



WORLD HEALTH ORGANIZATION **COLLABORATING CENTRE**
FOR RESEARCH AND TRAINING IN VETERINARY PUBLIC HEALTH
AT THE UNIVERSITY OF VETERINARY MEDICINE HANNOVER FOUNDATION

Annual Report 2011

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1 State of the WHO-Centre

1.1 Terms of Reference

In agreement with the WHO the terms of reference were restructured. On the whole there are three fields of activity identified:

- (i) "Training and research in collaboration with WHO in the following aspects of the interrelationship between human and animals health:
 - (a) Health problems associated with animal production practices and their control
 - (b) Zoonoses associated with food hygiene aspects(including infections, veterinary drug residues, chemical residues, contaminants, etc.)
- (ii) Training and research for national, regional and global strategies and methods for surveillance, prevention and control of zoonoses and foodborne infections due to animal products by direct cooperation with WHO Member States.
- (iii) Training and research in the development and application of epidemiological methods in Veterinary Public Health in collaboration with WHO."

A detailed description of the tasks and related working plan can be found in the annex.

2 Research

The WHO-Centre conducts research activities in multiple fields. During 2011 the main focus of attention was on research networks – that means research with cooperation partners from other scientific disciplines. The following short reports summarize the plans.

2.1 Research networks: further development of small group caging of laying hens

A research network has been established by various scientific institutions and manufacturers of housing systems for laying hens, to investigate and enhance the small group housing system introduced in Germany on August 22nd, 2006 by the revised act for animal welfare in livestock and poultry husbandry (Animal welfare livestock regulation).

In this context two projects have been generated: The first to compare various existing systems of enriched cages and small group housing in the controlled environments of several field stations. The second project evaluates small group housing and barn systems as found in the practical conditions on different laying hen farms. Both projects focus, among other things, on animal health and behavior.

Project 1: In the controlled environments of several field stations the potential influencing variables on laying hens in small group housing have been successively modified over three laying periods. The influence of these changes on animal health and behavior are being investigated. Especially considered are the utilization of the functional areas (perch, litter area, nest, feeders and drinkers), the different

alignment of perches, the different size of the litter area and modified number of hens in one section as well as their various effects on selected behavioral attributes. In line with the evaluation of animal health the hens were examined concerning damages to plumage and skin, footpad health and infestation with ectoparasites. Pathologic-anatomic diagnoses of the organs were recorded as well. Additional examinations regarding the immunological status of the hens, stress impact and gene expression, salmonella load, immissions and emissions as well as economic efficiency are conducted.

During the time the WHO-Center prepared the cross-project statistical analysis. First results will be expected for 2012. The project started in 2008 and will conclude in the beginning of 2012 after the completion of the third laying period.

Project 2: As small group housing should be investigated under practical conditions as well, a number of farms keeping laying hens either in small group housing or barn systems were recruited for evaluation. At specific times during the laying period these farms were visited by various network partners to gather information concerning animal welfare, economic efficiency and environmental impact. The required questionnaires and data entry forms have already been developed and evaluated by the WHO-center in close collaboration with the network partners. Various evaluations to estimate and avoid interviewer-bias have been epidemiologically and statistically attended by the WHO-Center. The required, extensive data bank has been generated, evaluated and is still being maintained. In conclusion a cross-project statistical analysis will be conducted. The project started in 2009 and will be continuing until the end of 2012.

2.2 FBI-Zoo: Food borne zoonotic infections of humans: a network of human and veterinary medicine for research concerning food borne infections

The Federal Ministry of Education and Research promotes research networks concerning diseases that can be transmitted from animals to humans (zoonoses). The network "FBI-Zoo" consists of more than 40 research facilities of human and veterinary medicine and hosts many different research disciplines. Overall 16 projects did ally in this network to conduct research concerning the four most important bacterial pathogens *Campylobacter*, *Salmonella*, *Yersinia* and Shigatoxin producing *Escherichia coli* that cause diarrhoea in humans. The network has been working successfully and is since 2011 in its second promotion period that will continue until 2013. Meanwhile gained knowledge shall be deepened, enlarged and consolidated. First results from the "Case-Control Study about sporadic *Salmonella* infections in humans in Lower Saxony" show the necessity for more thorough examinations of regionality. Findings from the animal-studies of the first promotion period about entry and distribution of zoonotic pathogens are to be examined more detailed with the help of two further studies.

In future, similar to the first promotion period the WHO-Centre Veterinary Public Health, a subproject with multiple focuses will be conducted with the aim to gain answers to the following questions:

- Is it possible to detect *Salmonella* and *Campylobacter* excreted by pigs in the herd in the following slaughtering process and food? (see paragraph 2.3 and 2.4) For this in pigs the occurrence of pathogens causing diarrhoea is examined in two studies. This way the occurrence of zoonotic pathogens along the whole production chain from piglet production to the meat product will be explored (see paragraph 2.3 and 2.4). Aim of the study is to estimate prevalences at the individual phases as well as an estimation of risk factors for the occurrence of the pathogens in the pig meat production chain. Also the spectrum of occurring pathogens will be exactly characterised.
- Are there regional variations of frequencies of the different species or characteristics of the isolates? Are there associations between the *Salmonella* incidence (of notified cases) respectively the risk behaviour and the urbanity of a region as well as the regional intensity of livestock keeping? If yes, are these to be explained depending on the content or are these false conclusions? Therefore patients with salmonellosis that are unique cases and not part of an

outbreak will be examined. Case and control persons answer a questionnaire where is asked for all known and suspected sources of infection, for example nutrition habits, living situation, age and many more. On the basis of this information general risk factors for sporadic infections are identified (see paragraph 2.11).

- Which are the sources and ways of re-entry as well as apparent persistency (“stable hospitalism”) of clones in the fattening production?
- How is the course of presence of identified clones during the fattening period?
- Do more continuative statistical analyses confirm the assumption that there is a correlation between characteristics of pathogen isolates and the characteristics of the host?
- Is it generally possible to merge existing information saved in different data bases of science, administration and production into one and evaluate and analyse them together? All data gathered or generated by the different project groups were already combined in a central data base and analysed collectively. Already existing structure data from Germany about human and animal populations can be linked to this data base. On this base as well as with gathering of experience from other countries, first steps for answering these questions in the network project will be made. Further steps are planned for 2012 in line with an additional project.

In 2011 the WHO-Centre worked on publications of study results from the first promotion period as well as on planning studies and pre-examinations and its realization in the second promotion period. During the time reported, two dissertations and one scientific publication concerning this project have been published.

2.3 Ecology of Salmonella in fattening pigs

In a longitudinal study, samples from the environment and from the pigs themselves will be collected from five fattening farms. These farms have been selected due to the known infection of their pigs with Salmonella. Sampling includes the direct and indirect environment of the animals as well as earlier stages of the production chain (piglet production, weaned and growing pigs). Farm data is gathered using a questionnaire to characterise possible risk factors.

Per farm, two groups will be examined from birth to finish. Approximately 2000 samples in total (collective faeces, environmental samples [sticks, boots, pipes, walls, scales etc.]) will be examined. After the first sampling during the suckling period of the piglets, samples will be collected during the weaning, growing and fattening period in intervals of four to six weeks.

At the end of the study, utilizing the results of the typing of identified Salmonella isolates and the data of the questionnaires concerning management (hygiene, biosecurity etc., an analysis of risk factors for salmonella in fattening pigs will be performed.

2.4 Screening study about the transmission of zoonotic pathogens along the food chain

In cooperation with one abattoir, fattening pigs from conventional herds with a high sero-prevalence of Salmonella will be sampled. The samples will be comprised of : (1) on farm (pooled faecal samples from the pen floor), (2) during the slaughtering process (faeces from the intestine, surface swabs of the carcass as well as tonsil and lymph node samples) and (3) after cutting (meat samples).

The first samples will be collected on farm immediately prior to slaughter. These samples are examined via culture for three pathogens (Salmonella, Campylobacter and Yersinia). The samples taken during slaughter will be examined according to type: faecal and carcass samples for Salmonella, Campylobacter and Yersinia; lymph nodes only for Salmonella and tonsils only for Yersinia. The meat samples will be analysed for all three pathogens. All identified isolates will then be serotyped.

2.5 Examinations regarding hygiene, safety and quality of food from animals –reducing the burden of Salmonella in pig meat (Case-Control-Study)

In the research network agricultural and food economy there are examined in the so called network project 2 possibilities for sustainable production of food from animals in high density areas of farming in Lower Saxony. The WHO-Centre Veterinary Public Health is a cooperation partner of the subproject 4 under the direction of the Institute for food quality and food safety of the University of Veterinary Medicine Hannover. Aim of the study is it to help both food enterprises and official veterinary and food surveillance offices to follow the new hygiene regulations of the EU by reducing contamination with Salmonella. This shall be reached by systematically reporting sources of entry, by regional controlling strategies and by concepts about avoiding a re-contamination. With this the principle of controlling the final product shall be replaced through a preventive concept of gradual reduction.

The focus of the investigation is the determination of risk factors which could be associated with a higher Salmonella burden in fattening pig herds. The study results provide a basis for a generation of hypotheses on the importance of several farm and management factors as a possible hazard. The results shall assist to help developing selective measurements for preventing and reducing a salmonella burden in order to reduce the hazard for the consumers.

Initially an epidemiological Case-Control-Study for determination of possible risk factors in fattening pig herds was performed. Afterwards the salmonella burden of fattening pigs and pork from farm to cutting in the abattoir was estimated. In addition, based on determined samplings, possible reasons for the salmonella burden in farms with piglet production should be investigated.

The WHO-Center accompanied the realization of the project parts: schedule of the study, design of the research tools, sampling procedure and the epidemiological and statistical evaluation of the study results. In the year of the report the main focus is on the publication of project results.

2.6 The Meaning of *Clostridium botulinum* in cases of chronic disease in dairy farms

In the beginning of 2011 the execution of a research project called “The Meaning of *Clostridium botulinum* in cases of chronic diseases in dairy farms” was announced by the Federal Ministry of Food, Agriculture and Consumer Protection. Thereupon the WHO-Centre, the Clinic for Cows (main applicant) and the Institute for Food Quality and Food Safety of the University of Veterinary Medicine Hannover Foundation engaged in an application, which was submitted in April, 2011. The project was accepted at the end of the year and starts in March 2012.

2.7 Pilot study - representative veterinary consumption of antibiotic use in food producing animals - VetCAB

Unlike other European neighbour countries in Germany no valid data are available which would be suitable for a species specific estimation of drug consumption especially regarding food producing animals. It is necessary to develop a concept for a regular monitoring system within Germany as a country with a non-central federal state system. For that in 2007/2008 a feasibility project was conducted to identify the technical preconditions and develop a concept for a regular monitoring system. The results were reported to the Federal Institute for Risk assessment (BfR).

Depending on the feasibility project, in 2010 the WHO-Centre started a pilot study to collect representative data throughout Germany. This project is conducted jointly with the Institute of Pharmacology, Pharmacy and Toxicology, Faculty of Veterinary Medicine, University of Leipzig on behalf of the Federal Institute for Risk assessment (BfR).

The experience of the previous feasibility study will be considered and implemented in accordance with the underlying concept. By careful selection of farms in suitable country districts, a representative data acquisition is sought. The focus of 2011 was the recruitment of appropriate farms and veterinary surgeries. For this purpose in the chosen country districts have been discussions with the veterinary authorities and representatives of agriculture and veterinary profession. The project will be completed in 2012.

One Publication of the feasibility study was published in "Preventive veterinary medicine".

2.8 Interdisciplinary research network „ESBL and Fluoroquinolone Resistance in *Enterobacteriaceae* - RESET“

Enterobacteriaceae play an important role in the spreading of antimicrobial resistances. Resistances against β -lactam-antibiotics by producing extended spectrum beta lactamases (ESBL) and resistances against (fluoro) quinolones pose new emerging resistance characters that restrain therapeutic possibilities of veterinary and human medicine.

The network RESET consists of ten network partners and five associated partners from human and veterinary medicine, basic and practical research as well as from epidemiology. RESET contains different studies complementing one another that examine factors that are connected to the spread of new emerging resistances in *Enterobacteriaceae* among humans, animals and environment.

The project task of the WHO-Centre is to connect data concerning the situation of resistances of *Enterobacteriaceae* with data concerning the consumption of antibiotics by farm animals. For this purpose a cross-sectional study with pigs, cattle and poultry in four rural districts in Germany is done. Each rural district represents one of the four agricultural regions in Germany. In addition to recording the antibiotic consumption, faeces samples and environmental samples of participating farms are taken and examined concerning the appearance of resistant *Escherichia* (*E.*) *coli* as well as *Salmonella* (*S.*) *enterica* and the resistance situation. In the statistical analysis correlations between the use of antibiotics and resistance patterns are tested and possible risk factors identified. During the reported time, questionnaires and a data base for managing the data were developed and aligned with other project partners. Visiting of farms started in spring 2011. Up to now 52 of the planned 200 farms have been visited and about 700 samples have been taken and forwarded to the project partner FU Berlin for cultural analysis.

As coordinator of the network, the WHO-Centre worked on many management tasks. The webpage was built (<http://www.reset-verbund.de/>) and meetings and workshops for promoting junior scientists were organised.

2.9 Research in cooperation with South Africa: Strategies for Establishing counting of farm animals in the province South Africa

An agricultural animal counting is a large-scale periodical statistical method to gain quantitative information about the structure of agriculture and with this detailed information about number of animals and farming methods. As the reliability of official numbers of stock and animals in the Eastern Cape Province, South Africa has to be questioned, a counting is fundamental for planning and developing the farming sector. It helps the veterinary administration to control diseases and to carry out campaigns concerning protective vaccinations against diseases with great economic effect, like Foot and Mouth Disease, swine fever or bird flue.

In context with the project, a concept for counting stock was performed taking the example of the regions Mbashe and Great Kei. After successfully finishing the project, parts of the work were published in 2011.

2.10 Investigation of Zoonoses in a Subtropical Rainforest of Guatemala

The population of Guatemala lives either in modern cities or in rural areas with traditional lifestyles which were previously separated from each other. As well, while establishing themselves and increasing the encroachment towards wildlife, pathogens which were previously isolated in the forests might have found a way to infect new hosts in humans and their livestock, posing a threat for the entire population.

In the following investigation, the pathogen pool of wild peccaries is investigated. Wildlife species are increasingly being hunted and therefore, the estimation of the pathogen occurrence is essential to assess the risk of the general population.

During the ongoing year, the study protocol as well as the proposed methods for sample collection and for veterinary diagnosis will be defined. Also, a standardized questionnaire to collect information from the villagers will be developed.

2.11 Case-Control study of salmonellosis in humans

The most common food born infections in humans are caused by *Salmonella* spp. Not continuously chilled food is affected by *Salmonella* spp. in particular (deserts, salads with raw eggs or mayonnaise). *Salmonella* can as well be identified in food not of animal origin (e.g. chocolate, tomatoes, almonds, salad, scion). However, in 80% of the reported cases the source of infection is indeterminate (sporadic cases).

In order to identify risk factors for these cases the Governmental Institute of Public Health of Lower Saxony conducted a study in collaboration with the WHO-Centre and different Lower Saxonian administrative districts. Persons affected by a sporadic infection were investigated concerning their activities and food consumption within the last three days before disease. Randomly selected control persons were investigated likewise.

This case-control study is part of a project on food borne zoonoses (FBI-Zoo) founded by the German Ministry of Education and Research. The study is currently being continued in a modified way during a second period of foundation. The WHO-Centre accompanies the study as regards development of a standardised survey instrument (questionnaire for telephone interviews) and special analyses (Non-Response Bias, Interview Bias and handling of missing data, small group sizes, multicollinearity and conducting multivariate endpoint analysis of basic typing).

In 2011 the WHO-Centre worked on the publication of study results of the first foundation period and planned the second period.

2.12 Development of a standardised survey instrument for risk factors of zoonotic agents for patients with diarrhoea in hospitals

During the first study period of the project „FBI-Zoo“ (s. Section 2.2) zoonotic agents were isolated from stool samples from clinically and epidemiologically conspicuous patients in hospitals. Aim of the study was to identify the spectrum of subtypes and to establish new typing methods based on DNA sequences. Furthermore, more sensitive isolation methods were developed. Isolates can be used by the project partners for further analyses and typing.

All in all 5,000 stool samples were collected in three university hospitals in Germany. Using immunomagnetic separation and sensitive methods like this helped to isolate about 100 isolates per pathogen (*Salmonella enterica*, *E. coli*, *Campylobacter* spp.) and 50 isolates of enteropathogenic *Yersinia* spp. Apart from stool sampling a standardised survey instrument was developed by the WHO-Centre in collaboration with the Robert Koch Institute. The questionnaire was used in the first foundation period, already. It will be applied during the second period likewise. Apart from

demographic characteristics and information about the diarrhoeal event (severity of symptoms) data is being collected on specific risk factors of the pathogens.

This survey instrument enables a projects encompassing comparison of epidemiological data of different FBI-Zoo populations as regards risk factors. Additionally, associations between severity of symptoms and virulence of isolates were quantified.

In 2011 a comprehensive data analysis was conducted and results were interpreted and classified.

2.13 Preparation of the study protocol (focus on zoonoses) of the national cohort

Knowledge about prevention of popular diseases of humans can be gained above all from epidemiologic long term studies. It is aimed at identifying both genetic and environmental risk factors to be able to recognize and treat diseases at an early state. At all Helmholtz Health Centres the competence on the field epidemiology is enlarged. As a unique tool for multifaceted epidemiologic studies a big population-based study with 200 000 participants is planned, the so called “National Cohort”. During this long term study, that the Helmholtz group wants to build up together with partners from universities, people who are healthy at the time of being recruited, are examined clinically and asked for living circumstances and behaviours and shall be accompanied for 10 to 20 years.

The WHO-Centre will take part in the study as one partner from universities. Together with the Institute for Epidemiology and Prevention Research (BIPS) Bremen, the clinic of the university Hamburg-Eppendorf as well as the Helmholtz-Centre for infection research a “north German cohort centre” was built. Studying the risks of environment, living conditions and genetic facts on the field of infectious and inflaming diseases is the main subject of this north German cohort centre.

At the WHO-Centre VPH from May until September 2011 a feasibility study about sampling of animals by their owners was conducted. It was meant to find out, if sampling of cats and dogs by their owners is in general possible and the quality of samples was evaluated. This kind of sampling pets proved to be feasible and offers the possibility to gain animal samples of pet owners along with human samples of participants of the cohort. With the help of these biologic samples many questions in the field of VPH could be worked on (e.g. transmission of MRSA or Bartonella from animal to human). Results of the study shall be published in 2012.

In 2011, in line with a feasibility study, at the BIPS and the clinic of the university Hamburg-Eppendorf a random sample of 100 participants of the population was recruited. This first recruiting served the testing and development of the examination programme. Mid 2012 the revised examination programme inclusive infrastructure and study personnel will be piloted. End of 2012 the pilot period will continue in the actual recruiting.

2.14 Collaborative Research in Rural and Commercial farming of Chile

We are preparing projects in close collaboration with the University of Chile, Santiago, the Agricultural and Fisheries Services, Chile in the area of animal health and food production.

Chile is composed of a large variety of aboriginal ethnic groups that have lived in its territory for thousands of years. Although initially only the groups in the north domesticated animals (Llamas & Guanacos), nowadays all of them practice animal husbandry at some level. In 2007 a full scale agricultural census took place in Chile, generating valuable information regarding both key elements: ethnic group of the owners and number of animals of each species simultaneously. Additional other information of agricultural interest was also integrated into the census data. This study therefore focuses on this association and describes the relationship of different Chilean ethnic groups and their animals especially with their non-aboriginal counterparts for the first time.

The analyses are conducted in a multi-step stratified approach using administrative regions as well as geographical measures (altitude, agricultural zone etc) as classes to adjust for possible confounding and to study interactions in the different livestock systems.

The results of this study can be of great interest to develop a new series of studies exploring the animal husbandry traditions of Chilean aboriginal ethnic groups, and by doing so, helping the government to develop their agricultural policies according to each specific group.

2.15 Research and Progress for Application of epidemiologic methods

In this field, in the WHO Centre VPH, works concerning methods for determining the necessary examination extent for veterinary studies were finished. A schoolbook was published in 2011.

3 Training activities

The WHO-Centre VPH organises and supports training activities and scientific congresses. In 2011 following events were organized or prepared.

3.1 Seminar Veterinary Public Health: The (re)use of slaughtering by-products

According to the congresses “Seminar Veterinary Public Health” (former Seminar Environmental Hygiene) on the 4th of February 2011 a meeting “(re)use of slaughtering by-products” took place in Hannover. All 261 seats available for participation were taken, which mirrors the public interest in this subject. Members of regional and state authorities for food surveillance, consumer protection and veterinary offices, of industry and university as well as journalists took part.

After a short introduction by Prof. Dr. Josef Kamphues of the Institute for animal nutrition of the TiHo, Dr. Anne Balkema-Buschmann, Friedrich Löffler-Institut, gave an overview of the epidemiologic BSE situation during the last ten years and gave an outlook on possible future developments. Data about BSE incidences in Europe show that the number of cases reduced. In Germany in 2008 and 2009 only two cases per year were diagnosed, in 2010 there was no case registered. This is supposedly due to strictly obeying BSE surveillance methods.

In a second presentation Dr. Matthias Greiner of the Federal Institute for risk assessment (BfR) showed aspects of the actual risk analyses concerning BSE. He introduced a model for risk assessment in Germany and catered to a transparent documentation of the model. Conclusion of his presentation was the continuously declining epidemiologic trends of the BSE disease in Germany and that this will be considered in future BSE risk assessments.

Dr. Isabel Krabs, from the service for veterinary affairs and consumer protection, Diepholz, reported the realization of judicial guidelines concerning the surveillance of production businesses of material of category 3. Contained animal proteins can be processed and used as basic material for the production of animal food and fertilizer.

Following, Harald Niemann of the service society for animal by-products, Bonn, reported the status quo of disposal of slaughtering by-products. He pointed out that the collection, processing and usage could be organized in a way that the categories remain separated.

Prof. Dr. Dr. Alois Heißenhuber of the technical university Munich presented economic and ecologic consequences of actual procedure of disposal and usage of slaughtering by-products. He emphasized that present considerable masses of protein carriers to produce animal food have to be imported. By substitution of soy in animal nutrition by proteins from slaughtering by-products cultivated areas and CO₂ emissions could be reduced.

Prof. Dr. Ewald Schnug of the Julius-Kühn-Institute, Braunschweig, described the effects of fertilizers from meat-and-bone meal and further from meat-and-bone meal produced fertilizing products. Following Prof. Dr. Josef Kamphues of the Institute for animal nutrition of the TiHo explained possibilities of using products from slaughtering for feeding. He pointed out, that risk material is removed anyway and a potential remaining infectious risk will be eliminated by inactivation, so by-products can definitely be not more risky than the main products turning directly into food.

An especially great need of fat and protein containing food exists present at fish farming. Mrs Carine van Vuure of Sonac B.V., AA Son, Netherlands, Dr. Franz-Peter Rebafka of the GePro Poultry-Protein GmbH & Co. KG and Professor Dr. Frank Liebert of the Georg-August-University, Göttingen catered to the use of slaughtering by-products for the production of fish food. By-products from slaughtered farm animals contain a good amount of phosphor and protein and are well digestible. With this they hold great possibilities for a sustainable development of aquaculture that would otherwise be limited because of lack of fish meal (overfishing of oceans). To reach this, acceptance of consumers has to be increased by thorough education.

The final presentation about the subject slaughtering by-products was addressed by Dr. Udo Wiemer of the Federal Ministry of Food, Agriculture and Consumer Protection. He summarized possibilities of processing following the EU regulations Nr. 1069/2009 and an additional EU executive regulation (valid from 4th of March).

After the presentations the Konrad-Bögel prize was awarded for the first time. Excellent works of junior scientists on the fields of veterinary epidemiology or veterinary public health were awarded. This year Dr. Ulrike Sorge was awarded for her PhD thesis "Evaluation of a voluntary Paratuberculosis control programme in Ontario and Western Canada".

3.2 Training Courses Epidemiology - Biometry 2011

Courses were held in March and end of August/beginning of September by the WHO-Centre in collaboration with the Foundation for applied Epidemiology and Ecology and the Institute for Biometry, Epidemiology and Information Processing of the University of Veterinary Medicine, Hannover Foundation. Training courses are meant for all who have to work with planning, analysing and evaluation of empiric researches.

There were offered five courses consisting of two to three days of teaching:

- „Descriptive epidemiologic methods“
- „Analytic epidemiologic methods“
- „Basics of risk assessment“
- „Animal diseases monitoring“
- „Sampling Approaches for Monitoring and Surveillance“

The courses "Descriptive" and "analytic epidemiologic methods" gave insight into methodical knowledge that is important for epidemiologic studies and explained those using examples. For this purpose, concepts of constructing and gaining epidemiologic measures, most important elicitation methods, evaluation and correction of sources of errors as well as basic analysis methods of epidemiologic studies were described.

In the course „Basics of risk assessment" terms of risk assessment (standards of OIE, Codex Alimentarius) and of risk modelling (deterministic, stochastic models, simulation) were explained. Further subjects were modelling tools and qualitative risk analysis with the example of use animal protection which was taught theoretically and with examples (model building, data availability, validation).

Aim of the course „Animal diseases monitoring" was to increase the awareness of participants concerning different aspects of animal disease surveillance using the examples of different actual animal diseases. After the introduction into biometric-statistical basics and practical exercises concerning calculation of random samples exemplary surveillance and monitoring measures of different animal diseases were introduced, calculations made and pros and cons of the random sampling and its practical exercises in small groups critically analysed and discussed. Furthermore, these and other components in line with clarification of disease outbreaks in a stock were used and enlarged.

End of August at the University of Veterinary Medicine Vienna (VUW) in preparation of the DACH Epidemiology meeting 2011, the course "Sampling Approaches for Monitoring and Surveillance" took place, where correlations of specific monitoring and surveillance, the structure of the target population, a useful random sampling and the calculation of the size of the random sample and an unbiased prevalence and variance estimation were explained.

All courses were evaluated very positive by the participants.

3.3 DACH Epidemiology meeting 2011 „Modern Epidemiology - Quantitative Methods at the control of animal diseases”

From 31st of August to 2nd of September the meeting of the German Veterinary Society -expert group epidemiology and documentation of the forum epidemiology and animal health Switzerland and the Austrian Society of Veterinarians -department epidemiology took place at the campus of the university of veterinary medicine Vienna.

Scientists from practice and basic research, decision-maker from ministries, federal institutions and professional associations as well as official veterinary surgeons and veterinary surgeons of animal health service came together to exchange latest research results and experiences and to develop new ideas, concepts and cooperations. Main subjects of the expert conference were:

- Influence of climate change and globalisation on the situation of animal diseases
- Evaluation of surveillance programmes
- Modelling of spreading
- Strategies on documentation and analysis

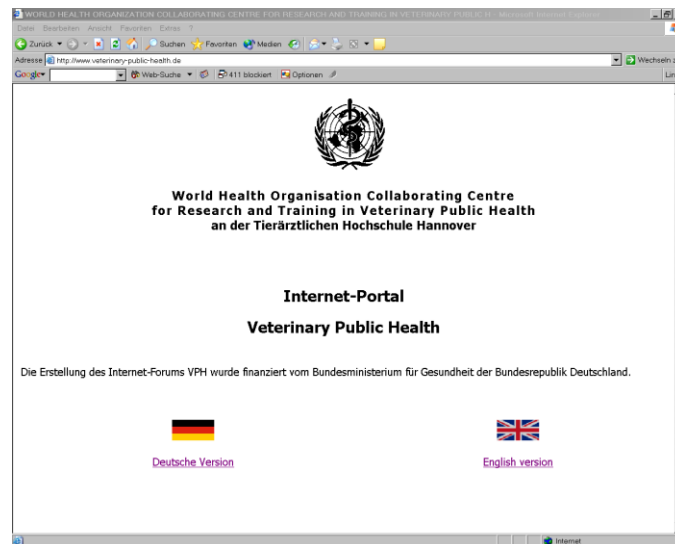
4 Webpage Veterinary Public Health

The WHO Collaborating Centre for Research and Training in Veterinary Public Health attends to public relations around veterinary public health. The internet is suited as an information and contact forum. Therefore, an internet portal that presents information about this task is available on the address

www.veterinary-public-health.de.

The following structure is available

- Definition
- Tasks
 - promotion of animal health, surveillance of animal transports
 - environmental hygiene
 - quality and safety of food of animal origin
 - surveillance of other products of animal origin
 - detection, surveillance and control of zoonoses and other relevant diseases
 - co-operation, information exchange and consultation about veterinary aspects of social interest
 - other activities:
 - antimicrobial resistance
 - comparative medicine
 - medicine of laboratory animals
- methods
- competences
- training



Picture.: Homepage of [veterinary-public-health.de](http://www.veterinary-public-health.de)

Administration of the Webpage with enlargement of the link offering was continued in 2011.

5 Future activities

5.1 Continuation of the current research and training activities

The WHO-Centre VPH intends a continuation of the following research activities in animal populations:

- Network projects: Enhancement of small furnished cages for laying hens
- FBI-Zoo: Food borne zoonotic infections of humans: A network of human and veterinary medicine on research of foodborne infectious diseases - second promotion period
 - Screening study about the transmission of zoonotic pathogens in the food chain
 - Ecology of Salmonella in fattening pigs
 - Statistical analysis of the influence of epidemiologic factors on multivariate characteristics of isolates
 - Evaluation and implementation of epidemiologic comparisons of bacterial distribution in different populations
 - Case-control study on human sporadic salmonellosis
- Investigation of hygiene, safety and quality of food of animal origin - Reduction of Salmonella load in pork (case-control study)
- Representative elicitation of consumption of antibiotics regarding food producing animals –a pilot study
- Interdisciplinary research consortium „ESBL and Fluoroquinolone Resistance in Enterobacteriaceae - RESET“
 - Cross-sectional study in agricultural farms, environment, animal food and vegetables
- Research concerning the national cohort
 - Feasibility study animal sampling by study participants
 - Building of recruiting centres
- Research in cooperation with the republic South Africa:
 - Study about the appearance of tick populations
 - Setup of additional teaching capacities in the Eastern Cape Province
- Zoonoses research in the tropical rainforest of Guatemala
- Collaborative Research in Rural and Commercial farming of Chile
 - Analysis of Census data on the background of social-cultural circumstances
- Research and development regarding the application of epidemiological methods

5.2 New Research Projects

The WHO-Centre VPH plans to add more research activities to following projects:

5.2.1 The Meaning of *Clostridium botulinum* in cases of chronic disease

In March 2012 a research project on the meaning of *Clostridium botulinum* in cases of chronic diseases in dairy farms starts.

The purposes are:

- (1) Definition of a suspicious farm or cow, considering epidemiological aspects. The definitions should allow a statement if a relationship between *C. botulinum* and chronic diseases can be expected with sufficient statistical safety. This is an indispensable condition for the execution of a case-control-study.
- (2) If there is a relationship between *C. botulinum* and chronic diseases in dairy farms, the relevance of clinical symptoms for the definition of affected and unaffected animals or farms will be clarified with adequate statistical methods.

Additionally or in the case of a missing relationship between *C. botulinum* and chronic disease other parameters and detected symptoms will be tested for their importance for chronic diseases in farms.

- (3) A molecular-biological analysis, the identification and the genotypisation of *C.-botulinum*-Isolates will be made for further aetiological clarification and disclosure of possible causality.

5.2.2 Feasibility study: Is a linkage of existing epidemiological databases in Germany something worthwhile? - Options and limits of a linkage in the context of zoonotic diseases

The increasing specialization in the field of medical science in the last century caused an increasing separation between the disciplines of veterinary and public health. Meanwhile, it can be observed “that a great number of diseases can be successfully combated through interdisciplinary efforts only” (Wieler et al., 2009). Lately, there are growing demands for a joint use of the data collected on zoonotic agents (notifications of disease outbreaks as well as part of a screening program) to better prevent, understand and predict the diseases in humans and animals.

In Germany, at the moment these data are stored in different databases, depending on their origin (animals, foodstuffs, humans) and the purpose of data collection (disease outbreak, monitoring, i.a.) and they are used and analyzed for a primarily destined purpose, only. Interfaces between the different sources are rare. To enable a cross-sectoral data interpretation, routines for data sharing have to be developed. It is less the development of a central database but the generation of interfaces and sharing mechanisms, for example a data warehouse, which is being considered.

Before answering the question, how such an integration could be implemented technically, it is important to evaluate, if the data are suitable for a secondary analysis and to ascertain whether links between the existing databases really generate added value. In the project submitted for funding, we will examine the advantage of such a linkage for different stakeholders and compile the factors of limitation and a requirements list with duties and responsibilities. The project will be funded by the TMF e.V.

[1] Wieler LH, Antao EM, Semmler T. [Research on zoonoses: central element of the "One Health" initiative]. Berl Munch Tierarztl Wochenschr 2009 Nov-Dec;122(11-12):412-6.

5.2.3 Latent Class Analysis of data on *Brucella abortus* in Irish cattle

In cooperation with the Federal Institute for risk assessment (BfR) and the Irish veterinary surveillance offices, evaluations of the existing data are prepared to examine the prevalence of *Brucella abortus* in Irish cattle. There are several results of diagnostic tests for each animal and an estimation with missing gold standard test shall be made. It has to be tested, if the statistic programme SAS can be used for this kind of analysis.

5.3 Meetings in Preparation

Further training seminars are planned or are in preparation:

5.3.1 Seminar Veterinary Public Health

In 2012 the main subject of the Seminar Veterinary Public Health will be “maximum animal welfare with minimal usage of antibiotics”.

Everybody is claiming the reduction of the use of antibiotics in the animal production –it is discussed by interested laymen, politicians and scientific groups. Generally it is accepted above frontiers. On the other hand, these medications have to be used if it is indicated by veterinary rules. Therefore, requests only cannot reach much, and there is the question of concepts that guarantee a high animal welfare and reduce the necessity of the use of antibiotics.

It is reported, which ways neighboured European States chose and follow. Also there are presentations about practical concepts of reducing the use of antibiotics, like for example the systematic use of vaccinations and the potential that is posed by intensifying diagnostics. Last there is presented a review over the situation of present and future activities in Germany from the point of view of scientists and officials.

5.3.2 Courses Epidemiology - Biometry

The established course for educating basic knowledge as well as procedures related to practice by examples from science, veterinary medicine and veterinary administration is to be continued in 2012.

Additionally in cooperation with the WHO the courses shall be enlarged.

5.3.3 Further Activities

Contribution to the preparations of the DACH Epidemiology Meeting of the expert group „Epidemiology and Documentation“ in September 2012 at Neuruppin

6 Cooperation

The WHO-Centre is working in line with its research and training activities in cooperation with following institutions:

International cooperation partner:

- Austrian Agency for Health and Food Safety (AGES)
- Federal veterinary office FVO, Switzerland
- Department of Biomathematics and Informatics, University of Veterinary Science, Budapest, Hungary
- Department of Population Medicine, Ontario Veterinary College, University of Guelph, Guelph, Canada
- Department of Veterinary Tropical Diseases, University of Pretoria, Onderstepoort, South Africa
- European Centre for Disease Prevention and Control, Solna, Suede
- European Medical Agency, London, Great Britain
- Faculty of Veterinary Medicine, Latvian University of Agriculture, Latvia
- Forum for Epidemiology and animal health, Bern, Switzerland
- State Veterinary Services, Department of Agriculture, Stutterheim, Eastern Cape Province, South Africa
- University of Veterinary Medicine, Universidad Austral de Chile, Valdivia, Chile
- Veterinary faculty, University Chile, Santiago de Chile, Chile
- University of Veterinary Medicine, Vienna, Austria
- Veterinary Epidemiology Unit, Department of Agriculture, Northern Ireland
- Veterinary Public Health-Institute, Bern Switzerland
- Vetsuisse-Faculty of the University Zürich, Switzerland
- WHO Collaborating Centre for Drug Statistics Methodology, Oslo, Norway

National cooperation partner:

- Bavarian State Research Center for Agriculture, Freising
- Federal Institute for risk assessment (BfR), Berlin
- Carl-Friedrich-Gauß-Faculty of the technical University Carolo-Wilhelmina at Braunschweig Charité, Berlin
- Fa. Balvi, Lübeck
- Fa. Big Dutchman, Vechta
- Fa. Labordiagnostik Leipzig
- Fa. QS GmbH, Bonn
- Fa. Qualitype AG, Dresden
- Fa. Salmat, Dietzenbach
- Fa. Specht, Sonsbeck
- Faculty of Agricultural Sciences of the University Hohenheim, Stuttgart
- Faculty of Science, University Paderborn
- Friedrich Loeffler-Institut, Celle, Mariensee, Insel Riems and Wusterhausen

-
- Helmholtz research centre for infectious medicine, Braunschweig
 - Helmholtz research centre for environmental health, München
 - Institute of Structural Research and Planning in Areas of Intensive Agriculture (ISPA), University Vechta
 - Medical faculty of the Westphalia Wilhelms-University Münster
 - Hannover Medical School
 - Lower Saxony State Office for Consumer Protection and Food Safety, Oldenburg (LAVES)
 - Lower Saxony State Office for Health, Hannover (NLGA)
 - Lower Saxony State Office for Rural area, Food, Agriculture and Consumer Protection, Hannover (NML)
 - Robert Koch-Institute, Berlin and Wernigerode
 - Veterinary and medical faculty of the Justus-Liebig-University Gießen
 - Veterinary and medical faculty, Institute for statistics of the Ludwig-Maximilians-University München
 - Veterinary faculty of the Freie Universität Berlin
 - Veterinary faculty of the University Leipzig
 - Veterinary office administrative district Kleve
 - Veterinary office administrative district Osnabrück

7 Publications

Following publications have been published by the WHO-Centre during the reported time:

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Stichprobenplanung bei veterinärmedizinischen Studien. Ein Leitfaden zur Bestimmung des Untersuchungsumfangs. Hannover: Schlütersche; 2011.
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Scientific articles in journals

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