Interagency Meeting
on Planning the Prevention and Control of
Neglected Zoonotic Diseases (NZDs)
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Organized by the Department of Control of Neglected Tropical Diseases of the World Health Organization with the Special Programme for Research and Training in Tropical Diseases, the Food and Agriculture Organization of the United Nations and the World Organization for Animal Health
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1. **Opening remarks**

Dr Savioli, Director, Department of Control of Neglected Tropical Diseases of the World Health Organization (WHO/NTD), welcomed participants to the interagency meeting on planning the prevention and control of neglected zoonotic diseases (NZDs) and extended WHO’s welcome to the representatives of two partner international organizations in the field: the Food and Agriculture Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE). He thanked participants for their keen interest and dedicated work on a group of diseases that has significant public health and economic impacts in communities around the world but attracts little attention from national and international decision-makers. He stressed that many tropical diseases are in the same situation, and, as Director of WHO/NTD, it was his duty to bring these infections into the limelight, promote research on new tools and assist in mobilizing resources for their prevention and control. He reminded the participants of the outcome of the third international conference on NZDs, held in Geneva in November 2010, which had recommended that a roadmap be drawn up to promote progress in combating those diseases. The outcome of the conference was reviewed during the annual FAO, OIE and WHO Tripartite Executive and Coordination Meeting, held at WHO Headquarters from 3 to 4 February 2011, where the three organizations agreed to participate in the present interagency group to implement the recommended activities.

Dr F.X. Meslin, Team Leader for NZDs, WHO/NTD, presented the objectives and expected outcomes of the meeting:

- to review and prioritize NZDs and activities for their prevention and control in the short (2012), medium (2015) and long term (2020); to define the outcomes and their deadlines; to define targets and indicators to monitor implementation;
- to consider the research priorities identified by the WHO Special Programme for Research and Training in Tropical Diseases (TDR) ‘think tank’ for research on infectious diseases of poverty and to integrate the most relevant priorities into activities where possible; and
- on the basis of the outcome of the meeting, to prepare a multiagency proposal for the prevention and control of major NZDs, to be used to seek funds at a larger tripartite meeting with international and national development agencies and foundations.

Dr S. Mukaratirwa agreed to be Chair of the consultation and Dr M. Kachani the Rapporteur.

2. **Existing plans for neglected zoonotic diseases**

2.1 **Zoonotic trypanosomiasis (Sue Welburn)**

The Stop Sleeping Sickness (SOS) team has prepared an evidence base for effective control of zoonotic trypanosomiasis, which represents a significant public health issue in Uganda. Eliminating the parasites circulating in cattle at district level and subsequently helping farmers to apply insecticides regularly to their animals at low cost are the main actions for control, with human disease surveillance. Tools to deal with the disease in humans and in the animal reservoir are in place, and structures to translate epidemiological data into practical action are functioning. Economic analysis has shown the multiple benefits (social and financial) of effective control at the livestock level, including the number of disability-adjusted life years, health-care costs saved and improved returns on livestock production.

On this basis, effective systems for delivering veterinary interventions have been designed, tested and scaled up in nine districts of Uganda. The current constraints are securing adequate financial resources to allow further scaling up and to sustain long-term operations in the 23 endemic or at-risk districts. New ways are therefore needed to secure financial support, by learning from other fields. For example, ways should be
found of ‘monetizing’ the social impact of controlling zoonotic trypanosomiasis, i.e. securing donor money for successful outcomes that will interest the private sector.

Discussion:

The Government of Uganda is willing to contribute funding. Uganda is already making a significant contribution from the budgets of the health and the veterinary sectors, but this should be emphasized and built into a sustainability model.

The SOS private–public partnership has been a successful model for the ‘One health’ concept but should be more apparent and transparent. All insect vectors need not be eliminated, because only 1/1000 head of cattle is infected. Restricted application of insecticides will reduce the populations of both tsetse flies and ticks as an added benefit in treated areas. The introduction of veterinary services in these regions is welcomed by communities, which are willing to pay for long-term protection against tsetse flies and ticks.

Disability-adjusted life years are not necessarily the best indicator for highlighting the impact of a disease, and might in fact have the opposite effect.

Human African trypanosomiasis is targeted by WHO for elimination.

2.2  Cystic echinococcosis (Malika Kachani)

Cystic echinococcosis is a preventable disease, which can be controlled, prevented and eliminated. It has been eliminated as a public health problem in some countries (island models); in others, control is under way, usually in pilot areas within endemic areas (continental models). In most endemic countries, it is not controlled because of obstacles such as a lack of long-term funding, lack of awareness among decision-makers (cystic echinococcosis is not a priority in public health), lack of data on its impact, lack of commitment of government, lack of intersectoral collaboration and coordination, lack of suitable control structures and unfavourable epidemiological features.

A consultation held at WHO Headquarters on 22 to 23 June 2011 identified the best options for cystic echinococcosis control and surveillance tools. The control measures include dog population management, praziquantel treatment of owned dogs, slaughterhouse management, control of animal movement, disposal of dead carcasses, health education, legislation and vaccination. The surveillance tools include hospital reporting, community surveys, slaughterhouse data, dog necropsies and coproantigen enzyme-linked immunosorbent assay. Gaps in knowledge include scientific demonstration of the value of the EG95 vaccine for sheep and a comparative evaluation of the available copro-antigen tests.

The group proposed to conduct integrated interventions for cystic echinococcosis control and elimination that incorporate the new EG95 sheep vaccine in three countries: Kyrgyzstan, Peru and Tunisia. Various combinations of a minimum set of control measures will be used and the results compared. Integration with other disease control programmes will be considered, and possible funding possibilities will be explored.

2.3  Rabies

2.3.1  Elimination of human rabies transmitted by dogs in the WHO South-East Asia Region (Gyanendra Gongal)

An expert consultation organized by the WHO South-East Asia Regional Office finalized a regional strategic framework for elimination of human rabies transmitted by dogs. Prevention, promotion and partnership are the three strategic elements, and the main focus is to introduce cost-effective public health interventions to improve the accessibility, affordability and availability of post-exposure prophylaxis, mass vaccination of
dogs and dog population management. Partnerships with community, civil society, government, nongovernment sectors and international agencies are essential for sustainable elimination of human rabies transmitted by dogs. WHO is recommending that ministries of health reach consensus on dog rabies control at national level and coordinate funding for anti-rabies campaigns.

Discussion:

The ‘One health’ approach could be used as part of the implementation framework.

A research component should be added to the framework.

2.3.2 International and regional rabies programmes (Deborah Briggs)

The main rabies control programmes in Africa, Asia (dog rabies) and Europe (wildlife rabies) were highlighted. Several pilot projects are under way for the elimination of canine and human rabies in an intersectoral approach. The largest of these projects are funded by the Bill & Melinda Gates Foundation and by member states of the European Union. Projects funded by the Gates Foundation cover the Visayas in the Philippines, KwaZulu-Natal in South Africa and in the United Republic of Tanzania. The European Union projects are in neighbouring countries, mostly for fox and raccoon dog rabies control. Intersectoral collaboration and the ‘One health’ approach have been used in all these projects. The Global Alliance for Rabies Control is playing an important role in advocacy, awareness and education for rabies prevention and control. Its main activities include promoting World Rabies Day, organizing meetings of partners for rabies control and creating an e-communications network of stakeholders and experts. The partners for rabies prevention launched a ‘Blueprint for human rabies prevention and canine rabies elimination’ in June 2010 (www.rabiesblueprint.com).

The global health community must invest in new tools, such as methods to control the expanding dog population humanely. Shorter post-exposure prophylaxis (PEP) vaccination regimens are needed for use in isolated populations, where the current 4-week regimen is not feasible. Studies on a ‘three visits in one week’ regimen are under way. New strategies and methods are needed to prevent reintroduction and ensure the sustainability of control and elimination efforts.

Discussion:

Community dogs are vaccinated in some urban and rural areas of, for example, India, Sri Lanka or Bali, reaching an overall dog population coverage of 75%. Achieving a high enough dog vaccination coverage remains a major challenge in most places.

A fair, effective human and animal health partnership should be established in order for a rabies control project to work well.

Effective intersectoral collaboration, usually between health and agriculture, is in place in some countries. Other ministries should be involved, such as those of the environment and education, and also local government and municipalities.

A number of rabies-affected Asian countries are committed – under the aegis of the Association of Southeast Asian Nations plus China, Japan and the Republic of Korea – to eliminating human and dog rabies by 2020.

2.3.3 Rabies and other neglected zoonotic diseases in Latin America and the Caribbean (Marco Vigilato)

The Pan American Foot-and-Mouth Research Center (PANAFTOSA) is a specialized veterinary public health centre that supports animal health, zoonosis and food safety activities in Latin America. Cysticercosis/taeniasis, Equine encephalitis, echinococcosis/hydatidosis, leishmaniasis, leptospirosis, plague,
rabies and soil-transmitted helminthiasis are considered NZDs in the WHO Region of the Americas. The Regional Office launched a coordinated programme for the elimination of human rabies transmitted by dogs in 1983, and by 2004 the number of human dog-transmitted rabies deaths was reduced by 90%. Human deaths due to bat-transmitted rabies have, however, been increasing in recent years. A plan to eliminate human dog-transmitted rabies from Latin American countries by 2012 was prepared and endorsed by a health and agriculture interministerial meeting in 2008. The Region has 22 rabies laboratories in 16 countries, and web-based rabies surveillance has been established. Several actions are supported by PANAFTOSA to strengthen rabies surveillance and control, including the biannual meetings of the directors of national rabies control programmes aiming particularly at eliminating rabies transmission from dogs to humans and the RIMSA meeting of health and agriculture ministries, which is the regional forum for collaboration and coordination on issues related to veterinary public health. Through this forum, the Regional Office receives the political support necessary for technical cooperation among countries. PANAFTOSA is also seeking and operationalizing technical cooperation for action and country support in areas with outbreaks of zoonotic diseases due to natural disasters, as in the case of leptospirosis. PANAFTOSA acts with WHO collaborating centres such as the Zoonosis Control Center of São Paulo and the United States Centers for Disease Control and Prevention. Capacity at local level is strengthened through virtual seminars for the management of zoonosis control services on the PANAFTOSA zoonoses website (http://new.paho.org/panaftosa), targeting professionals at local level. The aim is to create a Regional network of local zoonosis control services.

Discussion:

The constantly changing target dates for elimination of human dog-mediated rabies in Latin American countries was discussed. The Regional Committee of the Pan American Health Organization (PAHO) at its 61st session set 2015 as the target date for eliminating neglected diseases and other poverty-related infections including human dog-mediated rabies. National programmes plans should be readjusted regularly. The current priority countries in the region are Guatemala, Haiti, the Plurinational State of Bolivia and states in Brazil.

The reported increase in bat rabies over the past 10 years may be due to better surveillance.

Delivering pre- and post-exposure prophylaxis to isolated human populations of the Amazon remains a major challenge.

2.4 Taenia solium taeniasis/cysticercosis (Samson Mukaratirwa and Lee Willingham)

A working group formed in East and South Africa has identified the risk factors for *T. solium* taeniasis/cysticercosis, estimated the burden, improved detection methods and elicited community participation in prevention and control. Plans for prevention and control include:

- selecting the drug of choice for treating human taeniasis (i.e. praziquantel vs. niclosamide),
- preparing an easy-to-use formulation of oxendazole for pigs,
- assessing the safety and measuring the impact of widescale treatment of pigs,
- establishing the best combination of control strategies for effectivity and sustainability,
- developing a field vaccine for pigs with the collaboration of the University of Melbourne (Australia) and GALVmed (the Global Alliance for Livestock Veterinary Medicines, Edinburgh, Scotland),
- investigating the effect of community-led total sanitation to stop open defecation on *T. solium* transmission,
- refining the diagnostic tools,
- mapping *T. solium* taeniasis/cysticercosis and its endemicity with other NTDs,
improving pig husbandry practices and community-based marketing of pigs,
developing protocols for human case management and the related ethical issues, and
promoting the ‘One health’ concept for *T. solium* taeniasis/cysticercosis control and elimination.

**Discussion:**

Information is lacking about the life cycle, causes of outbreaks and transmission factors, and the perceptions of how people become infected are wrong.

Questions were raised about when the TSOL18 vaccine will be ready, the anticipated price, commercialization, affordability by farmers, the vaccination regimen, feasibility, mode and frequency of delivery and cost-effectiveness. Pilot projects include porcine treatment and vaccination. Questions were also raised about funding sources.

Answers are expected from the current European Union-funded Integrated Control of Neglected Zoonoses (ICONZ) project and from the work carried out by GALVmed with a network of partners to develop and make available the tools which could eventually help to eradicate taeniasis/cysticercosis.

### 2.5 Zoonotic leishmaniasis (Jorge Alvar)

The most important features of the disease are that dogs are reservoirs, patients and targets for control as well as used as experimental models. The financial and business aspects of the disease are important and should be considered. Asymptomatic dogs are capable of infecting sandflies, and thereby play an important role in the epidemiology of the disease. A dog vaccine is not available, and dog culling is not acceptable. There is a conflict of interest in relation to treating dogs, in view of the associated profits and business aspects; furthermore, it provides only temporary remission. No guidelines are available on dog treatment. The efficacy of pyrethroid collars depends on the region. Little is known about the control of zoonotic leishmaniasis, and there is a lack of leadership. Practising veterinarians and physicians often disagree about control methods.

**Discussion:**

Collaboration between veterinary and medical professionals in relation to dog leishmaniasis control should be strengthened, for example by common courses for medical and veterinary students at university level.

The financial and business issues pose a real problem, as discouraging dog treatment might put some veterinarians and drug providers out of business.

Prerequisites to initiating activities are the development of guidelines on dog treatment and an agreed upon strategy for dog-borne zoonotic leishmaniasis control and elimination common to both veterinary and medical officers.

### 2.6 Fascioliasis and other foodborne trematodiases (Aya Yajima and Albis Gabrielli)

To reduce the human burden of foodborne trematodiases (FBT), it should be included in the mainstream preventive chemotherapy strategy (triclabendazole to treat fascioliasis and praziquantel to treat opisthorchiasis, clonorchiasis and paragonimiasis), with the necessary veterinary public health support, as the biology is comparable and the field-applicable diagnostic tools are sensitive. The three types of control intervention in humans are mass drug administration (MDA), targeted treatment and individual case management.

A comparison of mass drug administration and targeted treatment is under way. It has been shown that concrete strategies and appropriate resources lead to successful control and prevention in human populations.
Discussion:

A reported increase in the incidence of carcinomas will disappear only after many years.
The value of school education should not be underestimated.
Triclabendazole is a veterinary drug that is now formulated for human medication.
Mass drug administration should be used indiscriminately, even for pregnant women. The drug
donated by a pharmaceutical company) has been tested in Egypt on humans.
The VPH component should be given more emphasis in the case of fascioliasis.

2.7 Bacterial and other zoonotic diseases (Bernadette Abela-Ridder)

2.7.1 Leptospirosis

A systematic review of the evidence, incidence and sequelae by sex, age and region is to be submitted to a
peer-review journal and will be the basis for estimating the burden of leptospirosis by the end of 2011.

The global endemic incidence is about 5 per 100 000 but can be as high as 14 per 100 000 when outbreaks are
included. WHO guidelines for the prevention and control of leptospirosis were published in 2003 and are

The major knowledge gaps are:

lack of point-of-care and diagnostics for acute leptospirosis,
insufficient studies of incidence and long-term studies for directly assessing the burden of disease,
insufficient understanding of the influence of the environment and climate,
lack of guidance for outbreak response and clinical management
lack of protocols for surveillance of disease and infection sources.

Work on leptospirosis planned at WHO consists in generating data for the Global Burden of Disease study by
the end of 2011, to be submitted to WHO and published in a peer-reviewed journal, and translating the Global
Burden of Disease estimates into policy in selected countries through the WHO evidence-informed policy
network (EVIPNET).

WHO in partnership with the Health and Climate Foundation are in the process of launching a new initiative
to harness collaboration to strengthen the detection, prevention and response to climate-sensitive diseases, in a
similar format to the Meningitis Environmental Risk Information Technologies project (http://www.hc-
foundation.org/merit.html). The project will address the control of rodent populations, environmental
conditions, water and sanitation for predicting, preventing, detecting and responding to these diseases.

2.7.2 Brucellosis and tuberculosis

Two systematic data and literature reviews are being prepared by the WHO foodborne disease epidemiology
reference group (FERG). In 2010, the FAO/OIE/WHO tripartite meeting recognized that brucellosis and
tuberculosis at the animal–human interface require more attention worldwide and recommended a common
approach for the progressive prevention, detection and control of these two diseases in various regions, in
order to guide countries and donors, and updating guidance on their prevention and control. A
WHO/FAO/OIE document entitled Brucellosis in humans and animals was published by WHO in 2006
2.7.3  Anthrax

Localized anthrax outbreaks appear to have increased lately, as has also been observed for brucellosis. The reasons for these observed changes should be found. Joint animal–human health risk assessments and linkage of surveillance systems would allow better understanding of the causes of changes in the trends of disease, including outbreaks. This capacity should be strengthened. The most recent WHO guidelines for the surveillance and control of anthrax in humans and animals were published in 1998 and are available at http://www.who.int/csr/resources/publications/anthrax/WHO_EMC_ZDI_98_6/en/.

2.7.4  Rift Valley fever

WHO and FAO have collated 40 years of data on epidemic Rift Valley fever, which allows better understanding and epidemiological analysis. The database includes references to primary areas (where the virus persists between epidemics) and secondary areas (where the virus amplifies when introduced). These data aid in the development of specific risk maps, which are used to improve the rainfall-based real-time model for risk monitoring developed by the National Aeronautical and Space Administration in the United States.

Joint guidelines on RVF contingency planning and response are being finalized by FAO and WHO. The draft guidelines have already been used during emergency missions to support the development of national action plans in Madagascar and in Mauritania. On the basis of these plans, significant emergency funds were obtained from various sources (including the Central Emergency Response Fund of the United Nations). An overview of Rift Valley fever outbreak forecasting models was posted on the Global Early Warning System website in February 2010 (http://www.glews.net/index.php?option=com_docman&task=doc_details&gid=17&Itemid=2).

WHO and FAO are updating standard operating procedures for the prevention and control of outbreaks of Rift Valley fever, for both animal and human public health officers at district level, and are preparing specific guidelines for risk reduction of the transmission of Rift Valley fever (and Crimea–Congo haemorrhagic fever) in slaughterhouses during outbreaks.

Discussion:

The diversity of pathogens is an obstacle for developing diagnostic tests.

The small number of validated tests is also an issue, when most countries want rapid, specific, sensitive diagnostic tests.

The clinical presentation in humans is changing.

The WHO systematic approach should be used for calculating disability-adjusted life years. As leptospirosis is not included in the Global Burden of Disease study, it may be difficult to influence policy.

An FAO-led simulation exercise on Rift Valley fever is under way in Croatia.

Adopting the ‘progressive control’ approach used by the FAO for animal diseases could be useful in the control of brucellosis.

3.  Research priorities for neglected zoonotic diseases (Lee Willingham)

TDR fosters global research on poverty-related diseases and innovative interventions with regard to malaria, tuberculosis and HIV, neglected tropical diseases, vectors, the environment and societies. TDR has established a ‘think tank’ for identifying priorities for research on infectious diseases of poverty. Some of the
themes focus on issues arising from the animal–human interface, which could benefit by addressing social aspects in interventions and community-based behavioural change interventions. The TDR-facilitated Disease Reference Group (DRG 6) on zoonotic and marginalized infections of poverty – branded 'ZOOM-IN' – considers a variety of diseases, ranging from zoonotic, diarrhoeal and foodborne diseases to opportunistic diseases. DRG 4 on helminth infections and Thematic Research Group 4 on the environment and agriculture and infectious diseases of poverty have made recommendations for research based on reviews of the evidence, gap analysis and stakeholder consultation, which will be published in the WHO Technical Report Series. These priorities should be considered for inclusion in the roadmap for control of NZDs.

ZOOM-IN's top 3 priority research areas for immediate impact:

- New methods for assessing burden of the zoonoses beyond DALYs - in order to attribute monetary loss from humans and animals, nutritional impacts (milk, meat), manure and cash assets
- Assessment of the cost effectiveness of community health care delivery methods for control of zoonoses
- Innovative ways of promoting inter-sectoral collaboration (health, livestock, agriculture, natural resources and wildlife), cross systems policy and prioritisation

A number of recommendations from DRG 4 and DRG 6 were used in the statement of the third conference on NZDs held in Geneva in November 2010, indicating agreement on research priorities in the WHO and TDR documents.

4. Identifying high-priority zoonotic diseases and targets for control and elimination
   (Gyanendra Gongal)

Priorities for control and elimination among zoonotic diseases should be decided by ranking the health and economic burdens that these diseases impose on both human and animal health and also on the availability of effective tools, systems and strategies for their surveillance, control and, when feasible, elimination at global, regional and national levels. The ranking may, however, be affected by the level of attention and funding that a disease might attract, independently of its health or economic impact. Some determining factors are associated with the level of socioeconomic development, risk perception and mitigation capacity. For example, industrialized countries might prioritize new, emerging zoonotic diseases, whereas developing countries might give priority to endemic zoonotic diseases.

Many endemic and epidemic-prone zoonotic diseases are neglected, as they affect poor marginalized populations. WHO calls these ‘NZDs’ in an attempt to draw the attention of national governments and international partners to their prevention and control. Targets for a particular disease should be defined on the basis of its epidemiology, the availability of prevention and control tools, the level of commitment of the affected country or countries, and the amount of funding available or expected. The target might be to eliminate the disease in humans by eliminating the zoonotic disease in its animal hosts or to eliminate the human disease as a public health problem by bringing the number of cases or deaths below an agreed threshold by preventing the disease in humans or only controlling (without eliminating) the disease in the animal host.

Discussion:

The criteria to be taken into consideration in prioritizing zoonotic diseases are their socioeconomic, public health and animal health impacts. The criteria for prioritization can be further determined from questionnaire surveys and by semi-quantitative methods. The target audiences are usually professionals in medical or veterinary colleges and governments and only rarely community members. The criteria are different for other stakeholders, such as livestock producers and pet owners. Some diseases affect several of these groups, which should reinforce efforts to determine the most pressing priority.
Outside factors influence priority setting. During the first meeting on NZDs in 2005, seven diseases were listed. Leishmaniasis was subsequently included, as it was part of WHO/NTD portfolio and has a clear zoonotic component. The list was expanded in 2007 and again in 2010 by adding schistosomiasis (zoonotic) and toxoplasmosis.

Many activities on specific NZDs have been abandoned at WHO during the past 5 to 10 years mostly due to lack of human resources and loss of VPH focus.

Effective tools for the prevention, control and elimination of human and animal rabies are readily available. A number of countries in Asia and Latin America have already defined target dates for eliminating human dog-mediated rabies. Rabies control activities are ongoing in many developed and developing countries. In 2008, the Gates Foundation awarded US$ 10 million to demonstrate the feasibility of eliminating human rabies in 5 years through dog rabies elimination in three sites located in Africa and Asia. Rabies therefore should rank high on the list of NZDs.

Cysticercosis and echinococcosis are NZDs with a global impact, and the tools for their control and elimination are almost ready, benefiting from strong support at regional and international level.

A strategy has been developed for zoonotic African trypanosomiasis, fascioliasis and other foodborne trematodiases, which would have a significant regional impact.

Unfortunately, few initiatives are in place and little interest is expressed at global level for the other NZDs. Anthrax and brucellosis are addressed only sporadically. Outbreaks of these diseases are indicators of weak veterinary services, and addressing them requires strengthening these services, securing strong public health involvement and developing necessary partnerships with relevant civil society organizations.

WHO/NTD is aiming to eliminate the most important NTDs (lymphatic filariasis and dracunculiasis). When those priority NTDs are eliminated, other NTDs, including NZDs, may move up on the global NTD agenda.

Some NZDs are targeted for elimination, such as rabies and *T. solium* cysticercosis, but the target for echinococcosis/hydatidosis may be to eliminate the disease as a public health problem.

Elimination may be very difficult or unsustainable, as these diseases are poverty related. The diseases should be compared and prioritized according to feasibility or their burden, although it is difficult to compare them and to integrate them into one objective indicator.

The clinical course of some diseases, such as human African trypanosomiasis and rabies, is dramatic, enough to make them priorities. Other diseases might have a greater impact but be less visible or striking. Diseases with a low incidence or prevalence and a low economic impact or disability-adjusted life years score tend to receive less attention.

The group of NZDs may encompass too many diseases to be seen as a common platform for intervention. Groups that advocate for a single disease may make a better case for mobilizing interest and resources.

More awareness should be created among the major funding agencies and foundations. The Gates Foundation has both a global health programme and an agriculture development programme, which should be brought together to support projects that cover both aspects, such as zoonosis prevention and control. NZDs interventions could be used as examples of implementing the ‘One health’ concept, but this is generally not understood by the wider donor and research community. The contribution of NZDs prevention and control to ‘One health’ should attract at least as much attention as emerging zoonotic diseases.
5. Vertical and horizontal approaches and single-disease and integrated prevention and control (Katinka de Balogh)

There has been much discussion about vertical and horizontal approaches. The purpose of this presentation is to provide a basis for further discussion and to emphasize that there is not a ‘one size that fits all’. Animal and human health systems in developing countries are generally weak and fragile, which generally hampers the effective control of animal and human diseases. Vertical approaches generally address one disease and have been used for the successful eradication of smallpox and rinderpest and are also most commonly used for controlling poliomyelitis, rabies and foot-and-mouth disease. In the case of an outbreak of an emerging disease, the vertical approach allows a clear chain of command and rapid intervention to contain it. Eradication or elimination programmes are characterized by clearly defined policies and strategies and the availability of (outside or donor) funding. Momentum is created through massive mobilization campaigns and clearly targeted public awareness campaigns. Personnel are specifically recruited and trained, and clear performance indicators are defined to monitor progress. In addition, the campaigns are generally part of an international or regional effort supported by donor funding. As a result, the adoption and implementation of an eradication or elimination programme can help a country to establish defined health goals, with specific strategies and indicators for evaluation and monitoring. Furthermore, eradication or elimination programmes provide opportunities for strengthening national health structures and overall capacity to deal with such issues. The sustainability of these programmes can be at stake once the outside funding ends, putting at risk any achievements in the prevention and control of a specific disease. Overall health systems should be strengthened, so as to be able to deliver an appropriate level of benefits for an extended period even after major financial and technical donor assistance has ended.

In the horizontal approach, several disease interventions are combined. They can be for different zoonotic diseases or for zoonotic and purely animal or human diseases (e.g. brucellosis and peste des petits ruminants, sheep pox), with the aim of achieving cost-effectiveness and sharing of resources (e.g. personnel, vehicles, cold chain). Overall, infrastructure, surveillance, diagnosis and delivery systems are strengthened in order to address different diseases and conditions. The impact might, however, be more difficult to measure. A large outbreak of a major livestock disease may easily mobilize all available resources and halt all other regular control activities carried, as observed for FMD and rabies in KwaZulu-Natal, South Africa, in 2011. Horizontal approaches can also entail a combination of vaccination and treatment (dogs vaccinated against rabies and dewormed with praziquantel to break the echinococcosis cycle) or combination of interventions in different species, e.g. combining vaccination against dog rabies with vaccination of small ruminants against brucellosis.

Beside purely horizontal and vertical approaches, specific disease packages might be defined, such as a rabies package consisting of interventions in human health (animal-bite reporting, post-exposure prophylaxis, surveillance and diagnostics) as well as in the animal health field (surveillance and diagnosis, animal vaccination and dog population management). Interventions, such as enhancing biosecurity, can also be relevant for a number of different diseases. Slaughterhouses can be key sites, not only for food safety and environmental health by meat inspection, hygiene and waste management but also as surveillance points.

Overall intervention approaches vary not only between regions but also within countries in urban and rural areas. It is recommended that experiences be shared and the approaches be evaluated, including their possible lateral benefits and negative impacts.
Discussion:

A country may choose to think ‘vertically’ but act ‘horizontally’. Veterinary services should pay more attention to the impact on human health of animal diseases, and public health services should pay more attention to economic and trade aspects of these diseases. Interventions will depend on the tools available for a particular disease. This may evolve with time, as it did for zoonotic trypanosomiasis, in which the emphasis was on assessing the number of tsetse flies rather than studying the prevalence of the disease in cattle.

In order to eliminate human dog-mediated rabies, interventions should take place at the level of the animal reservoir. Nevertheless, pre-exposure prophylaxis in children has been proposed as an alternative and has shown under certain conditions to be another cost-effective intervention. With the continuously decreasing cost of human-rabies biological products and the development of constantly shorter economical post-exposure prophylaxis (PEP) regimens, the overall costs of delivering PEP in any given country are decreasing and may compete more and more easily in terms of cost effectiveness with control of the disease at the level of the animal reservoir. Looking at a problem from a different point of view may indicate innovative, feasible solutions, although they may not be the best from a strict cost-effectiveness point of view.

The ‘One health’ concept is of value but is still led by the veterinary sector, and participants agreed that this is a major issue. Human health specialists are not yet fully engaged in most places. Not all medical specialists may need to be involved, but those in public health and zoonoses control should be targeted. One way of improving the situation is to share studies and experience. Master’s degrees in public health should become available for both medical and veterinary students. Presenting the problem in the right multidisciplinary/multigenerational meetings might bring about a cultural change at all levels: students, practitioners and policy-makers. In India, most rabies control activities are conducted by physicians and not by veterinarians. ‘Adopt a village’ is a small-scale project bringing students and professors of medical and veterinary faculties to villages to work with local women on rabies control. The physicians are fully engaged, while involving veterinarians is a challenge as they are fully occupied with food animals. Levels of human health and veterinary specialists’ engagement seem to depend on the prevailing culture.

Governments are not adequately involved in ‘One health’. Unless they are, NZDs issues will not be addressed properly. Information on ‘One health’ programmes should be collected and linked to ensure easy access and transparency of information and to better coordinate activities.

The three organizations should consider veterinary public health as a core priority while ‘One health’ evolves. The structures of governance in countries should be better understood so that concerns can be properly addressed. OIE was considered to be in a good position to make an inventory of available veterinary public health structures and their mandates. Furthermore, OIE, FAO and WHO should develop common guidelines on the terms of reference of veterinary public health units and veterinary public health activities and their place in existing animal health, public health and nongovernmental structures.

NZDs interventions could be used as examples of implementing the ‘One health’ concept, but this is generally not understood by the wider donor and research community. The contribution of NZDs prevention and control to ‘One health’ should attract at least as much attention as emerging zoonotic diseases.

WHO collaborating centres and FAO and OIE reference centres on zoonoses and veterinary public health are present on most continents. Many are disease oriented and have specific focuses and only some address NZDs as a whole. They should be brought together and motivated to better address NZDs issues.
6. **Existing and future plans for integrated control of zoonotic diseases (Sue Welburn)**

Effective control systems with multiple veterinary, public and animal health interventions are being designed and tested within the European Union-funded ICONZ project in case studies in Mali, Morocco, Mozambique, Nigeria, Uganda, the United Republic of Tanzania and Zambia. These tests, which will later be scaled up, will require mobilization of state veterinary and public health resources with, in some cases, innovative private sector veterinary businesses to deliver appropriate veterinary control sustainably in rural communities.

It is difficult to persuade the veterinary and medical sectors to work together effectively. Engaging other actors in particular communities, such as in community-based total sanitation projects, is more complex, as communities appear to expect larger packages from the veterinary sector, including animal feed and deworming in addition to vaccination and basic treatments for sick animals. Benefits must be demonstrated for all. A stronger contribution from social scientists is needed to make interventions sustainable.

Evidenced-based control strategies for zoonotic trypanosomiasis have been shown to work in Uganda (and are being refined in ICONZ), reducing the public health burden and improving livestock productivity. In seven affected districts, 500 000 head of animals have been treated; however, 15 districts with 2.5 million head of cattle require treatment for effective control of human infection. The financing necessary to implement these control operations at the scale and over the time needed to interrupt transmission and deliver long-term sustainable outcomes is not currently available: the blight of remaining an NZD. A new ‘mechanism’ is needed to attract the necessary financing, perhaps by learning from financing in other fields of social impact. For example, ways should be found to ‘monetize’ the impact of controlling zoonotic trypanosomiasis and thus secure donor money in a way that is geared towards successful outcomes and which will raise private sector interest.

7. **Identifying major programme components and the roles of the different organizations**

7.1 **Role of the OIE (Susanne Münstermann)**

The OIE would like to become a partner in writing a tripartite proposal for collaborative action on NZDs. In OIE, working groups are in place to address various aspects of strengthening the public health capacities of veterinary services. In addition, the OIE ‘twinning programme’ for laboratories and institutions (North–South and South–South collaboration) is applied to topics such as foodborne zoonotic parasites and emerging zoonotic diseases by linking an OIE reference laboratory or a collaborating centre with laboratories that wish to upgrade their capacity and capability. For capacity-building, the OIE has been requested to undertake veterinary education, to review and evaluate veterinary curricula and to identify the required competences at global level. OIE held a meeting of the deans of veterinary schools in Lyon, France, in 2011 to discuss veterinary curriculum issues. This is an opportunity to address topics related to veterinary public health and ‘One health’. Existing laboratory networks in member countries and subregions should be exploited to address veterinary public health issues, including NZDs prevention and control.

OIE also contributes to vaccine quality control, foodborne disease prevention and control, food safety promotion and training, and disease epidemiology and recently published a study on the cost of prevention systems for animal diseases and zoonoses. OIE has published guidelines on certain zoonotic diseases, such as *T. solium* taeniasis and cysticercosis (with WHO and FAO), which should be checked to see if they require updating. OIE also collects data from countries on rabies, cysticercosis and tuberculosis in animals and humans.

The proposed contribution and input of the OIE into the interagency proposal are shown in Annex 3.
7.2 Role of FAO (Katinka de Balogh)

Veterinary public health networks can be used to establish links in the field of NZD prevention and control. Projects for distance learning for continuing professional development in East Africa include modules for a range of veterinary professionals. FAO is investigating ways to promote training of veterinary public health experts, who in turn will be responsible for preparing appropriate curriculum modules for use in educational institutions. FAO is also involved in capacity-building in selected countries and is considering how it can enhance surveillance of zoonotic diseases and institutionalize ‘One health’ by strengthening interministerial committees, undertake zoonosis simulation exercises and establish community-based ‘One health’ activities.

7.3 Role of WHO (François Meslin)

Since its inception in 1948, WHO has been promoting veterinary public health activities particularly for zoonotic disease prevention and control. Since 2005, WHO has organized three international consultations on NZDs with a number of partners, including FAO and OIE, and the participation of many experts from various sectors and countries. These conferences have contributed to making NZDs an important component of WHO/NTD. NTD provides the coordination/secretariat for the global initiative for strengthening NZDs prevention, control and elimination.

NZDs are included in the Global Plan to Combat NTD (2008-2015) as well as in the first WHO report on Working to overcome the global impact of neglected tropical diseases, launched on 14 October 2010. The report acknowledges the importance of NZDs and identifies veterinary public health as one of five public health strategies for the prevention and control of NTDs. These conferences introduced the term ‘neglected zoonotic diseases’ for this group of diseases, and it is now well accepted internationally. This term indicates that the diseases are insufficiently addressed by governments and the international community at large, and that they are best defined by the people and communities they affect most: poor people living in remote rural areas or urban slums of the developing world.

The third meeting issued a concluding statement on the development of a roadmap for NZDs prevention and control aiming at initiating or strengthening NZD control and elimination activities at global, regional and country levels. As indicated earlier, the outcome of the 3rd meeting was jointly reviewed by FAO, OIE and WHO at WHO’s headquarters in Geneva, Switzerland, in February 2011; these three organizations agreed to participate in the present interagency group meeting and to start implementing the recommended activities.

8. Draft roadmap for integrated prevention and control of high-priority zoonoses and possible sources of funding

A first draft roadmap for preventing and controlling NZDs by 2015–2020 was presented by the WHO Secretariat and endorsed by the Scientific and Technical Advisory Group (STAG) of WHO/NTD at its annual meeting in Geneva in April 2011. The participants in this interagency meeting were invited to review and complete the guidelines, taking into consideration existing plans for individual NZDs presented above and also existing or foreseeable FAO and OIE institutional plans in this area.

Subgroups were asked to define project outputs and a timetable, including if possible budget estimates for specific activities. In addition, TDR identified key research priorities, which include improving diagnostics, knowledge management and dissemination of information on NZDs. The outcome of this exercise is attached as Annex 1.

A budget could not be estimated for all the activities listed in Annex 1. However, the WHO consultation on cystic and alveolar echinococcosis held in Geneva in June 2011 estimated the cost of implementing cystic echinococcosis pilot projects in 2013–2017 to obtain validated echinococcosis strategies in three countries by
2018 at about US$ 10 million over 5 years. Producing a validated strategy for control and elimination of *T. solium* taeniasis/cysticercosis by 2015 was estimated to require a similar investment. According to PAHO, the programme for human and dog rabies elimination in Latin America will require somewhat more than US$ 81 million over 4 years (2011–2014), of which US$ 62 million are expected to be contributed by governments and more than US$ 2 million by the Regional Office; with a funding gap of US$ 16.4 million remaining to be filled. In the WHO South-East Asia Region, the cost of regionally coordinated national and international activities was valued at approximately US$ 20 million (including Regional coordination costs of US$ 1.4 million) for 5 years (2012–2016), without taking into consideration direct national contributions to national projects in terms of vaccines and human resources.

Therefore, the annual funding requirements for human dog-mediated rabies prevention and control in Latin America, South-East Asia and capacity building in Africa plus research on echinococcosis/hydatidosis and *T. solium* taeniasis/cysticercosis will require approximately US$ 14 million annually for 5 years. This rough evaluation indicates that the minimum investment in a ‘priority NZDs portfolio’ covering three NZDs of global importance (human dog-mediated rabies, echinococcosis/hydatidosis and *T. solium* taeniasis/cysticercosis) plus two NZDs of regional importance (i.e. fascioliasis, other foodborne trematodiases and zoonotic trypanosomiasis) and some activities on major bacterial NZDs (i.e. anthrax, brucellosis and leptospirosis) would easily reach US$ 20 million a year for the next 5 years for the period 2012–2016. A tentative breakdown is attached as Annex 2.

Possible sources of funding were briefly discussed:

The United Kingdom Department for International Development is interested in the subject and should be approached.

The Gates Foundation recently reviewed its priorities and strategy. Dialogue should be established with key representatives in both the global health programme and the agriculture development programme. An NZD project might be a way of creating synergy between the two programmes.

The Rockefeller Foundation is now promoting the "One Health" trans-disciplinary approach to policy and practice in animal and human health through disease surveillance networks initiatives in Eastern and Southern Africa and Southeast Asia.

The United States Agency for International Development is committed to supporting global health initiatives.

The International Development Research Centre (IDRC) of Canada has been promoting ecosystem approaches to control of zoonotic diseases in the developing world.

Emerging economies such as those of Brazil, China, India and South Africa, where NZDs have a huge impact on poor populations, should be approached.

The interest of the private sector should be assessed, as well as the possible contribution of the pharmaceutical (both human and animal health) industry.

The European Union has showed interest in the subject with ICONZ.

The World Bank is definitively interested in new, emerging zoonotic diseases and in strengthening veterinary services.

The WHO South-East Asia Regional Office is advocating for a regionally coordinated rabies elimination programme in the countries of the South Asian Association for Regional Cooperation (SAARC), which has established a development fund. This association could be approached as a potential contributor to the human and dog rabies control and elimination programme.
9. **Final conclusions and recommendations**

- FAO and the OIE confirmed their strong interest in writing a common proposal with WHO for investment in a ‘priority NZDs portfolio’, defined as comprising:
  
  a) three NZDs of global importance (human and dog rabies, echinococcosis/hydatidosis and *T. solium* taeniasis/cysticercosis) plus
  
  b) two NZDs of regional importance (fascioliasis and other foodborne trematodiases and zoonotic trypanosomiasis) plus
  
  c) activities with regard to major bacterial NZDs (anthrax, brucellosis and leptospirosis).

- This first cost evaluation indicated that the external funding required by this ‘priority NZDs portfolio’ to achieve the expected outcomes mentioned in annex 1 would be at least US$ 20 million a year for the next 5 years.

- On the basis of the outcome of the meeting, the 3 agencies have agreed to prepare a detailed multiagency proposal for the prevention and control of major NZDs, to be used to seek funds at a larger tripartite meeting with international and national development agencies and foundations.
## Annex 1. Interagency roadmap for high-priority neglected zoonotic diseases: expected outcomes by objective by 2015 and 2020

<table>
<thead>
<tr>
<th>Objective</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reduce the burden of human rabies transmitted by dogs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freedom from terrestrial rabies maintained in western European countries</td>
<td>Western European countries continue to be free of terrestrial rabies</td>
<td></td>
</tr>
<tr>
<td>Human dog-mediated rabies eliminated and dog-to-dog transmission stopped in Latin American countries; first areas to be declared free of human and dog rabies.</td>
<td>Human dog-mediated rabies-free status and dog rabies-free status maintained and incidence of human bat-mediated rabies reduced in Latin America;</td>
<td></td>
</tr>
<tr>
<td>Coordinated regional rabies control programmes established in the WHO South-East Asia and Western Pacific regions</td>
<td>Human dog-mediated rabies eliminated in the WHO South-East Asia Region and some countries of the Western Pacific Region and sustainability ensured</td>
<td></td>
</tr>
<tr>
<td>Progressive control of terrestrial rabies, improved public awareness, surveillance and diagnostic capacity established in eastern European and Central Asian countries</td>
<td>Human dog-mediated rabies eliminated as a public health problem in eastern European and Central Asian countries</td>
<td></td>
</tr>
<tr>
<td>Reduced burden of human dog-mediated rabies in the Middle East and North Africa as well as sub-Saharan Africa by increased dog rabies control activities and wider use of cost-effective regimens like intradermal rabies post-exposure prophylaxis</td>
<td>Human dog-mediated rabies eliminated in the WHO South-East Asia Region and some countries of the Western Pacific Region and sustainability ensured</td>
<td></td>
</tr>
<tr>
<td></td>
<td>75% of population at risk of foodborne trematodiases reached by preventive chemotherapy</td>
<td></td>
</tr>
<tr>
<td><strong>Reduce the burden of foodborne trematodiases, including fascioliasis</strong></td>
<td>75% of population at risk of foodborne trematodiases reached by preventive chemotherapy</td>
<td></td>
</tr>
<tr>
<td>Foodborne trematodiases included in mainstream preventive chemotherapy strategy</td>
<td>Morbidity due to foodborne trematodiases controlled in all the endemic countries</td>
<td></td>
</tr>
<tr>
<td>Animal infections controlled and human fascioliasis reduced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Necessary veterinary public health support provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morbidity due to foodborne trematodiases controlled where feasible</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reduce the burden of zoonotic trypanosomiasis</strong></td>
<td>Eliminated in Uganda and sustainability ensured</td>
<td></td>
</tr>
<tr>
<td>Incidence controlled in selected countries of the WHO African Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Epidemiological and economic knowledge</strong></td>
<td>All major NZDs in humans and animals reported or notified</td>
<td></td>
</tr>
<tr>
<td>Validated estimates of global or regional burden available for major NZDs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Areas of co-endemicity of NZDs and NTDs mapped such as cysticercosis, schistosomiasis and foodborne trematodiases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs of NZD intervention strategies and cost-benefit and cost-effectiveness assessed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objective</td>
<td>2015</td>
<td>2020</td>
</tr>
<tr>
<td>-----------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Implementation research and scaling up interventions</td>
<td>Validated strategy for control and elimination of <em>T. solium</em> taeniasis/cysticercosis available including improved pig marketing and management in relation to disease control</td>
<td>Scale up interventions in selected countries for taeniasis/cysticercosis control and elimination using validated strategy</td>
</tr>
<tr>
<td>Pilot projects for the validation of effective echinococcosis/hydatidosis control strategies implemented in selected countries</td>
<td>Scale up intervention in selected countries for echinococcosis/hydatidosis control and elimination as a public health problem using validated strategy (available by 2018)</td>
<td></td>
</tr>
<tr>
<td>ICONZ Packages for integrated NZD control and system analysis in certain African countries of:</td>
<td></td>
<td>Scale up implementation in selected countries of country specific packages for integrated control of NZDs</td>
</tr>
<tr>
<td>- anthrax/bovine tuberculosis/brucellosis package in Nigeria and the United Republic of Tanzania</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- tick-borne and other vector-borne diseases (trypanosomiasis) package in Nigeria and Uganda</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- pig-related package with community-based total sanitation approach in Zambia and drugs and vaccine against cysticercosis in Mozambique</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- dog-related package with rabies and echinococcosis in Morocco</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research promotion</td>
<td>Progressive control pathway for NZDs studied</td>
<td>Scale up intervention in selected countries for brucellosis and tuberculosis control and elimination as a public health problem</td>
</tr>
<tr>
<td>New control packages for brucellosis and tuberculosis control available</td>
<td>Scale up intervention in selected countries for canine leishmaniasis control and elimination</td>
<td></td>
</tr>
<tr>
<td>Validated consensus guidelines for canine leishmaniasis control developed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog contraceptives of low cost and with improved delivery available to facilitate dog rabies control</td>
<td></td>
<td>New tools to be used in scale up interventions for relevant NZD control</td>
</tr>
<tr>
<td>Operational research completed on public health intervention and community participation for rabies control and other NZDs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New animal rabies vaccines (combined with reproduction control and of low cost and with improved delivery) available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Validated sheep vaccine for cystic echinococcosis and pig vaccine for <em>T. solium</em> cysticercosis control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Validated simple, specific and affordable point-of-care/pen-side tests for detecting <em>T. solium</em> infections in humans and pigs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparative evaluation of coproantigen enzyme-linked immunosorbent assays for cystic echinococcosis completed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Objectives

Continuous activities (2012 - 2020)

Capacity-building

Improved training:
- in expanded and improved NZD diagnostic capacity and surveillance systems for humans and animals
- in the use of essential biologicals for rabies (intradermal route for human post-exposure prophylaxis and rabies vaccines for dogs increasingly used globally) and echinococcosis and cysticercosis (in sheep and pigs respectively)
- in planning, implementation, monitoring and evaluation for dog rabies, cystic echinococcosis and/or T.solium cysticercosis/taeniasis control/elimination and other NZDs (using WHO/FAO/OIE guidelines)
- in care and management of neurocysticercosis cases in endemic areas (using WHO Guidelines)
- in humane methods for dog population management when combating dog rabies and/or cystic echinococcosis

Institutional strengthening

Veterinary services strengthened and veterinary public health services established or strengthened
Intersectoral committees and interministerial collaboration strengthened or consolidated

Annex 2. Tentative breakdown of financial requirements for the ‘minimum neglected zoonotic diseases investment portfolio’ for 5 year

<table>
<thead>
<tr>
<th>Subject</th>
<th>Area</th>
<th>Million US$ required per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human and dog rabies</td>
<td>Latin America</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>South-East Asia Region</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>African Region</td>
<td>1</td>
</tr>
<tr>
<td>Cystic echinococcosis/hydatidosis</td>
<td>Selected pilot zones</td>
<td>2</td>
</tr>
<tr>
<td>T. solium taeniasis/cysticercosis</td>
<td>Selected pilot zones</td>
<td>2</td>
</tr>
<tr>
<td>Foodborne trematodiases</td>
<td>Selected pilot zones</td>
<td>2</td>
</tr>
<tr>
<td>Zoonotic trypanosomiasis</td>
<td>African Region</td>
<td>1</td>
</tr>
<tr>
<td>Bacterial zoonoses</td>
<td>Selected pilot zones</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>
### Annex 3: OIE contribution and input to the interagency roadmap for neglected zoonotic diseases and veterinary public health

<table>
<thead>
<tr>
<th>Objective</th>
<th>Reference or benchmark</th>
<th>Input to proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reduce the burden of human rabies transmitted by dogs</strong>&lt;br&gt;Reduced chapter on rabies in manual to be taken as the reference for diagnostic techniques&lt;br&gt;The revised Code chapter on rabies will emphasize dog population control and guidance on intermediate steps to control rabies in the dog population (adoption of chapter presumably in 2012)&lt;br&gt;Forthcoming update on vaccine section of manual to be taken into consideration in rabies control programmes&lt;br&gt;Terrestrial Code chapter 7.7, Stray dog population control&lt;br&gt;Recommendations of the OIE Global Rabies Conference</td>
<td>Rabies could feature high on the agenda of OIE Regional Commission meetings in the targeted regions.&lt;br&gt;Awareness campaigns&lt;br&gt;Pledging at OIE Global Rabies Conference</td>
<td></td>
</tr>
<tr>
<td><strong>Reduce the burden of foodborne trematodiases, including fascioliasis</strong>&lt;br&gt;To be considered by the OIE working group on food safety</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Capacity-building</strong>&lt;br&gt;Code chapters 3.2.7 (Zoonoses) and 3.2.5 (Veterinary public health) as reference points&lt;br&gt;Chapters 4.12 (Disposal of dead animals), and 6.1 (Role of veterinary services in food safety)</td>
<td>Performance of Veterinary Services (PVS tool): to strengthen VS competence in veterinary public health&lt;br&gt;Inclusion of NZDs in training focal points for food safety&lt;br&gt;Twinning on priority NZDs&lt;br&gt;Sensitize about OIE reporting obligations</td>
<td></td>
</tr>
<tr>
<td><strong>Epidemiological and economic knowledge</strong>&lt;br&gt;Reference to OIE study on cost of national surveillance systems for animal diseases and zoonoses&lt;br&gt;Reference to OIE study on listing and categorization of high-priority animal diseases, including those transmissible to humans</td>
<td>Issue follow-up studies with more emphasis on NZDs</td>
<td></td>
</tr>
<tr>
<td><strong>Implementation research and scaling up interventions</strong>&lt;br&gt;Use the OIE network of reference laboratories and collaborating centres&lt;br&gt;Use OIE disease chapters in the Code and manual as guidelines: 8.4/2.1.4 Echinococcosis; 2.9.5 Cysticercosis WHO/FAO/OIE guidelines on trichinellosis&lt;br&gt;WHO/FAO/OIE guidelines on taeniasis/cysticercosis</td>
<td>Address NZDs in OIE ad hoc group on parasitic zoonoses&lt;br&gt;Enforce notification of notifiable NZDs (rabies, tuberculosis, cysticercosis) and reporting on others</td>
<td></td>
</tr>
<tr>
<td><strong>Research promotion</strong>&lt;br&gt;Use the OIE network of reference laboratories and collaborating centres for specific studies if required.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Annex 4.  List of participants

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UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases

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