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

Annual Report 2012

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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 structured in 2011 as follows.
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 2012 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 public funded 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: This project was conducted during the timeperiod 2008 - 2012 in the controlled environments of several field stations. Potential influencing variables on laying hens in small group housing were successively modified over three laying periods And the influence of these changes on animal health and behavior were investigated. Especially considered were 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 were conducted.

In 2012 the WHO-Center concluded the cross-project statistical analysis and reported the results. Additionally several cluster analyses were conducted to compare the various field stations. A respective paper is ready for submission. To compare section within a housing system detailed analyses were carried out, especially focusing on reasons for systematic and consistent differences between individual sections. On this a paper was prepared for submission as well. By way of a meta-analysis, comprehensive analyses of the field stations were realized, although only a incomplete design could be implemented. For this purpose the influence of four determining factors on 13 target variables, covering animal health, animal behavior and economic efficiency, was separately analyzed. A paper on this is in preparation, too.

Project 2: This project was conducted during the timeperiod 2009 - 2012, as small group housing should be investigated under practical conditions as well. Therefore 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. The required questionnaires and data entry forms were developed and evaluated by the WHO-center in close collaboration with the network partners. In 2012 comprehensive statistical analyses were conducted, regarding variables from different target areas (animal health, animal behavior, economic efficiency and environmental impact). The multiblock redundancy analysis by Bougeard et al. (2011) was implemented. At the moment, the results are being reported to the funding sources. Several paper covering the project are planned.

2.2 Research network FBI-Zoo (Phase 2): 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 2.2.1 and 2.2.2)

  For this purpose, the occurrence of pathogens causing diarrhoea in pigs 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 2.2.1 and 2.2.2). 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 Salmonalla incidences (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 2.2.3).

- 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 2012 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.

2.2.1 Ecology of Salmonella in fattening pigs

In the score of a longitudinal study, samples from the environment and from the pigs themselves (pooled fecal samples) were collected repeatedly from five fattening farms. These farms were selected due to the known infection of their pigs with Salmonella. Sampling included the direct and indirect environment of the animals (guiding boards, boots, pen walls, pipes, etc.) as well as earlier stages of the production chain (piglet production, weaned and growing pigs). Farm data was gathered using a questionnaire to identify and characterise possible risk factors.

Per farm, samples were taken within two production cycles including the production stages of the suckling, weaning and the following fattening period. After the first sampling during the suckling period of the piglets, samples were collected repeatedly in time periods of four to six weeks during the weaning, growing and fattening period in intervals of four to six weeks. A total of 1256 samples were collected in the year of 2013 from January to December. All samples were culturally examined for Salmonella in the Field Station for Epidemiology (University of Hanover, Bakum).

Overall, 2246 isolates of Salmonella were extracted from the samples and were send to the Robert Koch Institute, Berlin, Wernigerode Branch for further typing. Besides serotyping, lysotyping and analysing the resistance against selected antibiotics, molecular typing methods (MLVA, PFGE, MLST) were performed as well in order to categorize the Salmonella isolates into clonal lines. At the end of the study, utilizing the results of the typing of identified Salmonella isolates, analyses on individual farm basis were conducted with the focus on the diversity and dynamics of clonal strains. In addition, the data of the questionnaires concerning management (hygiene, biosecurity etc., will be used for an analysis of risk factors for salmonella in fattening pig production systems.

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

In cooperation with one abattoir a defined number of fattening pigs from five conventional fattening pig farms were selected. The participating farms were chosen due to their known infection of their pigs with Salmonella based on their results of the German serological Salmonella monitoring (sero-prevalence). Sampling of the fattening pigs will be carried out in the following production stages and the samples will be culturally examined for Salmonella, Campylobacter and Yersinia: (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.

2.2.3 Case-Control-Study regarding sporadic 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 or 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, multicolinearity and conducting multivariate endpoint analysis of basic typing).

In 2012 the WHO-Centre worked on the publication of study results of the first foundation period and planned the second period.

2.3 Research network: The meaning of *Clostridium botulinum* in cases of chronic disease in dairy farms

Since March 2012, a research project called “The meaning of *Clostridium botulinum* in cases of chronic disease in dairy farms” is conducted. The WHO-Centre cooperates with the Clinic for Cows (project leader) and the Institute for Food Quality and Food Safety of the University of Veterinary Medicine Hannover as well as the Friedrich-Löffler Institute in Jena. The project is founded by the Federal Ministry of Food, Agriculture and Consumer Protection through the Federal Agency for Agriculture and Nutrition (BLE; FKZ: 514 06.01 2810HS005).

A definition of suspicious farms or cows was designed the way that it allows for a statement towards the relationship between *C. botulinum* and chronic diseases on the basis of sufficient statistical safety. Additionally or in the case of the absence of a relationship between *C. botulinum* and chronic disease other parameters and detected symptoms will be tested for their importance for chronic diseases in farms. A molecular-biological analysis, the identification and the genotypisation of *C.-botulinum*-Isolates will be made for further etiological clarification and disclosure of possible causality.

In the reporting year the WHO-Centre coordinated the study design and supported the design of 14 different questionnaires and other forms with its expertise. Furthermore the WHO-Centre developed a database with more than 1,400 variables and some basic statistical analyses that facilitate the reporting for the visited farmer for the project partner Clinic for Cows.

2.4 Research network: Representative veterinary consumption of antibiotic use in food producing animals - pilot study

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 2012 was the data input of data from the forms obligatory by German law containing the treatment of animals and the delivery of animal drugs provided by veterinary surgeries and farms. Data input was finished in 2012. Now data are evaluated and results will be published in a report in 2013. Also, a voluminous publication concerning the used variables was prepared, which is actual in review process.

2.5 Research network RESET: "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 sprectrum beta lactamases (ESBL) and resistances against (fluoro) quinolones restrain therapeutic possibilities of veterinary and human medicine dramatically.

The network RESET, supported by means of the Federal ministry of Education and Research, 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 influencing the spread of new emerging resistances in *Enterobacteriaceae* among humans, animals and food.

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. In addition to the sampling of faeces and dust, risk factors concerning the appearance of resistant *Escherichia* (E.) *coli* as well as *Salmonella* (S.) *enterica* and the resistance situation are determined. In the statistical analysis correlations between the risk factors and resistance patterns are identified.

The sampling was completed in october 2012. Altogether 131 farms were investigated. Additionally, 55 cattle farms and 30 farms with dairy cows were examined by the Bavarian Health and Food Safety Agency. There is a result of 216 investigated farms. About 1900 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 and updated (http://www.reset-verbund.de/) and meetings and workshops for promoting junior scientists were organised.

2.6 Investigation of zoonoses in a subtropical rainforest of Guatemala

Interaction between human and animal population is a possible hazard for the outspread of zoonotic agents. This is especially true for the strong interrelationship between wildlife and rural populations in semi-development countries like Guatemala. In the proposed communities for the study, villagers use and collect material from wildlife, cultivate maize and other crops for domestic consumption and raise pigs and poultry as sources of animal protein. Hunting is common, and subsistence hunting pressure is biased towards larger vertebrate species, and individuals are generally harvested without regard to sex or age-class. Therefore, there is an interface between wildlife and domestic animals as well as humans, which may increase the zoonotic burden and cause human diseases.

The focus of the proposed research is therefore to determine the prevalence of potential zoonotic agents (i.e. Rickettsias, Leishmaniasis, Leptospirosis, Brucellosis, Tuberculosis, and Vesicular Stomatitis) as well as the existence and prevalence of suidae pathogens (CSF, Mycoplasma and Actinobacillus), and blood parasites in peccaries (Tayassu pecari and Pecari tajacu), and domestic pigs

(Sus scrofa) in the community forestry concessions of Carmelita and Uaxactún. Thus, samples which are taken from domestic pigs and from peccaries which are hunted by the residents will be analyzed for the above mentioned pathogens. Analyses will focus on prevalences and coexistence of pathogens in these taxa, as well as on epidemiological baseline information of the interrelationship of the villagers with the wildlife by means of a questionnaire survey in the communities.

With both information, the pathogen burden on the human population in the com-munity forestry will be estimated and basis for possible future actions are given.

2.7 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. These examinations are funded by means from the Federal ministry of Education and Research as well as the Lower Saxony Ministry for Science and Culture.

Results of the feasibility study concerning sampling of companion animals by their owners were published in 2012.

Also in 2012, the WHO-Centre VPH conducted a feasibility study in line with preparing the national cohort, concerning the recruitment of participants using a mobile study centre. As recruitment in the national cohort will take place in 18 study centres, recruiting mainly participants of urban areas of high population density, it seems sensible, to complement these with populations of rural areas. Therefore, in this feasibility study, the mobile study centre made small towns and rural areas accessible.

Aims of the study were technical and logistic testing of this approach, evaluation of acceptance in the rural population as well as the estimation of efforts for this kind of recruitment. With this, a basis for the main period of the national cohort was created to decide if this kind of recruitment might be useful.

Field work was done from October to December 2012 in Stade and Vechta, Lower Saxony in cooperation with the study centre Bremen (BIPS) as well as in Ladbergen, North Rhine-Westphalia, in coopertation with the study centre Muenster (WWU). Essential examinations of the basis program of the second pretest period were undertaken.

The feasibility study mobile recruitment of participants among people of small towns and rural areas was successfully finished with the examination of overall 116 participants. There were no incidents during examinations or blood withdrawal which would oppose to this kind of recruitment. Response quote was 20.2% in Stade, 16.9% in Vechta and 22% in Ladbergen (total 19%). Examination results were average compared to stationary recruitment centres.

In summary, response and performance of examinations were very satisfactory. Cooperation with local health authorities proved to be the optimal solution regarding not only accommodation but also acceptance in the population.

2.8 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.

2.9 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.

2.10 Research and progress for application of epidemiologic methods

Diverse methods of modeling and analysis of veterinary epidemiologic data will be examined. Data are derived from consultation sessions of the institute and include general modeling as well as special use of logistic regression, cluster analysis and contingency tables analysis.

3 Training activities

The WHO-Centre VPH organises and supports training activities and scientific congresses. In 2012 following events were organized or prepared.

3.1 Seminar Veterinary Public Health: “Good animal health by minimal use of antibiotics”

Main topic of this year’s seminar Veterinary Public Health which took place on the 3rd of February 2012 in Hannover, was the question, how to reduce the use of antibiotics and still keep up good animal health. Because of the great interest, another location had to be chosen, so all 350 participants were seated in the auditorium of the University of Veterinary Medicine Hannover (TiHo). Among participants were practicing veterinarians, scientists and members of authorities as well as representatives of industry and press. An introduction into the meeting was given by Prof. Dr. Thomas Blaha of the Field Station for Epidemiology, Bakum of the TiHo. His main statement was that the effectiveness of these drugs is an important good of humankind that has to be protected in the understanding of a state duty and that measures of protection are no bargain chips for particular interests and ideological disputes. In this sense, the meeting will emphasize not only the generally accepted abidance of “Guidelines for proper use of antimicrobial veterinary drugs” but also the reduction of usage of antibiotics in livestock husbandry, to drastically reduce any exposition of bacteria with antibiotics.

Besides speakers from Germany, also Dr. Tim Petersen of the Danish ministry for agriculture and fishing and Prof. Dr. Dik Mevius of the Dutch reference laboratory for antimicrobial resistances in animals had followed the invitation. They gave an overview of the development of antibiotic use in Denmark and the Netherlands during the last years. Dr. Tim Petersen presented the "Yellow Card Initiative on Antibiotics" which was introduced in Denmark in 2010. Farmers using during nine months more than double of antibiotics than the average farmer in Denmark will be imposed with warranties (“Yellow Card”) to reduce their antibiotic use within the next nine months. If they don’t succeed, they will be stronger surveyed and advised by a veterinarian for a defined period. If the antibiotic use is then still too high, there might be more warranties (“Red Card”), like for example reduction of stocking rate. In the Netherlands a similar system was introduced in 2011, presented by Prof. Dr. Dik Mevius. Essential element of both systems is a central collection of data concerning antibiotic use, enabling farmers and veterinarians to gain an overview of their usage in comparison with other participants.

In a second block of lectures, Professor Dr. Thomas Blaha presented the results of a longitudinal study in six swine herds supervised by the surgery of Dr. Peter Veltmann, Vechta. Here a reduction of antibiotic consumption could be detected after the introduction of vaccination against PCV2 virus. At the same time the farm management played a significant role. Dr. Gerhard Kreher, Bad Liebenswerda and Dr. Stefan Wesselman, Wallhausen gave vivid examples from their practices for a successful reduction of antibiotic consumption through the improvement of housing and feeding conditions. Both emphasized the positive impact of a good immune prophylaxis. Dr. Kreher referred to the " Guidelines for proper use of antimicrobial veterinary drugs " of the Federal Chamber of Veterinary Surgeons as a good basis to achieve a reduction of these drugs. Other measures outlined by Mr. Wesselmann, were consultation by the veterinarian and the maintenance of high standards of hygiene and good structural substance of the stables. In addition, he spoke about problems in the alternative pig keeping. The infection pressure is here increased compared to conventional pig keeping by the continuous occupancy, increased contacts of the animals in pens and the use of hard-to-clean litter, which necessitates the use of antibiotics. At the same time, producers lose their label recognition the case of multiple treatments with antibiotics. Therefore, prophylactic measures are particularly important here.

Results of a study documenting the use of antibiotics were introduced by Prof. Dr. Marcus Doherr of the Veterinary Public Health Institute of the University of Bern. There, the records of farmers and veterinarians were compared. The routinely recorded data were incomplete and even in spite of prior

instructions, only 68% of the treatments were found both in the records of the veterinarian as well as in those of the farmer. To improve data quality, Prof. Doherr recommended a standardized, electronic data collection with proper instruction and motivation of the user.

In his presentation, Dr. Arno Piontkowski, NRW Ministry, presented the results of a survey of data from the examination of slaughtered poultry in North Rhine-Westphalia, which took place from February to June, 2011. As a result, 96.4% of acquired broilers came from farms where antibiotics were used at least once. Mr. Piontkowski introduced the legal basis of antibiotic treatment and impressively described the difficulties that arise for farmer and veterinarian in some situations. He called for better disclosure of the data and an evaluation of the 'outputs' of resistant bacteria from livestock.

Dr. Roswitha Merle introduced the concept of the study VetCAb (detection of antibiotic use in farm animals). This project, carried out jointly with the Veterinary Faculty of the University of Leipzig, serves the assessment of antibiotic use in Germany for monitoring purposes. Here, data are collected from a representative sample of farms directly or through veterinarians. Using the so-called “treatment frequency” it is described, on how many days an animal was treated on average in a time interval (depending on the species, a year or a fattening period) with an agent. The recording is carried out with exact documentation of the used agent and against the background of the treated number of animals as well as the veterinary indication. In the current pilot study representative data will be collected on antibiotic use at regional level. Results are expected for year 2012/2013.

The animal treatment index (TBI) presented by Dr. Meemken also expresses the average frequency of treatment of animals and is a parameter to evaluate the health of slaughtered animals. It was used in various production groups for fattening and breeding pigs and evaluated regarding its informational value to animal health in combination with mortality and frequency of diagnostic organ findings.

To conclude the event, Dr. Annemarie Käsbohrer, Federal Institute for Risk Assessment, gave an outlook on current and future activities to reduce the use of antibiotics and to ensure consumer protection. Focus will be here on monitoring and research regarding recording and use of antibiotics and as well as monitoring emerging resistances in the food chain and the population. Based on this the risk assessment results in courses of action and management measures like for example a proper use of antimicrobial agents, the prevention of infections and their spread and the development of new drugs or alternatives. The goal is to maintain the future efficacy of antibiotics.

In the discussion it was emphasized that in the usage and the guidelines also the indication for the treatment must be considered. In summary, the call for reduction of the use of antibiotic drugs in animal husbandry is accepted beyond all professional and political boundaries. Besides the pure consumption quantities however, also the animal health as well as microbiological and pharmacological aspects should be involved in the development of concepts.

As part of the event the Konrad Bögel Award for outstanding work in the field of veterinary epidemiology and veterinary public health was awarded for the second time this year. The award winner Dr. Heiko Nathues, Royal Veterinary College, London, was honored for his PhD thesis entitled "Influence of Mycoplasma hyopneumoniae strain variation, environmental factors and co-infections on Enzootic pneumonia in pigs". He finished his work in 2011 at the University of Veterinary Medicine Hannover.

3.2 Training Courses Epidemiology - Biometry 2012

Courses were held in February and March 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 days of teaching: “Descriptive epidemiologic methods”, “Analytic epidemiologic methods”, “Control of animal diseases and examples” and “Evaluation of diagnostic tests”.

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 "Applied Animal Disease Control with the examples of current animal disease" the main components of animal disease surveillance were developed using the example of avian influenza, classical swine fever, BSE, rabies and other diseases. Besides the basics of animal disease surveillance and the calculation of required sample sizes for a statistically reliable statement also the assessment of diagnostic tests and the use of software such as geographic information systems (GIS) and the diseases messaging software (TSN, animal health news, Friedrich Loeffler Institute, Wusterhausen) were part of the program. A half-day excursion to the Teaching and Research farm Ruthe with small group work completed the event.

In the course "Evaluation of diagnostic tests" knowledge of planning studies, sample collection, analysis and critical interpretation of the various types of studies for the evaluation of diagnostic tests were conveyed to participants. The necessary epidemiological and statistical concepts were illustrated by examples.

All courses were evaluated very positive by the participants.

3.3 DACH Epidemiology meeting 2012 “Early Diagnosis and Surveillance of Emerging Diseases”

From the 05th to the 07th of September 2012 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 (DACH) took place in Neuruppin.

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 cooperation. Main subjects of the expert conference were:

- Documentation systems and statistical evaluation
- Modeling and prognosis as well as
- Methods of early detection and surveillance in domestic and wild animal diseases.

The WHO-Centre supported the event by active contributions and participation in the planning committee.

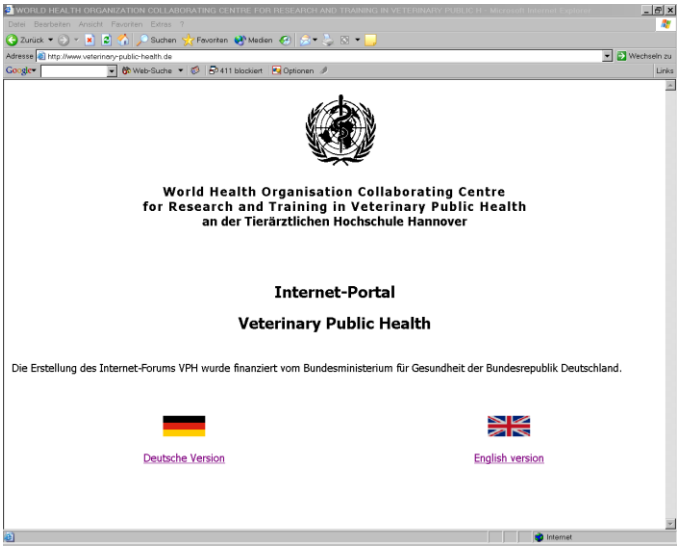
4 Webpage Veterinary Public Health

The WHO Collaborating Centre 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

Administration of the Webpage with enlargement of the link offering was continued in 2012.

Also, structure and design of the homepage are actually revised. In the middle of the year 2013 the new homepage with actual design and revised chapter structure as well as adapted contents will go online.

5 Future activities

5.1 Continuation of the current research and training activities

The WHO-Centre VPH intends a continuation or new assimilation of the following research activities:

- FBI-Zoo: Food borne zoonotic infections of humans: A network of human and veterinary medicine on research of foodborne infectious diseases - second promotion period
  - Case-control study on human sporadic salmonellosis
  - 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
- The meaning of *Clostridium botulinum* in cases of chronic disease in dairy farms
- Representative elicitation of consumption of antibiotics regarding food producing animals – sentinel study
- Interdisciplinary research consortium 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
  - Building of examinations for zoonosis research
- Feasibility study about the question if a linking-up of available epidemiologic data bases in Germany is sensible
- Research in cooperation with the republic South Africa:
  - Study about the appearance of tick populations
- 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
  - Building of a cross section concerning surveillance of resistances
- Research and development regarding the application of epidemiological methods

5.2 Meetings in Preparation

Further training seminars are planned or are in preparation:

5.2.1 Seminar Veterinary Public Health

The Veterinary Public Health Seminar deals in 2013 with the topic "Risk based surveillance and consultation – strategies of methodology and regarding contents."
The modern health monitoring and consultation in the field of veterinary medicine today uses a variety of information, which is integrated into so-called monitoring and surveillance systems (MOSS). Here for example the food inspection is carried out risk-based, following the new legal framework in Germany and in the European Union. Farms with a higher risk are sampled more often with the aim to more likely identify critical test results.

The planning and design of such a system and its use requires a variety of skills and interdisciplinary collaboration. Among these are detailed knowledge about the clinic and transmission of animal diseases, the selection of appropriate diagnostic instruments and the establishment of adequate sample material.

The Veterinary Public Health Seminar spends time on these topics in 2013 against the background of practical implementation:

- What kind of concepts of risk-based planning and evaluation are there?
- What methodological aspects need to be considered?
- What practical examples are available in various areas of animal disease control, feed or ante-mortem and post-mortem inspection, as well as in animal welfare?
- What are the prospects for development in Germany and in Europe?

5.2.2 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 2013.

5.2.3 International courses and cooperation in the field of Veterinary Public Health

In addition, the course offerings shall be expanded in cooperation with the WHO. This includes, among others

- participation in the construction of additional teaching capacity in the province Oostkap, South Africa
- development of courses on Veterinary Public Health in conjunction with the "Department of International Relations, coordinator of external relations, Latvia University of Agriculture"

5.2.4 Further Activities

Scientific organisation of the DACH epidemiology meeting "Epidemiology and documentation" from the 04th to 06th of September 2013, Hannover is planned. The workshop is entitled "Veterinary Epidemiology in practice and veterinary livestock management". Main topics are:

– epidemiology in the practice: from one animal to the clinical study

– epidemiology in animal welfare: detect and assess animal welfare

– epidemiology of zoonoses research: from animal to man

– Current methods of statistics and documentation

6 Cooperation

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

International cooperation partner:

- Veterinary Epidemiology Unit, Department of Agriculture, Belfast, Northern Ireland
- Veterinary Public Health-Institut, Bern Schweiz
- 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
- Faculty of Veterinary Medicine, Latvian University of Agriculture, Jelgava, Latvia
- European Medical Agency, London, Great Britain
- Department of Veterinary Tropical Diseases, University of Pretoria, Onderstepoort, South Africa
- WHO Collaborating Centre for Drug Statistics Methodology, Oslo, Norway
- Veterinary faculty, University Chile, Santiago de Chile, Chile
- European Centre for Disease Prevention and Control, Solna, Suede
- State Veterinary Services, Department of Agriculture, Stutterheim, Eastern Cape Province, South Africa
- University of Veterinary Medicine, Universidad Austral de Chile, Valdivia, Chile
- Austrian Agency for Health and Food Safety (AGES)
- University of Veterinary Medicine, Vienna, Austria
- Vetsuisse-Faculty of the University Zürich, Switzerland

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
- 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
- Leibniz Institute for Prevention Research and Epidemiology - BIPS GmbH
- Medical authority of Stade
- Medical authority of 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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