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NEGLECTED DISEASES IN NEGLECTED POPULATIONS, WITH EMPHASIS ON ZOOSES

People living in poverty throughout the developing world tend to have a heavy burden from a number of communicable diseases, many of which are zoonoses. They tend to be marginalized from the health sector. *Neglected Diseases in neglected populations, with emphasis on zoonoses*, pose a major challenge to the achievement of the Millennium Development Goals (MDG) and the commitments made by PAHO Member States, which still linger as the “unfinished agenda”, since the Declaration of Alma-Ata in Primary Health Care in 1978.

Fifty years of accomplishments in zoonoses control in Latin America and the Caribbean have created the necessary infrastructure in many countries to address, in an integrated and comprehensive manner, zoonoses control, food safety, and foot-and-mouth disease eradication under veterinary public health programs.

Because many determinants of the *neglected zoonoses in neglected populations* lie outside the purview of the health sector, they present an important and new challenge. They must address the multiplicity of risks and protective factors, and the strategies must rely on convergence and synergies of animal and human health resources, which must permeate at the local community and individual level, both urban and rural.

In addressing the issues, PAHO is making particular efforts to work with the five Key Countries that have been identified by its Governing Bodies (Resolution CD45.R6 of the 45th Directing Council), namely: Haiti, Honduras, Nicaragua, Guyana, and Bolivia. The new approach with targeted strategies at the local level will increase program sustainability in socially disadvantaged and marginalized populations.

The RIMSA meetings could provide the opportunity and the entry points for integrated, intersectoral, inter-programmatic, and multi-disease approaches for the control/elimination of the *neglected zoonoses in neglected populations*.

It is expected that this issue will stimulate dialogue, mobilize international cooperation, and lead to action through the establishment of pilot interventions and partnerships in local communities, with a vision of ensuring their sustainability in support of the MDG.

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The Importance of the Neglected Diseases and the Zoonoses

1. In historical context, the dawn of the 21st century ushered in an unparalleled technological development and expectations for a better life. “It is a great time to be alive!” expressed Mr. Bill Gates succinctly. But human demographics, environmental changes, and globalization, with their associated social and economic consequences, have converged to create a contemporary age with new challenges--neglected human infectious diseases have re-emerged and new ones have appeared. The majority of the responsible pathogens are zoonoses, infections that have crossed the species barrier from animals to humans.

2. Populations living in poverty throughout the developing world tend to have a heavy burden from a number of infectious diseases, most of them zoonoses. They also tend to be marginalized from the health sector, and so are many of the diseases that affect them. These diseases, which are currently referred to as the *Neglected Diseases of Neglected Populations*, pose a major challenge to the achievement of the Millennium Development Goals (MDG) and the commitments made by PAHO Member States, which still linger as the “**unfinished agenda**”, since the Declaration of Alma-Ata in Primary Health Care in 1978.

3. In the region of the Americas, there is a broad range of viral, bacterial, mycotic, chlamydial, rickettsial and parasitic zoonoses in both humans and animals. The WHO Expert Committee defined zoonoses as “those diseases and infections which are naturally transmitted between vertebrate animals and man”. They are of global and regional importance because of their major impact on the health and socio-economic development of many peoples. This is further enhanced by the fact that, in addition to direct transmission, a great number are transmitted to humans from animal reservoirs via food, animal products, and human and animal waste.

4. Some of the neglected zoonoses include plague, yellow fever, leptospirosis, bucellosis melitensis, bovine TB and brucellosis, equine encephalitides, leishmaniasis, Chagas disease, schistosomiasis japonicum, taeniasis/cysticercosis (*T. solium*), taeniasis saginata, trichinellosis, hydatidosis, fascioliasis, angiostrongylosis, clonorchiasis, echinostomiasis, opistorchiasis, paragonimiasis, sparganosis and diphyllbothriasis, toxocariasis, cutaneous larva migrans. Table 1 shows the list of some selected neglected zoonoses in the Region of the Americas.

5. These zoonoses are “neglected” because, with the exception of plague and yellow fever which are subject to compulsory reporting in most countries, they usually affect the poor, are unknown or little known, and therefore not perceived as public health problems. Most of them do not lead to dramatic epidemiological emergencies, and consequently attract little attention from the media, and the official and private sectors. Moreover, the

financial sector and the multinational pharmaceutical companies do not consider this group of diseases as a lucrative investment, a phenomenon which severely hampers the development of corresponding diagnostic tools, drugs for treatment, and vaccines.

6. New non-profit drug companies and public-private partnerships are, however, beginning to address this group of diseases, at least for leishmaniasis and Chagas Disease.

7. Most of the countries of Latin America and the Caribbean, with the technical cooperation of PAHO, have recognized and addressed the problem of zoonoses as simultaneously social, economic and health issues since the decade of the 1950's. Programs have been launched, some are still on-going, to prevent, control and eradicate rabies, bovine TB and brucellosis, echinococcosis, taeniasis/cisticercosis, equine encephalitides, brucellosis melitensis, *inter alia*, and foot-and mouth disease. Others, however, particularly the parasitic zoonoses, continue to persist and become more menacing, as conditions associated with poor living conditions and human migration strengthen their transmission and foothold in endemic foci. New ones threaten the Region, such as SARS, influenza, and BSE.

Rationale and socio-economic impact of the neglected zoonoses

8. The burden of the neglected zoonoses is mostly shouldered by poor and vulnerable populations. Everyday, thousands of people living in poverty get sick and die of preventable diseases. These diseases account for the major difference in the magnitude of mortality and morbidity rates between developed and the developing countries. Infectious diseases, the neglected zoonoses in particular, are proxy indicators of the level of socio-economic development, and are pervasive in regions or countries where the gross national product (GNP) is low or where the income distribution is highly skewed. Some of these diseases would cease to exist with an increase in GNP and a more balanced income distribution.

9. The neglected zoonoses exert a high financial burden on the individual, the family, the community, the country, and even the Region by impeding social and economic development. For instance in Latin America, an estimated 75 million persons live in areas where *Taenia solium* cysticercosis is endemic, and approximately 400,000 have symptomatic disease and where neurocysticercosis is the leading cause of epilepsy. Human hydatidosis has the highest concentration of cases in the southern cone of South America (Argentina, southern Brazil, Chile, the highlands of Peru, and Uruguay.). Prior to the implementation of control programs in the 1960's, the annual incidence of surgical cases per 100,000 inhabitants ranged from 1.0 in Peru, 2.0 in Argentina, 7.9 in Chile, and 20 in Uruguay. However, these data paint an unrealistic picture since they refer to total country and not the rural population, which is the population at real risk to the infection.

The direct costs of medical attention and surgical intervention, let alone the related indirect costs, from these two zoonoses are inestimable; particularly to populations living on less than a dollar a day.

10. Other vulnerable groups in society, such as indigenous populations and minority ethnic group, infants and pre-school children, the elderly, those with physical limitations, and immune-compromised people (such as those with HIV/AIDS) can be highly burdened with the neglected zoonoses. Additional high-risk populations often include people living in slums, migrant workers, and those living in agricultural fields and plantations.

11. Critical determinants of health lie outside the scope of the health sector. Moreover, the policies of the sectors that exert influence on these negative health impacts are usually not established according to public health criteria. Consequently, addressing comprehensive and sustainable solutions to the health problems ensuing from the neglected zoonoses cannot be achieved solely by the health sector. Most of the parasitic zoonoses are good examples of the multisectoral and multifactoral nature of neglected diseases, where interventions to improve food safety programs, ensure water quality and supply, provide safe excreta disposal, combined with periodic drug treatment and health education are key to sustainable control.

12. Partnerships with other sectors capable of effective action, particularly agriculture, environment and education, will be necessary for the reduction and effective control of the neglected zoonoses. An intersectoral approach, complemented by primary health care strategies, active community participation and the promotion of appropriate technology in endemic areas, will ultimately contribute to sustainable social and economic development of poverty stricken populations within countries, and to Regional economic growth in Latin America and the Caribbean.

Zoonoses control in Latin America and the Caribbean--50 years of accomplishments

13. In 1947, by mandate of the 13th Pan American Sanitary Conference, the then Director of the Pan American Sanitary Bureau, Dr. Fred Soper, created the veterinary public health service to the address the issue of the zoonoses in the countries of the Western Hemisphere. This was brought about by an epidemic of anthrax in Haiti in 1943 and 1945; the request for assistance by Panama in 1946 by an outbreak of equine encephalitis and the introduction of foot-and-mouth disease into Mexico in the same year; and the alarming problem of rabies in the Region, prompting the Member Governments of PAHO to address the need for “a coordinated and simultaneous action of all countries to combat the animal diseases transmissible to humans”.

14. The Member States of PAHO early on recognized the need for an intersectoral collaboration between health and agriculture to address the zoonoses and other issues related to animal and human health interaction, such as foot-and-mouth disease. By mandate of its Governing Bodies, PAHO institutionalized the meeting of ministers of agriculture to address issues of mutual interest to both health and agriculture sectors in 1967. Initially named RICAZ. RIMSA 14 culminates a total of 36 ministerial meetings to address issues of mutual interest, operationalizing in effect, intersectoral coordination between agriculture and health at the highest political level.

15. As a result of PAHO Member States, efforts with technical and financial support from international organizations, the necessary infrastructure have been put in place in many countries of the Region to address, zoonoses control, food safety, and foot-and-mouth disease eradication in an integrated and comprehensive manner under the overarching field of veterinary public health.

16. There has been a 90% reduction in the total number of cases of human and dog rabies in Latin America (1982-2004). In 1990, Uruguay, one of the countries in the Region with the highest rate of human hydatid disease, launched a program to eradicate hydatidosis in its territory. Between 1991 and 1997, the prevalence of *Echinococcus granulosus* in dogs (the primary source of human infection) decreased from 10.7% to 0.74%, with a corresponding reduction in the number of human surgical cases from a historical annual average of 550 (1974) to 246 (1999). Several countries of the southern cone have achieved an internationally recognized status of freedom from foot-and-mouth disease, including Chile, Uruguay, Argentina, and southern Brazil. In 1975, Jamaica launched a national bovine TB and brucellosis eradication program, which reached levels of reduction from 5% to less than 0.1 and 0.5%, respectively, in 1985. Mexico and some Central American countries have sustained their bovine TB brucellosis eradication programs despite the transition from public to more private participation. These are some of the more visible accomplishments, but there are many others.

Importance of the neglected zoonoses in neglected populations

17. A constellation of factors particularly socio-cultural is essential in establishing the endemicity of neglected zoonoses, as well as the limited distribution of the intermediate hosts.

18. The intrinsic determinants are biological in nature (i.e., genetic make-up, immune response). Most of the intrinsic determinants can be manipulated only with advances in biomedical research and technology, such as the availability of new vaccines, drugs and diagnostic tools. Significant progress has been made by the private and academic sectors in developing some new tools, specifically those that target lucrative markets. However, their availability for the neglected diseases, supported by WHO Tropical Diseases

Research Program and the multi-national pharmaceutical companies, has been slow. Access to the new tools and technology has also been difficult given their high cost.

19. The extrinsic determinants are economic, socio-political and environmental, such as poverty, vector ecology and socio-cultural behavior, occupational activities, natural disasters, with their outcomes resulting from poorly planned agricultural and irrigation development, uncontrolled urbanization, indiscriminate insecticide use, and improper medications.

20. Clearly, poverty is one of the most critical extrinsic determinants that impact the health of individuals and groups. It also increases the vulnerability to diseases by limiting access to high quality health care, safe and nutritious food, and adequate housing. Managing these determinants would require intensive advocacy, food security, improved living conditions, health and environmental education, and community participation.

21. Human activities that alter the environment create favorable conditions for the transmission of neglected zoonoses. One example is the intense deforestation combined with heavy rains that may lead to disastrous mud slides and flooding resulting in increase in vector-borne and food-borne diseases. The indiscriminate use of insecticides in agriculture and public health interventions has induced resistance in some vectors. The widespread and uncontrolled use of antibiotics and other medications (in both humans and animals) has contributed to the widespread occurrence of drug resistance.

22. Climatic changes, such as the phenomenon of “El Nino”, have contributed to epidemic outbreaks of neglected zoonoses in endemic areas. The epidemics of leptospirosis following flooding corn harvests which attract rat population into human communities and resulted in a devastating outbreak of plague.

23. Human incursions into sylvatic, virgin areas, such as the Amazon, will increase the risks of neglected zoonoses as local populations are displaced and forced out of their communities as a result of exploitation of natural resources and opening of commercial trade routes.

Quo vadis--where do we go from here?

24. The neglected zoonoses in neglected populations demand immediate action but the solutions require sustained action over a long-term. The strategy for their prevention and control is based on integrated, multi-disease, inter-programmatic, intersectoral management approaches to address the multiple health risks and protective factors both in the short- and medium-term. The mobilization of both the public and private initiative and resources, particularly at the local and community levels is required.

25. In the Region of the Americas, we must tailor our approaches to both urban and rural populations. In addressing the issues, PAHO will make particular efforts to work with the five Key Countries that have been identified by its Governing Bodies (Resolution CD45.R6 of the 45th Directing Council), namely: Haiti, Honduras, Nicaragua, Guyana, and Bolivia. We hope that this new set of approaches with targeted strategies at the local level will increase program sustainability of neglected diseases control, including the neglected zoonoses, and elimination efforts in socially disadvantaged and marginalized populations.

26. This set of approaches is further expected to strengthen existing services and surveillance systems, as well as contribute to their integration into a multi-disease based disease identification and control/elimination systems.

27. WHO has prepared an intensified plan to control neglected diseases which is reflected in the Report of an International Workshop held in Berlin in December 2003.

28. Many determinants of neglected diseases in neglected populations, particularly zoonoses, lie outside the purview of the health sector. These determinants include poor living conditions, unsafe drinking water, contaminated food, inadequate sanitation and excreta disposal, poor drainage, non-existent solid waste disposal, poor housing and air pollution perpetuate the cycle of the neglected diseases. Consequently, comprehensive and sustainable solutions have to be a shared responsibility of all sectors involved in achieving a better quality of life for all citizens.

29. Reducing risk factors needs to go hand in hand with the adoption of protective factors, including cleaner environment, better education, food security and safety, and employment opportunities which must be backed by political and fiscal commitment for sustainability. Improving food security and safety, and thus improvement of overall caloric intake and nutrition could protect against susceptibility to infection with neglected zoonoses, and contribute to social well-being and economic benefits.

30. The conceptual basis of the approach for the neglected zoonoses in neglected populations must address the multiplicity of risks and protective factors, and the strategies must rely on convergence and synergies of animal and human health resources which must permeate at the local community and individual levels.

31. By articulating one disease control intervention infrastructure with another, such as the eradication of foot-and-mouth disease and bovine TB and brucellosis control/eradication, or urban rabies control, dog population control and control of other urban zoonoses, integrated multi-disease interventions can be cost-effective.

32. PAHO has developed, in cooperation with Brazil, three hypothetical scenarios where an integrated, intersectoral, inter-programmatic, and multi-disease approach applied in three very different populations (a slum, an indigenous community, and a medium-sized city with a mix population). Examples are in the City of Jaboatao dos Guararapes on the coast of the State of Pernambuco for control of lymphatic filariasis, schistosomiasis, geohelminths, and domestic fly infestations; in the Yanomani communities in northern Brazil (States of Amazonas and Roraima) for the elimination of onchocerciasis, with concomitant benefits for the control of geohelminths in children and adolescents and control of tungiasis in dogs; and in the City of Imperatriz in Western Maranhao State for the control of malaria, leishmaniasis, leptospirosis, and dengue cases.

33. The preparation and implementation of an inter sectoral plan of action for the control/eradication of neglected zoonoses in neglected population needs good orchestration, given the perceived self-interests of each sector, the political conflicts, the existing tensions between social and economic priorities, and the maximization of public-private needs.

34. Intersectoral collaboration, appropriate technology, community participation, and technical and economic cooperation among countries are embodied in the central strategies of the Alma-Ata Declaration on Primary Health Care. Primary health care must reflect and evolve from the economic conditions and social values of the countries and their communities.

35. We hope that addressing the issue of the neglected diseases in neglected populations, with emphasis on zoonoses, will stimulate dialogue, mobilize international cooperation, and lead to the establishment of pilot interventions and partnerships in local communities with a vision of ensuring their sustainability in support of the MDG.

36. Better coordination and harmonization of strategies to reduce poverty in rural and periurban areas, focused on local development and improvement of quality of life of families and communities, will have an accelerated and sustainable impact in eliminating these neglected diseases.

Table 1: List of selected neglected zoonoses in neglected populations in Latin America and the Caribbean.

| Neglected Zoonoses | Distribution | Control/Elimination |
|--|--|---|
| Hydatidosis | Widespread with areas of high endemicity in southern South America (Argentina, southern Brazil, Chile, Peru, and Uruguay). | Inter-country control/elimination program underway in Argentina, Brazil, Chile, & Uruguay |
| Taeniasis/Cysticercosis (<i>T. solium</i>) | Prevalent and widespread in Bolivia, Brazil, Colombia, Ecuador, Guatemala, Honduras Mexico, and Peru. Present but with sporadic transmission Argentina, Chile, Costa Rica, Haiti, Panama, Dominican Republic and Venezuela. Active foci exist. | Guides exist for control, and possible elimination, in areas with active foci both urban and rural. |
| Fascioliasis | Endemic human foci exist in Cuba, Chile, Costa Rica (Canton of Turrialba), and Bolivian highland plateau. Believed more widespread than reported in literature. | Preventable and controllable through integrated multi-disease intervention approach. |
| Brucellosis (<i>B. melitensis</i>) | High prevalence in endemic foci Argentina, Mexico, and Peru | Control and eradication feasible through integrated multi-disease intervention approach. |
| Bovine Brucellosis and TB | One of the most serious diseases of cattle in Latin America and the Caribbean. Human exposure usually occupational. | On-going control/eradication programs on-going, but limited in many countries of the Region. |
| Leptospirosis | Widespread. Epidemic outbreaks in humans have been reported in Brazil and Jamaica, following natural disaster such as heavy rains and flooding. | Prevention and control feasible through integrated multi-disease intervention approach. |

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|---|---|---|
| Dog-transmitted helminthes (<i>Toxocara</i> sp., <i>Ancylostoma</i> sp.) | Cutaneous larva migrans common in tropical and subtropical areas. Visceral larva migrans underreported due to lack of diagnostic facilities. | Community-based prevention and control through integrated multi-disease approach. |
| Equine encephalitides (Eastern, Venezuelan, Western) | Occurs exclusively in the Americas. Reported outbreaks in US, Cuba, Dominican Republic, Argentina, Panama, and Brazil. | Prevention and control programs based on equine vaccination in endemic areas |
| Trichinosis | Outbreaks have been reported in Argentina, Canada, Chile, Mexico, US, Uruguay, and Venezuela. | Control/eradication through integrated multi-disease approach. |
| Rickettsiosis | Outbreaks have been reported in Brazil, Uruguay, Argentina, Peru, Colombia, México, Panama, Costa Rica, Canada and US. | Community-based prevention and control through integrated multi-disease approach. |
| Leishmaniasis | Occurs especially in Brazil. Sporadic cases in Argentina, Bolivia, Colombia, Ecuador, El Salvador, Guatemala, Honduras, México, Paraguay, Surinam, Venezuela and Guadalupe and Martinica Islands. | Control/eradication through integrated multi-disease approach. Brazil developed an important program to control and prevent this disease. |

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