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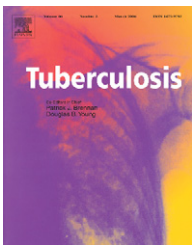

Human *Mycobacterium bovis* infection in ten Latin American countries

Isabel N. de Kantor[a,*], Marta Ambroggi[b], Susana Poggi[b], Nora Morcillo[c], Maria A. Da Silva Telles[d], Marta Osório Ribeiro[e], María C. Garzón Torres[f], Claudia LLerena Polo[f], Wellman Ribón[f], Vicente García[g], Dolores Kuffo[h], Luis Asencios[i], Lucy M. Vásquez Campos[i], Carlos Rivas[j], Jacobus H. de Waard[k]

[a]*Tuberculosis Consultants Group, World Health Organization, Av. Libertador 7504, 16 A, 1429 Buenos Aires, Argentina*
[b]*Hospital FJ Muñiz, Instituto R. Vacarezza, Buenos Aires, Argentina*
[c]*Hospital Dr. A. Cetrángolo, V. López, Buenos Aires, Argentina*
[d]*Instituto Adolfo Lutz, São Paulo, Brazil*
[e]*Instituto de Pesquisas Biológicas, Laboratório Central do Estado RGS, Porto Alegre, Rio Grande do Sul, Brazil*
[f]*Instituto Nacional de Salud, Grupo de Micobacterias, Bogotá, Colombia*
[g]*Laboratorio Veterinario Central, Santo Domingo, R. Dominicana*
[h]*Instituto Nacional de Higiene L.I.Pérez, Guayaquil, Ecuador*
[i]*Instituto Nacional de Salud, Lima, Peru*
[j]*Comisión Honoraria Lucha Antituberculosa, Departamento de Laboratorio, Montevideo, Uruguay*
[k]*Laboratorio de Tuberculosis, Instituto de Biomedicina, Caracas, Venezuela*

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Summary
The aim of this work was to obtain the best possible estimate of the relevance of bovine tuberculosis (BTB) in humans in Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Peru, Uruguay and Venezuela. Sources of information were a questionnaire filled by the participant laboratories, and a search of published literature (1970–2007). Only four of these countries reported bacteriologically confirmed cases of BTB in humans. Most of these were diagnosed in Argentina, where the mean percentage of *Mycobacterium bovis* cases in relation to those due to *Mycobacterium tuberculosis* (2000–2006) ranged from 0.34% to 1.0%, according to the region. A slowly decreasing trend was observed in non HIV as well as in HIV/AIDS patients in Buenos Aires. In most of these countries, the low coverage of culture methods, especially of those including pyruvate-containing media, appropriate to isolate *M. bovis*, contributes to an underestimate of the problem. It was confirmed that BTB in humans exists, even though its relevance seems to be low. Milk pasteurization, sanitary controls to dairy products, and meat inspection at slaughterhouses contribute to the protection of human health. However, occupational

*Corresponding author. Tel.: +54 11 4701 2019; fax: +54 11 4701 7731.
E-mail address: ikantorp@fibertel.com.ar (I.N. de Kantor).

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aerogenous exposure to TB cattle and their carcasses remains a source of infection in the region.
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Introduction

The prevalence of tuberculosis (BTB) infection in cattle, in most Latin American countries, can be roughly estimated on the bases of tuberculin surveys results, usually restricted to areas with a history of proved BTB disease, and from official reports to international animal health agencies. From there it can be concluded that most of cattle bred in this region are in areas where BTB infection is still prevalent, even though it achieves different levels of prevalence. In consequence, human populations living in these areas, especially where livestock and dairy industries do not have effective animal health and sanitary controls, are at risk of infection.[1–5]

In public health, smear examination continues to be the main resource available to diagnose TB patients. The culture method is indicated for children and extra-pulmonary (EP) TB suspects, as well as for re-treated and HIV(+) patients, either for diagnosing mycobacterial disease, or for investigating drug susceptibility of the isolates.[6] For that purpose, solid, egg-based Löwenstein Jensen (LJ) or Ogawa media are usually employed. Both contain glycerol, which inhibits growth of most strains of *Mycobacterium bovis*.[7] This is an important qualification which limits the evaluation of the true prevalence. Reference laboratories perform culture, identification and susceptibility tests. In some of these, the Stonebrink pyruvate-containing egg medium, or different semi-synthetic media without glycerol have been introduced. In other cases, even though media with pyruvate are not included in routine-culture procedures, they are used for specifically oriented studies and surveys.

Taking into account these conditions and possible limitations, the aim of this work was to obtain the best possible estimate of the relative importance of BTB in humans in 10 countries of this region, with emphasis in the period 2000–2006.

Materials and methods

Reports on bovine stock, human population, total TB cases and related data were obtained from WHO, PAHO, FAO, FAO/GLIPHA, IUATLD, UNFPA and OIE,[1,2,5,8]. A systematic search and review (1970–2006) was made in *Scielo and Medline* data bases for articles on BTB in animals and man, in the Latin American countries.

Other publications, in Spanish or Portuguese, which were not indexed, were also consulted. The search was extended to congress and meetings proceedings, to official reports from animal health, and public health national departments, as well as from university and hospital reference laboratories (NRL). In addition, responsible officials from the participanting laboratories in Argentina, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, Peru, Uruguay and Venezuela filled in a questionnaire that included the following points:

1. Culture media currently used in the laboratory: egg containing and/or semi-synthetic liquid media, with and without pyruvate. Description of those media included in routine work, and of those reserved for special surveys, or for culturing certain type of specimens.
2. Number of cultures for mycobacteria annually performed (average) from human samples.
3. *M. bovis* isolations. Number, origin, year of isolation. Percentage of *M. bovis* isolates in relation to all other mycobacteria.
4. Phenotypic and/or genotypic tests performed to differentiate *M. bovis* from other members of the *Mycobacterium tuberculosis* Complex.

Data provided by these laboratories covered periods that ranged from 3 to more than 20 years, and achieved different

Table 1 Bovine population, tuberculosis incidence rates in humans, and reported number of cases for 2005, by country, in 10 Latin American countries.[1,2,8]

Country	Bovines	Humans	
	Bovine population (million)	TB incidence rate per 100,000	No. of cases notified, 2005
Argentina	51.0	41	15,869
Brazil	189.0	60	111,050
Chile	2.8	15	2377
Colombia	25.0	45	20,496
Costa Rica	0.8	14	622
Dominican R	1.9	91	7946
Ecuador	3.6	131	17,331
Peru	7.5	172	47,976
Uruguay	11.7	28	957
Venezuela	13.5	42	11,126

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