to affect public health. Endotoxin, a pro-inflammatory agent of microbial origin, is a constituent of livestock farm emitted particulate matter (PM) that is potentially related to health effects observed.

Objective

We aimed to assess exposure-response relations for a range of respiratory endpoints and atopic sensitization in relation to modelled livestock farm emitted PM₁₀ and endotoxin.

Materials and Methods

Self-reported respiratory symptoms and health information of 12,117 persons participating in a population based cross-sectional study was used. For 2,494 persons, also data on lung function (spirometry) and serologically assessed atopic sensitization was available. Annual-average PM₁₀ and endotoxin concentrations at home addresses were predicted by dispersion modelling and land-use regression (LUR) modelling. Exposure-response relations were analysed with generalized additive models.

Results

Health outcomes were generally more strongly associated with exposure to livestock farm emitted endotoxin compared to PM₁₀. An inverse association was observed for dispersion modelled exposure with atopic sensitization (endotoxin: $p=0.004$, PM₁₀: $p=0.07$) and asthma (endotoxin: $p=0.029$, PM₁₀: $p=0.022$). Prevalence of respiratory symptoms decreased with increasing endotoxin concentration at the lower range, at the higher range prevalence increased with increasing concentration ($p<0.05$). Associations between lung function parameters with exposure to PM₁₀ and endotoxin were not statistically significant ($p>0.05$).

Discussion and Conclusion

Exposure to livestock farm emitted particulate matter is associated with respiratory health effects and atopic sensitization in non-farming residents. Results indicate endotoxin to be a potentially plausible etiologic agent, suggesting non-infectious aspects of microbial emissions from livestock farms to be important with respect to public health.

Perspectives

Gaining further insights in this is essential, especially since many people worldwide live in rural areas of which some are potentially more vulnerable to livestock farm emissions.

P29: Assessment of the suitability of different deterrents to prevent contact of wild boar with potentially ASF – positive carcasses

Frithjof Helmstädt¹, Carolina Probst², Franz-Josef Conraths², Nicolai Denzin²

¹*Technische Universität Dresden, Germany;* ²*Friedrich-Loeffler-Institut, Germany.*

Background

In the course of the African Swine Fever (ASF) epidemic in Europe it became evident that the epidemic is maintained by an epidemiological cycle unknown before – the habitat cycle. Wild boar get infected through contact with infectious carcasses, favoured by the high tenacity of ASF-Virus. Therefore, one of the most important measures in ASF control is considered the search for and timely removal of potentially infectious carcasses. If immediate removal is not possible e.g. for logistic reasons, deterring wild boar from the carcasses might be an option.

Objective

Identification of suitable deterrents to keep wild boar from getting in close contact with potentially infectious carcasses. The deterrents are supposed to be reasonable and easy to apply.

Materials and Methods

The study is carried out on five sites in a forest next to the city of Greifswald, Germany. The study sites (four test and one control site) are standardised as far as possible. The carcasses (as an entity of attraction to the wild boar) are simulated by baiting automats (offering maize). Each site is monitored by two wildlife cameras. Baiting areas (2 X 4 m) are located within a rectangle of slender posts connected by a wire, the latter serving as a frame to carry the deterrents to be tested.

Results

Some preliminary results concerning the effectivity of different physical and chemical deterrents will be presented.

Discussion and Conclusion

It has to be borne in mind that a temporary effect of deterrents may be sufficient since an eventual removal and proper disposal of the carcass has to be an imperative in ASF control.

Perspectives

Successful candidates of deterrents need to be tested on carcasses.

P30: Risk-based approach for checking intra community trade consignments of animals

Peter Wagner¹, Jörg Hiesel¹, Ian Kopacka², Reinhard Fuchs²

¹*Veterinary Public Health Unit, Provincial Government of Styria, Austria,* ²*Division for Data, Statistics and Risk Assessment, Austrian Agency for Health and Food Safety Ltd., Austria.*

Background

In spite of official veterinary inspections of animals at the place of origin, intracommunity trade of animals may be a source of the transboundary spread of animal diseases. Therefore, random physical and laboratory checks of such consignments at the place of destination are useful to detect possible disease incursions.

Objective

To increase the effectiveness and efficiency of these checks, a system for a uniform and automatic selection of consignments with an increased risk of containing potentially diseased animals was required.

Materials and Methods

The percentage of intracommunity consignments per animal category to be checked by veterinary officers is laid down in a national Austrian ordinance. Data on animal consignments are taken from the TRACES database and data on animal disease outbreaks from the ADNS database. Analyses are carried out using the software package R.

Results

The developed tool preferably selects intracommunity animal consignments originating from regions near recent outbreaks of notifiable animal diseases. A list of consignments to be checked and sampled is generated every two weeks, taking into account the prescribed surveillance goals, and sent by email to the responsible veterinary officers. A target-performance comparison is carried out regularly and reports on the progress of the surveillance program and on data errors are provided.

Discussion and Conclusion

The new system saves personnel resources and harmonizes the selection of consignments to be checked. By taking into account the disease situation in the vicinity of the region of origin, it increases the sensitivity of the intra community trade surveillance in Styria and the chance of detecting potentially infected animals which did not show clinical symptoms at the place of origin.

Perspectives

A rollout of the developed system to other Austrian Provinces is planned in the near future.

P31: Antimicrobial usage and resistance in companion animals - A cross-sectional study in three European countries

P. Joosten¹, S. Sarrazin¹, D. Ceccarelli², [EFFORT group], D. Mevius^{2,3}, J. Dewulf¹

¹*Veterinary Epidemiology Unit, Department of Reproduction, Obstetrics and Herd health, Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133. 9820 Merelbeke, Belgium;* ²*Department of Bacteriology and Epidemiology, Wageningen Bioveterinary Research, Lelystad, Netherlands;* ³*Department of Infectious Diseases and Immunology, Faculty of Veterinary Medicine, Utrecht University, Utrecht, Netherlands.*

Background

Antimicrobial resistance (AMR) is a complex issue with many contributing factors. Companion animals have been described as potential reservoirs of AMR, however data remain scarce. High usage of broad-spectrum antimicrobials in these species is demonstrated in different studies, which can select for resistance.

Objective

Objectives of this cross-sectional study were to describe AMU in dogs and cats in three different European countries and to investigate phenotypic AMR in *Escherichia coli* isolates.

Materials and Methods

This study was set up within the framework of the European research project EFFORT (<http://www.effort-against-amr.eu/>). Over one year sampling, a questionnaire filled in by the owner, and one faecal sample per animal (n=303) were collected. AMU of one year was registered and quantified based on the mean dosage per active compound since no ESVAC DDDvet values are available. Phenotypic resistance profiles of 282 *E. coli* isolated from faecal samples were determined for 14 different antimicrobials.

Results

In one year, 19% of the animals received at least one antimicrobial treatment. Overall, the most frequently prescribed compounds were amoxicillin-clavulanate (27%), amoxicillin (8%), cefovecin (8%) and enrofloxacin (8%). The average treatment incidence of treated animals is 4%, which means that 4 animals per 100 receive a daily dose of antimicrobials. Resistance to at least one antimicrobial agent was found in 27% of the isolates; of these 66% showed resistance to two or more unrelated antimicrobial agents. Most common resistance in *E. coli* was to ampicillin (18%). Two isolates were colistin resistant, a last-resort antimicrobial in human medicine.

Discussion and Conclusion

These results show high use of broad-spectrum and critically important antimicrobials and a substantial resistance prevalence. Taking into account that owners and pets often have close contact, companion animals should be considered as a potential transmission route of AMR. This emphasizes the importance of studying AMR in companion animals and the possible risks of transmission to owners.

P32: Simultaneous observation of human and animal symptoms in Yao and Danamadji, Chad

R. Özcelik¹, F.M. Abakar², R. Issa², A. Naminou Bakary², S. Dürr¹

¹*Veterinary Public Health Institute, Vetsuisse Fakultät, Universität Bern, Bern, Schweiz,* ² *Institut de Recherche en Elevage pour le Développement, N'Djamena, Chad.*

Chad is a country placed in the Sahel region of the sub-Saharan African continent and is facing major difficulties providing their rural populations and their animals with adequate health services. This is due to limits in trained staff and lack of medical facilities, long distances for reaching the next medical facility and community member's reluctance regarding western medicine. Community members in the Sahel region live in close contact with their animals and are thus, under high risk of being infected with transmissible diseases. For the improvement of these populations' health status, by the early detection of transmissible diseases, understanding the most common occurring symptoms is valuable. Such perceptions can be achieved by observing human and animal symptoms concurrently. As a precursor study, for a later to be established case control study with a One Health approach in Chad, in total 92 interviews were conducted using a KoBoCollect survey. A team of Swiss and Chadian researchers visited camps and villages selected by the randomized cluster sampling. Throughout the interviews, community members were asked about the perceived frequency of given symptoms (cough, diarrhea, skin problems, fever, weight loss, weakness, vertigo, pale mucosa, swollen joints, ulcer, abnormal behavior) that occurred among members of their household and their animals during a past time frame. 41 of the interviews took place in villages and 51 interviews in camps within concentration zones. From the 92 interviews in total, community members counted 1373 household members and 9013 animals, which they took in account when asked for observed symptoms. In humans, fever was reported most frequent (720 cases), whilst among animals, cough was reported most frequent (1912 cases) in the past year. Data from the questionnaire on the frequency of occurring symptoms will later serve as a base line for the symptom recordings of a further study.

P33: Management, exercise and soundness in pleasure horses in North West England and North Wales

S.L. Harley¹, G.L. Pinchbeck², P.I. Milner¹, P.D. Clegg¹, J.L. Ireland³

¹*Institute of Ageing and Chronic Disease, University of Liverpool;* ²*Institute of Infection and Global Health, University of Liverpool;* ³*Institute of Veterinary Science, University of Liverpool.*

Background

Pleasure horses constitute a major part of the UK equine population. Little is known about the factors affecting exercise and lameness in this demographic.

Objective

To observe factors affecting exercise routine in pleasure horses.

Materials and Methods

Owners of pleasure horses completed an interview questionnaire. Comparisons were made using Kruskal-Wallis, Mann-Whitney or Pearson's Chi Square tests.

Results

Fifty-two owners completed the questionnaire regarding 74 horses. 31.1% (23/74) of horses were described as overweight; 91.9% (68/74) received hard feed daily and 95.9% (71/74) received supplementary forage, associated with hours at turnout ($p<0.01$). Leisure was the most common discipline (31.3%, 26/74). 71.6% of horses were in medium work, 10 horses at a lower intensity than usual due to previous lameness. 40.5% (30/74) horses had suffered at least one previous lameness event. Hoof abnormalities were reported in 45.9% (34/74) of horses, 44% (15/34) were hoof imbalance. Remedial shoeing was associated with hoof imbalance ($p=0.04$). Increasing age was associated with lower exercise intensity ($p<0.001$). Exercise intensity was associated with total minutes of exercise per week ($p<0.05$), but not total sessions per week ($p>0.05$). Total sessions and minutes per week were associated with discipline ($p<0.05$). 91.6% (66/72) horses exercised regularly on a synthetic surface. 83.4% were outdoor; in wet conditions 13% became boggy, in hot or dry conditions 27% became deep and 11% became dusty. Harrowing was the most popular arena maintenance method (57.1%). Average maintenance frequency was 14 days (IQR=49-3.5), this was not associated with yard type.

Discussion and Conclusion

Many pleasure horses are overweight. Age, discipline and previous lameness conditions affect exercise intensity. Hoof abnormalities and previous lameness events are common. Changing weather conditions alter arena surface properties, a wide range in maintenance method and frequency exists. These factors may have serious implications for injury risk.

Perspectives

Limitations include recruitment bias.

P34: Morphometric measurements of the equine hoof; how is hoof shape altered by trimming?

S.L. Harley¹, P.D. Clegg¹, G.L. Pinchbeck², J.L. Ireland³, P.I. Milner¹

¹*Institute of Ageing and Chronic Disease, Leahurst Campus, University of Liverpool;* ²*Institute of Infection and Global Health, Leahurst Campus, University of Liverpool;* ³*Institute of Veterinary Science, Leahurst Campus University of Liverpool.*

Background

Foot shape is associated with lameness in horses. Farriery has a significant role in managing hoof shape.

Objective

To evaluate the effect of farriery on hoof shape.

Materials and Methods

Digital photographs were taken of dorsal, lateral, medial and solar views of the forefeet of 45 sound pleasure horses before and after trimming by qualified farriers at a single time point. Measurements were made in Image J and calibrated to a 5cm scale in each photograph. Comparisons were made using Wilcoxon signed rank test or Mann-Whitney test for paired or independent samples as appropriate.

Results

Increases in centre of rotation-frog apex ($p < 0.001$), centre of rotation-centre of pressure ($p < 0.001$) and heel buttress-centre of pressure ($p < 0.001$) were associated with trimming in both limbs. Compared to pre-trimming, frog apex-toe distance ($p < 0.001$), solar width ($p < 0.001$) and medial solar width (left $p = 0.016$, right $p = 0.03$) were reduced post-trimming, whilst medial hoof wall angle was increased post-trimming (left $p = 0.017$, right $p = 0.004$). Lateral: medial sole width did not change significantly following trimming. The difference between dorsal hoof wall angle and heel angle was greater ($p = 0.03$) on the medial view than lateral view across both limbs. Medial hoof wall angle was significantly more acute ($p < 0.001$) than lateral hoof wall angles in both pre- and post-trim conditions of the left forelimb, but not the right forelimb.

Discussion and Conclusion

Hoof trimming results in palmar heel migration and reduction in length at the toe. Differences in trimming and angulation of medial and lateral walls of the hoof may indicate differing growth during the shoeing interval and have implications for mediolateral balance of the hoof before and after trimming.

Perspectives

Asymmetry within forelimb pairs may result from different loading or trimming patterns and affect the conformation and ultimately soundness.

P35: A One Health Approach to understanding the epidemiology of *Cryptosporidium* in Scotland

Sue C. Tongue^{1,4}, Harriet Auty^{1,4}, Jude Eze^{1,4}, Dominic Mellor^{2,4}, Franz Brülisauer³, Geoff Foster³, Alison Smith-Palmer², Gillian Hawkins²

¹Scotland's Rural College - Epidemiology Research Unit, United Kingdom (UK); ²Health Protection Scotland (HPS), UK; ³Scotland's Rural College – Veterinary Services, UK; ⁴EPIC – Centre of Expertise on Outbreaks of Animal Disease, Scotland.

Cryptosporidium is the most commonly reported protozoal cause of infectious intestinal disease among humans in Scotland. The project aim was to explore the relationship between trends in human and animal surveillance reports.

A one health approach was taken to bring together human and veterinary expertise and data to achieve a better understanding of the epidemiology of *Cryptosporidium* and to demonstrate the value in this approach.

Descriptive and time-series analysis were used to explore two data sources:

- Aggregated human data from the routine reporting of all laboratory confirmed cases to HPS via the Electronic Communication of Surveillance in Scotland (ECOSS).
- Animal data from voluntary diagnostic submissions of Scottish origin by veterinarians to the SRUC Disease Surveillance centre network.

The analysis was directed via iterative discussions with domain and data experts.

There were over 5,700 human and 2,300 animal isolates during the past decade, with the latter predominantly from cattle.

The spring peak of the biphasic seasonal pattern among humans is predominately due to *C. parvum*. It occurs consistently four weeks behind the single peak of cattle isolates, associated with the spring-calving period.

Rates of *Cryptosporidium* vary considerably across the 14 NHS Boards, with some similarity between the human rate and herd-level cattle rates within a Board. They are highest in the cattle-dense rural Board in South-West Scotland, providing additional evidence for the zoonotic contribution to human infection.

The strength of this approach was not only in bringing human and animal data together but equally important bringing together expertise in both disciplines to ensure a common understanding of the limitations and biases of the data and to provide a joint interpretation of the analysis.

Cryptosporidium was used as an exemplar to demonstrate the value of collaboration. This study forms the foundations for a true One Health approach, via the addition of environmental data.

P36: Difficulties in estimating usage of antimicrobials based on sales to beef and dairy farms and associated denominator data from a UK veterinary practice

Roger W. Humphry¹, Madeleine K. Henry¹, Aaron Reeves¹, Carla Correia-Gomes¹, Anon. Smith², George J. Gunn¹, Sue C. Tongue¹

¹*Epidemiology Research Unit, Department of Veterinary and Animal Science, Northern Faculty, Scotland's Rural College (SRUC), An Lòchran, 10 Inverness Campus, Inverness, IV2 5NA; ²c/o R. W. Humphry.*

Background

Targets have been set for the reduction of antimicrobial usage (AMU) in livestock population at national level, with agreed metrics across Europe. However, which data sources and what metric is best for use at a herd-level have still to be agreed for the British cattle sector, especially for beef herds.

Objective

To assess standard metrics for estimating AMU and their applicability for estimating usage at the individual herd-level, using two data sources.

Materials and Methods

Data on antimicrobial sales in a UK veterinary practice, for 75 cattle herds, over the period 2011-2015 were linked to farm demographic data from the Government's agricultural census and used to estimate AMU metrics at the herd-year level.

Results

There was a clear positive relationship between herd-size and usage in mg/kg. The top 1% of sales in mg/kg of bovine animal all came from VERY small herds. Seven (from 368) observations were particularly high, (50-350 mg/kg) and these came from herd-years with very low total weight of animal.

Discussion and Conclusion

- The importance of unusually low estimates for the denominator is mathematically clear but *empirically* demonstrated here. Outlying high estimates for usage per kg of animal came from those herd-years with very low total weights of animal.
- This method seems to work for large herds but is flawed for small herds.
- Standardising usage in relation to herd-size is necessary BUT...
 - Ratios designed for national-level targets may not be applicable to herd-level targets.
 - Sales and/or census data may not be applicable as a denominator for herd-level targets.

Perspectives

Standardisation of AMU with respect to herd-size makes sense because larger herds, on average, use more antimicrobials. Denominators that are applicable for target-setting at the national level may not be useful for target-setting by individual vets & farmers.

P37: Shiga toxin producing *E. coli* (STEC) in lambs meat in the Netherlands, a chain approach

Yvette de Geus¹

¹*University of Utrecht, the Netherlands.*

Background

A Dutch lambs meat processing company had several recalls of meat products because the microbiological limits of STEC were exceeded.

Objective

To determine where in the production process the contamination with STEC took place, the whole production chain from primary farm, to cutting company and slaughterhouse was checked for microbiological contamination.

Materials and Methods

Samples for total aerobic bacterial count, Enterobacteriaceae and STEC analysis were taken at the slaughterhouse and cutting company. Faeces of two different groups of slaughter lambs were cultured for STEC. Furthermore samples of the workers' hands at slaughterhouse and cutting company were taken and microbiologically examined for total aerobic bacterial count, Enterobacteriaceae and STEC. Company audits were done to gain insight of the hygienic behaviour of the workers.

Results

Microbiological contamination of the carcasses with Enterobacteriaceae took place at the slaughterhouse during pelt removal and evisceration. STEC bacteria could not be cultured from the different samples. Unhygienic behaviour of the personnel influenced the slaughter process.

Discussion and Conclusion

The lack of hygienic knowledge and low intrinsic motivation of the workers were important factors which influenced the hygienic work level of the employees negatively. This resulted in a contamination of the product during evisceration and pelt removal with Enterobacteriaceae, possible STEC, on the lambs carcasses. To improve the hygienic knowledge and intrinsic motivation of the workers, a custom made company training of slaughterhouse personnel was developed. The aim of the training was to give the workers insight of the microbiological impact of their hygienic behaviour and to create a common goal to reduce the microbial contamination of the carcasses. To sustain hygiene quality improvements and to keep the workers intrinsically motivated, also positive effects of the hygiene measurements have to be shared with the slaughterhouse workers and the quality manager.

List of participants

No.	First Name	Surname	Institution	Country
1	Jens Frederik	Agger	University of Copenhagen	Denmark
2	Thiemo	Albert	Institute of Food Hygiene	Germany
3	Dragan	Antic	University of Liverpool	UK
4	Simon	Archer	University of Surrey	UK
5	Kurt	Arden	University of Liverpool	UK
6	David	Argyle	University of Edinburgh	UK
7	Naser	Arzoomand	Swedish Food Agency	Sweden
8	Harriet	Auty	Scotland's Rural College (SRUC)	UK
9	Rachelle	Avigad	Animal and Plant Health Agency (APHA)	UK
10	Francois	Beaudeau	Oniris-INRA	France
11	Racem	Ben Romdhane	FU Berlin - Institute for Veterinary Epidemiology and Biostatistics	Germany
12	Boyd	Berends	VPH Division - Institute for Risk Assessment Sciences	Netherlands
13	Christian	Berking	National Food Agency	Sweden
14	Bojan	Blagojevic	University of Novi Sad	Serbia
15	Lisa	Boden	University of Edinburgh	UK
16	Frank	Boelaert	EFSA	Italy
17	Marnie	Brennan	University of Nottingham	UK
18	Mark	Bronsvort	University of Edinburgh	UK
19	Franz	Brülisauer	Scotland's Rural College (SRUC)	UK
20	Anja	Buschulte	German Federal Institute for Risk Assessment	Germany
21	Maria	Caramelli	IZS del Piemonte, Liguria e Valle d'Aosta	Italy
22	Helena	Cardoso de Carvalho Ferreira	Gent University	Belgium
23	Mickael	Cargnel	Sciensano	Belgium
24	Luis Pedro	Carmo	University of Bern	Switzerland

25	Beniamino	Cenci Goga	University of Perugia	Italy
26	Ilias	Chantziaras	Flanders Research Institute for Agriculture, Fisheries and Food	Belgium
27	Robert	Christley	Dogs Trust	UK
28	Antoine	Clinquart	University of Liège	Belgium
29	Lucie	Collineau	INRA	France
30	Alasdair	Cook	University of Surrey	UK
31	Aurélie	Courcoul	French Ministry of Agriculture	France
32	Niko	Dadios	Royal Veterinary College	UK
33	Yvette	de Geus	Utrecht University	Netherlands
34	Ricardo	de la Rua-Domenech	Animal and Plant Health Agency (APHA)	UK
35	Myrna	de Rooij	Utrecht University	Netherlands
36	Sarne	De Vliegheer	Ghent University	Belgium
37	Francesco	Debenedetti	University of Bristol	UK
38	Nicolai	Denzin	Friedrich-Loeffler-Institute	Germany
39	Klaus	Depner	Friedrich-Loeffler-Institute	Germany
40	Jeroen	Dewulf	Ghent University	Belgium
41	Marcus	Doherr	Freie Universität Berlin	Germany
42	Veronica	Duckwitz	Freie Universität Berlin	Germany
43	Maria-Eleni	Filippitzi	Sciensano	Belgium
44	Principia	Formisano		UK
45	Ruth	Fowler	University of Edinburgh	UK
46	Maria	Fredriksson-Ahomaa	University of Helsinki	Finland
47	Brian	Friker	University of Bern	Switzerland
48	Juan	García-Díez	Universidade de Trás-os-Montes e Alto Douro	Portugal
49	Jane	Gibbens	Consultant Epidemiologist	UK
50	Katherine	Grace	Animal and Plant Health Agency (APHA)	UK
51	Matthias	Greiner	German Federal Institute for Risk Assessment	Germany

52	Andrew	Gresham	Animal and Plant Health Agency (APHA)	UK
53	Lisa	Guardone	Department of Veterinary Sciences	Italy
54	Bruce	Gummow	James Cook University	Australia
55	Sarah	Harley		UK
56	Sonja	Hartnack	Vetsuisse Zurich	Switzerland
57	Andreas	Hensel	German Federal Institute for Risk Assessment	Germany
58	Lourens	Heres	Darling Ingredients / Sonac	Netherlands
59	Hans	Houe	University of Copenhagen	Denmark
60	Kurt	Houf	Ghent University	Belgium
61	Robert	Huey	Department of Agriculture, Environment and Rural Affairs (DEFRA)	UK
62	Eleni	Iossifidou	Aristotle University of Thessaloniki	Greece
63	Urska	Jamnikar Ciglencečki	University of Ljubljana	Slovenia
64	Philip	Joosten	Ghent University	Belgium
65	Arja Helena	Kautto	National Food Agency	Sweden
66	Pieter-Jan	Kerkhof	Ghent University	Belgium
67	Theo	Knight-Jones	ILRI	Tanzania
68	Nicolas	Korsak Koulagenko	University of Liège	Belgium
69	Tineke	Kramer	Stichting Milieukeur	Netherlands
70	Sarah	Krumrie	University of Glasgow	UK
71	Thomai	Lazou	Aristotle University of Thessaloniki	Greece
72	Anaïs	Léger	University of Geneva	Switzerland
73	Ann	Lindberg	National veterinary institute	Sweden
74	Len	Lipman	Utrecht University	Netherlands
75	Gunda	Lubek	Federal Ministry of Food and Agriculture	Germany
76	Simone	Magnino	IZS della Lombardia e dell'Emilia Romagna	Italy
77	Ana	Mateus	Royal Veterinary College	UK

78	Stella	Mazeri	The Roslin Institute, University of Edinburgh	UK
79	Catherine	McCarthy	Animal and Plant Health Agency (APHA)	UK
80	Rosemary	McManus	University of Glasgow	UK
81	Stefanie	Meinke	German Armed Forces	Germany
82	Dom	Mellor	University of Glasgow	UK
83	Roswitha	Merle	FU Berlin, Institute for Veterinary Epidemiology and Biostatistics	Germany
84	Davide	Messina	University of Surrey	UK
85	Natascha	Meunier	Animal Health Ireland	Ireland
86	Eleni	Michalopoulou	University of Liverpool	UK
87	Madeleine	Moazzami	Biomedical Sciences and VPH	Sweden
88	Marina	Morach	Institute for Food Safety and Hygiene	Switzerland
89	Paolo	Motta		Italy
90	Alexandra	Muller	University of Porto	Portugal
91	Christina	Nathues	Swiss Food Safety and Veterinary Office	Switzerland
92	Liza Rosenbaum	Nielsen	Dep. of Veterinary and Animal Science	Denmark
93	Torben	Nielsen	University of Adelaide	Australia
94	Søren Saxmose	Nielsen	University of Copenhagen	Denmark
95	Rodrigo	Nova	University of Nottingham	UK
96	Derk	Oorburg	Vion Food Group	Netherlands
97	Ranya	Özcelik	Veterinary Public Health Institut	Switzerland
98	Giles	Paiba	Home Office ASRU	UK
99	Christina	Papadopoulou	Animal and Plant Health Agency (APHA)	UK
100	Elias	Papapanagiotou	Aristotle University of Thessaloniki	Greece
101	Tim	Parkin	University of Glasgow	UK
102	Andrew	Paterson	Animal and Plant Health Agency (APHA)	UK
103	Maria Francesca	Peruzy	University of Naples "Federico II"	Italy

104	Joana	Pessoa		Ireland
105	Julie	Pont	University of Bern	Switzerland
106	Merel	Postma	Ghent University	Belgium
107	Stefano	Rea	University of Camerino	Italy
108	Susan	Rhind	University of Edinburgh	UK
109	Katharina	Riehn	HAW Hamburg	Germany
110	Moniek	Ringnier	Ghent University	Belgium
111	Joanna	Robinson	DAERA	Ireland
112	Cristina	Saraiva	UTAD	Portugal
113	Carola	Sauter-Louis	Friedrich-Loeffler-Institut	Germany
114	Alessandro	Seguino	University of Edinburgh	UK
115	Geoff	Simm	University of Edinburgh	UK
116	Kirsten	Shields	University of Edinburgh	UK
117	Franciscus	Smulders	University of Veterinary Medicine, Vienna	Austria
118	Cristina	Soare	University of Edinburgh	UK
119	Katharina	Stärk	Federal Food Safety and Veterinary Office	Switzerland
120	Iva	Steinhauserova	University of Veterinary and Pharmaceutical Sciences Brno	Czech Republic
121	Susanna	Sternberg Lewerin	Swedish University of Agricultural Sciences	Sweden
122	Sue	Tongue	Scotland's Rural College (SRUC)	UK
123	Paul	Torgerson	Section of Veterinary Epidemiology	Switzerland
124	Marcello	Trevisani	University of Bologna	Italy
125	Aurélie	Tschopp	Cantonal medical office, Berne	Switzerland
126	John	Tulloch	University of Liverpool	UK
127	Matthys	Uys	University of Edinburgh	South Africa
128	Liese	Van Gompel	Institute for Risk Assessment Sciences, Utrecht University	Netherlands
129	Ed	van Klink	Wageningen Bioveterinary Research	Netherlands

130	Gerty	Vanantwerpen	Poulpharm	Belgium
131	Madalena	Vieira-Pinto	UTAD	Portugal
132	Louise	Vince	Royal Veterinary College	UK
133	Peter	Wagner	VPH Unit, Provincial Government of Styria	Austria
134	Maarten	Weber		Netherlands
135	Claire	White	University of Bristol	UK
136	Bruce	Whitelaw	The Roslin Institute, University of Edinburgh	UK
137	Noelia	Yusta	University of Glasgow	UK