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AEEMA MEETING, MAY 20-21st, 2010 - ORAL COMMUNICATIONS, MAY 20th, 2010 CONTRIBUTION OF SOCIOLOGY TO ANIMAL EPIDEMIOLOGY AND DISEASES CONTROL

Population of the French *Dombes* and bird flu

Vanessa Manceron

In February 2006, the bird flu (virus H5N1HP) affected the French *Dombes*, region leading to the implementation of an ambitious control program which lasted for 6 months. This paper provides a detailed review of this episode as experienced, evaluated and commented by the local population. The main focus of the paper is on the impact of health zoning and on the geographical aspects of the management of the disease, which deeply affected the social groups involved, depriving them temporarily of their means of action and challenging basic principles of their day-to-day relationship with the territory, the environment and other growers.

Animal welfare and acceptability of health measures: ovine Brucellosis' example

Anne-Marie Brisebarre

In traditional breeding, the link between men and their animal stock is not economic only. Shepherds also care for the welfare of their animals. Breeders are often reluctant to accept measures required for epizootic control. Ovine Brucellosis provides a nice example of the problems generated by contradictory measures applied to a flock of transhumant sheep. The social impact of such measures requires attention.

Framing epizootics and actors' strategies: the case of avian influenza (H5N1) in Egypt, 2006-2009

M. Fintz

Emergence refers to the rise of a state that cannot be predicted or explained from the antecedent conditions. This definition immediately underscores the link between emergence and emergency, in so far as a new emerging state urges officials and experts to manage its indeterminacy and find more relevant explanations of the reality. The wax-and-waning of emerging threats and the production of emergencies seems to be a powerful dynamic allowing the provision of exceptional measures to tackle down invisible enemies, such as viruses. In this paper, we show how these invisible enemies and their characterization are intimately linked to the political properties of the locations where they occur. Then, the proliferation of competing narratives on reality can be understood as the by-product of strategies among actors and their impingement on media space.

Representations of animal health by cattle farmers - Motivations and obstacles to enter in and comply with a voluntary control programme for bovine viral diarrhoea

Christine Fourichon, Brigitte Frappat & D. Pécaud

The definition and implementation of a control programme for transmissible endemic diseases relies on a coordination of farmers' decisions. This implies to account for farmers'

behaviour towards disease risk. To better understand this behaviour, the present study aims at describing cattle farmers' representation of animal health and their justifications to enrol or not in a collective control programme. Two sets of semi-directive interviews were carried out in a sample built to obtain a variety of opinions. The first one described representations of 45 farmers, independently of the history of infectious diseases in their herd. The second one described the justifications of 20 farmers whose herd had been detected as infected by the bovine viral diarrhoea virus (BVD) to enter or to reject the control plan proposed after detection of the virus. Farmers' representations of a herd in good health rely on visual inspection and behaviour of the animals or on good farming practices, rather than on absence of disease. Ordinary (accepted) diseases, as well as an acceptable threshold of disease incidence are mentioned. Motivations and obstacles for farmers to enter the BVD control plan refer to either their individual perceptions of the disease and on their farm or their social and professional network. Trust in and consistency of farm advisors are pivotal. Lack of knowledge on the disease is not associated with enrolment. Very few farmers speak of the possible externalities of health management decisions. Recommendations are proposed to account for farmers' behaviour in a collective control plan.

Sociology for Dummies. Exploration of some concepts used in the field of food

E. Birlouez

Sociology can be defined as « the study of social facts ». Among them is the food act: in all cultures, eating has an important social dimension. Moreover, the classic concepts of sociology - behaviours, mental representations, norms, social distinction, etc. - are very used in the field of human food and diet. Our food choices are complex and influenced by many interrelated factors, *e.g.* the mental representations, *i.e.* the ways of thinking which are socially built and shared by the members of a human community (Claude Lévi-Strauss wrote: a food is consumed not because it is "good to eat" but because it is « good to think »). Our food habits are also affected by social norms, *i.e.* a set of rules perceived as "socially correct" and respected by the members of a human group. On another plan, food sociology analyses the differences in food habits depending on social groups: in spite of the rise in the standard of living, food consumption and food attitudes are not the same. Finally, the article shows that the epidemic of obesity is a good example of a social fact we can use to illustrate these various sociological concepts. Moreover, the sociological approach is very appropriate to think about how to care obese persons.

Contribution of sociology to epidemiology. Representations of health and illness in the analysis of the production of scientific facts

Emmanuelle Fillion

Epidemiology is henceforth omnipresent in the area of health by the « resistance » of populations to adopt a behaviour reflecting epidemiological knowledge. This article sets up to examine the contributions of sociology to understand the phenomenon of possible disconnection through - most notably - works on risk, perception together with laymen's representations of health and disease. We shall then demonstrate the contribution of more recent sociological works, which analysed the conditions of production and success, or failure, of the epidemiological speech. These works show that epidemiology is part of a social world

much larger than that of experts. As such, epidemiology has to integrate in the core of its thought political and cultural stakes associated with health matters.

Contribution of Social Science to interactions with breeders in the area of animal health

Florence Kling-Eveillard & Brigitte Frappat

The French Livestock Institute uses sociological approach to assist livestock farmers in effecting changes in their practice on topics such as milk quality and mastitis, reproduction and fertility, sanitary risks, animal welfare and human-animal relationship. Qualitative interviews are conducted to identify the main obstacles to change, such as the farmer's prior knowledge, social perceptions, influence of social group and material aspects. These are taken into account in the advisory programmes, in the choice of farmer categories, in the presentation of objectives, in the technical message, the argumentation, the type of advice given and the role of the various advisors. These advisory programmes pay specific attention to the influential role of the farmers' social environment. First by involving the key advisors in the programme, and also by encouraging balanced and opened exchanges between farmers.

FREE COMMUNICATIONS

Estimation of the likely distribution of the intra-herd infection rate based on a survey.

Proposal and comparison of two methods

V Auvigne & E. Petit

Two methods, brought together in an MS Excel tool called DistriDiag, are being proposed to estimate the distribution of intra-herd infection rates in a population, based on the results of a survey. The surveys concerned call for a fixed sample size in each herd tested. The methods are called « percentile method » and « ascending adjustment method ». They are based on the application of the laws of random sampling without replacement (binomial law, hypergeometric law). The methods were applied to a real set of data obtained from a serological BVD survey with samples of five animals in 222 herds. The two methods gave similar results. They make it possible to make a distinction between a population free of the disease or with a low infection rate, representing 84 or 85% of the herds, and a heavily infected population, representing 16 or 15% of the herds. The formulation of the results of the survey is notably different from that usually given following the calculation of a confidence interval: « 31 to 44% of the herds tested are infected ». The DistriDiag tool also makes it possible to carry out strategic sampling simulations (the effect of a change in sample size, or of the number of positive results based on which a farm is considered positive). The advantages and limitations of the two methods are discussed.

Investigation of the factors involved in the persistence and spread of the HP H1N1 virus in North-Vietnam. A retrospective study

Stéphanie Desvaux, Hoa Pham Thi Thanh, V. Grosbois, Stan Fenwick, S. Tollis, H. Pham Ngoc, A. Tran & F. Roger

Retrospective studies were conducted on the 2007 wave was carried out in one province of North Vietnam. Data on potential risk factors related to the human and natural environment, and to the production system were collected for 19 cases and 38 unmatched control villages.

The number of broiler flocks in the village was significantly associated with a higher risk of H5N1 outbreak (OR = 1.49, 95% CI: 1.12-1.96), as was the village having at least one poultry trader (OR =11.53, 95% CI: 1.34-98.86). To a lesser extent, the number of duck flocks in the village and the percentage of the village area occupied by ponds and streams also increased this risk. The effect of vaccination implementation was difficult to evaluate due to the poor recording system of the local services. Second, a study on a regional scale was implemented in order to reduce the spatial heterogeneity and to explore environmental parameters. Initial results of this investigation will also be presented.

Epidemiology of infectious hematopoietic disease (IHN) and haemorrhagic viral septicaemia (VHS) the Piedmont region of Italy

Maria Christina Bona, Elena Pavoletti, Marzia Righetti, Paola Arsieni, G. Ru & M. Prearo

Infectious Hematopoietic Necrosis (IHN) and Viral Haemorrhagic Septicaemia (VHS) are two systemic infections affecting several species of salmonid fish. Reporting of these diseases is mandatory in accordance with Directive 67/1991 EC. In order to obtain and preserve the free status at farm level, the Italian legislation (D.L.vo 148/2008) adopted a surveillance program for all freshwater farms of salmonid fish used for repopulation in public water. This study was designed to provide data on the descriptive epidemiology of IHN and VHS in the Piedmont region when the surveillance program was extended to all fish farms. The progress of the diseases was described year by year, by geographical area and by species. Moreover, univariate and multivariate analysis were used to test the potential role of a number of farm characteristics. Rainbow trout was the only salmonid fish species found infected; IHN and VHS are present with a very low overall prevalence, less than 10%. The study of the main potential risk factors did not allow the identification of any statistical association. These results are a starting point for future investigations on risk factors.

Analysis of French cattle network. Focus on vulnerable sub-groups of holdings facing to disease spread, the « giant strong components »

Séverine Rautureau, Barbara Dufour & B. Durand

Movements of animals form complex networks linking holdings and are associated with a major risk of dissemination of infectious agents between farms. Using the social network analysis method, the network of cattle movements throughout France has been studied to suggest features that might have important implications for disease spread. For that purpose, large cohesive sub-groups, so-called « giant strong components » (GSC), have been identified; GSC's represent structural vulnerability of the French cattle trade facing epidemic risks. They are consistently present and widely spread all over the country. The way to avoid their emergence in order to decrease network vulnerability was studied. The analysis of commercial flows has shown that control measures affecting both types of merchants (dealers and markets) were necessary. On the other hand, targeting holdings based on their central position in the network were more relevant and more efficient in terms of number of holdings calling for surveillance.

Interference of maternally derived antibodies with the response of beef calves to inactivated bluetongue serotype- 8 vaccine

D. Vitour, J. Guillotin, Corinne Sailleau, C. Viarouge, Alexandra Desprat, F. Wolff, G. Belbis, B. Durand, L. Bakkali-Kassimi, E. Bréard, S. Zientara & Gina Zanella

This study was designed to investigate the duration and scope of protection induced by colostrum antibodies in calves born to dams vaccinated against bluetongue virus serotype 8 (BTV-8) and the extent of interference by colostrum antibodies with vaccination in these calves. The median age at which calves became sero-negative for BTV was 84 and 112 days as determined by sero-neutralisation test (SNT) and VP7 BTV competitive ELISA (cELISA), respectively. At the mean age of 118 days, 13/22 calves were immunized with inactivated BTV-8 vaccine. In most calves, vaccination elicited a weak immune response, with seroconversion in only 3/13 calves. This lack of response was attributed to the persistence of virus-specific colostrum antibodies that interfere with the induction of the immune response. Indeed, the level of immune response to vaccination was inversely proportional to the level of antibody prior to vaccination.

The most likely time and place of BTV8 introduction into Belgian ruminant herds

C. Saegerman, P. Mellor, Aude Uyttenhoef, J-B. Hanon, Nathalie Kirschvink, E. Haubruge, P. Delcroix, J-Y. Houtain, P. Pourquier, F. Vandebussche, B. Verheyden, K. De Clercq & G. Czaplicki

In Northern Europe, bluetongue (BT) caused by serotype 8 of the BT virus (BTV), was first notified in August 2006 and a number of ruminant herds were affected in 2007 and 2008. However, the origin as well as the time and location of the initial introduction had not been determined yet. Four retrospective epidemiological surveys were carried out to determine the initial space-temporal occurrence of this emerging disease in Southern Belgium: investigations of the first outbreaks recorded close to the disease epicentre; an extensive anonymous, random postal survey of cattle herd and sheep flock owners; a random historical survey of tank milk samples tested using an indirect ELISA technique and a follow-up survey of non-specific health indicators. The initial introduction of BTV into the region probably occurred in the spring of 2006 near the National Park of Hautes Fagnes and Eifel when *Culicoides* become active. The determination of the most likely time and location of BTV8 introduction into a given country is of paramount importance to enhance awareness and understanding of the disease and, to improve the development of models of vector-borne emerging infectious diseases.

Efficiency in a population of voluntary vaccination against communicable enzootic disease in bovine holdings: Study by coupling an epidemiological model and an economic model

O. Rat-Aspert & Christine Fourichon

For transmissible diseases, individual management of the disease reduces the probability for other herds to be infected. When the disease is not regulated, the choice of the control measures is left to farmers, who did not necessarily take into account the collective effect: individual management of transmissible diseases creates a positive externality. Besides, the decrease in risk due to the positive externality may have an impact on the individual choices. The objectives of this study are to evaluate the effectiveness at a regional level of voluntary

vaccination. We developed a dynamic deterministic model, based on a decision model interacting with an epidemiological state transition model. It determines the proportion of farmers who vaccinate and the prevalence of infected herds over time. The model shows that voluntary vaccination cannot eradicate the model's disease. Incentives for vaccination decrease the prevalence but do not result in eradication of the disease.

Evaluating efficiency of the exhaustive surveillance of bovine spongiform encephalopathy in France: A simulation approach

Carole Sala, B. Durand & D. Calavas

In France, since 2001 every bovine above 2 or 2.5 years of age, slaughtered for human consumption or dead-on-farm is to be tested for BSE. However, since the diagnosis is only made post mortem and since the average lifespan of cattle in France is shorter than the average incubation time of BSE, the mandatory BSE surveillance program cannot detect every infected animal. Our simulation study demonstrates that the epidemic pattern, the degree of infection, the time required to implement the program as well as the duration of surveillance and the changes in the incubation period of the BSE affect in various ways the efficiency of BSE surveillance program. We estimate that, assuming that no infections occurred in France after 1st January 2001, only 3% of the animals infected from January 1985 to December 2000 were detected between 2001 and 2007.

Using methods of capture-recapture unilinear in monitoring animal diseases: Application to French data classical scrapie

T Vergne, V. Grosbois, Géraldine Cazeau, D. Calavas, B. Durand & Barbara Dufour

Initially, capture-recapture methods were developed in ecology to evaluate the size of wild populations. Then they were applied to human epidemiology in order to determine the number of humans affected by a given disease and who were not detected by the surveillance system. The first applications in the veterinary field appeared in 2005. Among these methods, the "unilist" approach is the most recent one. This article presents these "unilist" methods and applies them to the French conventional scrapie surveillance data for 2006 and 2007 in order to evaluate the number of affected holdings that were not detected by the French surveillance system. The importance of properly choosing the data to be analysed is highlighted. In the current state of knowledge, and because of the scarcity and the low contagiousness of the disease, it appears that these methods are not yet fully suitable for diseases such as scrapie.

Interest of sensibilisation campaigns on skin testing practices performed by veterinarians

Marie-France Humblet, J.-L. Moyon, P. Bardoux, Maria-Laura Boschioli & C. Saegerman

An original methodology for assessment of skin test evaluation based on experts' opinion was carried out among field veterinary practitioners in Belgium (N = 859) and in the French Department of Dordogne (N = 94), which recently faced a re-emergence of bovine tuberculosis in cattle herds. This assessment was performed through an anonymous postal questionnaire. In the case of Dordogne, a meeting was held to sensitize veterinary practitioners in December 2006. The French veterinarians were asked to fill the same questionnaire twice: once before the training at the meeting and again after that training. The objective was to highlight

changes of attitude, if any, as a result of the meeting. Several international experts in the field of bovine tuberculosis (N = 5) filled the questionnaire and determined a score for each possible answer. A global score was calculated for each veterinarian. Each item in the questionnaire was also weighted, based on the experts' opinion (N = 11) in relation to its possible impact on the risk of not detecting reactors (positive/suspicious reaction). The participation rate was statistically representative 18.3% in Belgium and 24.5% in Dordogne. A comparison between the two countries' situation was performed as well. The results showed the usefulness of an appropriate sensitization of veterinarians regarding skin testing. It also highlights the merits of a structured self-assessment process of veterinary practices.

Development of a hierarchical model for emerging diseases in the Walloon Region

S. Vandeputte, Marie-France Humblet, Fabienne Fecher-Bourgeois, Christiane Gosset, A. Adelin, Nathalie Kirschvink, E. Haubruge & C.Saegerman

Over the last decades, an increase of the emergence or re-emergence of animal diseases has been observed all over the world. Most of these diseases are zoonotic. The recent emergence in Belgium of ovine catarrhal fever confirms this trend. Our project is designed to develop a hierarchical conceptual model of emerging infectious diseases in the Walloon Region for evaluation of direct and indirect economic losses suffered by producers and society following the emergence of an animal disease. The first step in this project is the development of a database of emerging or potentially emerging diseases based on recent references in the literature and on consensus meetings. The final database will be prioritized, based on various criteria such as socio-economic or zootechnic criteria. Several « model » diseases, present in different ranks in the database will be studied thoroughly. The evaluation of socio-economic losses in animals and humans, if the disease under consideration is zoonotic, will be made possible by the study of these model diseases. This evaluation will be based on conventional analysis techniques and its results will help us to determine a ranking of socio-economic losses. Finally, all the results will be summarized and, by taking into account the particular typology of each disease (based on several quantitative parameters), an estimation of the socio-economic losses for each disease will be achieved.

PAPERS

Cigarette smoke: Carcinogen also in dogs and cats?

Anne Straub

The ill effects of passive smoking on human health are a current issue, and have led to new regulations designed to protect non-smokers. This report deals with the recent interest of the scientific community in animal exposure to cigarette smoke, as illustrated by the publication over the last few years of epidemiological studies linking passive smoking to the development of cancers of the respiratory tract in dogs, and to oral and lymphatic cancers in cats. Household exposure of pets to cigarette smoke can be evaluated by atmospheric markers but also by biomarkers whose analysis is developing nowadays. A number of clinical observations in veterinary practice confirm the damaging effects of passive smoking on pets.

Highly pathogenic H5N1 avian influenza in Africa: Review of the epizootic and epidemic until June 30, 2009

Camille Bellet & Barbara Dufour

This article presents the main characteristics of the avian influenza epidemic caused by the highly pathogenic H5N1 influenza virus which prevailed in Africa, since the winter of 2006, almost three years after its emergence in Southeast Asia. All cases reported in humans and in animals in the countries concerned have been reviewed, based on data available as of June 30 2009. This makes it possible to understand better how the infection was introduced in Africa, how it spread over the continent and how the epidemic was managed and to demonstrate any changes that occurred since its emergence in China.