

Integrated Control of Neglected Zoonotic Diseases in Africa



Applying the “One Health” Concept

Report of a Joint
WHO/EU/ILRI/DBL/FAO/OIE/AU Meeting

ILRI Headquarters, Nairobi, 13–15 November 2007

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Zoonoses and Veterinary Public Health
Department of Food Safety, Zoonoses, and Foodborne Diseases
Sustainable Development and Healthy Environments

http://www.who.int/neglected_diseases/zoonoses/en/

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Preface

Endemic zoonotic diseases such as anthrax, bovine tuberculosis, brucellosis, cysticercosis, echinococcosis (hydatid disease), rabies and zoonotic trypanosomiasis (sleeping sickness) occur throughout the African continent where conditions for their maintenance and spread exist. These diseases perpetuate poverty by attacking not only people's health but also their livelihoods. Unfortunately, these persistent zoonoses remain neglected in most of the African countries where they are endemic because of lack of information and awareness about the extent of the problem, lack of suitable diagnostic and managerial capacity, and lack of appropriate and sustainable strategies for prevention and control. The result is a false perception that the burden of these diseases and their impact on society are low, such that they neither attract the health resources nor the research needed for their control – effectively putting them in the category of neglected zoonotic diseases (NZDs).

Control of NZDs, by simultaneously saving lives and securing livelihoods, offers a very real and highly cost-effective opportunity for alleviating poverty, especially in remote rural areas and marginalized periurban communities. In many African countries, the veterinary public health infrastructure is poor or nonexistent, generating indecision as to which sector(s) should take responsibility for investigating and controlling NZDs (the veterinary or agricultural sector versus the health sector). This situation has led to control of NZDs falling into the gap between veterinary responsibilities and medical needs. Because NZDs affect both humans and animals, especially where they involve livestock, interventions to control NZDs require concerted action between veterinary, livestock and human health sectors. A comprehensive, interdisciplinary approach is therefore needed to address the major obstacles to control NZDs.

This joint meeting brought together researchers, those working on the control of NZDs and policy-makers from across the African continent to discuss and plan the specific actions needed to implement a regional programme for understanding and controlling NZDs. These actions are detailed in the proceedings of the meeting contained in this report. The results of such a programme will benefit the many communities affected by these diseases.

Successful control of NZDs entails effective leadership and concerted effort as well as technical, financial and political support. The NZD initiative is focusing first on Africa as the continent most affected by these diseases. Together, we should seize the opportunity afforded to make a genuine difference.

The representatives of WHO, EU, ILRI, DBL, FAO, OIE and AU



Acknowledgements

The organizers of the meeting would like to express their sincere thanks to all those who contributed to its success – especially to the participants for their valuable inputs during the plenary and working group sessions.

Particular gratitude is due to Dr Malika Kachani and Dr Sayoki Mfinanga for chairing and co-chairing the meeting, respectively, and to Dr Eric Fèvre and Professor James Mlangwa for serving as rapporteurs. These individuals also provided invaluable assistance by leading and reporting on the discussions and recommendations of the working groups.

The meeting would not have been possible without the excellent day-to-day organization provided by Marion Reverdin at WHO headquarters, by Albert Minyangadou Ngokobi and other staff at the WHO Kenya Country Office in Nairobi, and by Gertrude Ngeleshi, Veyrl Adell, Vivian Awuor and the many other support staff at ILRI. Special thanks go to Dr Alexandra Shaw for suggesting a timely follow-up to the first NZD meeting.

Dr François Meslin, WHO headquarters, convenor of the meeting was assisted by Dr Arve Lee Willingham of the WHO/FAO Collaborating Center for Parasitic Zoonoses at the University of Copenhagen in Denmark with regards to the overall coordination and reporting of the meeting on behalf of the organizing agencies.



Summary

Control of neglected zoonotic diseases (NZDs), by simultaneously saving lives and securing livelihoods, offers an important opportunity for alleviating poverty in remote rural areas and among marginalized periurban communities of poor livestock keepers in Africa and other less developed areas of the world.

The meeting held at the headquarters of the International Livestock Research Institute (ILRI) in Nairobi, Kenya during 13–15 November 2007 was supported jointly by the World Health Organization (WHO), the European Commission (EU), ILRI, the DBL-Centre for Health Research and Development (DBL), the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE) and the African Union (AU). It focused on the need to and opportunities for combating NZDs in Africa as the most affected continent where all of the NZDs occur; and where their burden on society hinders development and has a serious impact on health and agriculture.

The objective of the meeting was to formulate a strategic framework for implementing the action points for combating NZDs that arose from an initial meeting held at WHO in 2005.¹ These actions were to promote a “one health” integrated approach to control of NZDs, to develop plans for advocacy and information, to improve diagnosis and surveillance, to foster research, to build capacity and to strengthen prevention and control activities. A multidisciplinary group of researchers, programme managers and policy-makers from across the African continent was brought together with international experts and representatives of regional and international technical support agencies and organizations to address practical, institutional, political and resource-related issues associated with integrated surveillance, prevention and control of NZDs in Africa.

The meeting appreciated that controlling, preventing and eventually eliminating NZDs would be highly cost effective from a societal point of view, taking into account both the health and agricultural aspects. A plan of action for implementing integrated control of NZDs in Africa is recommended as follows.

- To provide global and regional leadership to promote and coordinate the “one health” integrated approach to control of NZDs through the establishment of an International Scientific Advisory Committee (ISAC) for NZDs.
- To promote advocacy efforts to inform about the societal burden of NZDs to create demand for their control.
- To conduct, maintain and report inventories of control activities and tools.
- To develop and test practical, cost-effective strategies for surveillance and control.
- To produce guidelines for implementing surveillance, prevention and control activities.

¹ www.who.int/zoonoses/Report_Sept06.pdf



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1

Introduction

A joint meeting on integrated control of neglected zoonotic diseases in Africa was organized in Nairobi, Kenya from 13 to 15 November 2007 by the World Health Organization (WHO) in collaboration with the European Commission (EU), the International Livestock Research Institute (ILRI), the DBL-Centre for Health Research and Development (DBL), the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE) and the African Union (AU).

The meeting was opened by Dr Carlos Seré, Director-General, ILRI; Dr Abdoulaye Diarra representing the WHO Regional Office for Africa (AFRO); Dr William Amanfu representing FAO; Dr Nicolas Denormandie representing OIE; Dr Isabel Minguez-Tudela representing the EU’s Research Directorate, Dr Maria Vang Johansen representing DBL and Dr Hameed Nuru representing the African Union’s InterAfrican Bureau for Animal Resources (AU-IBAR).

Dr François Meslin, Coordinator, Zoonoses and Veterinary Public Health, welcomed participants on behalf of WHO headquarters and, assisted by Dr Lee Willingham, presented the background, objective and agenda of the meeting.

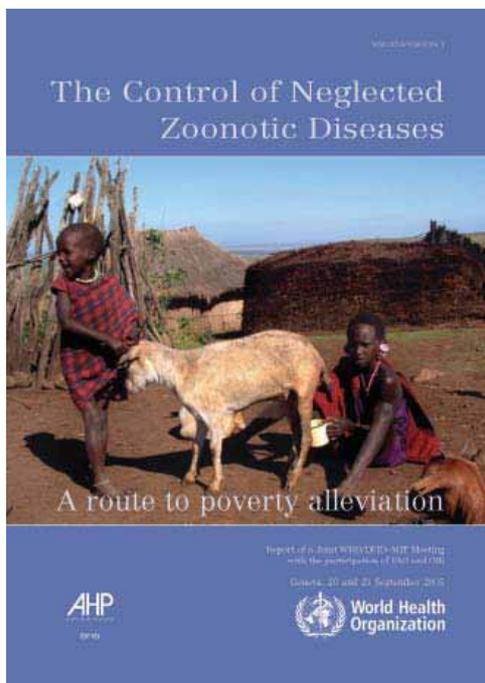
Participants elected Dr Malika Kachani, of the Western University of Health Sciences’ College of Veterinary Medicine (USA) as Chairperson and Dr Sayoki Mfinanga of the Muhimbili Research Centre, National Institute of Medical Research (United Republic of Tanzania) as Co-Chairperson. Dr Eric Fèvre of the University of Edinburgh’s Centre for Infectious Diseases (Scotland) was elected as Rapporteur and Professor James Mlangwa of the Department of Veterinary Medicine and Public Health, Faculty of Veterinary Medicine, Sokoine University of Agriculture (United Republic of Tanzania) was elected as Co-Rapporteur.



Participants at the meeting on Integrated Control of Neglected Zoonotic Diseases in Africa held at ILRI headquarters in Nairobi, Kenya

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Background



Proceedings of the WHO/DFID-AHP meeting “The control of neglected zoonotic diseases: a route to poverty alleviation” can be obtained freely via the Internet: www.who.int/zoonoses/Report_Sept06.pdf

Promote the concept of “one health” by dealing with health problems in both people, their livestock and other domestic and wild animals they depend on through the development of integrated “control packages” that address several disease/health problems

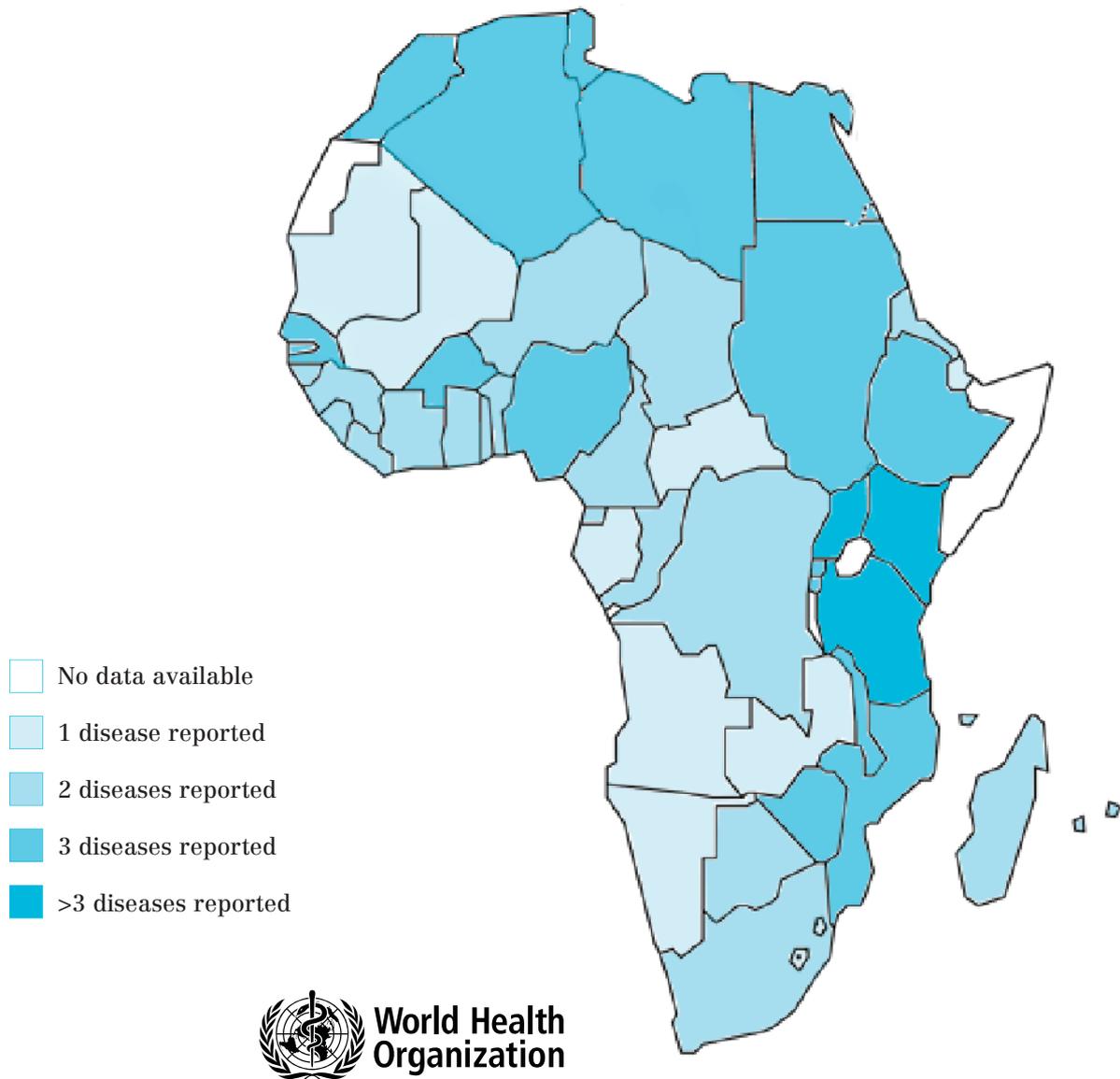
**WHO/DFID-AHP
Control of Neglected Zoonotic
Diseases Meeting, 2005**

Although many meetings and initiatives have addressed emerging and re-emerging diseases, the particular focus on endemic zoonoses and the problems of their control has been lacking. There is increasing interest in neglected zoonotic diseases (NZDs), an under-diagnosed group of diseases whose neglect stems from various reasons, including the fact that the main burden of these diseases falls mostly on poor and marginalized populations. There is today a growing body of evidence to suggest that many of these diseases impact negatively on livestock productivity, undermining livelihoods both by causing illness in the household and by threatening its livestock and their output. Many of these diseases are more or less effectively controlled in industrialized countries, but are emerging or re-emerging in developing countries, particularly in Africa. Since controlling them is highly cost effective from a societal point of view, taking into account both the health and the agricultural aspects, this is an area where interventions have enormous potential to alleviate poverty.

An international meeting jointly organized by the UK’s Department for International Development-Animal Health Programme (DFID-AHP) and the World Health Organization (WHO) was held at WHO’s headquarters in Geneva, Switzerland in September 2005, entitled “The control of neglected zoonotic diseases: a route to poverty alleviation” to focus international attention on the issue. Seven endemic zoonoses, namely anthrax, bovine tuberculosis, brucellosis, cysticercosis, echinococcosis, rabies and zoonotic trypanosomiasis, were targeted as the initial group of NZDs at which to direct concerted efforts. The report of this first meeting outlined the needs, justification and opportunities for combating NZDs and proposed five main action points to accomplish this: to promote a “one health” integrated approach, to develop plans for advocacy and information, to improve diagnosis and surveillance, to foster research, and to strengthen prevention and control activities.

This second meeting addressed the needs and opportunities for controlling NZDs in Africa, which is the continent most affected by NZDs, where these diseases are endemic and where their combined burden seriously hinders development. The objective of the meeting was to formulate a strategic framework for implementing the action points emanating from the first meeting. The involvement of researchers, programme managers and policy-makers in this planning phase was to enable the intended outcome of the meeting – effective and sustainable control of NZDs in Africa.

Distribution of selected zoonotic diseases



World Health Organization 2005

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Overlap of 5 selected neglected zoonotic diseases at country level in Africa: cutaneous leishmaniasis (anthroponotic and zoonotic), zoonotic trypanosomiasis, echinococcosis, cysticercosis (Taenia solium) and rabies. No attempt has been made to differentiate diseases that occur focally within each country. Over 30% of African countries have 3 or more of these NZDs in various combinations.

Note that the boundaries shown and the designation used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country territory, city or areas or its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data source: World Health Organization map production: Public Health Information and Geographical Information Systems (GIS) World Health Organization.

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Objectives

The objective of the meeting was to address the practical, institutional, political and resource-related issues associated with integrated surveillance, prevention and control of NZDs on the African continent by formulating a specific implementation plan for accomplishing the action points emanating from the first meeting on NZDs held in 2005 (see Table). A multidisciplinary group of researchers, programme managers and policy-makers from across the African continent was brought together with international experts and representatives of regional and international technical support agencies and organizations to develop this strategic framework for implementation.

The meeting was arranged such that researchers and programme managers first came together to discuss the situation of NZDs in Africa and to consider in-depth through working groups specific realistic actions at the regional and national levels that could be undertaken to effectively and sustainably relieve the burden of NZDs. Four working groups were convened to cover the areas that needed to be addressed:

- management and advocacy
- research and training (changed to research and capacity building)
- diagnostics and surveillance
- prevention and control.

On the third day of the meeting, regional policy-makers were informed about the needs and opportunities for combating NZDs and invited to provide feedback on how the issue and actions to address it (*i.e.* integrated surveillance and control) would be considered from their viewpoint and to make suggestions for refinement. The outcome was an appropriate and achievable plan of action for each of the thematic areas. The key issues considered, main discussion points and action plans developed by each of the working groups, which are presented below.

In support of the working groups' deliberations, plenary presentations were provided by key speakers on topics of relevance. Two keynote presentations were given on the "one health" approach to prevention and control of NZDs and the double benefits of the control of NZDs in consideration of their dual burden on health and agriculture, respectively. Other presentations – on trends, initiatives, programmes and approaches of relevance to NZD surveillance and control in Africa – included:

- Changes in livestock marketing and production systems in Africa
- Avian influenza: paving the way for surveillance and control of NZDs
- The intersectoral approach to sleeping sickness control
- Challenges and opportunities for integrated control of NZDs
- OIE's information system (WAHIS) and database (WAHID)
- The EU's FP7 for research and the ETPGAH
- The Global Alliance for Livestock Veterinary Medicines (GALVmed)
- The health promotion approach for control of NZDs.

Abstracts of these presentations are included in the proceedings (pages 30–39).

The five action points from the initial meeting of control of NZDs in 2005

Action Points	Activities Needed
1/ Promote "One Health" approach to integrated surveillance and control of NZDs	Veterinary and medical aspects of NZDs control must be linked at all levels thereby promoting and facilitating communication, cooperation and collaboration across sectors and disciplines
2/ Advocacy and Information	<p>Establish a secretariat to coordinate activities in conjunction with a scientific advisory committee tasked with facilitating and promoting priority research and training activities</p> <p>Increase awareness of decision-makers, the donor community, technical support agencies and other stakeholders about the burden and costs of NZDs as well as cost-effectively combating them</p> <p>Establish international/regional resource centers for producing, gathering and distributing educational and advocacy materials</p>
3/ Research	<p>Ensure research activities integrated with surveillance and control needs</p> <p>Recognize and support centres of excellence in NZDs research linked to local public health and agricultural systems</p> <p>Promote and facilitate pilot studies on the NZDs including burden, socioeconomic costs and risk analysis including adjusting for underreporting</p>
4/ Diagnosis and Surveillance	<p>Promote systematic collection and assimilation of data on neglected zoonoses infections in both human and animals</p> <p>Ensure surveillance systems for each NZD established and incorporated in national health and agricultural information systems</p> <p>Develop and manage reporting systems for both veterinary and medical data</p> <p>Use existing databases as appropriate. Reviews of the status of the different NZDs at national/regional/global levels needed</p> <p>Ensure diagnostic facilities for neglected zoonoses available with appropriately trained staff at the regional and national levels as appropriate</p> <p>Validate and standardise diagnostics for NZDs at the regional level</p>
5/ Control	<p>Promote cost-effective integrated approach to NZDs within existing health and agricultural systems</p> <p>Formulate and validate integrated control packages to address several related disease/health/livestock problems</p> <p>Conduct operational research to assess impact, safety and cost-effectiveness of NZDs control packages, using disease control and cost modelling exercises where appropriate</p> <p>Target most vulnerable populations - rural smallholders, pastoral communities and urban/peri-urban livestock producers</p> <p>Conduct pilot intervention studies based on research indicating the most appropriate, acceptable, cost-effective and sustainable strategies</p>

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Conclusions

Control of NZDs is a recent initiative. The concept and “branding” of integrated surveillance, prevention and control of NZDs was jointly proposed by DFID-AHP and WHO in early 2005. The report of the WHO/DFID-AHP inception meeting on “The control of neglected zoonotic diseases: a route to poverty alleviation” held at WHO headquarters in September 2005 was very well received internationally and paved the way for subsequent NZD initiatives.

Neglected diseases are at the core of human rights as they deal with issues related to poverty, discrimination, stigma and the right to health.

**WHO Meeting on Intensified Control of Neglected Diseases
Berlin, 2004**

The meeting on integrated control of NZDs in Africa is satisfied with the progress achieved over the past two years since the initial meeting. The momentum has been maintained until this second meeting, which is tackling some of the practical, institutional, political and resource-related issues associated with the NZD initiative in Africa. Strong international interest in this initiative is evidenced by the support provided for the meeting from international technical support agencies (WHO, FAO, OIE) and research institutes (ILRI, DBL) as well as the European Commission and the African Union. In addition to the commitment of these agencies, institutes and intergovernmental organizations, funding bodies have also begun to recognize the impact of these diseases and have started supporting the development of the concept of NZD prevention and control (*e.g.* the EU Research Directorate, the Wellcome Trust, the Bill & Melinda Gates Foundation).

Recommendations from the meeting for a plan of action to combat NZDs in Africa have been developed following intense deliberations of the diverse group of researchers, programme managers, policy-makers, international scientists and representatives of technical support agencies assembled in Nairobi to consider the best way forward. The results provide the basis for a strategic framework to effectively address the burden of NZDs in Africa. One of the main components of this plan is the establishment of a coordinating body in the form of a scientific advisory committee to provide managerial support and to serve as the “driving force” for combating NZDs. The meeting also called for an assessment of current NZD surveillance and control activities and tools in Africa with an aim of filling in the gaps through development of regional and national surveillance and control programmes based on proven guidelines and tested strategies. The justification and demand for these activities will be secured through understanding and information about the burden of NZDs on African society and their recognition as a serious hindrance to development. The NZD initiative may benefit from the global attention paid to highly pathogenic avian influenza due to H5N1, whereby new whereby new veterinary public health (VPH) structures and initiatives established to deal with that emerging threat (*e.g.* OIE/FAO/AU Animal Health Centres, Regional/National Task Forces) can also be utilized to address the persisting problem of endemic NZDs. In addition, a number of neglected tropical diseases (NTDs) are targeted for elimination. The successful completion of these programmes will create new opportunities on the global NTD platform for increased attention to be paid to NZDs that are already being included as a subset of the NTDs under WHO’s global plan to combat NTDs (http://whqlibdoc.who.int/hq/2007/WHO_CDS_NTD_2007.3_eng.pdf).

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Recommendations

AT THE GLOBAL LEVEL

1. Establish a WHO Global Scientific Advisory Committee for NZDs in collaboration with FAO and OIE where veterinary and medical fields are represented together with other relevant technical areas.
2. Step up advocacy for NZDs and the “one health” approach. Participants recommended that WHO along with other relevant organizations (particularly FAO and OIE) take a leading role by bringing NZD prevention and control to the attention of their respective governing bodies. A realistic target date for WHO would be the World Health Assembly in May 2009. The involvement of international organizations not represented at this meeting such as UNICEF was recommended.
3. Increase as an urgent need awareness among decision-makers, the donor community and other stakeholders on the burden of NZDs and their impact on livelihoods, human health and productivity and other associated costs.
4. Consider extending the scope of work to prevention and control of avian influenza **and other zoonoses including NZDs** of the 3rd International Ministerial Conference on Avian and Pandemic Influenza (New Delhi, 4–6 December 2007) in an effort to further increase awareness and mobilize much needed resources¹.
5. Make clearer in NTD advocacy documents and on the NTD web site that NZDs also mostly affect populations living in the tropics (as detailed in the WHO Plan to Combat Neglected Tropical Diseases, 2008–2015)².
6. Keep up to date and disseminate inventories of vaccines, treatments, public awareness materials, suppliers and supplies related to NZD prevention and control.
7. WHO and partners should plan the next global conference on NZDs (proposed deadline: end of 2009).

¹ Action already taken by the EU. A statement endorsed by the 21 members and shared with FAO, OIE and WHO was made during the New Delhi pledging meeting in December 2007.

² Discussion already held with NTD Director, action taken within WHO.

AT THE REGIONAL LEVEL

1. Establish a NZD International Scientific Advisory Committee (NZD - ISAC) This committee should include representation from AFRO, WHO Regional Office for the Eastern Mediterranean (EMRO) and AU (IBAR and human health group as well as other regional institutions. Its main role will be to share and communicate information and provide a model for how the “one health” approach can be applied in Africa in relation to NZDs in the context of eco-systems that facilitate transmission of NZDs and existing institutional frameworks for their prevention and control.
2. Invite the President of Liberia, Her Excellency Ellen Johnson Sirleaf (or another notable figure from the region) to be associated with the work of the Scientific Advisory Committee focusing on Africa.
3. AU, FAO, OIE and WHO should coordinate the setting up of a biennial meeting of ministers of agriculture/livestock and health from African states, with a plan to review issues of joint concern regarding NZDs. (This meeting should be modelled on the biennial Inter-American Meeting in Health and Agriculture at Ministerial Level (RIMSA) coordinated by the Pan American Health Organization (PAHO).
4. WHO, FAO, OIE and other organizations or entities such as the AU, EU, World Bank (WB), African Development Bank, ALive, bilateral development agencies and, international foundations should join forces to support and facilitate cooperation, intersectoral collaboration, coordination and resource mobilization by organizing regular regional executive meetings involving ministers of health and agriculture/livestock as well as technical meetings, stimulating (operational) research, and strengthening veterinary/agriculture and health services.
5. Newly established regional FAO/OIE/AU animal health centres should support activities to control NZDs within their regions.
6. WHO with FAO and OIE should lead a regional inventory of existing intersectoral arrangements and ongoing NZD control programmes.
7. WHO AFRO with HQ support should develop a regional strategy and mid-term plan for NZD surveillance, prevention and control.
8. WHO, FAO, OIE and other organizations or entities such as the AU, EU, WB, IFAD and ALive should plan for a next Africa regional meeting on NZDs (suggested deadline: early 2009).

AT THE NATIONAL LEVEL (WITH GLOBAL AND REGIONAL INPUTS)

1. Clarify the role of national VPH structures in the context of their contribution to health care, while recognizing that the responsibilities of VPH go beyond NZDs.
2. Use guidelines developed by the NZD International Scientific Advisory Committee to guide how VPH units should be established and structured. It will be crucial to be very clear as to whom they report to and where they are located. The mandate of the national intersectoral committees or task forces established to deal with avian influenza should include other zoonoses of public health significance including NZDs. In addition, these committees should become permanent as was successfully accomplished in Ethiopia.
3. Produce and diffuse advocacy and informational material in all media (radio, film, print media, etc.), targeting decision-makers and those who implement and enforce recommendations and, separately, end-users (that is, those people threatened most by NZDs). The first group of briefing documents targeting specific key decision-makers (ministers of agriculture/livestock, finance, health, education and the interior and writers of policy documents) will need to be designed. Developing the educational materials for the second group of documents will require the active involvement of mass media technicians and communication experts.
4. Include zoonoses in the education system (alongside other health and veterinary issues) at all levels from primary school onwards and integrate NZDs in the health delivery system.
5. Include NZDs in the curricula of veterinarians and physicians, with the possibility of joint courses at undergraduate and postgraduate levels.
6. Promote synergy through reciprocal dialogue between employers and educational institutes so that employers (*e.g.* ministries) advise educational establishments on the profiles required for effective NZD control.
7. Conduct pilot studies on the burden of NZDs and their societal costs, risk analysis and adjusting for underreporting. In particular, conduct cost analyses of "incentive-based research and intervention packages", and study the relationship between poverty, human health-related risks, livestock production, distribution systems and value chains (farm to fork, stable to table) and NZDs.
8. Conduct an inventory of notifiable NZDs (in humans and animals) in each country, evaluate and develop diagnostic tools (including molecular tools) and conduct knowledge, attitude and practices (KAP) studies in local settings. Improve the compatibility of reporting systems for human NZDs and animal NZDs.
9. Initiate pilot studies to test the acceptability, effectiveness, timing and costing of possible combined integrated prevention and control packages. In this respect, WHO and its partners should produce guidelines for the development and delivery of such packages. Increased public awareness of all relevant audiences is a crucial and cross-cutting component of any integrated package.

6

Management and Advocacy

The Cysticercosis Working Group in Eastern and Southern Africa (CWGESA), a registered NGO, was established in 2002 to facilitate integrated research and control activities to combat cysticercosis



Responsibilities of VPH Units go beyond simple meat inspection and food safety issues to include active surveillance and awareness creation, with reference to existing guidelines and in response to previous/recent developments.

KEY ISSUES CONSIDERED

Management

1. Need for an international entity with strong regional representation to steer the *Integrated Control of Neglected Zoonoses* initiative, with particular attention to Africa.
2. This initiative requires:
 - an intersectoral approach;
 - effective communication among all stakeholders;
 - the establishment of and liaison with regional NZD networks, collaborating and reference or training centres and other relevant public and private institutions including academia.
3. Need for *Regional Scientific and Technical Advisory Groups* to advise the above entity in planning, implementing and monitoring control and research activities in order to:
 - conduct an inventory of current research into epidemiology, burdens and control of NZDs;
 - identify significant research gaps in these areas;
 - ensure that research efforts are integrated with control needs.
4. Need to mobilize human and financial resources by securing the commitment of governments, international and regional organizations and donor bodies to enable operational research, training and implementation of surveillance and control activities.

Advocacy

1. Establish regional resource centres for gathering educational and advocacy materials on NZDs in collaboration with WHO, FAO and OIE.
2. Increase awareness among decision-makers and policy-makers, donor community and other stakeholders about the burden, impact and costs of NZDs.
3. Disseminate and improve availability of information on all aspects of NZDs.

MAIN DISCUSSION POINTS

Establishing an International NZD Scientific Advisory Committee and VPH Units

- An international scientific advisory committee for NZDs (NZD-ISAC) should be established to facilitate information-sharing.
- Both veterinary and medical fields must be represented on the committee, while recognizing the need to involve other professionals such as scientists, economists and sociologists.
- As Africa is a key area for NZDs, the NZD-ISAC should include representation from AFRO, and include AU (IBAR and human health group).
- The committee should also involve existing vertical groups (*e.g.* African rabies group, CWGESA, Bovine tuberculosis (TB) network), which could include setting up a forum for regular meetings with representatives from these groups.
- A time-line should be fixed for the basics of setting up the NZD-ISAC, ideally before the next global neglected zoonoses meeting.
- NZD-ISAC should be responsible for setting dates and themes for future international and regional NZD meetings, which should be held regularly, probably at least every two years.
- The NZD-ISAC should provide a model for how the “one health” approach can be applied in Africa in relation to NZDs in the context of the eco-systems facilitating their transmission. This should initially be interpreted in terms of a dynamic intersectoral approach to the control of these diseases.
- The NZD-ISAC should establish ad hoc committees to address the following as required:
 - management and advocacy;
 - research and capacity building;
 - diagnostics and surveillance;
 - prevention and control.
- The NZD-ISAC should identify existing national, regional and international centres where NZD information could be compiled, stored, updated, accessed and disseminated (*i.e.* NZD reference centres).
- The NZD-ISAC should clarify the role of national VPH structures in the context of their contribution to health care, while recognizing that the responsibilities of VPH go beyond just the NZDs.
- The NZD-ISAC should provide guidelines on how national VPH units should be established and structured. Reporting arrangements should make clear to whom and in which location the units should report (ministry of health versus ministry of agriculture/livestock) .

Effective advocacy based on evidence of the burden of NZDs on endemic communities is needed to ensure that the importance of NZDs is recognised by decision-makers and donors.

Establishing VPH Units

- There is a need to institutionalize a national inter-ministerial committee in order to oversee the VPH units, both to clarify financial and authority issues. This should be advocated for at the policy level of national strategic action plans (as was successfully demonstrated in Ethiopia for avian influenza and the potential to transform these units to deal with more zoonoses).
- VPH units should oversee any programme or projects on NZD research, surveillance, and prevention and control and advise the leading organization of each programme/project.
- Responsibilities of VPH units go beyond simple meat inspection and food safety issues to include active surveillance and awareness creation, with reference to existing guidelines, and should be responsive to developments.
- Activities with respect to NZD should be included in the routine work of VPH units. Affected countries should identify the key NZDs and assign appropriate tasks for their surveillance, prevention and control to the VPH unit.
- Staffing of VPH units should reflect professional balance and appropriate training.
- Reporting structures should be promote links with the veterinary/ livestock, agriculture and health services and research organizations.

Awareness creation among decision-makers

- There is an urgent need to increase awareness among decision-makers, the donor community and other stakeholders on the burden, impact on livelihoods, human health, agricultural production and other costs imposed by NZDs. This task will rely on the work on surveillance, estimation of incidence and prevalence and calculation of disease burden .
- Information on the total costs to society of NZDs (in both people and their livestock) can be used to demonstrate that controlling NZDs is highly cost-effective. Information used should be highly relevant to the countries/organizations/groupings being targeted, and also appropriately packaged.
- The “one health” concept should be further explained and promoted.
- Active targeted lobbying for NZD control (*e.g.* for tabling items on World Health Assembly agenda, FAO council, AU council of Heads of State) by briefing relevant national ministers should be undertaken by key members of the NZ-ISAC or similarly high-profile individuals.
- AU, WHO and FAO should initiate a biennial meeting of Ministers of Agriculture/Livestock and Health from African states, with a view to reviewing issues of joint concern. (This should be modelled on the biennial RIMSA meeting organized in Latin America coordinated by PAHO.)

- Opportunities for regular interaction among individuals at all these levels (meetings, workshops, seminars, briefing sessions) should be created.
- Advocacy and information materials in all media (radio, film, print) should be produced and diffused, in particular, briefing documents targeting specific key decision-makers and policy-makers (Ministers of Agriculture, Finance, Health, writers of policy documents). Mass media technicians and communication experts should be actively involved in this process.
- New discoveries, innovations and research breakthroughs of relevance to the NZD control should be communicated to decision-makers.
- NZD issues should be included in the education system (alongside other health and veterinary issues) at all levels from primary school onwards.
- Synergies should be promoted through reciprocal dialogue between employers and educational institutes so that employers (*e.g.* ministries) can advise educational establishments on the profiles required for effective NZD control.
- Control of NZDs should be integrated into the health-care delivery systems for both humans and animals.
- Decision-makers and policy-makers should be identified at different levels (see list of acronyms page 40–41):

Sub-national

- Local/district/cercle authorities
- State/province authorities/government
- NGOs
- Other stakeholders (*e.g.* civil society organizations; CSOs)

National

- relevant arms of government (parliaments, office of the president) ministries/departments/sectors (especially Ministry of Finance, authors of Poverty Reduction Strategy Papers (PRSPs), policy dialogues)
- NGOs, CSOs
- Private sector
- Professional organisations
- Producers' associations
- Educational institutions

Regional and Sub-Regional

- AU
- African Development Bank
- Regional economic alliances (*e.g.* CEAC, EAC, ECOWAS, IGAD, SADC, UEMOA, UMA, etc.)
- Regional/Subregional Research Organizations (AMREF, FARA, ASARECA, CORAF-WECARD, SADC-FANR, AARINENA, etc.)

A forum of existing groups with a vertical approach to controlling NZDs (e.g. CWGESA, African Rabies group, Bovine TB network, etc) need to be consulted continuously through regular meetings of representatives.

International organizations

- United Nations agencies (*e.g.* WHO, FAO, UNICEF, IFAD, IAEA, UNEP, UNESCO, UNDP)
- World Bank
- IMF
- International Research Organisations (*e.g.* CGIAR centres, GFAR)
- International NGOs
- OIE
- European Union
- Bilateral donor organisations
- National organisations with an international mandate
- Global foundations and trusts

NZD Resource Reference Centres

- Resource or information centres at national and regional levels are needed to make available appropriate information on NZDs at all levels and to all stakeholders.
- To avoid duplication of medical/veterinary resource centres, consideration should be given to creating NZD sections within existing centres or independent NZD resource centres as appropriate.
- Good management of these resource centres is imperative: for example, it is vital that information materials are submitted to these centres in a timely manner; ways and means to increase access to NZD resource centres should be devised and those who need the materials should be alerted to their availability (*e.g.* e-mail alerts)
- The relevant VPH unit should take the lead in ensuring the NZD resource reference centre is established and the information effectively disseminated.



Pastoralist boy near Lake Chad. Consumption of unpasteurized milk enables transmission of NZDs from livestock to humans.

Programmes for sustained personal interchange between ministries of agriculture and ministries of health should be developed, to facilitate long-term communication, collaboration and programme development across the sectors.

WHO Consultation on Emerging Zoonoses, 2004

ACTION PLAN

1. WHO to establish an International Scientific Advisory Committee for NZDs (NZD -ISAC) in collaboration with FAO and OIE

- a. There should be diverse representation on the committee with regard to disciplines, geography, gender, etc.
- b. Africa should be represented scientifically as well as politically with a representative of the AU.
- c. Terms of reference for the Committee should be formulated.
- d. The committee will assist WHO and other organizations and agencies with organizing international and regional NZD meetings. The next international and Africa meetings should be held in 2009.
- e. Ad hoc subcommittees on management and advocacy, research and capacity building, diagnostics and surveillance, and prevention and control will be formed.
- f. Guidelines concerning the structure and functions of regional and national VPH units will be developed by the above Committee.
- g. Guidelines for establishing national, regional and international reference centres for NZDs will be developed and the Committee shall nominate existing institutes to serve as hosts for the NZD reference sections.

2. Establish/strengthen national Veterinary Public Health Units

- a. An inventory of African countries where VPH units exist will be conducted by the NZD-ISAC.
- b. VPH units will be established in countries where they do not already exist and strengthened in those where they do exist based on general guidelines provided by the NZD-ISAC:
 - i. National interministry committees will be formed to oversee the VPH units;
 - ii. The structure and functions of the VPH unit and its location will be determined by the interministry VPH committee.

3. Increase Awareness of Decision-Makers

- a. The NZD-ISAC will lobby to have the issue of NZD control addressed by the governing bodies of AU, WHO, FAO and OIE.
- b. The NZD-ISAC, AU, WHO, FAO, OIE and other relevant bodies will initiate joint regional meetings of the Ministers of Health and Agriculture/Livestock on a regular basis (biennial) to review the NZD situation and other issues of joint concern.

A lot of people who really need informational materials on NZDs currently find them inaccessible.

Alexandra Shaw

- c. The NZD-ISAC together with WHO, FAO, OIE and AU will assist regional NZD networks/working groups to produce advocacy and informational material on the societal costs and benefits of controlling NZDs for dissemination to decision-makers at all levels.
- d. The VPH units and regional NZD working groups/networks with support from NZD-ISAC will actively lobby national and regional governing bodies to include the issue of NZDs in the health, agriculture/livestock and educational systems.

4. Establish Regional/National NZD Reference Centres

- a. NZD centres should be established by the VPH units within national veterinary or medical resource centres or as independent NZD reference centres when appropriate
- b. AU-IBAR/FAO/OIE regional animal health centres should select national NZD units to serve as regional reference centres for Africa.
- c. Mechanisms for timely submission and dissemination of information should be instituted (*e.g.* Africa VPH network, national/regional e-mail notification systems).
- d. VPH units should manage the NZD reference centres (whether national or regional in scope)
 - i. Hiring an administrator
 - ii. Establishing a NZD office
 - iii. Liaising with networks/working groups and vertical programmes for individual diseases to share information



Butcher in Mozambique. Some of the NZDs are transmitted to humans through meat.

7

Research and Capacity Building

KEY ISSUES CONSIDERED

Research

1. An inventory of ongoing and new research on the epidemiology, burdens and control of NZDs in Africa should be compiled and maintained and research gaps in these areas in relation to control needs should be identified.
2. A standardized and accepted methodology for quantifying the burdens and costs of NZDs in Africa should be developed.
3. Support centres of excellence in NZD research linked to local public health and agricultural systems should be identified.
4. Pilot studies on the NZDs, especially in regard to their burden and socioeconomic costs, and risk analysis including adjusting for underreporting should be conducted.

Capacity Building

1. Regional training centres on NZDs should be established.
2. Individual scientists, medical doctors, veterinarians, animal scientists and other appropriate personnel should be trained in techniques applicable to the diagnosis, epidemiology, burdens and control of NZDs should be trained.
3. Training packages on prevention and control of NZDs should be provided to target groups in affected communities (*e.g.* livestock keepers) with particular regard to the importance of the role of women through health education and agricultural extension.

Epidemiological studies are needed to demonstrate the existence of and links between the NZDs in both animals and man, to support advocacy and assist with designing control strategies

MAIN DISCUSSION POINTS

- The term “training” should be substituted with “capacity building”.
- Research should guide control.
- Both basic and operational research are needed.
- Emphasis should be placed on bridging research and development.
- Research should be aimed at improving livestock marketing opportunities and livelihoods of farmers/livestock keepers.
- Involvement of stakeholders is important especially for sustainability (*e.g.* validating endemic community acceptance of intervention tools).

- Sustainability can also be ensured by mobilizing affected communities to make change through “community and incentives-based control packages”.
- The research package needs to be attractive to the private sector.
- Curricula need to be flexible enough to include other sectors.
- There is a need to ensure publication, dissemination and feedback to study populations of results.
- It should be remembered to elucidate traditional methods for prevention and control of NZDs.
- Research and capacity building should be:
 - designed with the aim of achieving cost-effective, ethical and sustainable control or elimination/eradication of NZDs;
 - multidisciplinary, multidisease, intersectoral and interprogrammatic in nature;
 - directed at both humans and animals;
 - contribute to the surveillance and control of NZDs;
 - support diagnostic methods for NZDs;
 - provide evidence on the burden of NZDs based on published and informed data: and
 - promote an “incentives-based approach”.
- Research and capacity strategies should:
 - build the capacity of both veterinary and human medical communities as well as of health and agricultural extension workers;
 - identify and strengthen NZD networks and reference laboratories;
 - use existing services in a combined way to share resources;
 - investigate the effectiveness and appropriateness of diagnostic tools and intervention measures (*e.g.* vaccines).

Importance and changeability of predisposing, reinforcing, and enabling factors for control of NZDs at community level need to be investigated to devise appropriate, acceptable and sustainable strategies.

Helena Ngowi

ACTION PLAN

1. Integrate research activities with control needs

- a. An inventory of notifiable NZDs (veterinary and human) for each country should be conducted.
- b. Available data should be gathered and analysed.
- c. Research gaps should be assessed.
- d. Diagnostic tools (including molecular tools) should be developed and evaluated.
- e. KAP and other sociological/anthropological studies should be carried out in local settings.
- f. Publication and dissemination of local results and feedback to studied communities should be encouraged.

2. Establish Centres of Excellence

- a. Centres that can conduct diagnosis for different NZDs should be identified.
- b. South–South and North–South collaboration to ensure training in NZDs should be promoted.
- c. An inventory of existing networks on specific NZDs should be made.
- d. Existing networks to promote multidisciplinary, multidisease, multiprogramme and intersectoral collaboration should be linked with each other.
- e. Multidisease curricula on NZDs at graduate level and in medical and veterinary study programmes should be developed.

3. Conduct pilot studies

- a. On the burden and societal costs by:
 - i. standardizing data gathering;
 - ii. designing appropriate epidemiological data collection methods;
 - iii. measuring mortality/morbidity/social impact associated with NZDs;
 - iv. conducting farmer field schools on selected issues;
 - v. developing rapid appraisal for proxies of diseases;
 - vi. performing cost analyses of “incentive-based intervention packages”;
 - vii. conducting epidemiological studies to demonstrate the existence of and links between the NZDs in both animals and humans.



Training local health and agricultural extension workers about NZDs along with other livestock diseases and public health problems.

We need to conduct NZD burden analyses because it helps with decision making - enabling comparison between the gains from intervention against the costs of the disease. DALYS were developed to obtain a common measure of health for:

- *International comparison*
- *Quantify the burden of disease and injuries*
- *Determine the global and regional burden of diseases*

Hélène Carabin

- b. On Risk analysis by:
 - i. developing transmission dynamic models to link human and animal disease;
 - ii. assessing the relationship between risk, poverty and NZDs;
 - iii. assessing risks of livestock production and distribution systems in relation to NZDs;
 - iv. assessing risks associated with value chains (farm to fork, stable to table).
- c. On underreporting by:
 - i. developing and validating methods to estimate reporting proportions (biases) at all steps;
 - ii. promoting better linkage with extension services.

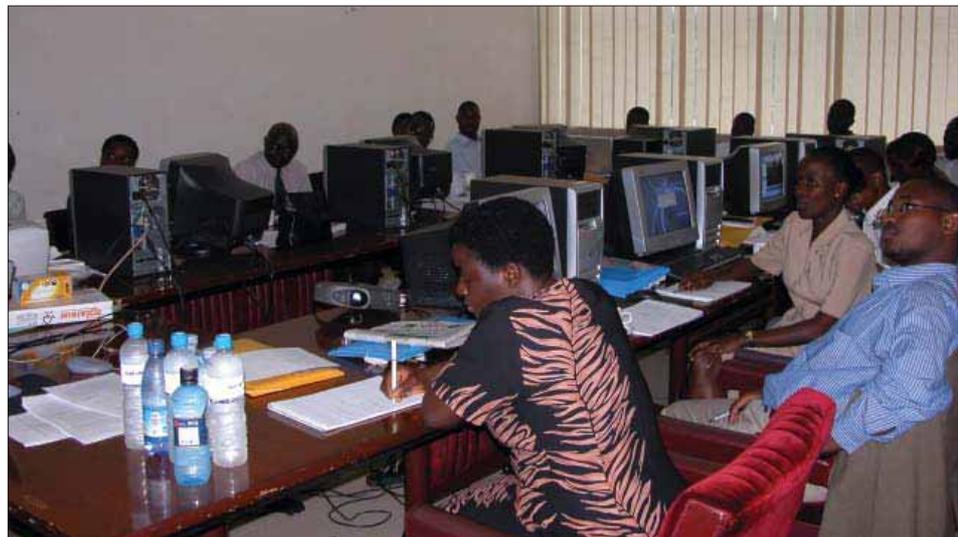
4. Develop and validate diagnostic and control tools

- a. Multi-disease diagnostics that could be used for NZDs should be developed and tested.
- b. Training packages for field diagnostic tools should be developed.
- c. District health and agricultural workers should be trained in research methodologies including data collection and record keeping.
- d. Inclusion of NZDs in existing reporting systems should be promoted.
- e. Incentive-based control packages for multiple-diseases should be developed and tested.
- f. “Proof of principles” for the effectiveness of NZD control in animals for prevention of human disease should be demonstrated.
- g. “Proof of principle” studies to show effectiveness of production system changes should be carried out.
- h. Control measures should be developed and their effectiveness and appropriateness in the field be estimated.

5. Areas for research that could facilitate NZD prevention and control in Africa include:

- Brucellosis vaccine (RB51) for cattle
- Improved brucellosis vaccines for small ruminants
- Treatment and vaccine development against porcine cysticercosis
- Low cost delivery solutions for administering praziquantel (*e.g.* injectable or bait formulation)
- Further development and testing of the echinococcosis vaccine for small ruminants in Africa

- Low-cost vaccine delivery systems (*e.g.* oral delivery of vaccines)
- Investigate combined vaccine formulations
- Cold chain solutions
- Development of pen-side/field tests (*e.g.* cysticercosis, echinococcosis, brucellosis)
- Development of an effective canine leishmaniasis treatment
- Improved rift valley fever (RVF) vaccine
- Other operational research to facilitate delivery of interventions including on public awareness.



Building capacity for local data management and analysis. through regional training programmes

8

Diagnostics and Surveillance



HAT control programmes have focussed on active case detection involving medical teams conducting surveys at community level.

KEY ISSUES CONSIDERED

Diagnostics

1. An inventory of currently available diagnostic tools for each of the NZDs required
2. A detailed assessment of gaps in the diagnostic tools available. should be conducted
3. The development of new and improved practical tools as appropriate. should be facilitated
4. Diagnostic tools in the African context should be validated and standardized.
5. Availability of diagnostic facilities at the regional (*i.e.* regional reference centres) and national levels as appropriate should be ascertained.

Surveillance

1. Reporting systems (appropriate/innovative) for both agricultural and health data related to NZDs (*e.g.* clinical surveillance, slaughterhouse surveillance, community-based epidemiological assessment) should be developed
2. Core indicators should be standardized.
3. NZD reporting should be integrated into Health and Agriculture Information Systems.

The underpinning for both successful advocacy and for targeting and planning control activities is disease surveillance, based on effective diagnostics

MAIN DISCUSSION POINTS

- A surveillance programme for NZDs in Africa should promote systematic collection and assimilation of data on both humans and animals.
- Surveillance systems should cover each of the NZDs.
- Existing databases should be used as appropriate, although it is not always clear where data are currently available (ministries, NGOs, etc),
- Data collection is most often the legal mandate of the respective ministries. Whatever parallel structure (if that is appropriate) is recommended it will have to fit into these systems;
- The impact of decentralization and privatization on data availability has not always been positive.
- Data transfer from local to central level (and back again) is often lacking.
- Medical and veterinary data collection is usually not coordinated and often maintained separately. There are examples of integrated surveillance systems (which currently do not have a focus on zoonoses) through the “INDEPTH Network” (www.indepth-network.org) which has Demographic Surveillance System (DSS) sites in different countries around the globe. This model is one of those available for collecting data, but may not be appropriate for country-wide, national/local data collection.
- There is a need for consistent, reliable data at a national level (over a longer term) but also the need for reliable data to demonstrate the neglected status of the diseases in the shorter term. This is necessary to raise the profile of NZDs and ensure adequate longer term resources for control.
- An example of a regional data capturing system is the East African Disease Surveillance System (EADSS) which depends on effective communication between veterinary and medical partners at each level (district, region, national, regional). Regional collaboration cannot be expected to work if there is no collaboration at the lower levels, to cross-check and validate the data.
- Data collection implies data storage. Best data storage methods need to be identified.
- The lack of diagnostic facilities and central/referral laboratories compounds the problem. There is a need for an inventory of national and regional laboratory capacity and data availability.
- Regional reference laboratories for diagnosis of NZDs should be established to provide services for countries where national diagnostic capacity is not currently available.
- An example of an established regional reference lab in Africa that could serve as a model is the CWGESA Regional Reference Laboratory for Immunodiagnosis of *Taenia solium* infections based at the Samora Machel School of Veterinary Medicine, University of Zambia in Lusaka:

Local level registration and reporting systems for NZDs containing both veterinary and medical data should be developed.

- the reference laboratory aims at standardizing immunological screening for *T. solium* infections in the eastern and southern Africa region;
 - it has capacity for antigen testing for both human and pig serum samples and is building capacity for antibody detection as well;
 - it conducts the same tests using the same reagents and methodology;
 - it uses the same personnel conducting the tests. In many instances the scientists conducting the surveys go to Lusaka with their samples to conduct the testing themselves under close supervision of the reference laboratory technicians and managers;
 - the end result is that results from around the region can be compared easily. So far, nearly 8000 samples have been tested (90% pig samples/10% human samples);
 - charges for testing cover the costs of reagents and other supplies (*i.e.* non-profit);
- A five-point flexible scheme could be used to develop a national/regional NZDs surveillance programme by answering these questions:
 - Which zoonoses are problems in which countries or regions?
 - Which primary data are important, and do veterinarians or medical doctors have a better opportunity for collecting the data for each NZD of importance?
 - What reporting system, if any, is already in place and does it need upgrading? Is diagnostic confirmation available in-country? Regionally?
 - What level of cross-checking is needed and at which level?
 - Can we have combined teams for active surveillance?
 - How can the detailed data be shared with higher levels?
 - Diagnostics research and development for NZDs should be focused on developing tests that are practical and inexpensive, can be stored easily and provide rapid results.
 - An independent validation of NZD diagnostic tests is required (*i.e.* those who have developed the tests should not be the ones validating them).

There is no “one size fits all” method for improving data collection for these neglected diseases. Each country and each situation (e.g. a disease focus) needs to be considered individually.

ACTION PLAN

To conduct (in parallel) demonstration surveillance projects on NZDs in selected African countries. Steps are as follow:

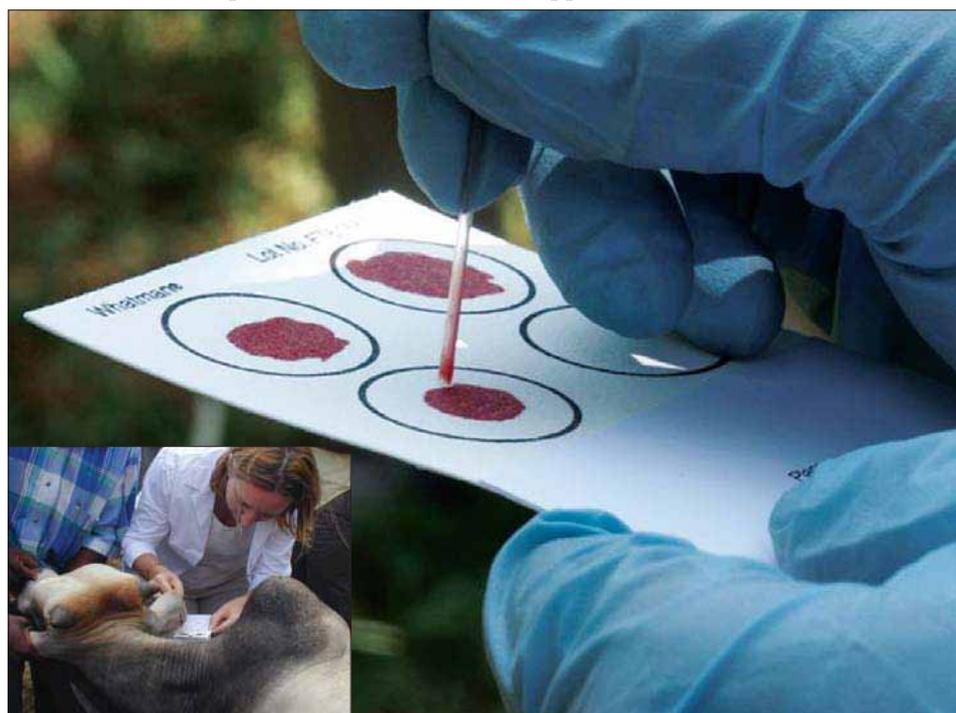
- 1. Form national multidisciplinary teams to conduct active surveys on the burden of NZDs relevant for each selected country**
- 2. Identify key individuals from the medical and veterinary services at the country level to serve as national NZD Focal Points responsible for coordinating the surveillance project jointly including collation and cross-checking data**
- 3. Assess capacity of national Health and Agriculture Information systems concerning how they address NZDs and relevant data will be collated from the different ministries and official bodies to form an initial NZD database**

- a. Veterinary Services
 - i. System for data collection and reporting
 - slaughterhouses
 - public/private/NGO sector veterinary laboratories/ diagnostic facilities
 - decentralized veterinary field service (local, district, national)
 - university sector
 - ii. Trained professional personnel
 - iii. Established veterinary extension services infrastructure
- b. Medical Services
 - i. System for data collection and reporting
 - Public/private/NGO sector medical laboratories/ diagnostic facilities
 - Public and private health centre and hospital records
 - University sector
 - ii. Trained professional personnel
 - iii. Established veterinary extension services infrastructure
- c. Level of under-diagnosis and under-reporting to be assessed
- d. Critical components of the existing diagnosis and reporting system that are in need of support and improvement will be identified.

4. Conduct large-scale community-based surveys for NZDs using the most appropriate diagnostic tests: Surveys should be conducted in multiple sites to fully represent different agro-ecological zones and livestock production systems

- a. Multidisciplinary mobile survey teams should collaborate with existing resources/networks, infrastructure and both health and agricultural extension services.
- b. Opportunities for addressing other adverse human and animal health/production conditions suffered by the surveyed communities while collecting the core data should be facilitated to promote the “one health” approach.

FTA (Flinders Technologies Australia™) cards have been found to be an inexpensive and practical way of collecting and storing blood for diagnosis of trypanosomiasis. Blood taken from a cow's ear vein is applied to a card and later tested with polymerase chain reaction (PCR) for detection of trypanosome species



9

Prevention and Control



Proper meat inspection and control including responsible disposal of infected carcasses and viscera can help combat NZDs.

KEY ISSUES CONSIDERED

Prevention and Control

1. Integrated, cost-effective control “packages” for NZDs should be developed based on a “best bet” strategy of recognizing the tools and resources actually available as well as what is appropriate, acceptable and sustainable for the targeted communities.
2. Strategies should take into account the economic, sociological and cultural aspects related to the diseases as well as traditional knowledge.
3. The “proof of principle” for integrated control should be demonstrated through pilot projects, which should assess the impact, safety and cost-effectiveness of the strategies.
4. Cost-effective single NZD control programmes that promote an intersectoral approach should be supported where appropriate.
5. Efforts should be directed primarily at rural smallholder and pastoral communities as well as marginalized urban/periurban livestock producers.

Public awareness and demand for action is a crucial entry point for prevention and control for NZDs. Policy-makers also have an important role to play with regard to advocating on the behalf of the need for prevention and control of NZDs to their ministers.

MAIN DISCUSSION POINTS

- Specific risk groups for the different NZDs and beneficiaries of interventions should be identified. The most vulnerable populations at risk of NZD infection are livestock keepers, veterinarians and animal health workers, laboratory workers, consumers, children and women.
- Operational research needs include intervention delivery systems and the benefit of combining interventions.
- Leishmaniasis and RVF should be considered for inclusion in the NZD group of diseases for Africa (RVF classified as an emerging zoonosis).
- VPH units should be created/strengthened and entrusted with managing/coordinating national NZD prevention and control efforts. Experience indicates that basing VPH units in the Ministry of Health to be the most effective arrangement.
- The formation at national level of an inter-ministerial committee with task forces to address NZDs could greatly facilitate prevention and control. It would be helpful to involve other relevant ministries in addition to those of health and agriculture/livestock such as Ministries of Finance, Wildlife and Tourism.
- In countries where a highly pathogenic avian influenza virus (HPAI) task force exists, its mandate could be expanded to neglected and other zoonotic diseases.
- Involving Ministries of Finance would be strategic with regard to mobilisation of resources aimed at NZD prevention and control.
- The newly established regional FAO/OIE/AU-IBAR animal health centres should include support of NZD activities within their regional mandate and facilitate the national VPH units.
- Policy-makers should advocate with their respective ministers to raise the issue of the burden and need to control NZDs on the agenda of the meetings of the governing bodies of relevant regional and international organizations (*e.g.* AU, World Health Assembly, FAO Conference and OIE chief veterinary officers (CVOs) annual meeting).
- International specialized (WHO, FAO, OIE) and other organisations/entities (*e.g.* AU, EU, WB, ALive) should join forces and play supporting and facilitating roles for cooperation, coordination and resource mobilization aimed at NZD prevention and control in Africa and elsewhere (*e.g.* arranging a regular regional meeting involving Ministers of Health and Agriculture/Livestock, technical meetings, stimulating (operational) research, strengthening veterinary and health services, etc).

There is a need for testing approaches that combine vaccination programmes for animals and children in pilot studies to investigate their acceptability, effectiveness and costing.

- There is a strong need for visibility and advocacy for NZDs as public awareness (and especially consumer demand) is a crucial entry point for prevention and control of NZDs.
- Regional inventories of vaccines, treatments, public awareness material, suppliers and supplies relevant for NZD prevention and control should be conducted, updated on a regular basis and reported to the appropriate bodies.
- Means for prevention and control of NZDs should be made accessible in Africa.
- Vaccination campaigns for NZDs may serve as an entry point for other interventions such as health education.
- The appropriateness of combining animal vaccination programmes with that of children should be considered and guidelines for such developed:
 - NZD research should be integrated with NZD prevention and control needs.
- With regard to the benefits of prevention and control of the NZDs, it is helpful to consider the following with respect to each of the NZDs:
 - animal species affected
 - human risk groups
 - preventive, curative and control measures available (or desirable)
 - beneficiary groups
 - possible added value for the intervention(s).
- Different modalities of integrated control packages:
 - combined vaccines against different zoonotic and/or non-zoonotic diseases (*e.g.* anthrax and blackquarter vaccines for cattle);
 - combining different types of interventions for the same species of animal (*e.g.* rabies vaccination and praziquantel administration to dogs);
 - Combined interventions for different animal species (*e.g.* vaccination of cattle and dogs).
- Lessons can be learnt from current ongoing integrated zoonoses control programmes such as sleeping sickness (SOS) and RVF.

The integrated approach to prevention and control of NZDs can be extended to incorporate non-zoonotic public health and livestock problems prevalent in the same impoverished communities.

ACTION PLAN

1. Conduct, maintain and report inventories of control activities and tools

- a. Make an inventory of existing intersectoral arrangements and ongoing zoonoses control programmes.
- b. Define the status and needs regarding vaccines, treatments, diagnostics, public awareness material, suppliers and supplies for surveillance, prevention and control of NZDs.

- 2. Develop guidelines for implementing NZDs prevention and control activities**
 - a. Develop regional strategies and midterm plans for NZD prevention and control in the Africa region in collaboration with WHO, FAO and AU.
 - b. Develop and deliver integrated NZDs control and prevention packages (including components on public awareness).
- 3. Initiate pilot studies to test the acceptability, effectiveness, timing and costing of possible combined integrated prevention and control packages for NZDs**
- 4. Secure agreement from the OIE/FAO/AU regional animal health centres in Africa to include combating NZDs as part of their mandate**
- 5. Develop and implement a plan for raising the issue of prevention and control of NZDs at the governing body meetings of the WHO, FAO, OIE and AU**



Mass vaccination campaign of dogs in Tanzania

© Sarah Cleveland



Abstracts of plenary presentations

'ONE HEALTH' FOR CONTROL OF NEGLECTED ZOO NOTIC DISEASES*

Esther Schelling and Jakob Zinsstag

Zoonoses are the most prominent example of interaction between human and animal health. Prevention and control of zoonoses call for closer cooperation between public and animal health. The observed lacking awareness of zoonoses may be the consequence of low capacity to recognise and diagnose zoonoses, but also owing to institutional barriers and seemingly high transition costs between sectors. Subsequently, governments often neglect zoonotic diseases, reflecting separated sectors of both medicines. Most African countries face difficulties in sustainably implementing efficacious control measures for zoonoses for various reasons such as dispersed smallholder livestock systems, predominance of informal markets, and limited capacity and resources to deliver services.

We present the evolution 'from one medicine to one health' and neighbouring concepts to the 'one health' for control of neglected zoonotic diseases. A research agenda on zoonoses should be interdisciplinary, participatory, and integrated with prevention and control needs. A 'one health' perspective enhances detection and control of zoonoses by intersectoral

surveillance and communication, by contingency planning with all line ministries, and by providing novel cost-effective trans-sectoral options for zoonoses control in low-income countries. Examples of its application and future potential emphasising the African context are presented. Cost-effective financing of public services from a 'one health' perspective can contribute to the strengthening of health systems in a way that disciplinary medicine cannot offer alone, and thereby contribute to an improved use of scarce resources. Furthermore, there is a large untapped potential of new institutional and operational models for providing health services jointly to remote populations which is particularly relevant with regard to ongoing health sector reforms and the human resource crisis. Promoting intersectoral participation and cooperation in regional and international working groups, and multidonor initiatives, as well as WHO-facilitated programs on zoonotic diseases, foodborne diseases, and control of neglected tropical diseases, adds value to the international advocacy efforts aimed at putting neglected zoonotic diseases on the agenda in multiple sectors.

The total societal benefits, the intervention in the animal sector saves cost, provides the economic argument and thus opens new approaches for the control of zoonoses in developing countries through cost contributions from multiple sectors.

CHANGING LIVESTOCK PRODUCTION AND MARKETING SYSTEMS IN AFRICA: THEIR IMPLICATIONS FOR ZOOBOTIC DISEASES

John McDermott

Major changes in population, urbanization, consumer demand, environmental risks and globalization are already having an important impact on development in Africa. The rate of change of these main drivers is likely to speed up even further and will profoundly influence livestock production and marketing systems. With respect to zoonotic diseases, we can expect an increase in the risk of zoonotic diseases and an increase in the complexity of how new and old risks will be identified and managed.

With respect to zoonotic diseases, three broad livestock production and marketing systems can be used to illustrate key anticipated trends. Industrial livestock systems are much less important in Africa than other regions and their widespread growth is unlikely except in a few sectors such as the poultry sector, close to large urban markets. The two main livestock systems will continue to be intensifying market-oriented smallholder systems and adaptive agro-pastoral and pastoral systems in more marginal areas. There will be major changes in intensive market-oriented smallholder systems which will supply large local and regional

markets. Intensification of production will increase disease risk and market supply chains to consumers will increase in complexity, requiring better risk management approaches for food safety and zoonotic disease control. In more marginal livestock systems, climate and other shocks will increase risk and vulnerability to traditional neglected zoonoses and as well as the potential threat for emerging ones.

As neglected diseases are linked to neglected peoples, the targeting of development interventions for the poor within systems will be critical. Opportunities for pro-poor targeting are discussed which could benefit producers, service providers, employees and consumers. Active interventions will be required if poor people are to benefit from increasing market opportunities and protected from economic and climatic shocks. How decision makers and investors are mobilized around a neglected peoples and diseases agenda will be critical. This requires demonstrating the importance of zoonotic diseases in addressing key development challenges such as economic growth and poverty alleviation.

The increasing length and complexity of value chains will require innovative arrangements for risk management. Control of NZDs needs to be linked to development challenges that matter to decision-makers and investors.

HIGHLY PATHOGENIC AVIAN INFLUENZA: PAVING THE WAY FOR THE SURVEILLANCE AND CONTROL OF OTHER ZOOONOTIC DISEASES

Katinka de Balogh

The international cooperation, coordination and support between animal and human health sectors and others for combating emerging zoonoses such as avian influenza can be transferred to endemic/neglected zoonotic diseases.

The first outbreaks of the presently circulating highly pathogenic avian influenza virus (HPAI/H5N1) have found most countries unprepared, requiring the diversion of human and financial resources from ongoing disease control programmes to address HPAI and its consequences. At present most developing countries affected or at risk have been able to access financial support from various sources. Nevertheless, the extent of human resources, technical expertise and logistical support have remained limited while countries have been able to establish inter-ministerial task forces, rehabilitate diagnostic laboratories and benefit from capacity building to enhance their surveillance and response capabilities.

The increased awareness of policy makers and the general public of the potential impact of zoonotic diseases on animal populations, human health and countries' economies provides the momentum to address not only emerging but also endemic/neglected zoonoses by building on the structures, approaches and cooperation mechanisms that have been put in place. Overall, the recognition that most zoonotic diseases in humans require coordinated control efforts addressing the disease at its source in animals is an important step forward for the implementation of integrated approaches and the long promoted intersectoral cooperation.

STAMP OUT SLEEPING SICKNESS: AN INTERSECTORAL APPROACH TO DISEASE CONTROL

Susan Welburn and the SOS Consortium

Neglected Tropical Diseases, such as Sleeping Sickness, promote poverty as they stigmatize, disable and inhibit individuals from being able to care for themselves and their families.

The key objectives of this program of research have been to define and quantify the magnitude of the animal reservoir of disease for human sleeping sickness, to delineate policy implications for control options and facilitate training of medical officers, scientists and veterinarians in Uganda. Outputs have influenced policy for disease control in Uganda and recently led to the formation of a Public Private Partnership aimed to 'Stamp Out Sleeping Sickness' (SOS – www.sleepingsickness.org). Phase 1 of the SOS campaign is being financed and supported by the veterinary pharmaceutical company CEVA Santé Animale and Industri Kapital (IK), a pan-European private-equity fund and is being implemented by Makerere University with inputs from the University of Edinburgh, the Co-ordinating Office for Control of Trypanosomiasis (COCTU) in Uganda and with support from WHO.

New PCR based diagnostics helped identify accurately the reservoir of disease in cattle and demonstrate that restocking activities were responsible for the disease spreading around Lake Kyoga, Uganda. This led to development of a cattle-based approach to halt the spread of the acute form of sleeping sickness towards the Gambiense disease focus, complementing efforts to trap tsetse flies or treat humans with the disease. In phase I, 220,000 head were targeted for trypanocide treatment in 5 districts in the overlap zone with follow on application of insecticide applied using restricted application technology to prevent re-infection. The cost-effectiveness of this new approach attracted private funding from IK, to help underwrite Makerere University's veterinary program to prevent the disease in cattle using an inexpensive spray-on insecticide developed by CEVA.

CHALLENGES AND OPPORTUNITIES FOR INTEGRATED CONTROL OF NEGLECTED ZOOONOTIC DISEASES

Maria Vang Johansen

The midterm report for the Millennium Development Goals indicates that sub-Saharan Africa significantly lags behind all the other regions of the world in meeting the goals; several of which are directly linked to health. Reasons for this are many and debatable but increased international attention has recently been drawn to the relationship between poverty and neglected zoonoses and it has been suggested that control of these diseases is a prerequisite for poverty alleviation, and for improving living conditions, livelihoods, and health. With WHO's new Global Plan (2008-2015) to prevent, control, eliminate or eradicate Neglected Tropical Diseases including the zoonoses, no simple, single, or cheap approach can be followed. This will require a multi-branched approach requiring 1) scientific innovation and investigations, 2) strong inter-sectoral commitment and collaboration, 3) strengthening of the human health and the veterinary public health systems, and 4) development of multi-disease control intervention packages, focusing on, and in close collaboration with the local populations. The Global Plan can with regard to the neglected zoonoses foresee major challenges but also great opportunities for being

implemented successfully. Major challenges include quantification of the comprehensive societal burden of each disease, which for some of the diseases requires development of appropriate diagnostic tools. Other major challenges include: mapping of co-infections, development of integrated control strategies including measures for control and optimization of co-administration of drugs, time intervals, delivery systems, monitoring platforms, and compliance. Finally, bridging the gap between research and integrated control of neglected zoonoses will be a major challenge requiring gap analyses, technology transfer, and enhanced communication and capacity building at all levels. Despite many challenges, opportunities are there for effective integrated control of the neglected zoonotic diseases. It is a very positive step forward that the neglected zoonoses are now being given higher international recognition. A major advantage is that distributions of the neglected zoonoses are to a great extent geographically overlapping. Finally, controlling zoonoses has been shown to be highly cost-effective from a societal point of view and will directly improve the health and living conditions of the poorest.

The development of integrated, cost-effective, sustainable and ethically justified control packages for NZDs must be evidence based, readily adapted to local settings, based on local priorities, using locally-owned resources and targeted to those in need!

OIE'S APPROACH TO ZOOBOTIC DISEASES INCLUDING THE WORLD ANIMAL HEALTH INFORMATION SYSTEM (WAHIS) AND WORLD ANIMAL HEALTH INFORMATION DATABASE (WAHID)

Nicolas Denormandie

When the world was hit by the avian influenza crisis, the OIE recommended strengthening veterinary governance worldwide, not just to fight avian influenza, but also to prevent and control any outbreaks of emerging or re-emerging animal diseases, including zoonoses, whether naturally occurring or deliberate. This recommended strengthening of Veterinary Services can also serve the objective of poverty alleviation by targeting also without major additional funds all endemic zoonoses already mostly prevented in developed countries but still rather under diagnosed and neglected in developing and in-transition ones. The OIE is now carrying out throughout the world, evaluations of performance of veterinary services through the PVS tool (Performance, Vision, Strategy) in countries, which voluntarily apply for it. The PVS tool is not simply an evaluation tool. It is also a development tool since it can be used to identify failings and weaknesses and thus help in the preparation of national investment programmes to overcome these deficiencies. The analysis of deficiencies carried out using the results of the PVS evaluation will help to identify priorities for investment and provide solid justification for the recommended reforms. The OIE hopes that the future requests for investment to control neglected zoonoses will be considered seriously.

It is now clearly established that the cost of preventing endemic zoonoses and sanitary crises of animal origin respectively by passive and active surveillance and by early detection of outbreaks and rapid response mechanisms (included in national veterinary surveillance systems) are insignificant compared to the social, economic and environmental cost of disasters resulting from epizootics but also compared to the vicious circle of poverty bred by neglected zoonoses.

As far as zoonoses are concerned, the OIE can lean since 2002 on one

permanent working group focusing on animal production food safety. Then, the Agreement on the Application of Sanitary and Phytosanitary Measures agreement recognises OIE as one of the 3 reference organisations for relevant international standards and more specifically in the case of animal health and zoonoses, the standards are those adopted by OIE member countries. Working closely with the *Codex Alimentarius* in charge of food safety standards, the OIE participates also to the review of those standards in particular related to food safety "from farm to slaughter". The OIE's food safety goal is to reduce food borne risks to human health by preventing, eliminating or controlling hazards arising from animals; with a primary focus on food safety measures applicable at the farm level such as good farming practices but also prior to slaughter of the animal or primary processing of the product. In addition, the OIE has created 3 out of the 7 existing ad hoc groups composed of worldwide recognised scientists working on neglected zoonoses such as tuberculosis, brucellosis and rabies.

Finally the OIE insists on the need for a strong cooperation with human health partners, which explains its reinforced collaboration over the past few years with the *Codex Alimentarius* and WHO on thematic areas such as food safety and zoonoses. In parallel to this shown existing collaboration at international level, the OIE recommends that human health and animal health national authorities should reinforce or create those links at all country administrative levels, including private sectors, keeping in mind that the work of Veterinary Services is crucial for human health. It also recommends to take advantage of the existing structures built up for avian influenza (inter ministry committees, epidemiological surveillance networks, etc.) in order to develop cost effective prevention and control of neglected zoonoses.

OIE's approach to zoonoses is that animal health is inextricably interwoven in the public's health and well being. WAHIS and WAHID are crucial tools enabling stakeholders to share on-line relevant animal diseases information -including neglected and other zoonotic diseases -using maps and geographic coordinates of outbreaks.

Animal Health Information System and Database
One of the two historic objectives of OIE being to ensure transparency in the worldwide animal health and zoonoses situation, the unprecedented impact of emerging and re-emerging animal diseases and zoonoses has imposed the OIE to strengthen its early warning system already based on an exhaustive network of information sources. Through its updated network of 169 country members, of 224 reference laboratories (out of which 2 in Africa are dealing with neglected zoonotic diseases: 1 in Morocco for echinococcosis, 1 in South Africa for rabies), 24 collaborating centres, the OIE has the capacity to collect, analyse and disseminate scientific veterinary information using the World Animal Health Information System (WAHIS) and Database (WAHID).

The WAHIS allows each Veterinary Administration to inform (with the input of OIE Reference Laboratories) OIE Headquarter through a harmonised and protected on-line website the suspicion or confirmation of an outbreak of disease or other epidemiological event using a unique (since 2005) list of notifiable diseases; for which one of the 4 criteria is the zoonotic potential. Four types of data reports are available (immediate notification & follow up, semi annual and annual reports).

At OIE Headquarters, the WAHID Database gives the opportunity to compile and analyse those data and alert the member countries of outbreaks. The interface of the WAHID database consists of the OIE headquarter providing animal health information through the internet (www.oie.int) therefore with access to all countries including non-OIE member countries. The quantity and reliability of those data depends of course on what has been sent by each OIE member country.

Ideally, as far as neglected zoonoses are concerned, there is a need for each OIE member country and especially for African countries to provide data on zoonoses, following previous cross checking with human health partners, on a monthly basis, and per first administrative unit. That's the prerequisite to allow the WAHID Database to provide exhaustive and reliable data to be used for prioritizing those endemic zoonoses and developing adapted control measures.

Although fairly widely used within Africa, the WAHIS software is not sufficiently used by OIE country members concerning zoonoses data, which are usually filled using the minimum templates (per half year period and for the whole country instead of the ideally template which is on monthly basis, and per first administrative unit) or even not filled. This is still the case in particular for 41 out of 53 African countries, which haven't sent any zoonoses data for the year 2006 report. Then, the lack of reliable data prevents to know the real prevalence and ranking of those neglected diseases already rather under diagnosed and thus, impedes any prevention and control strategy.

Therefore OIE invites all stakeholders involved in those neglected zoonoses to contact the OIE Delegates (usually the Chief Veterinary Officer of an OIE member country) in order to help them track, in collaboration with their animal health information focal points, all animal and human data related to the 8 "selected" neglected zoonoses (anthrax, bovine tuberculosis, brucellosis, echinococcosis, leishmaniasis, porcine cysticercosis, rabies, zoonotic trypanosomiasis); and to cross check those data with their counterpart from the human health sector before compiling them and sending them through WAHIS in their semi annual or annual reports.

THE EU'S 7TH FRAMEWORK PROGRAMME FOR RESEARCH (2007-2013) AND THE EUROPEAN TECHNOLOGY PLATFORM FOR GLOBAL ANIMAL HEALTH

Isabel Minguez-Tudela

The overall aim of the ETPGAH is to reduce the impact of animal diseases of major importance to Europe and the rest of the world, thereby improving animal and human health, food safety and quality, animal welfare, and market access, contributing to achieving the Millennium Development Goals.

EU 7th Framework Programmes for Research (2007-2013)
The EU's FP7¹ has expanded the scope for international research cooperation, opening up all the programmes to such cooperation. "International Cooperation Partner Countries" (ICPCs) can take part -and receive EU funding- in collaborative projects with EU member states (involving at least three participants from EU member or associated states) in all thematic areas in the COOPERATION programme. "Specific International Cooperation Actions" (SICAs) addressing specific problems of third countries or of a global character are also foreseen in these thematic areas. Other possibilities for international cooperation are envisaged in the PEOPLE programme for human resources and mobility and in the CAPACITIES programme for networking.

Support for research on neglected infectious diseases (NID) is explicitly foreseen in the "Health" thematic area reflecting political commitment of the EU Council and European Parliament^{2,3}. In addition, support to animal infectious diseases including zoonoses is envisaged in the "Food, Agriculture and Fisheries and Biotechnology" thematic area..

In the first calls for proposals of "Health" for 2007 two relevant topics were included: "Developments of new tools to control infections due to parasites of the Trypanosomatidae family" and "Development of a Leishmania vaccine". In the "Agriculture, Food and Biotechnology" one topic for a large collaborative project was included: "Neglected zoonoses in developing countries: integrated approaches for the improvement of their control in

animals". This topic emanates from the recommendations of the first WHO-DFID meeting held in Geneva in 2005. Future calls for 2008 and 2009 are currently in preparation in the human and animal sectors.

European Technology Platform for Global Animal Health (ETPGAH)⁴

The ETPGAH (<http://www.ifahsec.org/Europe/EUPlatform/Platform.htm>) constitutes a unique forum gathering all relevant stakeholders in animal health under the chairmanship of the International Federation of Animal Health (IFAH). The platform -launched in December 2004- aims to "facilitate and accelerate the development and distribution of the most effective tools for controlling animal diseases of major importance to Europe and the rest of the world". The stakeholders include animal health industry, farmers, international organisations (OIE, FAO and WHO), research institutions and academia, ILRI, regulatory authorities (CVOs), European Food Safety Authority, GALVmed, networks of excellence and civil society. The process involves three successive steps in which the stakeholders: 1) agree on a common "Vision" 2) define a "Strategic Research Agenda" (SRA) setting the mid- to long term objectives, and 3) implement the SRA with the mobilisation of human and financial resources detailed in an "Action Plan".

The SRA envisages 6 major themes: 1) Prioritisation of animal diseases; 2) Conduct gap analysis; 3) Ensure fundamental research; 4) Improve technology transfer; 5) Consider regulatory issues, and 6) Maintain a global perspective. Neglected zoonoses constitute one of the groups of priority diseases targeted by the platform in line with the recommendations of WHO.

¹ http://cordis.europa.eu/fp7/home_en.html

² Report of the European Parliament on Major and Neglected Diseases in Developing Countries. Rapporteur Hon. MEP John Bowis; 2005

³ International Conference on Neglected Infectious diseases, Brussels, Belgium, 8-9 November 2006: <http://nidconference.intbase.com/>

⁴ <http://www.ifah.be/Europe/euplatform/platform.htm>

THE GLOBAL ALLIANCE FOR LIVESTOCK VETERINARY MEDICINES (GALVmed)

Keith Sones and Steve Sloan

GALVmed believes that investing in better animal health provides hope, health and sustainability for those whose lives are inextricably tied to their animals. It aims to make affordable solutions accessible in a sustainable manner.

The Global Alliance for Livestock Veterinary Medicines (GALVmed – www.galvmed.org) was established in November 2005. GALVmed is a not-for-profit company that will directly contribute to poverty alleviation by bringing to market new vaccines, pharmaceutical and diagnostic animal health products that improve the health and food security amongst livestock keepers in developing countries. It does this by creating, leading and facilitating public-private partnerships between governments, industry, donors, researchers and civil society organizations that leverage assets, expertise and funding to

overcome barriers to new product development and delivery. Its aims to develop, register and launch at least four to six vaccine, pharmaceutical or diagnostic products by 2015. This will include both the pragmatic adaptation of developed world solutions for developing world contexts as well as the development of novel solutions.

GALVmed has initially prioritized six diseases including two which are zoonoses, Rift Valley fever and porcine cysticercosis, and in addition is maintaining a watching brief on trypanosomiasis and highly pathogenic avian influenza.

HEALTH PROMOTION APPROACH FOR CONTROL OF NEGLECTED ZOO NOTIC DISEASES: THE CASE OF CYSTICERCOSIS CONTROL IN TANZANIA

Helena Ngowi, Faustin Lekule, James Mlangwa and Rudovick Kazwala

Many health problems are linked to social and cultural factors - people differ in their priorities, values, and behaviour. The PRECEDE-PROCEED model enables affected communities to define their high-priority problems and then develop, implement and evaluate appropriate and acceptable solutions based on their importance and changeability.

Many health-related problems are linked to social and cultural factors that are prevalent in certain communities. It is important that professionals involve target communities in the planning, implementation, and evaluation of public health interventions for effective and sustainable control of health-related problems. Health promotion strategies are particularly important in the area of neglected zoonoses because these diseases mostly affect poorly served communities. In Tanzania, we are carrying out health promotion activities for control of *T. solium* infections, which are endemic but under-recognised by many stakeholders, including pig farmers and policy makers. Mbulu District, located in northern Tanzania, was used as a pilot-study area whereby the application of PRECEDE-PROCEED model guided systematic planning, implementation, and

evaluation of two different but related interventions: enhancing the quality provided by extension services through updating their knowledge and skills, and conducting seminars for smallholder pig farmers. The interventions were moderately effective and they are now being implemented in the southern districts of Chunya and Iringa Rural after adjustment of educational materials (used in Mbulu District) according to the southern districts' cultural settings.

In conclusion, the PRECEDE-PROCEED model is a useful social science theoretical model for planning, implementing, and evaluation of public health programmes. We need to sensitize policy makers on the burden of *T. solium* infections in Tanzania in order for the diseases to be considered among the priority diseases that are under government attention.

CONVERTING A WEAKNESS INTO A STRENGTH: HARNESSING THE ZOOONOTIC DOUBLE-WHAMMY*

Alexandra Shaw

When we met in September 2005 to consider the state of neglected zoonoses it was a very enriching experience for all who took part, because we looked beyond the diseases we had individually been focussing on, to consider a wider range of diseases which have the common characteristic of being passed back and forth between people and animals, often against a backdrop of great economic deprivation. This meeting focussed on these diseases in South America, Asia, the Middle East and Africa. However, that meeting was preceded by initial 'warm-up' workshop which was held here in Nairobi in February 2005, which brought together researchers who had worked in this field in Africa. It is very appropriate that we have now come back here to consider these diseases in an African context and to examine what we can do in practical terms to control them.

What became evident at our meetings in 2005, is that we were dealing with a very diverse set of diseases, caused by viruses, bacteria, blood parasites, worms, some food-borne, some transmitted by insect vectors... and manifesting themselves in very different ways in different human and animal populations. What they all have in common is that, firstly, they selectively attack the poorest members of society, all too often also reducing the productivity and increasing the mortality of those few animals these people are able to keep, and on whom families rely to provide some protein or a source of cash in times of adversity. Secondly, they are difficult to diagnose and awkward to treat. Many of these diseases are linked to very specific risk factors, reflecting the interaction between affected human and animal populations. As a result their distribution is very patchy, completely absent in some areas, highly concentrated in others. For this

reason, they are massively under-reported and the people affected often suffer for years before being correctly diagnosed – in some cases dying undiagnosed as a result of a treatable condition. Thirdly, effective control or even prevention of zoonotic diseases often relies on dealing with the disease in animals, thus involving the veterinary sector; while the main benefits accrue to human health and are channelled through the health services. Thus, as has often been said, these diseases fall into the crack between the veterinary and the human health services' responsibilities. For all these reasons, they are a grossly neglected group of diseases, and nowhere more neglected than in Africa, where poverty and the demands of the major diseases of malaria, HIV-AIDS and tuberculosis mean that health sector resources are already so stretched as to find it difficult to accommodate other concerns.

Our mission now must be to find ways of converting these diseases' main disadvantage – the way the responsibility for control often devolves to those who do not always directly benefit from it, being passed back and forth between the human and the veterinary sector – into a strength. As workers in the fields of human and animal health, as scientists and social scientists, we have come to believe that this is a challenge that can be met. Firstly, we aim to promote the concept of 'one medicine', founded on the belief that human and animal diseases need to be considered and treated together – sometimes because they are one disease which must be dealt with in all the populations it affects; sometimes because there are great economic and social advantages in delivering health to both people and their livestock at the same time. Secondly, we aim to provide financial decision-makers with clear evidence

Quantifying the dual burden of the disease, along with underreporting will greatly strengthen the justification for intervention. Having calculated the total societal benefit to be gained from controlling NZDs ways should be found to enable sharing the costs between the agricultural and health sector in proportion to the benefits each sector obtains.

of the true overall cost of these diseases, both to human health and livestock productivity. This means providing evidence of their actual, as against their reported, incidence as well as finding out more about their impact. Thirdly, we are all involved in developing cost-effective strategies for their control, and in demonstrating how very cost-effective these strategies can be, often far more so than is the case for other diseases. Using this as a basis, we are working on new models for equitable cost-

sharing between the veterinary and medical sectors. We believe that combining these approaches, by showing how high the dual burden that these diseases impose is, by improving existing diagnostics and control strategies, by looking for support for researching them and for their control and by implementing fairer intersectoral cost-sharing, will make it possible to greatly reduce the suffering of those affected by this neglected group of diseases.

**Keynote presentations*



Abbreviations

AFRO	WHO Regional Office for Africa
AARINENA	Association of Agricultural Research Institutions in the Near East and North Africa
AHP	Animal Health Programme (DFID)
AIDS	acquired immunodeficiency syndrome
AMREF	African Medical Research Foundation
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AU	African Union
AU-IBAR	African Union – Inter-African Bureau of Animal Resources
CEAC	Central African Economic Community
CGIAR	Consultative Group on International Agricultural Research
CSF	cerebrospinal fluid
CT	computerized tomography
CSO	civil society organization
CVO	Chief Veterinary Officer
COCTU	Coordinating Office for Control of Trypanosomiasis (Uganda)
CORAF/WECARD ..	West and Central African Council for Agricultural Research and Development
CWGESA	Cysticercosis Working Group in Eastern and Southern Africa
DALY	disability-adjusted life year
DBL	Centre for Health Research and Development (Denmark)
DFID	Department for International Development (UK)
DSS	Demographic Surveillance System
EAC	East African Community
EADSS	East African Disease Surveillance System
ECOWAS	Economic Community of West African States
ELISA	enzyme-linked immunosorbent assay
EMRO	WHO Regional Office for the Eastern Mediterranean
ETPGAH	European Technology Platform for Global Animal Health
EU	European Union
FANR	Food, Agriculture and Natural Resources Directorate (SADC)
FAO	Food and Agriculture Organisation of the United Nations
FARA	Forum for Agricultural Research in Africa
FP7	Framework programme 7
GALVmed	Global Alliance for Livestock Veterinary Medicines
GFAR	Global Forum for Agricultural Research
HAT	human African trypanosomiasis
HQ	Headquarters
HIV	human immunodeficiency virus
HPAI/H5N1	highly pathogenic avian influenza virus
IAEA	International Atomic Energy Agency

ICPC	International Cooperation Partner Country
IFAH	International Federation of Animal Health
IFAD	International Fund for Agricultural Development
IGAD	Inter-Governmental Authority on Development (in Eastern Africa)
ILRI	International Livestock Research Institute
IMF	International Monetary Fund
INDEPTH	International Network of field sites with continuous Demographic Evaluation of Populations and Their Health
ISAC	International Scientific Advisory Committee
KAP	knowledge, attitudes and practices
NID	neglected infectious diseases
NGO	non-governmental organization
NZD	neglected zoonotic diseases
OIE	World Organisation for Animal Health
PAHO	Pan American Health Organization
PAAT	Programme Against African Trypanosomiasis
PCR	polymerase chain reaction
PVS	performance, vision and strategy tool
RIMSA	Inter-American Meeting in Health and Agriculture at Ministerial Level
RVF	Rift Valley fever
SADC	Southern African Development Community
SICA	Specific International Cooperation Action
SOS	Stamp Out Sleeping Sickness Campaign
SRA	Strategic Research Agenda
STI	Swiss Tropical Institute
TB	tuberculosis
UEMOA	Union Economique et Monétaire Ouest Africaine
UMA	Union du Maghreb Arabe
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
VPH	veterinary public health
WAHID	World Animal Health Information Database
WAHIS	World Animal Health Information System
WB	World Bank
WHIB	World Health Image Bank
WHO	World Health Organization



References

Listed here are a number of freely available key documents concerning international efforts to address veterinary public health, emerging and neglected zoonoses, foodborne and tropical diseases.

Future Trends in Veterinary Public Health: Report of a WHO Study Group
WHO Technical Report Series 907, Geneva 2002 (meeting held in 1999)
http://whqlibdoc.who.int/trs/WHO_TRS_907.pdf

FAO Expert Consultation on Community Based Veterinary Public Health (VPH) Systems, Rome, 27-28 October 2003
http://www.fao.org/AG/AGINFO/programmes/en/vph/events/expert_consult_report.pdf

FAO/WHO/OIE Electronic Conference on Veterinary Public Health and Control of Zoonoses in Developing Countries, 2003
<ftp://ftp.fao.org/docrep/fao/006/Y4962T/Y4962T00.PDF>

Intensified Control of Neglected Diseases: Report on of an International Workshop, Berlin, 10-12 December 2003
http://whqlibdoc.who.int/hq/2004/WHO_CDS_CPE_CEE_2004.45.pdf

Emerging Zoonotic Diseases: Report of a WHO/FAO/OIE Joint Consultation in collaboration with the Health Council of the Netherlands, Geneva, 3-5 May 2004
http://whqlibdoc.who.int/hq/2004/WHO_CDS_CPE_ZFK_2004.9.pdf

Strategic and Technical Meeting on Intensified Control of Neglected Tropical Diseases: Report of an International Workshop, Berlin, 18-20 April 2005
http://whqlibdoc.who.int/hq/2006/WHO_CDS_NTD_2006.1_eng.pdf

Capacity Building for Surveillance and Control of Zoonotic Diseases
FAO/WHO/OIE Expert and Technical Consultation, Rome, 14-16 June 2005
<http://www.fao.org/docrep/009/a0083e/a0083e0b.htm>

The Control of Neglected Zoonotic Diseases - A route to poverty alleviation: Report of a Joint WHO/DFID-AHP Meeting with the participation of FAO and OIE, Geneva, 20-21 September 2005
http://www.who.int/zoonoses/Report_Sept06.pdf

Understanding the Links between Agriculture and Health: Policy Briefs
IFPRI and other CGIAR Centers, May 2006
<http://www.ifpri.org/2020/focus/focus13/focus13.pdf>

WHO Consultation to Develop a Strategy to Estimate the Global Burden of Foodborne Diseases: Taking Stock and Charting the Way Forward
Geneva, 25-27 September 2006
http://www.who.int/foodsafety/publications/foodborne_disease/fbd_2006.pdf

Neglected diseases: A human rights analysis
Paul Hunt, 2007
http://www.who.int/tdr/publications/publications/pdf/seb_topic6.pdf

Global Plan to Combat Neglected Tropical Diseases: 2008-2015
WHO Control of Neglected Tropical Diseases, 2007
http://whqlibdoc.who.int/hq/2007/WHO_CDS_NTD_2007.3_eng.pdf



Meeting agenda

Opening Welcome
Carlos Seré, Director-General, ILRI
Abdoulaye Diarra, WHO/AFRO
William Amanfu, FAO
Nicolas Denormandie, OIE
Isabel Minguez-Tudela, EU
Maria Vang Johansen, DBL
Hameed Nuru, African Union-IBAR
Meeting Background and Objectives
François-Xavier Meslin, WHO

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John McDermott
Highly Pathogenic Avian Influenza: Paving the Way for the Surveillance and
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Isabel Minguez-Tudela
The Global Alliance for Livestock Veterinary Medicines (GALVmed)
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Converting a Weakness into a Strength: Harnessing the Zoonotic Double-
Whammy (*Keynote address*)
Alexandra Shaw
Integrated Control of Neglected Zoonotic Diseases: From Concept to Action
François-Xavier Meslin

Working groups

(1) Management and Advocacy

Abulganiyu Abubakar, William Amanfu, Abdoulaye Diarra, John David Kabasa, Malika Kachani, Rudovick Kazwala, Nathan Kenya-Mugisha, Athanase Millogo, Samson Mukaratirwa (Chairperson), Louis Nel, Hameed Nuru, Patrick Seruyange, Alexandra Shaw (Rapporteur/Facilitator), Timothy Wesonga, Lee Willingham

(2) Research and Training

Ayayi Akakpo, Samuel Arimi, Jaouad Berrada, Bassirou Bonfoh (Chairperson), Hélène Carabin, Margarida Correia-Neves, Noline de Haan, Paulo Duarte, Mark Eisler, Jacques Godfroid, Maria Vang Johansen (Rapporteur/Facilitator), Seyfu Ketema, Gabriel Mbugua, Sayoki Mfinanga, Anita Michel, John Mugabe, Helena Ngowi, Jean Ndikumana, Mamadou Niang, Hameed Nuru, Isaac Nyamongo, Reuben Ocholi, Mamadou Sacko, Charles Waiswa

(3) Diagnostics and Surveillance

Rkia Azlaf, Richard Bishop, Jide Coker (Co-Chairperson), Philip Craig (Co-Rapporteur/Facilitator), Nicolas Denormandie, Eric Fèvre (Rapporteur/Facilitator), John Kagira, Nicholas Kauta, Ndichu Mainigi, Joseph Marete, Isabel Minguez-Tudela, James Mlangwa, James Mwansa, Mamadou Niang, Emilia Noormahomed (Chairperson), Esther Schelling, Elizabeth Shayo, Chummy Sikasunge, Saidou Tembely, Timothy Wesonga

(4) Prevention and Control

Katinka de Balogh (Rapporteur/Facilitator), Olufemi Oladaya Faleke, Peter Maina Ithondeka, Winji Kaboyo (Chairperson), Darryn Knobel, Faustin Paul Lekule, François Meslin, Pelagia Muchuruzu, Ngozi Njepuome, Patrick Nguku, Chris Rutebarika, Keith Sones, Dickson Suya, Getachew Tilahun, Susan Welburn, Eberhard Zehyle

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List of participants

Country Representatives

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