EPIDEMIOLOGICAL FRAMEWORK FOR MODELLING HIGHLY PATHOGENIC H5N1 INFLUENZA A VIRUS OUTBREAKS IN THE MEKONG REGION.

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Introduction
Since 2003 the Mekong Region has been recording seasonal circulation of highly pathogenic H5N1 influenza A viruses (HPAI) in a number of avian populations, with occasional spill-over of infection to humans. Risk factors relating to the marketing and husbandry of Sector 3 and 4 poultry farms have been implicated in the initiation of HPAI outbreaks. We aim at building a conceptual framework to model disease dynamics in the region which will allow predictive modelling of infection in different hosts and examine the proficiency of disease containment strategies.

Materials and methods
We used predictor data from Thailand and Vietnam and the transmission pathways were modelled using system dynamics software.

Results
We have developed a stochastic mean-field discrete time simulation model to evaluate changes in the basic reproductive number (R₀) of HPAI outbreaks in poultry. Infection is considered dependent on seasonal dynamics of the hosts’ environment and immunity is assumed to be achieved to the same HPAI seeding strain. Infectiousness at the end of the incubation period is modelled as a function.

Discussion
This approach enables the quantification of R₀ of an emergent HPAI. The ability of different control strategies, at different R values, in containing the spread between and within different poultry hosts and the resulting probability of human infection at different administrative levels can also be examined.

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A STUDY OF DRY COW THERAPY AND EFFECTS ON SCC IN 10 IRISH DAIRY HERDS.

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Introduction
The purpose of dry cow therapy is two fold, firstly to cure sub-clinical mastitis and secondly to prevent the acquisition of environmental mastitis. The cure of existing sub-clinical mastitis is known to be high variable. The objective of this study was to identify factors to predict treatment outcome.

Materials and methods
Somatic cell count data for 480 cows in 10 herds from January 2001 until June 2002 were analysed. An individual cow somatic cell count (SCC) of 200,000 cells per mL was used as the threshold for elevation of SCC. Uni-variate analysis was carried out initially. Two types of statistical models were fitted to the data. In the first model the probability of an elevated SCC after calving was modelled using logistic regression with a random effect. In the second model, the natural log of SCC, was modelled using a mixed model.

Results
The duration of elevated SCC prior to drying off and the magnitude of the elevation in SCC were found to have an impact on the response to dry cow therapy.

Discussion
This study shows that the longer a cow has had an elevated SCC, and the greater that elevation in SCC, the response to dry cow therapy will be diminished. This information aids decision making in the selection of cows for dry cow therapy or culling.

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VISUALISATION OF A HOLOGISTIC ANIMAL WELFARE PROGRAMM BY SPIDERGRAM

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Introduction
In the course of the revision of the Swiss animal protection law by 2005, the authors were asked to provide a certain party with a system to evaluate animal protection not only by physical means but include other factors like pasture, infrastructure, human – animal interaction etc.

Materials and methods
Basis for the constructed model was the guidelines for keeping horses by the Swiss federal office for veterinary medicine (Anonym, 2001). To measure the different parameters in animal welfare a scoring system as used by Austria in the animal protection law was used (Bartussek, 2002). Visualisation was realized by using a spidergram adapted from Rouiller et al. (2004) using Excel.
Results and Discussion

The spidergram consisted of 4 dimensions visualized by 2 axes. One axis was used to evaluate the horse welfare including social contact, tackling, training and grooming. The other axis was used to evaluate the surroundings of the stable in regard to animal welfare, like observation, feeding, know how and infrastructure. By using 2 concentric polygons in the spidergram, we were able to distinguish if the minimum of animal welfare is achieved regarding law and, if not, if it is compensated (Fig. 1).

The spidergram presented is a useful model for evaluating animal welfare. The scoring of the different parameter needs further adaptation.

References

Anonym, 2001: Haltung von Pferden, Ponys, Eseln, Maultieren und Mauleseln. Richtlinie 800.106.06(2), Swiss federal office for veterinary medicine, 3003 Bern, Switzerland.


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</table>

Fig. 1: Example of a spidergram visualisation of animal welfare

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Saturday 26\textsuperscript{th} November – Food Science

AFLATOXINS AND OCHRATOXINS IN FOODS OF ANIMAL ORIGIN

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Abstract

Aflatoxins and ochratoxins are two groups of toxins of several secondary fungal metabolites. Aflatoxins are produced by \textit{Aspergillus} spp. in a wide variety of foods and feeds around the world. Among the four main aflatoxins (B\textsubscript{1}, B\textsubscript{2}, G\textsubscript{1} and G\textsubscript{2}), the most frequent is aflatoxin B\textsubscript{1} (AFB\textsubscript{1}), which is also the most toxic. AFB\textsubscript{1} is the most potent natural carcinogen known. Ingestion of AFB\textsubscript{1} contaminated feeds by lactating animals leads to excretion of aflatoxin M\textsubscript{1} (AFM\textsubscript{1}), the 4-hydroxylated metabolite of AFB\textsubscript{1}, in milk. Occurrence of AFM\textsubscript{1} in milk and dairy products has been investigated in various countries. Ochratoxins are produced by fungi species of Aspergillus and Penicillium during the storage of various feedstuffs. Ochratoxin A (OTA) is the most important and most prevalent mycotoxin of the ochratoxin group. As a result of carry over from moldy feed, OTA is found in various foods of animal origin such as pork, offal and sausages containing blood, or poultry meat. OTA is classified by the International Agency for Research on Cancer as a possible human carcinogen (group 2B). Due to risk exposure, European Union and several other countries have established legislation to regulate the levels of aflatoxins and ochratoxins in feed and food.

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Free communications

STUNNING AND SLAUGHTER METHODS AND CONTAMINATION OF CARCASSES IN RUMINANTS

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Introduction

Traditionally, when considering stunning and slaughter methods the main emphasis is usually placed on animal welfare and product quality rather than on meat safety. However, in recent years public health aspects of stunning have received more attention. In particular, a number of studies have associated captive bolt stunning with risk of meat contamination by bacteria and/or central nervous system tissue (CNS). As a result, pithing was banned in 2001 and modifying or replacing of current mechanical stunning methods has recently been recommended (EFSA, 2004).

Materials and methods

The following investigations were carried out:

1) Haematogenous dissemination in sheep carcasses was investigated using non-pathogenic marker organisms inoculated in the brain during captive bolt stunning.
2) For the detection of CNS tissue ELISA and immunocytochemistry techniques were employed.
3) An electrolyte solution in the bolt hole was tested to ensure welfare and minimise carcass convulsions.

**Results and Discussion**
The results have demonstrated:
1) Microbial contamination of the immediate environment, blood and internal organs as well as the operatives occurred after stunning with a bacteria-contaminated gun (3) in sheep; was later confirmed also in cattle (7).
2) Prevalence of brain embolism and spinal contamination being caused and disseminated by penetrating and non-penetrating captive bolt stunning (4,5,6) and carcass splitting (8), respectively.
3) Recovery of consciousness and reduction of carcass convulsions after captive bolt stunning were prevented by potassium chloride injections in cattle.

**Conclusion**
Mechanical stunning and slaughter methods may pose public health risks, further research is needed to develop appropriate controls and alternatives.

**References**

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**MONITORING ANTIMICROBIAL USE AS A BASIS FOR ANTIMICROBIAL RESISTANCE MONITORING**

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Introduction
Monitoring antimicrobial consumption is crucial for the interpretation of data on the situation of antimicrobial resistance in bacteria from farm animals [1]. Before routine monitoring can be established, scientific and practical aspects of data collection and analysis need to be elaborated. In a first step, our aim is to evaluate data quality of farm records on antimicrobial use in dairy farms.

Materials and methods
During the year 2005, treatment data (product, quantity, indication) are being collected from 109 dairy farms. Data quality will be evaluated by describing completeness of the recorded information, and by comparing farmers’ and veterinarians’ records. Information on antimicrobial use will be classified according to the anatomical-therapeutic-chemical code (ATCvet) [2], and analyzed by calculating the prescribed daily dose (PDD) [3] and treatment incidence for each antimicrobial class.

Results and Discussion
Preliminary results are available for 1835 antimicrobial treatments in 95 farms. Mastitis and dry cow treatments accounted for 59% of all treatments. Penicillins were most frequently used (53% of treatments). Tetracyclines (9%), cephalosporines (8%), sulphonamides (8%), broad spectrum penicillins (7%), fluoroquinolones (5%), and macrolides (3%) were also regularly administered.
The results of this research project will be compared to data on antimicrobial use in Switzerland obtained from veterinarians and the pharmaceutical industry.

References

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EMERGENCE OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) IN COMPANION ANIMALS: ANTHROPOZOONOSIS, ZOONOSIS OR BOTH?

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Introduction
Methicillin-resistant \textit{Staphylococcus aureus} (MRSA) is an important human pathogen causing hospital and community-acquired infections. Recent studies have documented the occurrence of MRSA infections in dogs (1-3) and in horses (4-6). This paper analyses the outcomes of two independent studies conducted at the Royal Veterinary College in London (7) and the University of Liverpool (8).
The possible transmission of MRSA between humans and animals is reviewed on the basis of the current knowledge.

**Materials and Methods**

MRSA carriage was investigated in dogs, horses, cats, and veterinary staff. MRSA was isolated from oral/nasal swabs and diagnostic submissions by antibiotic selective methods and confirmed by phenotypic and genotypic methods ($mecA$ and $femB$ PCRs). The genetic relatedness between human and animal isolates was assessed by pulsed field gel electrophoresis (PFGE).

**Results and Discussion**

In contrast to horses and cats, the majority of both dogs and veterinary staff were found to be colonized with EMRSA-15, the predominant human epidemic clone in the UK. The results indicate that EMRSA-15 can be transmitted between humans and dogs but the direction and modalities of such transmission remain unclear. The origin of MRSA in companion animals is discussed on the basis of epidemiological and evolutionary considerations. Unnecessary fear or panic should be avoided but a serious discussion amongst veterinary professionals and institutions is needed to prevent spread of this important human pathogen by animal carriage.

**References**


**ANTIBIOTIC RESISTANCE OF BACTERIAL STRAINS ISOLATED FROM MILK AND MEAT**

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Introduction
Human infections by antibiotic resistant bacteria constitute a major public health problem. This study is aiming to assess susceptibility of bacterial strains isolated from the food-chain.

Materials and Methods
140 bovine milk and meat specimen were examined (1) for *Staphylococcus aureus* and *Escherichia coli* and susceptibility tests to 17 antibiotics were performed using the Kirby-Bauer disk diffusion assay (2).

Results and discussion
The isolated *S. aureus* strains exhibited resistance to penicillin-G (71,4%), ampicillin (57,1%), tetracycline (32,1%), amoxicillin/clavulanic acid (7,1%) and intermediate resistance to clindamycin (28,6%) and ciprofloxacin (3,6%). The *E. coli* strains were resistant to amikacin (40,5%), amoxicillin/clavulanic acid (32,4%), ampicillin (62,16%), ampicillin/subactam (24,3%), carbenicillin (48,64%), ceftriaxone (24,3%) cefuroxime (67,56%), cloramphenicol (21,6%), ciprofloxacin (27,03%), gentamicin (35,1%), imipenem (16,2%), nitrofurantoin (64,85%), norfloxacin (16,2%), piperacillin (56,8%), ticarcillin (37,8%), ticarcillin/clavulanic (35,1%). The results indicate presence of resistant strains in the food chain.

References

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CONTROL OF FOOD AND HEALTH PROTECTION IN VETERINARY RESEARCH AND EDUCATION

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Veterinarians are the exclusive pioneers of food hygiene. However, during the last decades the veterinary schools have severely failed in the development of food hygienic research and education. At the same time, strategies to implement a number of surveillance programs and control regulations are more and more intensively prepared both at the EU and national levels. Critical research on the impact of these changes, sometimes very expensive ones, is only very seldom available before their implementation in legislation. In addition, the Regulation (EC) No 882/2004 as well as regulation (EC) No 854/2004 highlight the quality of control and set demands for the education of authorities. Competent research on food control and legislation would provide an essential step forward in practical food hygiene. Therefore we think that establishing the modern control research and training tradition is a necessary step in veterinary schools. In Finland, these challenges are now faced by increasing the role of control in curriculum i.e. by establishing a lectureship on control, including a course
“veterinarian as authority”, developing several types of pedagogic approaches to enable the students face the challenges in real life and developing research on control and legislation.


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MUNICIPAL FOOD CONTROL RESOURCES IN FINLAND

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Even tough food safety in general in Finland is at high level, many municipalities have been reported to provide inadequate resources for food control when National Food Agency (NFA) has evaluated them. According to NFA evaluation in 2002, less than half of the required resources existed in 25 municipalities (total number of unicipalities was 448). These 25 municipalities with inadequate food control courses were compared with municipalities having adequate resources in order to study the possible factors explaining this difference. The results showed that economic condition in general was weaker in the municipalities with lacking resources. At the same time the trend has been that corporate rate incomes are higher in municipals with lacking resources which indicates stronger business activity. Also the population density and the net migration percent were higher in municipalities with lacking resources. The percentage of companies with own-checking systems in place was higher in municipalities with adequate resources compared to municipalities with lacking resources. This may be caused by the inability of local food control authorities to control and supervise food companies in their municipality.

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QUALITY OF ORGANIC AND CONVENTIONAL PORK AND DIFFERENT MEAT PRODUCTS IN GERMANY

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Introduction

Previous studies indicate that German consumers have a more and more positive attitude towards organic food. Results about the quality of organic products are published not very often. Our interest was to examine the quality of organic meat and meat products.

Materials and methods

A total of 400 pork samples (200 organic, 200 conventional) were analysed microbiologically. 85 different organic meat products were tested microbiologically, chemically (fat, water, muscle protein, sodium nitrite) and organoleptically. The microbiological analysis included total viable count, count of Enterobacteriaceae, lactic acid bacteria, coagulase-positive Staphylococcus, presence of Salmonella, Listeria monocytogenes and Campylobacter spp., Yersinia enterocolitica (last both only in pork samples).
Results and discussion
All samples were negative for Campylobacter spp., Salmonella and Yersinia enterocolitica. Counts of Listeria monocytogenes never exceeded the tolerance level of $10^2$ CFU/g. In 53% of the organic and in 35.5% of the conventional pork samples a total aerobic plate count of $\geq 10^6$ CFU/g was observed. In 14.5% of the organic but only in 1.5% of the conventional pork samples the Enterobacteriaceae-count was high ($\geq 10^5$ CFU/g).
In the organic meat products particularly high total viable and lactic acid bacteria counts were observed. The organoleptic results show most deficiencies in smell and taste (66%). Protein-values were with some exceptions in agreement with the minimum values according to the “Leitsätze zum Deutschen Lebensmittelbuch“ (2003).
In the organic pork and meat products problems concerning the normal microflora were observed more often. Most of the problems in organic pork and meat products are caused by technological and hygienic deficits of the production process. There were no signs with importance for food safety.

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EMERGING VPH PROBLEMS ON FARMS OPEN TO THE PUBLIC.

M.Barten, L.J.A. Lipman, and B.R. Berends

An increasing number of Dutch farmers start a subsidiary branch. For different reasons e.g. petting animals, buying regional produced products and camping, visitors are allowed on the farm premises. In the broad range of activities offered, interactions between humans and animals often are an important part of the attraction.
Prevention of incidents for the people visiting these farms has become important because they can generate financial claims and could harm good reputation.
Farms open to the public will generate different questions for veterinary advisory services.
To answer these questions, skills in the area of veterinary public health are indispensable. Besides microbiological hazards, chemical and also physical hazards due to (unexpected) animal behaviour are relevant. To prepare Dutch veterinary students for the changing demand for veterinary services, risk assessments at farms open to the public are performed regularly.

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IDENTIFICATION OF BIOLOGICAL HAZARDS TRANSMITTED TO HUMANS BY PORK CONSUMPTION : THE FIRST STEP OF A RISK ANALYSIS APPROACH IN EUROPEAN SLAUGHTERHOUSES

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Introduction
Currently, pork is the most consumed meat in Europe (1). To protect consumers from biological hazards transmitted by pork consumption, meat inspection is used as main mean to control these hazards. However, the epidemiological evolution of hazards led the European
Union to promulgate a new food legislation, the hygiene package (2, 3), based on a risk analysis approach. Hazard identification, which is the first step of qualitative risk analysis (4, 5, 6), is needed to apply such an approach.

**Materials and methods**
A literature review including 195 references was achieved to summarize useful data concerning hazards identification and characterization, especially: i) their occurrence in human beings; ii) the seriousness of symptoms induced in humans; iii) their occurrence in live pigs; iv) their occurrence on pork meat; v) possible clinical signs induced in pigs and observable lesions during meat inspection (table 1).

**Results and discussion**
Three classes of hazards were defined: i) confirmed hazards whose presence can not be detected or suspected during meat inspection; ii) confirmed detectable hazards; iii) exotic or unconfirmed hazards (table 2). Main hazards involved in human infections cannot be detected by a macroscopical examination of carcasses. Consequently, the advent of alternative means of hazards control is needed to complete macroscopical examination.

**References**
### Table 1 - Identification and partial characterization of biological hazards transmitted to humans by pork consumption.

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Table 2 - Classification of confirmed or unconfirmed biological hazards transmitted to humans by pork consumption according to their detectability by a macroscopical examination of carcasses and their presence in Europe.

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<tr>
<td>Sarcoystis spp</td>
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<td>Confirmed hazards undetectable by a macroscopical examination of carcasses</td>
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<tr>
<td>Toxoplasma gondii</td>
<td>Bacillus cereus</td>
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<tr>
<td>Trichinella spiralis</td>
<td>Brucella suis</td>
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<tr>
<td>Cryptosporidium spp</td>
<td>Thermophilic Campylobacter</td>
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<tr>
<td></td>
<td>Clostridium botulinum</td>
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<tr>
<td></td>
<td>Clostridium perfringens</td>
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<tr>
<td></td>
<td>Verotoxinogenic E. coli</td>
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<tr>
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<td>Staphylococcus aureus</td>
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<td>Yersinia enterocolitica</td>
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<td></td>
<td>Yersinia pseudotuberculosis</td>
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<td>Exotic or suspected hazards</td>
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<tr>
<td>Balantidium coli</td>
<td>Rift Valley Fever Virus</td>
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<td>Fasciola hepatica</td>
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<tr>
<td>(Halzoun syndrome)</td>
<td>Foot-an-mouth disease</td>
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<tr>
<td>Entamaeba spp</td>
<td>Rabies virus</td>
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<td>Human viruses</td>
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<tr>
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</table>

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CAMPYLOBACTER QUANTITATIVE RISK ANALYSIS IN FATTENING PIG SLAUGHTERHOUSE

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Introduction

Campylobacter are one of the most frequent causes of bacterial enteritis in industrialized countries (1) and are widespread in food animals. Pigs are known to be largely contaminated in farms (2,3,4), but few data exist about the status of the pork food chain particularly about the contamination level of primary products (animals) and meat (carcasses) (5). The purpose of this study was to quantify the Campylobacter contamination in fattening pigs when slaughtered and on their carcasses before chilling: prevalence, contamination level, bacterial species.
Materials and methods
A total of 250 rectal samples (5g/sample) and 500 carcass samples (25 cm²/sample, two samples/carcass) were collected from five slaughterhouses during 10 visits.

Results and discussion
Bacteriological results showed that 100 % of the pigs were infected with high levels of contamination: 40 000 CFU/g of faeces (50 to 5 × 10⁶ CFU/g, fig. 1), 23% of the carcasses were contaminated with low levels (2.3 CFU/cm² as a mean value) with high variations between samples (0.4 to 330 CFU/cm², fig. 2). On the basis of multiplex-PCR identification, 0 isolates were identified as C. jejuni, 81% (242/300) as C. coli and 19% (58/300) campylobacter-kike.

In pigs, Campylobacter coli carriage is high (5,6,7) but it is obvious that slaughterhouse hygiene is a determining factor for managing carcass contamination (5). The porcine strains virulence for humans remains to be studied.

References

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OCCURRENCE OF CLOSTRIDIUM PERFRINGENS IN CAECAL INTESTINAL CONTENT OF BROILER CHICKEN IN CZECH REPUBLIC

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Introduction
Clostridium perfringens is a causative agent of human and animal foodborne diseases.¹ Under the international project PoultryFlorGut is Clostridium perfringens considered as a new potential threat for human health associated with consumption of poultry products. For confirmation or elimination of this supposition, there is a conducted determination of this pathogen on different levels: from intestinal content to poultry products.
Materials and methods
The analyzed sample is the caecal intestinal content of broiler chicken. 1 ml of representative dilution is overlaid with TCS agar and cultivated in an anaerobic chamber at 37°C 22±2 h. Typical black colonies are selected for the next confirmation. Positive samples are stored in special medium under -70°C.

Results and discussion
From Mai to September 2005, there were 430 samples analyzed from 12 different farms. The total count of positive samples was 27, it is only 6.3%. As a possible cause of low occurrence of Clostridium perfringens might be using of antibiotic growth stimulators. The samples will be processed by PCR method for distinguishing purposes.

References
2. Clostridium perfringens protocol – PoultryFlorGut

This project is supported by PoultryFlorGut FOOD-CT-200X-007076

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INCIDENCE AND ANTIMICROBIAL RESISTANCE OF CAMPYLOBACTER SPP. STRAINS ISOLATED FROM POULTRY IN THE CZECH REPUBLIC

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Introduction
Campylobacter spp. is recognized as a major cause of food poisoning, the most common source of which is poultry. It is well known that chickens are frequently colonized by C. jejuni and C. coli, and that C. jejuni from chicken is considered to be the source of most human infection. Antimicrobial resistance has emerged among Campylobacter spp. mainly due to use of antimicrobial agents in animal feed. Resistance can prolong illness and compromise the treatment of patients with campylobacteriosis.

Materials and methods
The incidence of Campylobacter spp. in samples collected from cecal intestinal content of broiler chicken was evaluated at commercial slaughterhouses in the Czech Republic in the period from January to August 2005. The swabs were cultivated in accordance with the standard guideline CSN ISO 10272. Species identification was carried out by using the biochemicals and grown tests and by PCR/RFLP. The MICs of ciprofloxacin, tetracycline, erythromycin, chloramphenicol, ampicillin, nalidixic acid and gentamicin for C. jejuni and C. coli strains were determined by the agar dilution method according to the NCCLS M11-A6 standard.

Results and discussion
327 samples originated from caecum were examined in the period of 2005. Campylobacter spp. were detected in 52% (n=170) cases. On the basis of the PCR/RFLP, 27 (16%) out of the 170 isolates were C. coli and 143 (84%) were C. jejuni. Other thermophilic strains Campylobacter spp. were not found. Antimicrobial susceptibility results of C. coli showed
high level resistance to ampicillin (89.19%) and fluoroquinolones: all of 27 strains were resistant to ciprofloxacin (100%) and 25 (92.60%) strains to nalidixic acid. No resistance to chloramphenicol and gentamicin and very low resistance to erythromycin (3.7%). The strains of *C. jejuni* showed different results. Analysis showed high level resistance to ciprofloxacin (80.42%), but only 22.38% (32) strains were resistant to nalidixic acid and only 13.99% (20) strains to ampicillin. *C. jejuni* strains had low resistance to chloramphenicol (2.10%), erythromycin (4.2%) and tetracycline (4.20%). Fluoroquinolones and macrolides are the antimicrobial agents of choice for empirical treatment of gastroenteritis by human and therefore resistance to these classes of antimicrobial agents are of paramount concern in *Campylobacter* spp.

*This project is supported by COST OC NA.002 and PoultryFlorGut FOOD-CT-200X-007076.*

**References**


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NEW APPROACHES IN TEACHING VETERINARY PUBLIC HEALTH ACROSS EUROPE AND LATIN-AMERICA: THE EXPERIENCE OF THE SAPUVETNET II PROJECT

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SAPUVETNET II is a project co-financed under the EU ALFA programme (Cooperation for institutional management - curriculum development & teaching management), aimed to further consolidate an international network (SAPUVET [http://sapuvet.vet.uu.nl/](http://sapuvet.vet.uu.nl/)) in the field of Veterinary Public Health (VPH). SAPUVETNET II is formed by Faculties of Veterinary Medicine from Latin america (Argentina, Costa Rica, Cuba, Nicaragua, Peru, Bolivia) and Europe (Netherlands, Spain, Portugal, Italy). During SAPUVET I, exchanges of experiences and teaching approaches were utilised for curriculum harmonisation. SAPUVETNET II envisages the use of innovative teaching methods to promote long distance education, international interaction between students and lecturers by using a list server, WebCT®, electronic/video conferences, and study visits. Teaching is mainly based on the problem solving approach, development of case-studies and common modules on selected VPH issues, such as role of veterinarians in disasters/emergency situations. Further areas refer to upcoming VHP issues, such as food safety in international trade of animals & animal products, environmental health, wildlife zoonoses, animal welfare, etc. During SAPUVETNET II these important issues will be addressed through the development of additional teaching modules. A VPH manual and other teaching material (e.g. audiovisuals)
will be produced and circulated through the project web page (www.sapuvetnet.org), being developed.

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PRELIMINARY RESULTS OF THE RISK OF ANTIBIOTIC RESISTANCE IN FISH SALMONIDS IN NORTH-EAST OF SPAIN

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Introduction and objectives
The control strategies for diseases outbreak in aquaculture is made mainly through chemotherapy and in some cases by the use of vaccines. The problems linked to the use of antibiotics are the lost of efficacy because their uncontrolled use and the possible emergence of antibiotic resistant strains. In order to get information about the antibiotics resistance in Spanish aquaculture, we made a preliminary study to evaluate the resistance to the most used antibiotics in the isolated strains of *A. salmonicida*, the most important bacteria detected in the surveillance program of Spanish freshwater aquaculture and responsible of FURUNCULOSIS.

Materials and methods
1. *Aeromonas salmonicida* isolation
Atlantic salmon (*Salmo salar*) and Brown trout (*Salmo trutta*) were studied in rivers and fish farms in the NorthEast of Spain. Bacteriological culture was made in Tryptone Soya Agar (TSA).

2. In vitro studies of resistance to antibiotics
Kirby-Bauer disk diffusion method was used to evaluate the resistance to the antibiotics. In order to make the study we selected the antibiotics that have been largely used in Spain during the last years, some of the are used at present and anothers were forbiden some years ago. The classification of the resistance to antibiotics were made at four levels: Resistent (*R*), Intermediate (*I*) Sensible (*S*) Highly Sensible (*HS*).

Results and conclusions
Isolated *Aeromonas salmonicida* strains have presentated a high level of resistance to antibiotics. In the group of tests that we made with the isolated strains, we got a 41,9% of the tests with a R result. The most effective antibiotics were florfenicol and amoxicillin, while chloramphenicol, Nalidixic acid and oxytetracycline resulted the antibiotics with higher levels of resistance. We conclude that antibiotic treatments without control has produced a high level of resistance in aquatic bacterias wich can produce the transmisión of the resistance to animals or humans and to derive in a public health problem.

References
Austin, B; and Austin, A. 1999. Bacterial fish pathogens. Diseases of farmed and wild fish. pp: 63-81
European Agency for the evaluation of Medicinal Products. Veterinary Medicines Evaluation Unit. http://www.emea.eu.int

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EXPOSURE ASSESSMENT TO NON-IONISING RADIATION OF MOBILE PHONE BASE STATION ON SWISS DAIRY FARMS

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2. Federal Office of Communications, Biel, Switzerland

Introduction
Within the last decades mobile communication and thus exposure to non-ionising radiation (NIR) have increased considerably. Adverse health effects in animals have been associated with mobile phone base stations (MPBS) [1,2]. However, quantifying exposure to NIR and classification of exposed and unexposed individuals proves difficult. Hence this study aims to develop a measurement protocol for epidemiological studies to further investigate the influence of NIR on animal health.

Material and methods
Based on geographic position of MPBS, NIR exposure measurements were conducted on 26 dairy farms with a portable, frequency-selective field strength measuring system (SRM 3000, Narda Safety Test Solutions, Germany). Both maximum and average exposure values of distinct frequency bands were recorded in farmyard, stable, and paddock. Additional data on weather condition, local topography and farm management were collected.

Results
Exposure on all farms was below national threshold values [3]. Between farms up to a fivefold exposure difference could be observed (0.16 – 0.85 V/m). However, depending on the location of measurements within one farm, exposure varied heavily (e.g. 0.85 V/m in farmyard and 0.21 V/m in stable).

Discussion
Preliminary results have shown that relevant (10 dB or threefold) exposure difference between farms does exist. Within farm, large variability in exposure strength makes exposure classification difficult. More robust protocols are required to allow epidemiological investigations of NIR-related animal health end points.

References

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PREVALENCE OF CAMPYLOBACTER AND FREQUENCY OF CARCASE CONTAMINATION IN SHEEP SENT FOR SLAUGHTER IN A SCOTTISH ABATTOIR.


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Campylobacter species have been identified as the major cause of acute bacterial enteritis in the UK. However, the epidemiology of campylobacteriosis remains poorly understood. It has been suggested that the role of sheep in the epidemiology of Campylobacter is underestimated. The aims of the present study were to determine the prevalence of Campylobacter in sheep sent for slaughter into an abattoir in Scotland and the prevalence of Campylobacter on the carcases as a potential risk for human campylobacteriosis. Faecal samples and swabs (from fleeces and carcases) were collected and processed in the laboratory. The identification of the different species isolated in the study was carried out. Logistic regression was used for the analysis of the epidemiological data collected during the study.

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