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Med-Vet-Net Communications Unit

This month's Med-Vet-Net News continues our overviews of Workpackages with Source Attribution, 'Methods of attributing human Salmonella and Campylobacter infections with different animals, food and environmental sources'

From the Special Interest Group, New & Emerging Zoonoses, we have a report on MRSA as a food-borne pathogen, and an overview of the arthropod-borne zoonoses meeting in Palermo.

We also begin profiling members of the Med-Vet-Net Governing Board.

In case you were wondering, from now onwards the Project Management and Administration Bureau updates will be distributed in an alternative newsletter directed at relevant Med-Vet-Net members only.

We wish you all a very happy New Year!

Workpackage 28 overview

Methods of attributing human *Salmonella* and *Campylobacter* infections with different animals, food and environmental sources - Source Attribution

Zoonotic pathogens are infectious agents that can be transmitted from animals to humans and are a major cause of human diarrheal disease worldwide. Several sources of exposure are recognized, and food-borne transmission is one of the most frequent routes of human infection. Many countries have implemented national surveillance and intervention programmes to prevent and control food-borne zoonoses over the past decades. However, data on the public-health impact of such measures are still limited as information on the number or proportion of cases associated with a particular source is often lacking. In order to identify and, particularly, to prioritize appropriate food-safety interventions, it is crucial to relate the zoonotic pathogen to the responsible source(s) of infection and to estimate the relative importance of each source or exposure route.

A wide variety of approaches to attribute human illness to the responsible

source are available and used around the world. These include microbial subtyping, exposure assessment, analytical epidemiological studies, analysis of outbreak data, population studies and expert elicitations. The methodologies present different advantages and limitations, and their usefulness is therefore dependent on the public-health questions that need answering. In order to estimate the number and/or proportion of human infections attributable to various sources, we intend to apply these different methodologies. The methods will be applied to *Salmonella* spp. and, when possible to *Campylobacter* spp. The approaches will be compared and discussed, and recommendations on their appropriate use will be made. Participants from both the veterinary and public-health sciences from 12 Med-Vet-Net Partner Institutes will integrate experiences available in the different disciplines. Therefore, the process is expected to have a major impact on the general understanding of the research groups. The results are expected to be highly appreciated by

scientists, decision makers, the food industry and consumers.

The Workpackage was launched on 1 March 2006. The PhD student enrolled in the project was appointed on 1 April. Her name is Sara Monteiro Pires and she is employed by DFVF (Denmark), which is co-financing the study. Sara has also been officially enrolled as a PhD student at the Royal Veterinary and Agricultural University in Copenhagen, Denmark. It is planned that the Sara will work on the development of the approaches both in Denmark and in other partner institutes: RIVM (The Netherlands) and VLA (United Kingdom).

During the first six months of the Workpackage a kick-off meeting was held in connection with the EU-US conference on Priority Setting of Foodborne and Zoonotic Pathogens. In the meeting, the general concepts and definitions of human illness attribution were discussed, and harmonization regarding terminology was achieved. Data requirements for the different approaches that will be applied in the

Workpackage were presented and data availability in the participating countries was discussed.

Four selected approaches for human illness attribution have been selected for comparison. The applicability of each approach will be tested using *Salmonella* and *Campylobacter* as model organisms. These approaches



Workpackage 28 and 23 members at the joint kick-off meeting in July.

include:

1. Outbreak investigations, which can usually implicate a particular food source and pathogen combination and the outcome of such studies can be used for human illness attribution. Outbreak investigations, by extrapolation, can also be applied to estimate the attributing sources of infection for sporadic (non-outbreak) infections.

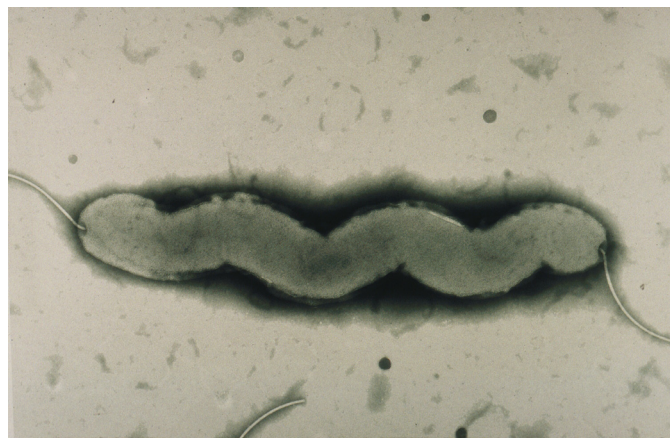
2. In case-control studies, data on relevant exposures are obtained from patients (cases) as well as asymptomatic (uninfected) control persons. Comparing these two groups can identify sources for infection and allow relative risks to be calculated and enable estimates of the relative role of various food exposures in a representative sample of culture-confirmed cases.

3. Microbial subtyping involves the characterization of a pathogen to identify identical subtypes of isolates originating from animals, food and humans. The approach works best for pathogens for which dominant subtypes are associated with particular reservoirs. This approach requires the integrated surveillance of the pathogen in major food animals, food and humans, followed by the use of appropriate discriminatory typing methods.

4. A risk or exposure assessment approach can also be applied to estimate the human illness attribution. The principle is to determine the relative importance of various transmission routes for zoonotic pathogens by estimating the human exposure via each route. This involves the use of data from many different sources including the results of surveys of animals, food and water.

In addition, all Workpackage 28 participants have agreed to assess the

Salmonella data available for the microbial subtyping approach in their home countries before March 2007. Such data will be collected and discussed and compared at the attribution workshop planned for May 2007.



Campylobacter jejuni. Courtesy D.G. Newell

Sara Monteiro Pires and Tine Hald

Med-Vet-Net People

Dr Tine Hald, Leader of Workpackage 28

Tine Hald is head of the Danish Zoonosis Centre, Department of Microbiology and Risk Assessment, the Danish Institute for Food and Veterinary Research. She is responsible for the administration and direction of activities of the Danish Zoonosis Centre, which has a staff comprising 12 academics.

Tine Hald's main research area is the epidemiology, surveillance and control of food-borne zoonoses in the whole production chain. Activities involve the planning and performance of quantitative-risk assessments, time-series analysis, and risk-factor studies. A main responsibility is to give scientifically based advice to veterinary and food authorities, farmer and consumer organizations, and international organizations, e.g. EFSA and WHO.

Tine's work also includes teaching and supervision of undergraduate and postgraduate students.

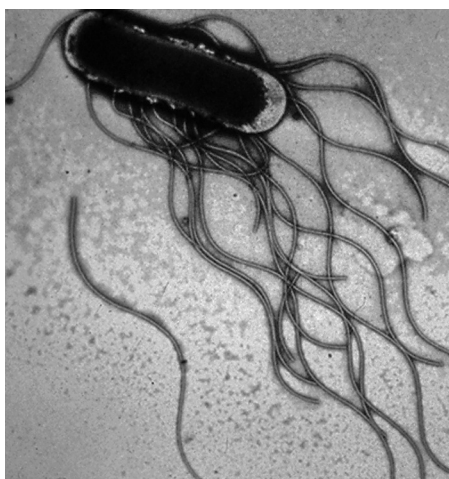


Sara Monteiro Pires, PhD student

Sara has a degree in veterinary science and is now studying for a PhD in 'Attributing human zoonotic infection with different animals, food and environmental sources' at the Danish Institute for Food and Veterinary Research (DFVF) with funding from Med-Vet-Net.

Although Sara graduated as a veterinarian she realized early in her studies that it was not medical practice that she was most interested in. A lecture on risk assessment was enough to call her attention to look for ways to work in this area.

As risk assessment is not yet a priority research area in her home country of Portugal, Sara hopes the opportunity to study in Denmark will help her gain knowledge and expertise in this subject.



Salmonella enteritidis. Courtesy SfAM

MRSA – an emerging zoonotic agent or a pathogen in edible clothing?

The gram-positive organism *Staphylococcus aureus* is recognized as both an important human pathogen and a commensal. This adaptable organism has been shown to be responsible for hospital-acquired infections, with methicillin-resistant *S. aureus* (MRSA) strains presenting particular treatment problems in hospitals worldwide.

Recently, there have been several reports of MRSA in both domestic and companion animals. The isolation of MRSA from animals was first reported in 1972 following its detection in milk from mastitic cows (cows with inflamed udders) (Devriese et al., 1972), and since then, occasional publications have reported MRSA infection in domestic animals including dogs, cats, cattle, sheep, chickens, rabbits and horses with the literature suggesting that the rate of isolation has been increasing (Devriese and Hommez, 1975; Hartmann et al., 1997; Pak et al., 1999; Tomlin et al., 1999; Lee, 2003; Goni et al., 2004; Rich and Roberts, 2004; Weese and Rousseau, 2005). For instance, Kitai et al. (2005), reported MRSA strains possessing SCCmec type IV, (a genotypic characteristic prevalent in community acquired-MRSA isolates), isolated from retail samples of chickens in Japan, and over a period of two years in the UK, 285 strains of MRSA were isolated from a variety of animals including cats and dogs (Rich et al., 2005). MRSA is now widely recognized as an important risk factor in veterinary medicine, with a number of practices screening animals for MRSA prior to operative procedures. Indeed, MRSA-positive animal patients can be treated using barrier-nursing methods to effect isolation from other patients (Pfeiffer et al. 2005; Leonard et al. 2006; Moodley et al 2006).

However, we may be witnessing a further niche exploitation by this organism in terms of reports of detection in raw meat products. Reports to date have indicated the presence of MRSA in a number of food-producing animals such as chicken (Kwon et al., 2006, Lee 2006) cattle (Lee, 2006) and rabbits (Rodriguez-Calleja et al., 2006). Interestingly, Kwon

and co-workers (2006) reported that, in their study, chicken, bovine milk and animal hospital isolates were closely related using multilocus sequence typing. In the study by Lee (2006) it is reported that whilst both chicken and cattle samples showed the presence of MRSA, the pork samples under examination did not. Preliminary studies (Agyirey-Kwakye et al. unpublished data) undertaken on 150 samples of chicken and pork giving rise to 26 *S. aureus* isolates from which two phenotypic MRSA isolates were detected, one from pork and one from chicken.

Reports have suggested that the presence of MRSA in raw meat products may constitute a health hazard to some consumers despite the rate of isolation being low (Kitai et al., 2005). It is acknowledged that there is a surprising paucity of data relating to the isolation of MRSA from foodstuffs, (Lee, 2003; Kitai et al., 2005).

With this in mind it is clear that there is a need to establish the relevance of these disparate findings. It is now evident that *S. aureus* isolates derived from animals and/or raw meat/meat products appear to harbour resistance to antimicrobials commonly used in human medicine, including methicillin. Several studies have shown a low, but potentially important, level of methicillin resistance appearing in animals and the food chain within Europe and the US and these findings concur with the findings of others for

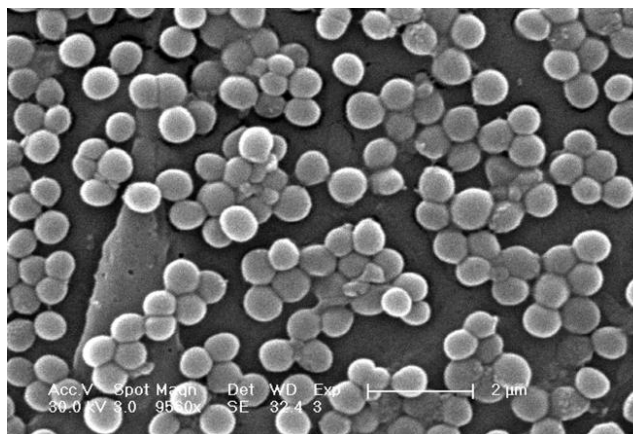


Petri dish showing resistance to certain antimicrobial agents. A disk with no clear zone indicates that the bacteria are resistant.

East and Southeast Asia (Kitai et al., 2005, Lee, 2003, 2006; Kwon et al., 2006). However, it is unclear whether the isolates cultured from these food items are colonizers of the source animal or contaminants from the food-processing agents therefore any inference of these findings from a zoonotic potential is at present uncertain. The dearth of data from Europe and the US points towards the requirement for a co-ordinated surveillance programme to be carried out to determine the epidemiology of *S. aureus* and MRSA in the food chain from clone tracing through to monitoring of antibiogram profiles to ascertain the importance of this versatile pathogen in a potentially new role. The collated data will contribute to the understanding of the natural biology of the organism. Importantly, we hope to assess whether we have a risk that needs to be properly assessed or whether a change in handling practices will be sufficient to control the apparent spread a microorganism harbouring human drug resistances.

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Scanning electron micrograph depicting numerous clumps of methicillin-resistant *Staphylococcus aureus* bacteria. Courtesy CDC

References are given on p. 6

Emerging & Neglected Zoonoses Groups meet in Palermo

Kumar Sivam reports on Med-Vet-Net's arthropod-borne zoonoses meeting in Palermo, Sicily.

On 2 November we converged on Palermo. Arriving in the pouring rain made those of us from the UK feel quite at home – the only difference was that this rain was warm (almost).

A group of 30 people both from Med-Vet-Net and other institutes gathered to discuss arthropod-borne zoonoses. In particular, we were there to form the nucleus of one or more groups to pursue EU Framework Programme 7 (FP7) funding. All the Med-Vet-Net Partner Institutes had been invited and it is good that we had such a high degree of interest.

We had details of topics likely to appear in the first FP7 call in January 2007 and we focused our discussions on these and, in particular, from the perspective of arthropod-borne zoonoses.

We put the emphasis on group discussion backed up by a single high-

profile scientific presentation. The participants really put a great deal of effort into their work and it was good that everyone had a real chance to contribute to building the ideas.

Kristy Murray from the USA came to talk to us about ArboNET, the West Nile virus surveillance system. This was very well received, and demonstrated a successful surveillance system that brings together a variety of data, covering vector, disease, human and veterinary data. It is clear that ArboNET is a model that can be applied within the EU and we hope to explore this in future activities. Kristy's presentation is available from the Med-Vet-Net member's site at: <https://www.medvetnet.org/membersite/templates/doc.php?id=53> (login required).

In the future we aim to use our funds to support a bid for FP7 funding of an arbovirus network, to explore vector-borne diseases and vector ecology, including the use of GIS, and bring



Participants in group discussions at the Palermo meeting.

together a critical mass of interest in MRSA.

The meeting demonstrated Med-Vet-Net's ability to reach out beyond the formal membership and to look at a broader range of zoonotic issues.

The meeting was a great success, in no small part due to the welcome given to us by colleagues from the local Istituto Zooprofilattico Sperimentale della Sicilia, in particular Alessandra Torina and Stefano Reale.

Kumar Sivam

FP6 First Results Conference

Med-Vet-Net was invited to present at the 'Food Safety and Safety Research: first results from Framework Programme 6' conference held on 12 December 2006 at the European Parliament in Brussels.

Using *Campylobacter* as an example, Dr Anne Ridley, a Med-Vet-Net Workpackage Leader and Senior Scientist at the VLA, outlined how the Med-Vet-Net research network functions. Her talk, 'Med-Vet-Net: working together to prevent pains in the gut', was presented to an audience of 180 participants from research institutions and councils, industrial associations, advisory bodies, policy makers and journalists.

Anne's presentation is now available online at: <ftp://ftp.cordis.europa.eu/pub/food/docs/ridley.pdf>



Anne Ridley explains how different Med-Vet-Net Workpackages focus on different aspects of *Campylobacter* source detection, risk analysis and public health impact.

Med-Vet-Net People – Governing Board

In this issue of Med-Vet-Net News we begin introducing members of our Governing Board.

Professor Peter Borriello, Governing Board Chair

Peter is a microbiology graduate and Fellow of University College London. He was Head of a Medical Research Council Unit (Microbial Pathogenicity Research Unit) working on pathogenicity of bacterial infections, was founding Director of the Institute of Infections and Immunity, University of Nottingham, and was appointed Director of the PHLS Central Public Health Laboratory, which was the National Centre for Reference Microbiology, in October 1995.

Since 2003, Peter has become an Executive Director of the Health Protection Agency (HPA) in his capacity as Director of the Specialist and Reference Microbiology Division. He is currently Director of the new HPA Centre for Infections, which brings together the microbiology Division and the Communicable Diseases Surveillance Centre. His basic science research has led to over 300 publications. He is Chairman of a number of International and National learned societies and committees, including the recently established Rapid Review Panel for products that may help reduce hospital-acquired infections, and on the Editorial Board of six scientific journals. He holds three chairs, being a Special Professor of the University of Nottingham (microbial pathogenicity), Visiting Professor at the London School of Hygiene and Tropical Medicine (Microbiology), and Professor of Microbial Ecology at the Free University of Herborn.



Dr Nils Strandberg Pedersen, Med-Vet-Net Governing Board Member

Nils is President and CEO of Statens Serum Institut, Denmark. He is also Chairman of the board of the Danish University of Pharmaceutical Sciences, Chairman of the board of Danish Bilharziasis Laboratory, member of the Boards of the National Institute of Occupational Health and the Michaelsen Foundation.

Nils has previously been chairman for the board of the Society for Theoretical and Applied Medicine, and member of the Danish Research Agency, the Danish Medical Research Council, the Research Committee of the Ministry of Food, Agriculture and Fisheries, the Research Committee of the Ministry of Interior and Health, and the Research Committee of the Danish Institute of Food and Veterinary Research.

Nils holds a DMSc degree and an MD with thesis on 'Treponemal antigens and their use in syphilis serological tests' from the University of Copenhagen.

Mr Philip Wheat, Med-Vet-Net Governing Board Member

Phil is Chief Executive Officer for the Society for Applied Microbiology (SfAM). He joined SfAM from Mast Laboratories (a company manufacturing and supplying products used in microbiology laboratories) where he worked for 10 years. He was Managing Director for Mast Laboratories and this involved directing both the manufacturing and laboratory (quality control and product development) functions of the company. During his time at Mast he also studied for a Master of Business Administration degree at Sheffield Business School, Sheffield Hallam University.

Before being asked to join Mast, Phil was the Laboratory Manager in the microbiology laboratory at the Royal Hallamshire Hospital, Sheffield, UK. He was involved for many years in teaching and education, in particular for the Biomedical Scientist profession. He taught and organized the microbiology modules for Fellowship of Institute of Biomedical Science and Master degree levels. In addition to teaching commitments, Phil has also been involved for numerous years with organizing the 'Microbe' series of conferences.

For 10 years, Phil was on the Scientific Advisory Panel for the Institute of Biomedical Science, this included the last four years as Specialist Advisor. In addition, during his stay in Sheffield, he obtained a Master in Medical Science degree obtained by thesis from the University of Sheffield.



Bioinformatics workshop

21st to 22nd February 2007,
Woodlands Manor Hotel, Bedford,
United Kingdom



Participants from Med-Vet-Net Workpackages are invited to attend a workshop to scope the potential contribution of online databases and bioinformatics resources to Med-Vet-Net.

Objectives:

- To scope the potential contribution of online databases and resources to medical and veterinary public health microbiology.
- To identify current and future needs for online database development within Med-Vet-Net.
- To audit database development and related bioinformatics activities within Med-Vet-Net.
- To identify the staff within Med-Vet-Net involved in online database development/bioinformatics and to audit the skill-sets thereby available (this in itself represents a Med-Vet-Net output).
- To explore mechanisms to facilitate communication and interaction between these staff.

Workshop Convenors:

- Jonathan Green; Centre for Infections, UK
- Ian Fisher; Centre for Infections, UK
- Bo G Sundqvist; National Veterinary Institute (SVA), Sweden
- Staffan Tamm; SVA, Sweden

More information:

Please contact the Communications Unit for more information and workshop booking (communications@medvetnet.org).

External congress

Institute of Biology Courses:

Technical Writing, 25 January 2007,
IOB, London, UK

This course is for writers of technical, scientific and other related reports who wish to improve their report and general document writing skills.

Grant Application, 7 February 2007,
Sheffield Hallam University, UK

The course will address issues of obtaining funding from Research Councils, Government Departments, UK Charities, the EU and Industry.

ISAAR 2007

Sixth International Symposium on Antimicrobial Agents and Resistance Raffles City Convention Centre, Singapore, 7–9 March, 2007

ISAAR 2007 is hosted by the Asian-Pacific Research Foundation for Infectious Diseases (ARFID) and co-organized by Society of Infectious Diseases, Singapore and many international organizations and academic societies will support ISAAR 2007 as in 2005.

Please visit ISAAR 2007 official website www.isaar.org for more information.

Society for Applied Microbiology, Summer Meeting, 'Microbiology of Fresh Produce', Park Plaza Hotel, Cardiff, UK, 2nd – 5th July 2007

For more information see: www.sfam.org.uk or contact: Sally Cryer (sally@sfam.org.uk)

14th International Workshop on *Campylobacter*, *Helicobacter* and Related Organisms, 2–5 September 2007, Beurs World Trade Center Rotterdam The Netherlands

For more information see: <http://www.chro2007.nl/>

Society for General Microbiology 161st Meeting, 3–6 September 2007, University of Edinburgh, UK

For more information see: <http://www.sgm.ac.uk/meetings/MTGPAGES/Edinburgh07.cfm>

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Contributions and suggestions are welcome. Deadline for publication is 1st of each month.

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