Control of neglected zoonotic diseases: challenges and the way forward

This note contains information on zoonotic diseases based on the outcome of the WHO/DFID-AHP (UK DFID’s Animal Health Programme) Consultation on the Control of Zoonotic Diseases: a route to poverty alleviation, which was held at WHO headquarters, Geneva, on 20 and 21 September 2005.

SUMMARY NOTES

• Zoonotic diseases are those diseases transmitted from vertebrate animals to people and thus compromising people’s health as well as endangering their livelihoods by affecting livestock and/or other useful domestic animals. Many of these diseases are prevalent in the developing world and affect the poorest segments of the human population.

• These diseases impose a substantial global burden on human health, the exact extent of which is still not known. Initial attempts at quantification indicate that the incidence of some of these diseases is likely to be as much as 10 to 100 times greater than that reported.

• Despite this potential for wider impact, however, the fact that the control of these ‘zoonotic diseases’ requires effective collaboration between human and animal health sectors has tended to mean that they lag behind other disease groups in attracting funding and effective control measures.

• Control of these diseases is in many cases most cost-effective if it targets the animal reservoir - by, for example, vaccinating dogs against rabies or treating cattle that carry sleeping sickness - and if it includes complementary measures to prevent and treat the disease in humans. This means that through effective control each infected country can reap a dual harvest, saving human lives, securing livelihoods and alleviating poverty by protecting livestock and other useful animals.

1. Neglected zoonoses: definition and significance

Zoonoses are defined as those diseases and infections naturally transmitted between people and vertebrate animals. Domestic and/or wild animals play an essential role in maintaining and amplifying the infectious agent in nature, as well as in the transmission of infection to humans and sometimes other animals. These diseases have a variety of transmission mechanisms that may be direct, such as in rabies, anthrax or trichinosis, or indirect, via vectors, food, water and the environment, such as in the case of bovine tuberculosis and cysticercosis. Many, such as brucellosis, also have multiple routes of infection.

A large proportion of human pathogens (61%) are zoonotic and 75% of all emerging pathogens fall within this category. New emerging zoonotic diseases, of which SARS and avian influenza are the best examples, have mobilized human and animal health authorities at national, regional and international levels as epidemic-prone diseases affecting domestic and wild animals and their owners/handlers. The vast majority of zoonoses are, however, not prioritized by health systems at national and international levels and are labelled neglected. Such neglected zoonoses include, among others, rabies, brucellosis, leishmaniasis, zoonotic sleeping sickness (T.b. rhodesiense), cysticercosis and echinococcosis.

The significance of zoonotic diseases is expanding and their health and socioeconomic impacts are increasingly being experienced by many countries, particularly the developing ones. Zoonotic diseases continue to burden public health systems as well as to undermine efforts to boost the livestock industry and the production of safe foodstuffs of animal origin to satisfy national needs and exports. In many
areas for instance, illegal slaughtering, transport, trade/marketing and improper animal waste disposal are still common occurrences.

"Communities, especially in rural areas, have traditionally depended on animals for food, transport and farm work. This dependence has gone up with the intensification in livestock production and the increase in the transport of livestock and their products domestically and across the globe".

Elisabeth Miranda, WHO/DFID-AHP Consultation on Control of Neglected Zoonotic Diseases: a route to poverty alleviation Geneva, 20-21 September 2005

2. Challenges in neglected zoonoses prevention and control

Despite this potential for wider socioeconomic impact, the control of zoonotic diseases has lagged behind other disease groups in attracting funding and effective control measures. The major reasons are as follows:

- Often the most effective control strategy is to deal with the animal reservoir - for example by vaccinating dogs for rabies or dealing with tuberculosis or brucellosis in cattle herds - and responsibility for this and its cost thus fall predominantly on the veterinary services. The major beneficiaries, however, are people and the human health services which can save the resources which would otherwise be needed to treat them. Since many veterinary and health services are both greatly over-stretched and under-funded, and since these services do not in all countries work efficiently together, it is not surprising that zoonoses control in many cases fall between the two sectors.

- Zoonotic diseases like most human diseases are under-diagnosed, particularly among the poor, and this under-diagnosis reflects the limited capacity and coverage of the health services. However, the under-diagnosis of zoonoses is further aggravated by the uneven geographical distribution of these diseases, and also by inherent difficulties in the diagnosis of some of them. Poor people are least likely to be correctly diagnosed and treated against these diseases.

- There are ways of preventing or controlling most of these diseases and there are a number of reasons why these are not applied. In many cases, the control measures which have worked well in Europe cannot easily be applied in developing countries. For example, brucellosis and bovine tuberculosis have been either controlled or eliminated in Western Europe by testing cattle and slaughtering infected animals. This approach would not be feasible in poor livestock keeping communities in developing countries, where people depend on their animals for their livelihoods and replacements are hard to obtain. However, although public awareness campaigns on the importance of boiling milk and better diagnosis of human patients could successfully be undertaken in these communities, they are rarely implemented owing to health policy-makers being unaware of these diseases.

3. Zoonoses prevention and control: the way forward

Further research and political will are needed to establish where these diseases are present, identify the risk factors which make particular groups of people or livestock likely to contract them, and work out cost-effective ways of dealing with them. A change in policy and attitudes to the control of these neglected diseases is needed, with veterinary and medical groups at all levels realizing that cooperation will reap rewards for both people and their animals. The involvement of private partners, including the animal production industry, and making the human and animal health policy-makers aware of the burden imposed by these diseases, are both of paramount importance.
"The impact of these diseases on poor households is far greater, and it tends to be the poor and marginalized populations upon whom the main burden of these diseases falls. Since controlling them can be shown to be highly cost-effective from a societal point of view, taking into account both the medical and veterinary aspects, this is an area where interventions have an enormous potential for poverty alleviation".

Alexandra Shaw, WHO/DFID-AHP Consultation
Control of Neglected Zoonotic Diseases: a route to poverty alleviation
Geneva, 20-21 September 2005

Veterinary public health programmes need to emphasize the prevention of zoonotic diseases by highlighting their economic and health consequences. If benefits to the livestock sector are added and the costs of the intervention are shared between the public health and agricultural sectors proportionally to their benefits, the control of many zoonotic diseases such as brucellosis, rabies and trypanosomiasis becomes profitable for both sectors. Where cost-recovery is not possible and the diseases particularly affect poor people, funds are needed to support these initiatives.

"Trans-sectoral assessments, considering both human and animal health economics from a societal economic perspective represent an innovative approach to health economics and zoonoses control and the improvement of public health in low-income countries that would otherwise never be cost-effective from a health sector point of view alone".

Jakob Zinsstag, WHO/DFID-AHP Consultation on
Control of Neglected Zoonotic Diseases: a route to poverty alleviation
Geneva, 20-21 September 2005

Cost-effective control measures already exist in a number of countries for several neglected zoonotic diseases such as rabies and brucellosis. More holistic interventions can be packaged through existing national zoonoses control structures and, in certain cases, given the right programmes and adequate funding, these could lead us to regional or even global control/elimination of individual or combination of diseases such as dog rabies and echinococcosis in northern Africa or brucellosis and echinococcosis in northern China. Such an integrated approach has the added value that it can be extended to incorporate non-zoonotic public health problems prevalent in the same impoverished communities.

"Improving the control and prevention of zoonotic diseases requires multi-disciplinary, inter-programmatic and cross-cultural efforts by health, agriculture, environment and other sectors of society at the national level. Effective zoonoses control also requires strong regional and international cooperation and prompt notification of disease occurrence domestically, regionally and globally. WHO and other international organizations, such as FAO and OIE, have a particular role to play in promoting intersectoral cooperation for zoonoses control"

François Meslin, WHO/DFID-AHP Consultation on
Control of Neglected Zoonotic Disease: a route to poverty alleviation
Geneva, 20-21 September 2005
Some figures for further information

- In today's world the rural poor represent 911 million people, of which 411 million are poor livestock-keepers (almost half in south Asia and one-third in sub-Saharan Africa).

- At least 55,000 people are dying of rabies in Asia and Africa, and expenses related to the prevention and control of this disease is estimated at US$ 590 million annually on these two continents.

- The total cost of an average rabies post-exposure prophylaxis course is US$40 in Africa and US$49 in Asia. This amounts to a substantial fraction of per capita Gross National Income (5.8% in Africa and 3.9% in Asia).

- The annual societal cost (agriculture and health) of porcine cysticercosis/taenosis is estimated at about US$150 million in India alone.

- On the Tibetan plateau, the annual combined human and animal losses due to echinococcosis equate to approximately US$3.47 per person or 1.4% of per capita gross domestic product.

- Echinococcosis in Tunisia causes significant direct and indirect losses in both humans and animals of between US$10 million and US$19 million annually. The reported incidence in humans is 1.5 to 2.05 cases per 100,000 inhabitants and between 12% and 17% of the cattle at slaughter is found to be infested.

- Disability-adjusted life years (DALYs) and monetary losses resulting from human and livestock cystic echinococcosis have been calculated at the global level assuming substantial under-reporting. The estimated global human burden of echinococcosis may be as high as 1,009,662 DALYs - or an annual loss of US$763,980,979. A maximum annual livestock production loss of US$2,190,132,464 is also estimated.

- More than 50,000 cases of human brucellosis were diagnosed in only eight countries located south and east of the Mediterranean Sea in 2003.

4. Further reading

- Mantovani, A. C.E. Control measures in the Mediterranean Area in Mediterranean Zoonoses Control Centre Information circular on Cystic Echinococcosis n° 57, June 2003, page 8-10.
5. For further details please contact: Dr François-Xavier Meslin, Coordinator, Zoonoses and Veterinary Public Health, Department of Food Safety, Zoonoses and Foodborne Diseases, Sustainable Development and Healthy Environment Cluster, World Health Organization, 1211 Geneva 27, Switzerland - Website zoonoses: www.who.int/zoonoses - Website rabies: www.who.int/rabies - Website Rabnet: www.who.int/rabnet.