

WHO MEDITERRANEAN ZOOSES CONTROL CENTRE



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NOTES OF THE EDITOR

Animal infectious diseases, and particularly zoonoses, may negatively affect, directly or indirectly, the public health quality of life. Diseases of farm animals may reduce their production and reproduction capabilities, shorten their lives and decrease availability of food for humans. Constraints and impediments are, also, created on animal movements and trade. The evaluation of these consequences and the interventions available towards preventing or minimizing such impacts are discussed in an article by *Prof. G. Battelli*.

Rabies, although a preventable zoonosis, is known to be frequently fatal. This is due to ineffectiveness in its control and lack of public awareness, particularly in the developing countries. In an article digested from "*Emerging Infectious Diseases*", by *P.G. Coleman, E.M. Fèvre and S.C. Cleaveland*, a methodology for assessing the impact of this disease on public health is suggested.

It is known that food plays a major role in the epidemiology of enteric diseases. The need to develop and expand appropriate food safety measures and education to protect public health is evident. In a concise article, reprinted from the *WHO Bulletin*, *Dr F.K. Käferstein* highlights one more aspect of this issue. On the other hand, contamination of food by biological and toxic agents is the cause of a worldwide major problem: foodborne diseases; the situation presently existing in the Mediterranean and Middle East regions, together with the actions suggested to undertake, are described by *Dr S. Gelders*.

The emergence of communicable diseases, among which the zoonotic ones are most important as recently appears (e.g. Rift valley fever, SARS, avian influenza), is alarming national competent authorities and international organizations. Human activities and behavior can lead to the emergence of zoonotic diseases. Among the causes are increasing demand for livestock products, low cost production systems, increasing movements of people and animals, increasing trade liberalization/globalization, new technologies etc. These factors have been discussed in an International Expert Consultation held in WHO/HQs, Geneva, on 3-5 May 2004. The main message derived from the conclusions and recommendations, published in this issue, is that inter-sectoral and inter-disciplinary collaboration, together with the integration of the relevant activities of international organizations, is crucial to ensuring that public health is not compromised.

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The 50th Session of the Regional Committee of WHO/Eastern Mediterranean was held on 29.09 - 02.10.2003 in Cairo, Egypt. Among the technical papers presented, the one on *Main challenges in the control of zoonoses in the Eastern Mediterranean region* is summarized in this issue, together with an adopted relevant Resolution emphasizing the need for intersectoral combat against zoonoses and integrated international activities and programmes. Member countries are also strongly recommended to join the MZCP.

During the first six months of this year, four major MZCP activities were performed, namely: (a) *International Training Course on Human Brucellosis Laboratory Diagnosis*; (b) *International Training Course on Animal Brucellosis Laboratory Diagnosis*; (c) *National Training Course on Intersectoral Brucellosis Surveillance*, held in Kuwait; (d) *Same activity as above* held in Cairo, Egypt. These courses were included in the activities of the MZCP Plan of Work for the years 2004-2005. More international and national training courses and workshops are expected to follow. The MZCC in Athens, Greece, is always happy to respond to the needs for technical assistance of the WHO/MZCP Member-Countries.

A. M. Seimenis

SOCIO-ECONOMIC IMPACT OF ANIMAL DISEASES AND HEALTH ACTION: SOME CONSIDERATIONS, WITH SPECIAL REFERENCE TO DEVELOPING COUNTRIES¹

Giorgio Battelli*

Animal diseases and their socio-economic impact

Animal diseases, owing to both direct and indirect damage, may negatively affect the “quality” of life and human “health”, the latter being meant not only as the mere absence of pathologies but as a state of complete physical, psychological and social well-being. The evaluation of these consequences and of the interventions capable of preventing or minimising them is therefore exceedingly important for Veterinary Public Health.

For example, diseases of farm animals may reduce their productive and reproductive capabilities, shorten their lives, and decrease the availability of food for human consumption. They may also impede trade exchanges and movements of animals, and prevent non-disease-free countries from exporting live animals and their products. It should be remembered that the illegal use of certain drugs (e.g. antibiotics, hormones) for preventive, therapeutic or growth-promoting purposes or of chemicals as food preservatives may inhibit the marketing and sale of living animals and their products, and represent a hazard to public health, with negative consequences for both producers and consumers.

Diseases and related problems may therefore exert a negative, sometimes very heavy impact on the social status of individual families and communities and on the economy of entire regions. This is especially true for those countries where technical assistance to farmers and stockholders, veterinary Services and prophylactic plans are insufficient or even absent, and where natural calamities (e.g. floods, earthquakes, drought) or man-made ones (e.g. wars, industrial disasters) create periodic or permanent emergency situations (Mantovani *et al.*, 1991).

Among the diseases of farm animals with strong socio-economic impact, special mention must be made of those included in “list A” of the World Organisation for Animal Health (OIE), such as rinderpest, foot-and-mouth disease, and classical and African swine fevers.

As for zoonoses, negative consequences include also cases of human infections, more or less justified distrust of consumers in some foods of animal origin or in animals in general, fear of possible use of zoonotic agents for war purposes or in terrorist actions. Examples are bovine tuberculosis, brucellosis, trichinellosis, BSE and anthrax. Some zoonoses are an important public health and economic problem, especially in endemic areas and in developing countries (VV. AA., 2003). Example is cystic echinococcosis in the Mediterranean Region, Latin America and Africa south of Sahara. Sometimes, human cases of zoonoses reported by mass media (often with wrong information and comments) may negatively

affect the economy of areas of very high tourist value. Furthermore, some zoonoses represent occupational hazards for certain categories of workers, especially in areas where they are highly endemic in animals and where the prevention of occupational risks is underestimated or completely ignored (Mantovani *et al.*, 1999).

Accordingly, damage caused by animal diseases may be either of strictly economic or social nature. The absence or inefficiency of multidisciplinary collaboration between Institutions and people charged with the surveillance and prevention of such diseases and with the information and health education of the general public or of the most concerned categories are themselves responsible for negative socio-economic consequences (VV. AA., 1999a).

The evaluation of damage is sometimes difficult and, for certain pathologies, the data obtained from literature must be interpreted with caution. Indeed, both quantity and type of damage depend upon such different factors as farming systems; breed of raised animals and their productive features; the market or “social” value of the living animals and/or their products; the possible concomitant presence of different pathologies; the quantity and quality of feeds; and others. The degree of difficulty is also depending on the availability (or the lack of availability) of basic (e.g. epidemiological) information necessary for evaluation. Also, regarding human infections it proves hard or even impossible to attribute a monetary value to some consequences such as death, abandon of work or loss of working days on the part of the diseased persons; the consequences for their families; the fear of contagion.

In spite of these obvious difficulties, the evaluation of the socio-economic impact of animal diseases, even if not sophisticated, proves indispensable for identifying major health problems, deciding the kind of actions to perform and the kind of resources to employ for their control or elimination.

It should be remembered that even the diseases of “pets” (a term especially appropriate in industrialised countries), especially dogs and cats, and of wild and synanthropic animals do have in many instances a significant socio-economic impact (VV. AA., 1998). Some of them (not only zoonoses but also infections not transmissible to man such as distemper) may pose serious public health problems. Examples are –in the Mediterranean region– rabies and visceral leishmaniasis. Other health problems and economic losses are associated with dog straying, which is on the increase in industrialised countries and is chiefly linked to the abandonment of animals and to the low level of collaboration and information among health services, public administrations and citizens.

¹ Annex of the paper “Multidisciplinary approach to V.P.H. Delivery System at Community Level – The past, the present and the future of multidisciplinary collaboration in VPH and expected perspectives” by Mantovani A. *et al.*, presented at the “FAO Expert Consultation on Community based Veterinary Public Health Systems”, Rome, 27-28 October 2003.

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Evaluation of health action

For many years, also in the animal health sector, a development has occurred of methodologies applicable to the evaluation of health interventions, especially of the prophylactic ones (VV. AA., 1983; Dijkhuizen and Morris, 1997; Noordhuizen, 1997; VV. AA., 1999b; Tacher, 2003). The reasons for such a development chiefly came from the need to optimise the exploitation of available resources (monetary, human, structural) and to provide decisional tools.

Evaluation types and techniques are numerous. There are, for example, evaluations that take into consideration how profits and losses associated with an intervention are shared among the single individuals; others consider how they influence economy and society as a whole. An intervention (or more alternative interventions) may be evaluated through various parameters and for different purposes, for instance to verify its/their degree of effectiveness and/or efficiency, the advancement level, the acceptance level, the social effects. Among the economic procedures frequently applied in the veterinary field, mention should be made of partial budgeting, cost-effectiveness analysis, cost-benefit analysis, decision tree analysis. Recently, the use of mathematical models has been introduced to compare different intervention strategies aiming at controlling a specific health problem. These models, however, are hardly applicable due either to the lack of accurate qualitative (epidemiologic and economic) data or to their insufficient number. In some cases, therefore, such models must be evaluated with due caution.

Regarding the evaluation of costs and benefits of an intervention, e.g. a control programme of a disease, their identification and quantification may sometimes prove complex and/or “twisted” when one intends to estimate all costs and benefits, especially the secondary ones, when the intervention itself is complex and associated with a high degree of uncertainty, or when benefits are essentially social or hard to calculate/predict. In addition, there are different decisional criteria for the evaluation of the results of a cost-benefit analysis, such as the net present value of the benefits, the benefit/cost ratio, the internal rate of return.

It is therefore desirable that, whatever the type and technique of evaluation of a health (or other kind of) intervention may be adopted, the parameters involved and the information sources should be always indicated in detail and the limits of the evaluation itself clearly stressed.

Remarks

The evaluations of the socio-economic impact of animal diseases and of health actions put into effect to control or eliminate them often prove difficult. Their validity strongly depends, besides on the specialised skills of those performing them, also on an efficient information system (not only sanitary) capable of providing reliable, real data and minimising exclusively personal evaluations. Sophisticated analyses not based upon qualitatively and quantitatively sufficient data may prove useless and give a false impression of precision.

Multidisciplinary collaboration is therefore prerequisite to activate adequate information systems, to follow them up and possibly modify them.

In spite of restraints, the socio-economical evaluation of the consequences of a health problem and of the interventions under way or still to be made to solve it proves indispensable to optimise the use of available resources and to possibly modify the strategies. Evaluations taking into account only few but sufficiently accurate and time-verifiable parameters and data, and based on correct methodologies, may assist in reaching the objective.

Many countries, especially the developing ones and those with unstable socio-political situations, generally do not have technicians and financial means (and health organisation) enabling them to perform the collection and analysis of extremely detailed (e.g. epidemiological) information. As a consequence, they must (should) work out socio-economic and health indicators based on rather easily obtainable data. This is also the reason why the international standardisation, once personally recommended (Caporale *et al.*, 1981), of the methods for evaluating disease-associated damage, interventions, and the type and number of data to be analysed is now seen with scepticism about its feasibility and usefulness.

In addition, evaluations should always allow for the socio-economic and political situation of the country or reference area. The “weight” and value of the different parameters and data and of the results of the analyses (e.g. costs, economic benefits, social benefits, interest rate of investments) must be evaluated by people who do know the situation itself and can more precisely assess the impact of diseases and programmes of intervention on the agricultural-zootechnical activities, on the economy of the concerned area, and on the society as a whole.

If necessary, a technical-scientific support to evaluations might be offered by experts working for International Agencies such as FAO, WHO and OIE, or on behalf of non-governmental Organisations acting in the field of international co-operation.

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ESTIMATING THE PUBLIC HEALTH IMPACT OF RABIES

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Rabies is a fatal disease that is considered a reemerging zoonosis throughout much of the world (1, 2). Rabies satisfies all the World Health Organization (WHO) criteria for diseases that are a priority for control (3) and, unlike many other emerging zoonoses (such as West Nile virus), safe and effective animal and human vaccines are widely available for its prevention and control. Despite this, rabies remains a neglected disease that is poorly controlled throughout much of the developing world, particularly Africa and Asia, where most human rabies deaths occur (3,4). A major factor in the failure of rabies control is the low level of political commitment, partly arising from a lack of quantitative data on the true public health impact of the disease (3) and the cost-effectiveness and cost benefits of controlling it (5).

The disability-adjusted life year (DALY) is a standardized, comparative measure of disease impact developed to assess the relative impact of different diseases across different settings and at different stages of economic and public health development (6). The DALY is a combination of the years of life lost (YLL) due to premature death and the years of life lived with a disability (YLD). DALYs have been used to organize disease control in the health sector (7) because interventions can be prioritized on the basis of their impact in reducing disease and on the cost-effectiveness of the intervention. Most emerging human diseases are zoonotic (2); while DALYs have been estimated for some of these, such as leishmaniasis and trypanosomiasis, a DALY score has never been determined for rabies, which has failed to be considered in any of the annual global disease burden estimates made by WHO (8).

Country-Level Estimates

A DALY estimate, which can be used to rank diseases globally, can also be used to prioritize health interventions at a country level. As a result of widespread problems of data quality and underreporting of rabies, a new approach has recently been adopted in Tanzania to estimate human rabies deaths by using a decision-tree method based on the incidence of human dog-bite injuries. Such bites are reported routinely and more reliably than rabies cases themselves (9). Age-specific human rabies incidence figures calculated from details data collected in the Mara Region (9), northern Tanzania, were extrapolated to provide a country-level rabies DALY estimate of 42,669 for all of Tanzania in 2000 (Table 1).

This example demonstrates how a country-specific mortality and DALY estimate can be calculated by using quality data collected from a specific study site. Indeed, the same method used to estimate the annual number of human rabies cases (9), and thus DALY impact, in Tanzania may be applied across sub-Saharan Africa to estimate the regional level of underreporting relative to officially reported figures. However, care needs to be taken when extrapolating from small-scale studies to

TABLE 1. Estimates of the DALY impact of human rabies in Tanzania in 2000^{a,b}

Age group (y)	Rabies cases
0-4	10,986
5-14	14,504
15-44	13,876
45-59	1,497
60+	1,807
All ages	42,669

^a DALY, disability-adjusted life year.

^b The DALY estimates were based on the estimated incidence of human deaths for Tanzania as reported by Cleaveland et al. (9).

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regional and national levels. For example, in Tanzania, country-level estimates of human rabies deaths are likely to be affected by regional variations in rabies incidence in different dog populations (which are the main source of human rabies exposures), availability of postexposure treatment, and levels of knowledge about rabies, which will affect the probability of seeking treatment in hospitals. In addition, knowing the scale of DALYs lost due to a single disease in isolation is not helpful to decision makers prioritizing interventions with limited funds. Better country-level estimates for other diseases also need to be determined. However, this study is a first step.

When these age and sex distributions of patients are used, an annual impact of 35,000 human rabies deaths equates to approximately 1.16 million DALYs. This estimated DALY impact is conservative because it considers only the YLL component and does not take into account YLDs resulting from the illness associated with the trauma of animal bites and postexposure therapy, if available.

A total of 1.16 million DALYs places rabies just behind trachoma, slightly above onchocerciasis, and well above dengue. This estimate shows rabies to be an important disease in terms of DALYs if the WHO figures reflect the true public health situation. However, unlike other zoonoses in the DALY ranking system, human rabies is fully preventable by disease control aimed at the animal reservoir. All 1.16 million DALYs could, in theory, be averted through veterinary interventions.

Although the above DALY figure gives a useful indication of the global DALY for rabies, the true global incidence (and hence DALY) of human rabies is difficult to assess because rabies is often inconsistently reported. For example, the 1996 World Survey of Rabies (10) recorded a total of 33,212 rabies deaths world-wide (of which 30,000 were reported by India), while only 1,326 were reported in 1991 (when India reported only 34 (13)). Although rabies is known to be grossly underreported in most developing countries, the degree of underreporting is difficult to assess. However, recent studies from Tanzania indicate that human rabies deaths may be up to 100 times higher than officially reported (9), with an estimated incidence of human rabies similar to that recorded during active surveillance studies (14). More country-level estimates of under-reporting, using methods similar to that developed for Tanzania (9), need to be conducted to provide more reliable figures of the true global scale of human rabies. However, even if the 35,000 estimated human rabies cases were more than double the true global figure, the DALY impact attributable to rabies would still be comparable to that of dengue fever, which is recognized by TDR as a major public health threat throughout the tropics.

Conclusions

The value of providing a quantitative estimate of disease impact due to rabies, even with the inaccuracies of existing case data, should not be underestimated. Rabies is often perceived as a rare or insignificant disease of humans in developing countries; this perception

has been a major factor hampering the development of disease control initiatives. Furthermore, control of rabies is often seen as the responsibility of veterinary authorities, but demonstration of the public health importance of rabies and the benefits of disease control to the public health authorities (both in terms of DALYs saved and reduced costs of postexposure treatment) will encourage involvement of the health sector in control efforts. Integration of medical and veterinary sectors is likely to be crucial for effective disease control, as shown by the success of recent rabies control programs in Central and South America, where medical authorities have taken a lead role in implementing mass dog vaccination programs.

This first estimate of a global DALY score for rabies together with the Tanzania-specific example, indicates that the disease exerts a considerable public health impact, exceeding other prominent diseases that currently achieve a higher priority for disease control. Furthermore, the human disease effects of rabies could be eliminated through vaccination of animal reservoirs by using technologies and methods that are available and accessible.

Source: *Emerg. Infect. Dis.* 10(1) 140-141, 2004.

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FOOD SAFETY AND FOODBORNE DISEASES

A. FOOD SAFETY: THE FOURTH PILLAR IN THE STRATEGY TO PREVENT INFANT DIARRHOEA

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Public health historians will hopefully clarify one day why the public health community has taken so long to recognize the link between contaminated food and diarrhoea – particularly infant diarrhoea – and why it has taken so long to integrate food safety into prevention strategies.

Over two decades ago, WHO recognized that infant diarrhoea was a critical public health problem (Snyder JD, Merson HMH. *Bulletin of the World Health Organization* 1982; 60:605-13) and that the epidemiological link between contaminated food and the resulting diarrhoea had been established and confirmed [*The role of food safety in health development. Report of a FAO/WHO Expert Committee on Food Safety*. Geneva: World Health Organization 1984, (WHO Technical Report Series, No 705); Motarjemi Y *et al.* Contaminated weaning food – a major risk factor in the cause of diarrhoea and associated malnutrition. *Bulletin of the World Health Organization* 1993; 71:79-82]. The microbiological evidence was even more striking: diarrhoea is caused by pathogens that enter the body through the mouth, mainly via food or drinking-water. Food, however, contains substances that are not only nutritious for people but that also support the growth of bacterial pathogens. Herein lies the crucial difference between food and water in terms of what happens to bacteria. In water, bacterial pathogens may survive for some time but they will not increase in number. However, in many foods, and most importantly in complementary (weaning) foods, the growth of pathogens is well documented. Thus, even if food contained an originally insignificant bacterial contamination, the pathogens may multiply within a few hours to reach the minimum infective dose that is required to cause disease, particularly if food is stored at ambient temperature (between 20°C and 40°C) a situation frequently observed in developing countries. A substantial number of cases of acute diarrhoea is caused by microbiologically contaminated food, and the resulting malabsorption, leading to a reduced nutritional status of the patients, is especially serious for malnourished people.

On the basis of the available epidemiological and microbiological evidence, WHO concluded that food plays a much more significant role in the epidemiology of enteric diseases than previously thought, and it advocated the need to develop appropriate food safety measures to complement the three traditional strategies for preventing infant diarrhoea – namely, promotion of breast-feeding, vaccination against certain childhood diseases and improvements in the communities' drinking-water supply and sanitation. This advocacy

was supported by data on infant diarrhoea morbidity. Although mortality had been successfully reduced annually from around 5 million deaths in the early 1980's to under 2 million deaths in 2000 by the widespread use of oral rehydration salts, morbidity figures have remained virtually unchanged during this period.

Although one could point to various reasons for the failure to reduce morbidity rate, it is clear that the advocacy to add food safety as the fourth pillar in the strategy to prevent infant diarrhoea is, at best, minimal. In my view, there is a lack of collaboration among different people working in the health sector, which originates from competing interests (e.g. case management vs preventive measures) as well as from competition for the limited resources available. Ministries of health have not, on the whole, established a mechanism that provides co-ordination of programmes like nutrition or control of diarrhoeal diseases, particularly if there are different professional disciplines involved, such as physicians, nutritionists, food safety specialists, sanitary engineers and others. I have also noticed that paediatricians and clinical microbiologists are still largely unaware of the role of food safety in preventing infant diarrhoea, and the need to assure safe complementary (weaning) food is often not considered, much less advocated. This also leads me to question the quality of training they receive. For example, I have not yet seen an undergraduate medical curriculum that includes food safety and its role in health and disease. This is, unfortunately, even true for curricula taught in Schools of Public Health. Likewise, nursing schools and the education of nutritionists do not cover food safety. The attempt, in 2000 and 2001, to add food safety to the Master of Public Health curriculum of the School of Public Health at Yale University (New Haven, USA) failed because of lack of money. Recently, the apparent general lack of concern about food safety was exemplified during a discussion I had with the director of the microbiological laboratory of a paediatric clinic in a developing country, where I was told that he and his colleagues have never asked themselves how the pathogens that cause diarrhoea get into the child's body.

On the basis of the sad reality regarding food safety, WHO published a fact sheet in 1993 on this topic (*Facts about Infant Feeding*, issue No 3, April 1993), in 1996, it published *Basic principles for the preparation of safe food for infants and children* (WHO/FNU/FOS/96.6) and in 1999 it published the book *Basic food safety for health workers* (WHO/SDE/PEH/FOS/99.1). However, the results of implementing the guidance contained in these texts are not yet visible.

The sources of food contamination are diverse. They include nightsoil, polluted water, flies, animals and pets, unclean utensils and pots, dust and dirt. Raw foods are frequently a source of contaminants because

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some might naturally harbour pathogens or come from infected animals. Food handlers may be the source of contamination either as carriers of pathogens or through poor hygienic practices. However, a careful analysis of foodborne diseases has shown that two main errors in food preparation increase risk, because they permit the survival and/or growth of pathogens to disease-causing levels. These errors are the preparation of food several hours before consumption, combined with its storage at temperatures that favour growth of pathogenic bacteria, and, in some cases, the formation of toxins; and insufficient cooking or reheating of food to reduce or eliminate pathogens. If these two practices are avoided most contaminants in food can be controlled, despite the numerous sources of food contamination, and a considerable number of foodborne disease episodes can be prevented.

It is difficult to understand why such a simple and inexpensive intervention that has substantial health outcomes is not strongly advocated by the public health community. It is also difficult to understand why health care providers don't see the treatment of institutionalized cases and outpatients with diarrhoea as creating opportunities for educating patients and their families/caretakers on why diarrhoea occurs and how it can be prevented.

Does history repeat itself? Ignaz Semmelweis, 150 years ago, proved that puerperal fever was a form of septicaemia and that this could be prevented by the simple measure of thorough hand-washing by obstetricians. But it took many years and perhaps thousands of deaths until this simple intervention was accepted by Semmelweis' colleagues. With regard to food safety and the prevention of infant diarrhoea, at least 20 years have already been lost.

Source: *Bull. Wrlld Hlth Org.*, 81(11)842-843, 2003.

B. MICROBIOLOGICAL CONTAMINATION OF FOODS – CURRENT STATUS AND NEED FOR ACTION IN THE MEDITERRANEAN AND MIDDLE EAST REGIONS¹ *by Susanne F.A.M. Gelders**

Introduction

Following the occurrence in the recent past of a number of extremely serious large-scale food emergencies, policymakers and consumers in a large number of countries are re-evaluating the existing food safety strategies. Many of these food emergencies have involved more than one country, such as the BSE-crisis, the dioxin contamination, and the recent Foot-and-Mouth Disease episode. Issues such as the increasing application of biotechnology in food production, and the new climate

in world trade and the new challenges this implies, require a comprehensive review and overhaul of current national food control systems. A future goal in food safety should be to develop sustainable, integrated food safety systems for the reduction of health risk along the entire food chain, from the primary producer to the consumer.

On a global level, food safety is becoming an increasingly important public health issue, with increased focus on the inclusion of consumers and consumer associations in decision-making processes. Last year, it was noted, among other topics, in the Resolution on food safety of the 53rd World Health Assembly (WHA, one of WHO's governing bodies) that food-borne diseases seriously affect peoples' health and well being, and that these diseases have economic consequences not only for individuals but for communities and countries as well. The work of Codex Alimentarius was recognised as being important for the protection of health of consumers. For future action, the Member States were urged by the WHA to increasingly integrate food safety matters in information programmes for consumers and schools, and to initiate culture specific health and nutrition programmes for food handlers and producers and consumers. In addition, outreach programmes have to be developed to involve the private sector in order to improve food safety at the consumer level, this in collaboration with consumer associations and the food industry in order to increase awareness regarding good and ecologically safe farming and good hygienic and manufacturing practices.

Food-borne diseases

Food-borne diseases affect all of us. We expect our food and meals to be enjoyable, nutritious and safe, but regretfully a number of different contaminants and natural constituents in foods can cause food-borne illnesses, which can either be acute or chronic.

The microbiological contamination of food items has been a source of concern for mankind since the early days, when foods had to be consumed immediately because most foods were perishable and preservation techniques were non-existent. Throughout history, often haphazardly, the preservation techniques of perishable foods have developed to such an extent, that microbiological spoilage, initially the reason for the search for preservation techniques, became less of a priority issue, and was overtaken by other, at that moment in time seemingly more pressing concerns.

Chemical food contamination is a field of research that greatly benefited from the relatively recent development of more and more refined analytical techniques. WHO, in partnership with FAO, has been addressing the issue of chemical contamination for over 40 years, through risk assessment bodies such as the joint FAO/WHO Expert Committee on Food Additives, JECFA, and the Joint FAO/WHO Expert Meeting on Pesticide Residues, JMPR. The assessments are the basis for international guidelines and national regulations.

¹ Paper presented at the AFC/WHO/FAO Intercountry Workshop on Emerging Food Safety Issues and Consumer Protection, Amman, Jordan, 28-30 October 2001.

* World Health Organization, Geneva, Switzerland.

Microbiological contamination

The realization that microbiological contamination was not being addressed adequately is rather recent, in spite of the fact that the link between microorganism and spoilage in food and food-borne disease is more obvious than the link between a chemical contamination and illness from food. Since 1995 WHO and FAO have been developing a framework for risk analysis of food-borne hazards, and recently the initiative in microbiological risk assessment, similar to the chemical risk assessment exercises, has been started. A list of the most important food-borne pathogenic microorganisms was developed, and a number of pathogen/commodity combinations were chosen for risk assessment work.

The actual sources of microbiological contamination can be classified as follows:

- **Bacteria:** such as: *Staphylococcus*, *Salmonella*, *Listeria*, *Clostridium*, *Shigella*, *Brucella*, *Campylobacter*, *Vibrio*, *Streptococcus*, *Escherichia*, *Bacillus*, *Yersinia*;
- **Protozoa:** such as *Amoeba*, *Cryptosporidia*, *Giardia*, *Toxoplasma*;
- **Parasites:** such as *Trichina*, *Taenia*, *Ascaris*, *Trichuria*, *Fasciola*;
- **Viruses:** such as Hepatovirus, Norwalk virus, Norwalk-like virus, Rotavirus, Poliovirus, Astrovirus; and
- **Fungi and their toxins:** such as Mycotoxins, Aflatoxin, Ochratoxin, Vomitoxin, Patulin, and Zearalenone. (Classification of these toxins is a debatable issue, the source for the toxin is biological, and the active compound in its purest sense is a chemical.)

The main reasons for the occurrence of food-borne diseases are the lack of overall quality control systems, and the lack of scrupulous attention to food hygiene from farm to table. Most food-borne illness agents enter the food chain via:

- Primary contamination: Infected animals or plants;
- Secondary contamination:
 - *Organisms transmitted by insects or rodents or any other animal;*
 - *Contact with polluted environment (water air, soil, container, etc...);* and
 - *Non-observance of good agricultural, good hygiene and good manufacturing practices.*

Detection of food-borne disease, and subsequently the identification of the cause of that disease, is often a difficult process. Underreporting is common, food-borne diseases are often perceived as mild, self-limiting diseases, as a normal occurrence. Also, some food-borne illnesses like diarrhoea and cholera are traditionally seen as water-borne diseases. The reported incidence of food-borne diseases worldwide is only a very small proportion of the real incidence. Data from different parts of the world are not necessarily comparable, which makes a global estimate of the food-borne disease burden rather difficult.

Several worldwide surveys of food-borne disease reports, including outbreak investigations, show that microbiological contamination is a major food safety issue. The presence of food-borne pathogens in a country's

food supply affects the health and well-being of the local population, and in addition presents a potential for spread to those who visit that country as well as for all those who consume food imported from that country.

In addition to the physical suffering of the patients, food-borne diseases have considerable economic consequences. These are due to food losses, decreases in food exports, loss of time at work, cost of hospitalisation, and decreased revenues from tourism industry. These consequences seriously affect the local economy and eventually public expenditure, thus perpetuating and aggravating the burden of the diseases.

The lengthening of food chains, and the increase of international trade and travel give new opportunities to pathogens to cause and spread diseases further. Despite our increased knowledge of the sources of the organisms, and the factors contributing to the disease, there seems to be little decrease in numbers affected, and the socio-economic impact of food-borne diseases remains very high. One reason given for the fact that food control is under-budgeted is because surveillance is inadequate and thus the extent of the burden of food-borne disease is not fully understood by policy makers. Another reason is that a consistent and coordinated effort by industry and government is required, for instance by the application of quality assurance mechanisms such as good manufacturing practice or HACCP, and consistency and coordination regrettably are difficult goals to attain.

In developing countries it is estimated that more than 1.5 billion episodes of diarrhoea occur per year in children under the age of 5 years, causing 3 million deaths per year. It is not clear to what extent contaminated local water supplies are responsible for these diarrhoeal diseases, and to what extent food borne diseases contribute to the total incidence figures. In industrialized countries, food borne infections with for instance *Salmonella*, *Campylobacter* or enterohaemorrhagic *E. Coli* do show an increasing trend, and it is estimated that up to 10% of the population in these countries suffer annually from food-borne diseases. Actual figures for food-borne disease incidence regrettably are very sparse.

The impact of food-borne diseases is being recognized as a major concern in industrialised countries. The extent of the problem in countries where urban growth is high, and where public health infrastructure is already overburdened, and in rural areas, where the contamination of drinking water is common can only be guessed at.

With increased travel, for instance tourism, immigration from developing countries into developed countries, and increased international trade, surveillance becomes an issue of increased importance, and the collection of good quality data a priority issue.

Microbiological contamination of foods – Issues in the Eastern Mediterranean/Near East Region

The occurrence of food-borne diseases in the region is accepted as a fact, however disagreeable, of daily life, and often disease episodes go unreported. Medical attention is only sought at a late stage, when the disease has become really debilitating, and treatment must be

more drastic in order to save lives compared to if treatment would have been initiated earlier.

Certain regional or local habits, such as the consumption of raw and cooked salads, and certain specific food preparation techniques, such as the preparation of cheeses from raw milk, enhance the opportunity of microbiological contamination and thus the spread of food-borne diseases.

The fact that food-handling practices are not optimal, often the result of a lack of knowledge of the food handler, has on a regular basis been reported as a cause for high incidence of food contamination and food-borne diseases. Good manufacturing practices and quality assurance systems such as HACCP have been introduced in all countries of the region, but are not applied widely. Street food vending is an important food source for a large part of the population, and often the vendors have little or no formal education in food handling practices.

Most countries of the region have no reporting mechanism in place for food-borne diseases, at least not one that communicates with the food safety authorities, and this results in the fact that the incidence of food-borne diseases is often not reflected in the setting of any food safety strategies.

Conclusion

Microbiological contamination of foods is an area that requires immediate increased attention in the region.

Proper education of all kinds of food handlers, be they professional or not, along with the assurance of effective application of that education are needed to prevent food contamination and proliferation of food-borne illness organisms at all levels of the food chain. Better appreciation of good agricultural, storage, manufacturing and marketing practices as well as quality assurance systems is urgently needed. Training in food handling and food hygiene must be given high priority, and there is a clear role for all key players, including consumer organisations, in food safety in this issue.

Improved food-borne illness data collection mechanisms should be developed to enable better identification of the extent and the location of problems, and of effective ways to solve them. Surveillance and data collection of both disease and contamination should become part of an ongoing national surveillance programme.

Increased participation of countries of the region in international microbiological risk assessment (for instance the recent collection of data for the Joint FAO/WHO Expert Consultation on Risk Assessment of Microbiological Hazards in Foods, where data and studies in the subject area of 'Hazard identification, exposure assessment and hazard characterization of *Campylobacter* spp. in broiler chickens and *Vibrio* spp. in seafood' were requested.) will lead to the development of increasingly 'region-relevant' guidelines.

WHO/FAO/OIE JOINT CONSULTATION ON EMERGING ZOOONOTIC DISEASES

Geneva, Switzerland, 3-5 May 2004

The meeting brought together international experts on public health, veterinary science, microbiology, ecology, conservation biology, disease modelling and forecasting. It aimed to identify factors which lead to the emergence of zoonoses such as SARS and avian influenza and to improve surveillance systems for their monitoring and control.

Transmission of diseases from animals to humans depends on numerous factors; among them ecological changes resulting from human activities represent the most important.

The significance of co-ordinated actions across the sectors and integration of strategies and tools among international organizations for the prevention and control in zoonoses was emphasized.

The conclusions and recommendations adopted are as follows:

Conclusions

- Emerging zoonotic diseases are a global and regional issue of increasing importance and their current upward trend is likely to continue.
- Human activities and behaviour often drive the emergence of zoonotic diseases; these include food and agriculture practices, deforestation and

urbanization of virgin areas, globalization of trade of live animals including wildlife and animal products, and climate changes.

- Co-ordination between the public health and veterinary sectors in responses to zoonotic diseases emergence was emphasized.
- Identifying what zoonotic diseases may arise in the future is extremely difficult, due to the multifactorial and constantly evolving nature of the risk factors involved.

Recommendations

- New mechanisms of surveillance and response are required, using new tools (satellite remote sensing data, analytical molecular epidemiology,) and bringing together different disciplines (medical, veterinary, population biology, information technology, diagnosis).
- Integrating the early warning and alert systems of international organizations (WHO, FAO and OIE) to facilitate early detection of potentially linked animal and public health events.
- Integrating animal and human health data at national and regional levels, including an intersectoral committee for zoonosis preparedness and control.

50th SESSION OF THE WHO/EASTERN MEDITERRANEAN REGIONAL COMMITTEE

Cairo, Egypt, 29 September - 2 October 2003

The Regional Committee of the WHO/Eastern Mediterranean Region convened in its 50th Session, in Cairo, Egypt from 29 September to 20 October 2003. Representatives from 21 States as well as International, Regional and NGO's attended the Session.

Among the Technical Papers presented, the following is of particular general and regional interest. It is entitled: *Main Challenges in the Control of Zoonotic Diseases in the Eastern Mediterranean Region*. It was presented by Dr R. Ben Ismail, WHO/EMRO, Regional Adviser, Tropical Diseases and Zoonoses. He said that the significance of zoonotic and related foodborne diseases was growing in the Eastern Mediterranean Region. In addition to causing human morbidity and mortality, such diseases hampered agricultural production, decreased availability of food and created barriers to international trade.

Brucellosis, rabies, salmonellosis and hydatidosis, he noted, were among the main zoonotic diseases in the Region. In the past two decades, other emerging and re-emerging zoonotic diseases had also acquired a particular significance. These included Rift Valley fever in the Arabian peninsula and Egypt, the New World screwworm (*Cochliomyia hominivorax*) in the Libyan Arab Jamahiriya, and zoonotic cutaneous leishmaniasis in almost all countries of the Region. Common to the emergence of all these diseases were changes in animal production practices, climate patterns and demographics and globalization of the food industry.

He pointed out that while control of zoonoses constituted an important health matter, many factors involved in prevention and control of zoonotic infections could not be addressed by the health sector alone. Success in reducing the public health significance of zoonotic diseases greatly depended on the level of cooperation between medical and veterinary sectors in diagnosis of zoonoses, exchange of information, organization of shared surveillance systems, common training of staff and creation of community awareness: High-level commitment and the ability of national programmes to mobilize the necessary resources and to collaborate closely with other relevant sectors were needed in order to cope with the common challenges in the control of zoonoses.

Dr Ben Ismail concluded by saying that strategies for strengthening zoonosis prevention and control in the Region needed to focus on enhancing political commitment, identifying the most appropriate control interventions and ensuring collaboration among all relevant stakeholders. Raising awareness among decision-makers and policy-makers on the burden of zoonoses in humans and animals would assist in securing political commitment and financial support for zoonosis control programmes. Cost-effective control tools appropriate for use in countries of the Region, such as animal rabies vaccines suitable for arid climates, needed to be

developed or adapted. Effective intersectoral collaboration must be underpinned by the development, in each country, of a common multisectoral national plan for prevention of zoonoses in humans and animals. To implement such strategies, multisectoral coordination structures with responsibility for zoonosis control should be established at national level. In addition, he said, information on the financial burden of zoonoses should be collected, analysed and used to enhance political support, and partnerships with relevant organizations should be strengthened at regional level.

The Regional Committee adopted the following relevant **Resolution** which reads as follows:

REGIONAL COMMITTEE FOR THE EASTERN MEDITERRANEAN RESOLUTION EM/RC50/R.11, October 2003 *Fiftieth Session, Agenda item 8 (c)*

MAIN CHALLENGES IN THE CONTROL OF ZOOONOTIC DISEASES IN THE EASTERN MEDITERRANEAN REGION

The Regional Committee,

Having reviewed the Regional Director's report on the main challenges in the control of zoonotic diseases in the Eastern Mediterranean Region,

Recalling resolution EM/RC39/R.5 on zoonotic diseases;

Recognizing that a number of endemic and epidemic zoonotic diseases, particularly rabies, brucellosis, cystic hydatidosis, Rift Valley fever and leishmaniasis, and foodborne zoonotic infections occur in the Region, and that new and emerging zoonoses and related foodborne diseases represent a threat to human and animal populations of the Region and lead to significant economic loss;

Recognizing also that efficient surveillance and control of zoonoses are the responsibility of both the public health and veterinary sectors and that intersectoral collaboration is essential.

Acknowledging the significant contribution of the Mediterranean Zoonoses Control Programme to the control of zoonoses in the Region;

1. Requests Member States to:

- 1.1 Ensure the establishment of an empowered national intersectoral committee charged with responsibility for co-ordinating and advising on surveillance and control of zoonoses;
- 1.2 Assess the national burden of zoonotic and related diseases, especially foodborne diseases and prioritize the diseases according to their impact on morbidity and the national economy;
- 1.3 Promote active community involvement in the implementation of zoonoses prevention and control activities through targeted public information materials, health education and community partnerships;

- 1.4 Update veterinary public health and health professions educational curricula according to current knowledge and practical needs for control of zoonotic diseases, with emphasis on multisectoral approaches;
- 1.5 Promote and support multidisciplinary research on new approaches to control zoonotic diseases, especially foodborne diseases, and health system research to strengthen intersectoral collaboration and co-ordination;
- 1.6 Cooperate in the prevention of zoonotic diseases, especially foodborne diseases and the exchange of information regarding any rejection by a State of a food shipment of confirmed infectiveness.

2. **Calls** upon Member States to participate in the Mediterranean Zoonoses Control Programme;
3. **Requests** the Regional Director to:
 - 3.1 Strengthen WHO's partnership with regional and international organizations, such as the World Organization for Animal Health (OIE), and the United National Food and Agriculture Organization in order to enhance control activities;
 - 3.2 Build an evidence base on the economic burden of zoonoses, including cost-benefit and cost-effectiveness analyses of zoonosis control interventions;
 - 3.3 Promote the development of regional self-sufficiency in vaccines for zoonotic diseases.

NEWS FROM THE MZCP PROGRESS OF THE PLAN OF WORK IMPLEMENTATION IN 2004

During the first semester of this year two International and two National Training Courses have been implemented as follows:

A. INTERNATIONAL TRAINING COURSE ON HUMAN BRUCELLOSIS LABORATORY DIAGNOSIS

It was held from 28th of March to the 1st of April 2004 in the premises of the Central Public Health Laboratory, Ministry of Health, Damascus, Syria.

The objectives of the Course have been articulated as follows:

General Objective

- *Updating laboratory professional staff in current human Brucellosis laboratory diagnosis.*

Specific objectives

- *Understanding the role of the laboratory as a tool for Brucellosis control;*
- *Strengthening collaboration/coordination between public health and laboratory services;*
- *Harmonization of standard Brucellosis laboratory diagnosis methods among MZCP countries;*

Learning objectives

To learn the:

- *Reaction mechanisms, methods and steps in performing basic bacteriological and serological tests for Brucellosis diagnosis;*
- *Characteristics of Brucella diagnostic antigens and their standardization;*
- *Correct evaluation of the laboratory tests results for collaboration with clinical physicians and public health services.*

Eight Syrian laboratory physicians and four representatives from other MZCP-Member countries attended the Course. It was coordinated by Prof. G. Araj,

Professor of Clinical Microbiology, American University of Beirut, Lebanon.

The WHO/MZCC is expressing its appreciation to Prof. Araj and the senior technician Ms L. Khoury for their high quality scientific and technical contribution in this activity. Moreover, acknowledgments are expressed to the local organizers for the arrangements made, as well as to all attendants of the Course for the interest demonstrated.

Before the closure of the Course, the Conclusions and Recommendations below have been discussed and agreed. Taking into account the difficulties existing towards harmonization of brucellosis laboratory diagnosis techniques and their interpretation, the document below should be considered as a guide-line to further processing an internationally acceptable Brucellosis diagnosis procedure.

1. Conclusions

- 1.1 Laboratory support for the diagnosis of infectious diseases in general and zoonoses in particular is a crucial factor in the context of prevention, surveillance and control activities as well as for the appropriate treatment of such diseases.
- 1.2 Laboratory network at national level constitutes an essential part of any surveillance and control programme for infectious diseases in general and zoonoses in particular.
- 1.3 Training and updating of scientific and technical laboratory staff is as essential as the provision of appropriate equipment.
- 1.4 Intersectoral collaboration and data exchanging between public health and animal health laboratories are essential in the context of prevention, surveillance and control programmes.
- 1.5 Human brucellosis case definition commonly used by certain countries in the Mediterranean and Middle East regions does not contribute to the establishment of the clinical status of suspected brucellosis infected patients.

2. Recommendations

- 2.1 The role and importance of human and animal brucellosis diagnostic laboratories should be particularly recognized and their high quality performance should be considered as a priority.
- 2.2 Central and district diagnostic laboratories should be staffed by well trained scientific and technical personnel and supplied by appropriate equipment, for their quality assurance.
- 2.3 Decision makers should be kept advised on the importance and the necessity of supporting the diagnostic laboratories requests for improvement.
- 2.4 Intersectoral collaboration and horizontal intercommunication between public health and animal health laboratories and health care services should be considered as tools of major importance.
- 2.5 Human brucellosis laboratories should use standardized diagnosis techniques and reagents.
- 2.6 The human brucellosis case definition should take into consideration certain interrelated parameters, as follows:
 - clinical signs and symptoms of the disease;
 - negative or low serum agglutination test (SAT) results should be confirmed by the indirect Coombs test;
 - slide agglutination test, although rapid, should be considered as indicative only and never as the conclusive one due to its inherent false negative results.

Remarks

1. The only confirmatory test existing is the isolation of *Brucella* spp. from clinical specimens. However, this test has low yield and it takes long time for *Brucella* to be detected.
2. SAT titers should not be considered as bounding the interpretation of the test, since it should be taken into consideration that:
 - 2.1 Brucellosis infected patients may demonstrate negative SAT titers or lower than 1:160
 - 2.2 In the presence of brucellosis suggestive signs and symptoms and despite absence of SAT titers, testing the patient's serum is still necessary using the indirect Coombs test and interpretation of the laboratory results in relation with the clinical status.
3. The slide agglutination test, due to its high rate of false negative results (up to 40%, particularly in chronic and/or complicated cases) should not be included among the tests to be performed as single mandatory.
4. The Rose Bengal test using standardized antigens, is recommended as rapid screening test but it should always be confirmed by other tests such as SAT and bacteriological culture (when this is possible).
5. IgG indirect ELISA is the appropriate test, particularly in chronic and complicated cases. However, in spite of its simplicity and higher credibility, its use is being restricted in developing countries due to its higher cost.

3. Recommendations for the WHO/MZCC

Considering the needs existing among countries in the Mediterranean and Middle East regions, the

Mediterranean Zoonoses Control Center of the World Health Organization should undertake all appropriate steps for the establishment of a regional reference brucellosis laboratory.

To this end:

- a. A brucellosis diagnosis laboratory, assuring high level quality operation, should be identified.
- b. International organizations such as WHO, FAO and OIE are requested to collaborate and contribute to this task.

The WHO/MZCC is expressing its appreciation to Professors *R. Diaz* and *I. Morillon*, Department of Microbiology, Faculty of Medicine, University of Navarra, Spain, for having revised this document.

B. INTERNATIONAL TRAINING COURSE ON ANIMAL BRUCELLOSIS LABORATORY DIAGNOSIS

It was held from 13 to 17 June 2004 in the premises of the Brucellosis Centre, Ministry of Agriculture, Damascus, Syria.

The objectives of the Course were as follows:

General Objective

- *Updating laboratory veterinarians in current animal Brucellosis laboratory diagnosis.*

Specific objectives

- *Understanding the role of the laboratory as a tool for Brucellosis control;*
- *Strengthening collaboration/coordination between public health, animal health and laboratory services;*
- *Harmonization of standard Brucellosis laboratory diagnosis methods among MZCP Member-countries;*

Learning objectives

To learn the:

- *reaction mechanisms, methods and steps in performing basic bacteriological and serological tests for Brucellosis diagnosis;*
- *characteristics of Brucella diagnostic antigens and their standardization;*
- *correct evaluation of the laboratory tests results for collaboration with animal health services.*

Eight Syrian laboratory veterinarians and four representatives from other MZCP-Member countries attended the Course. It was co-ordinated by Dr *A. Minas*, Prof. of Microbiology, High Institute of Technology, Larissa, Greece, with the contribution of Dr *A. Stournara*, National Brucellosis Reference Laboratory, Ministry of Agriculture, Larissa, Greece.

The WHO/MZCC is expressing its appreciation to both Dr *Minas* and Dr *Stournara* for their eager and high scientific and technical contribution in this activity. Acknowledgements are also expressed to the local organizers for the arrangements made as well as to all attendants of the Course for the interest demonstrated.

Before the closure of the Course, the Conclusions and Recommendations below have been discussed and agreed on.

Conclusions and Recommendations

1. Conclusions

- 1.1 Animal Brucellosis laboratory diagnosis, efficiently implemented, is one of the pillars upon which a prevention and control programme can only reside.
- 1.2 Laboratory is a crucial link in animal Brucellosis diagnosis as well as in a surveillance network oriented towards assessment of the disease prevalence in an area or country.
- 1.3 High credibility results produced by veterinary laboratories network are essential for the implementation of brucellosis surveillance and control programmes.
- 1.4 Ongoing training programmes for laboratory staff on diagnostic techniques as well as on the implementation of Good Laboratory Practice are of practical importance.
- 1.5 Intersectoral collaboration and data exchanging between public health and animal health laboratories are essential in the context of prevention, surveillance and control programmes.

2. Recommendations

- 2.1 The role and importance of veterinary laboratories should be recognized and their high quality performance should be considered as a priority.
- 2.2 Central and district diagnostic laboratories should be staffed by well trained scientific and technical personnel and supplied by appropriate equipment, for their quality assurance.
- 2.3 Decision makers should facilitate and encourage the provision of reagents by recognized firms in the market in order to assure their high quality.
- 2.4 For the development of an efficient veterinary laboratories network, a National Brucellosis Reference Laboratory should be established that would be responsible, among others, for
 - a. the quality assurance of the district laboratories through ring trials;
 - b. the provision of high quality reagents to the other laboratories and their control before delivery;
 - c. training and updating laboratory staff.
- 2.5 The National Brucellosis Reference Laboratory, or in its absence the Central Brucellosis Laboratory, should:
 - a. select the most relevant test to implement on sera originating from subcutaneously vaccinated animals in order to minimize false positive results;
 - b. produce Standard Operating Procedures for all tests implemented in the laboratories for brucellosis diagnosis in animals.
- 2.6 Laboratory staff (veterinarians and assistants) should be familiar with the use of all the equipment in the laboratory.

Remarks

- The tests that can be used with the lowest number of false positive results in subcutaneously vaccinated animals are Complement Fixation Test and Competitive Elisa.
- Indirect ELISA is not recommended.

3. Recommendations for the WHO/MZCC

- 3.1 The Mediterranean Zoonoses Control Center of the World Health Organization should:
 - a. promote the enforcement by Member Countries of as extended as possible regular vaccination programmes in cattle, sheep and goats, particularly in countries with nomadic husbandry.
 - b. ensure training of one or two qualified laboratory veterinarians to further train, later on, regional laboratory staff.
 - c. encourage the implementation of public health education programmes taking into consideration its high priority importance.
- 3.2 The public health education of the population must be regularly enforced since it is of great importance for the prevention and control of zoonoses among humans.

C. NATIONAL TRAINING COURSE ON INTERSECTORAL BRUCELLOSIS SURVEILLANCE, PREVENTION AND CONTROL

It was held from 13 to 17 March 2004 in the premises of the Veterinary Laboratory, Public Authority for Agriculture and Fish Resources (PAAF) Kuwait, State of Kuwait.

The objectives of the Course were distributed as follows:

Goal

- *To provide information on intersectoral Brucellosis surveillance and response systems.*

General Objectives

- *To review the human and animal brucellosis epidemiological situation and surveillance system.*

Specific Objective

- *To provide the general principles of planning, implementation, evaluation and monitoring of the brucellosis surveillance system.*

Learning Objectives

- *To provide understanding on the significance of intersectoral collaboration;*
- *To review and evaluate the brucellosis laboratory diagnosis methodology;*
- *To be able to manage the national surveillance system; and*
- *To produce an informative and clear report.*

Eighteen participants from the Public Health, Animal Health and Municipality sectors attended the Course.

Besides the local experts/facilitators, four WHO/MZCP international facilitators contributed to meet the targets of this activity.

The WHO/MZCC is expressing its appreciation to the local organizers for their high level arrangements as well as to the facilitators for their eager contribution. Special acknowledgments are addressed to Prof. *D. Tabbaa*,

Faculty of Veterinary Medicine, Hama University, Syria, Prof. L. Sharif, University of Science and Technology, Amman, Jordan, Prof. A. Minas, High Institute of Technology, Larissa, Greece and Dr F. de Massis, WHO-CC/IZS, Teramo, Italy.

N.B. – The Conclusions and Recommendations issued at the closure of the Course are almost identical to those expressed at the NTC held in Cairo, Egypt (see point D). For space limitation they have been fused in the document below being valid for both countries, i.e. State of Kuwait and Egypt.

D. NATIONAL TRAINING COURSE ON BRUCELLOSIS INTERSECTORAL SURVEILLANCE, PREVENTION AND CONTROL

It was jointly organized with the General Organization for Veterinary Services (GOVS), Ministry of Agriculture, Cairo, Egypt, from 5 to 9 June 2004.

The objectives of the Course have been as follows:

Goal

- *To provide information on intersectoral Brucellosis surveillance and response systems.*

General Objective

- *To review the human and animal Brucellosis epidemiological situation and surveillance system in Egypt.*

Specific Objective

- *To provide the general principles of planning, implementation, evaluation and monitoring of the Brucellosis surveillance system*

Learning Objectives

- *To understand the requests and needs of an intersectoral surveillance system according to the local situation;*
- *To identify and use the appropriate analytical methods and techniques for prioritizing actions;*
- *To be able to produce an informative and clear report on epidemiological events.*

Eighteen trainees from the Public Health and Animal Health sectors attended the Course. This was the second activity on the same subject: the first, at elementary/ introductory level was held in May 2002 and the present of basic level was attended by the same participants.

Local facilitators from both the sectors mentioned above together with the group of the WHO/MZCP international experts highly contributed for the Course to meet its targets.

The WHO/MZCC expresses special appreciation to Prof. H. Aidaros, Chairman GOVS, Egypt and to his collaborators for everything they have done to better arrange this activity. Acknowledgments are also addressed to the local experts as well as to

Prof. D. Tabbaa, Faculty of Veterinary Medicine, Hama, Syria, Dr J. Jabbour, Epidemiologist WHO/EMRO, Cairo Egypt and Dr F. de Massis, WHO-CC/IZS, Teramo, Italy.

At the end of the Course the group of trainees and experts/facilitators discussed and agreed upon the following Conclusions and Recommendations:

1. Conclusions

- 1.1 Brucellosis in humans and animals remains a major public health hazard in most Mediterranean and Middle East (MME) countries.
- 1.2 Although brucellosis is a notifiable disease, weakness in the epidemiological surveillance systems and on information exchange between the public health and animal health sectors does not reveal the real situation in each country.
- 1.3 The establishment of a functional epidemiological intersectoral surveillance system, at national level, on brucellosis in humans and animals (as first step) and on other major zoonotic diseases has been demonstrated to be a priority.
- 1.4 Strengthening of diagnostic laboratories in the Public Health and Animal Health sectors is an important tool to achieve monitoring and surveillance of zoonotic diseases in general and brucellosis in particular.
- 1.5 National Training Courses performed on priority subjects with intersectoral participation are of particular importance for all countries. Besides updated and specialized practical knowledge, they bring together for collaboration the major competent sectors, i.e. public health and animal health sectors.
- 1.6 Public health education on infectious diseases in general and zoonoses in particular, prevention and control, is a tool of high importance and priority.

2. Recommendations for the Ministry of Health, and the Ministry of Agriculture

- 2.1 Intersectoral collaboration between Public and Animal Health Sectors, should be strengthened by developing and establishing a functioning intersectoral surveillance, prevention and control system, for Brucellosis and other important zoonotic and related foodborne diseases.
- 2.2 Planning of a national epidemiological intersectoral surveillance system should take into consideration all methods/tools available, and ensure the participation and involvement of all competent authorities and institutions.
- 2.3 A list of priority zoonotic diseases of national importance should be prepared for action.
- 2.4 The implementation of the existing legislation on prevention, surveillance and control of zoonotic diseases in general and brucellosis in particular, as well as its updating according to the case, should be considered a major priority.
- 2.5 Surveys should be objective-oriented and implemented at regular intervals for screening brucellosis and other important zoonotic diseases among

occupational risk groups and susceptible species of the national livestock.

- 2.6 Locally produced or milk distributed for consumption should be pasteurized or boiled and dairy products should be equally treated and manufactured under good and hygienic practices. Inspection of such products should be implemented from the farm and all along the food chain up to the consumer.
- 2.7 Public awareness on zoonotic and foodborne diseases prevention should be promoted using all means available. Relevant educational material should be prepared focused on different target groups (e.g. physicians, veterinarians, professionals, farmers, school children etc.) and presented through different extension tools (e.g. meetings, lectures, leaflets, posters, mass media etc.).

3. Recommendations for the WHO/MZCC

- 3.1 Training Courses on zoonotic and related food-borne diseases intersectoral surveillance, prevention and control are of major importance for Member Countries, therefore, they should be increased in numbers and enriched in subjects.
- 3.2 The WHO/MZCC should take the necessary steps for the identification and establishment of a Regional Reference Brucellosis Laboratory to cover pressing needs for the accurate application and evaluation of brucellosis laboratory diagnosis procedures and techniques, as well as for the training of laboratory staff of Member Countries.

BOOK REVIEWS

ZOOZOSES AND COMMUNICABLE DISEASES COMMON TO MAN AND ANIMAL

3rd Edition, Pedro N. Acha and Boris Szyfres

In recent years, zoonoses and communicable diseases common to man and animals have gained increasing attention worldwide. Human diseases that have their origins in infected animals, such as AIDS or Creutzfeldt-Jakob, have highlighted the need for a better understanding of animal diseases. The ease and speed of modern travel facilitates the spread of diseases once confined to specific geographic areas, as recently occurred with the widely publicized severe acute respiratory syndrome (SARS) epidemic. Animal migration and trade pose a similar threat, as was shown by the outbreaks of West Nile fever in the United States, and most recently, monkeypox – two diseases not previously known in the Western Hemisphere. Each of these examples highlights the need for accurate, up-to-date information, such as that presented in the latest edition of *Zoonoses and Communicable Diseases Common to Man and Animals*.

This edition, published for the first time in three volumes, covers:

- I. Bacterioses and mycoses,
- II. Chlamydioses, rickettsioses and viroses, and
- III. Parasitoses

This series provides a detailed overview of the most important historic and emerging zoonotic diseases, such as Ebola hemorrhagic fever, foot-and-mouth disease, influenza, giardiasis, Japanese encephalitis, shigellosis and spongiform encephalopathies, with information ranging from their first appearance and most important outbreaks to the latest scientific knowledge of the diseases and their causative agents.

The chapters provide the following key information on each diseases:

- etiology
- geographic distribution
- symptoms and occurrence in man and animals

- source of infection and mode of transmission
- role of animals in its epidemiology
- diagnostic techniques, and
- prevention and control measures

Numerous tables and figures diagramming modes of transmission complement the text.

This book is an essential tool for biologists, parasitologists, virologists, veterinarians, physicians, epidemiologists, and workers in public health and animal health institutions, as well as professors, researchers and students in these areas. All of these groups will find *Zoonoses and Communicable Diseases Common to Man and Animals*, 3rd ed. to be an invaluable addition to their collection of most-consulted reference works.

Volume I Bacteriosis and Mycoses

2001, 401 pp., order code: SP 580 A
US\$ 36.00

Volume II Chlamydioses, Rickettsioses, and Viroses

2003, 416 pp., order code: SP 580 B
US \$ 36.00

Volume III Parasitic Zoonoses

2003, 424 pp., order code: SP 580 C
US \$ 36.00

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BOOK REVIEWS (continued)

MANUAL OF DIAGNOSTIC TESTS AND VACCINES FOR TERRESTRIAL ANIMALS

The purpose of the *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* is to contribute to the international harmonization of methods for the surveillance and control of the most important animal diseases. Standards are described for laboratory diagnostic tests and the production and control of biological products (principally vaccines) for veterinary use across the globe.

All OIE Lists A and B diseases are covered, together with additional diseases of importance for international trade. Each chapter of the *Manual* has been written and reviewed by experts of international standing and has been approved by OIE Member Countries. The diagnostic tests and protocols are those referred to in the *Terrestrial Animal Health Code*. These complementary publications contributed to the designation of the OIE as the reference organization for animal health by the Marrakesh Agreement establishing the World Trade Organization.

The introductory chapters contain information on sampling methods, principles of veterinary vaccine production, biotechnology, quality management in veterinary testing laboratories, assay validation, tests for sterility, laboratory safety, the role of official bodies in the international regulation of veterinary biologicals and antimicrobial susceptibility testing. Each disease chapter includes a summary that gives an overview of the tests and vaccines available for the disease. Bibliographical references are listed at the end of each chapter.

The complete edition of this *Manual* is available in English. Both French and Spanish versions are foreseen.

Parts I and II

Office International des Epizooties (O.I.E.)

12, rue de Prony, 75017 Paris, France

Fax: +33(0) 1 4267 0987 • E-mail: pub.sales@oie.int

Pages: 1600 • Price: 140 euros (airmail postage included)

OIE INTERNATIONAL STANDARDS ON ANTIMICROBIAL RESISTANCE, 2003

The increasing antimicrobial resistance of important human pathogenic bacteria, and the spread of such bacteria from the closed environment of hospitals into surrounding communities, are increasingly perceived as threats to public health. Any use of antimicrobials, whether in humans, animals, plants or food-processing, may lead to bacterial resistance. The use of antimicrobials in livestock production is thought to significantly contribute to the phenomenon, but little is known about the true causes of antimicrobial resistance. The lack of relevant scientific data means that risk managers must take precautionary measures, even though the underlying causes of public health risks associated with resistant bacteria may not have been adequately identified.

Increasing international travel and international trade in animals and animal products may spread resistance worldwide.

The present publication offers, in the first section, the O.I.E. International Standards of Antimicrobial Resistance as adopted by the OIE International Committee in May 2003, and published in the OIE *Terrestrial Animal Health Code* 2003 and in the *Manual of Standards for Diagnostic Tests and Vaccines for Terrestrial Animals*. The Second section contains the Proceedings of the 2nd OIE International Conference where the reports of the OIE *ad hoc* group on Antimicrobial Resistance were discussed publicly.

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