

Global burden of Chagas' disease in the year 2000

DRAFT

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1. Introduction

Chagas' disease exists only in the American continent and is caused by a flagellate protozoan parasite, *Trypanosoma cruzi*, which is transmitted to humans by Triatomine bugs and blood transfusion. There are two disease stages of the human disease: The acute stage shortly after infection and the chronic stage, which may last several years. The latter may affect the heart, oesophagus and colon and the nervous system. These chronic changes include Chagasic cardiomyopathy, which may lead to arrhythmia, heart failure and death as well as digestive lesions in the form of megacolon and megaesophagus.

2. Case and sequelae definitions

The case definition and sequelae used are given in Table 2.1 below.

Table 2.1 Case and sequelae definitions for Chagas' disease

Cause category	GBD 2000 Code	ICD 9 codes	ICD 10 codes
Chagas' disease	U023	086.0, 086.1, 086.2, 086.9	B57

Sequela	Definition
Cardiomyopathy without congestive heart failure	Disorder of the heart muscle resulting from infection with <i>T. cruzi</i> without congestive heart failure
Cardiomyopathy with congestive heart failure	Disorder of the heart muscle resulting from infection with <i>T. cruzi</i> with congestive heart failure
Megaviscera	Dilatation of interior organ in the abdominal cavity, particularly of oesophagus and colon due to <i>T. cruzi</i>

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3. Population prevalence and incidence studies

Community-based prevalence studies were used, where available (please see reference list for individual studies). In the case of Mexico and Nicaragua, where no community based data could be identified, the prevalence of other Central American countries was used (7%). Where incidence data were given for only one or two age-groups, the age distribution given in Table 4.1 was used to abstract incidence for the remainder.

Table 3.1. Numbers, types of studies and overall prevalence used for estimates

Country	Total number of studies	Community based studies	MoH reports, surveillance	Prevalence used (%)
Argentina	3	1	2	1.2
Brazil	3	1	2	0.1
Bolivia	1	1		24
Chile	5	1	4	0.4
Colombia	1	1		30
Costa Rica	1	1		11.7
Ecuador	1	1		10.7
El Salvador	2	2		7
Guatemala	2	2		7
Honduras	2	2		7
Nicaragua	1	1		El Salvador
Mexico	1		1	Guatemala
Panama	1	1		17.7
Paraguay	2	1	1	3.9
Peru	1	1		9.8
Uruguay	3	1	2	0.1
Venezuela	1	1		3

4. Mortality and case fatality

The community-based studies gave partial information on acute and long-term mortality from Chagas' disease and the assumptions are listed in the chapter below. The numbers of deaths derived from the model were supplemented with vital registration data from countries, where available.

5. Disease model for Chagas' disease

Years lived with disability (YLDs) were calculated for the boxes shaded in grey.

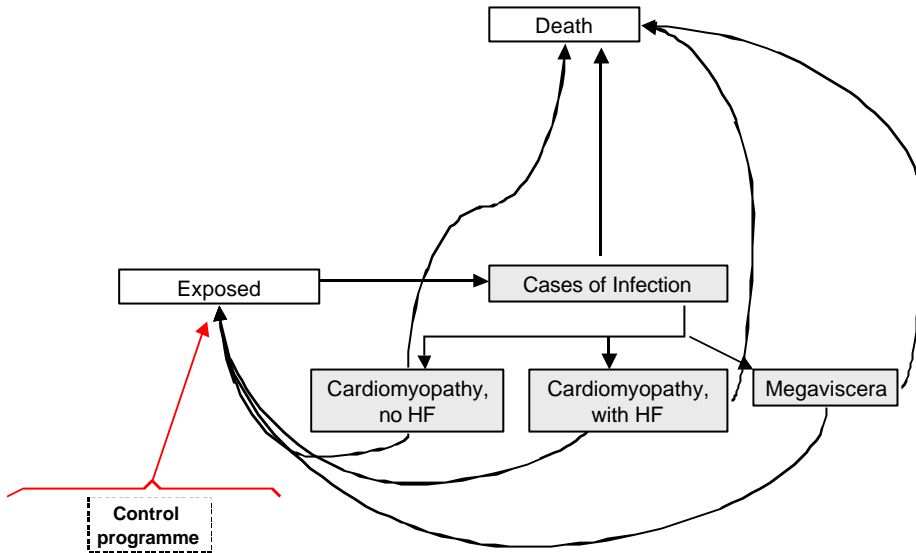


Figure 1. Chagas' disease model.

Table 5.1. Disease model assumptions

Definitions	As above
Incidence/Prevalence	Prevalence and incidence from community based studies (for details, see reference list)
Mortality	It was assumed that 26% of cases develop right bundle branch block, of which 7.5% die (Maguire 1987, Mota 1990). It was also assumed that 5% of acutely ill and symptomatic children aged 0-4 years die without treatment (Prata 2001). For the latter we assumed that 90% of children in Northern countries and 0% in Southern countries would remain without treatment. The mortality at ages 5-29 years was thought to be negligible.
Other assumptions	<ul style="list-style-type: none"> • The duration of infection is life-long. • Incident cases would be distributed according to the following distribution: 0-4: 42%, 5-14: 32%, 15-29: 15%, 30-44: 8%, 45-59: 2%, 60+: 1% • 4% of cases would develop cardiomyopathy with heart failure, 18% cardiomyopathy without heart failure. The respective figure for megaviscera was 3%.

6. Health State descriptions and disability weights

According to the model, the following health states with their respective descriptions were considered:

Table 6.1 Health State descriptions for Chagas' disease

Stage/sequela	Health State description
Infection	Episode of infection with <i>Trypanosoma cruzi</i>
Cardiomyopathy without congestive heart failure	Disorder of the heart muscle resulting from infection with <i>T. cruzi</i> without congestive heart failure
Cardiomyopathy with congestive heart failure	Disorder of the heart muscle resulting from infection with <i>T. cruzi</i> without congestive heart failure
Megaviscera	Dilation of interior organ in the abdominal cavity, particularly of oesophagus and colon due to <i>T. cruzi</i>

Table 6.2 Disability weights for Chagas' disease

Stage/sequela	GBD 1990
Infection	0.000
Cardiomyopathy without congestive heart failure	0.062
Cardiomyopathy with congestive heart failure	0.323 (untreated) 0.171 (treated)
Megaviscera	0.240

7. Global burden of Chagas' disease in 2000

General methods used for the estimation of the global burden of disease are given elsewhere (35). The tables and graphs below summarise the global burden of Chagas' disease estimates for the GBD 2000 and compare them with the estimates from the GBD 1990 (36).

Table 7.1*. Chagas' disease: global total YLD, YLL and DALY estimates, 1990 and 2000.

	Males	Females	Persons
YLD('000)			
GBD1990	172	169	341
GBD2000	231	228	460
YLL('000)			
GBD1990	129	171	300

GBD2000	198	160	358
DALY('000)			
GBD1990	301	340	641
GBD2000	430	388	818

* : The number of DALYS in 2000 is higher than in 1990 despite the interruption of transmission in the Southern Cone countries. This is due to survival of individuals who have previously developed chronic cardiac and digestive lesions.

Table 7.2. Chagas disease YLD, YLL and DALY estimates for WHO epidemiological subregions, 2000.

Subregion	YLD/100,000		YLL/100,000		YLD	YLL	DALY
	Males	Females	Males	Females	('000)	('000)	('000)
AMRO B	80.8	78.2	79.8	60.6	352	310	662
AMRO D	152.8	149.8	66.5	68.3	108	48	156

Figure 7.1. Chagas' disease prevalence rates, age group and sex, broad regions, 2000.

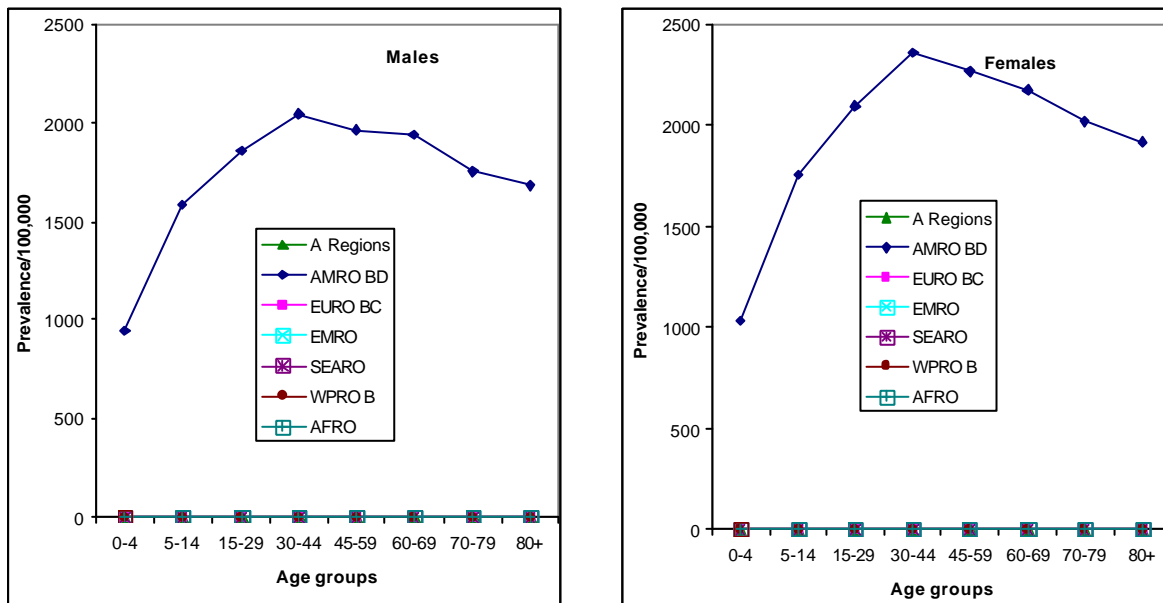
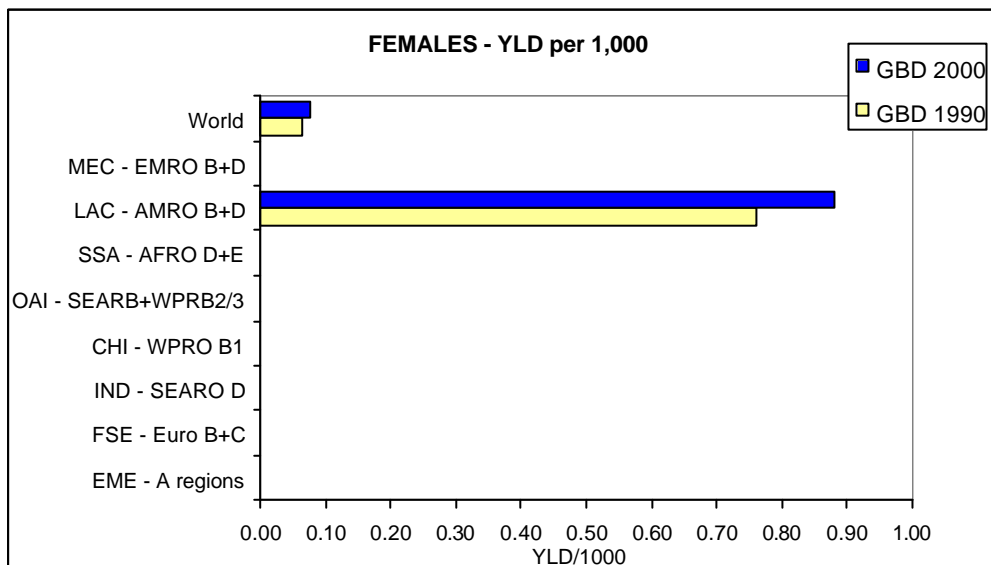
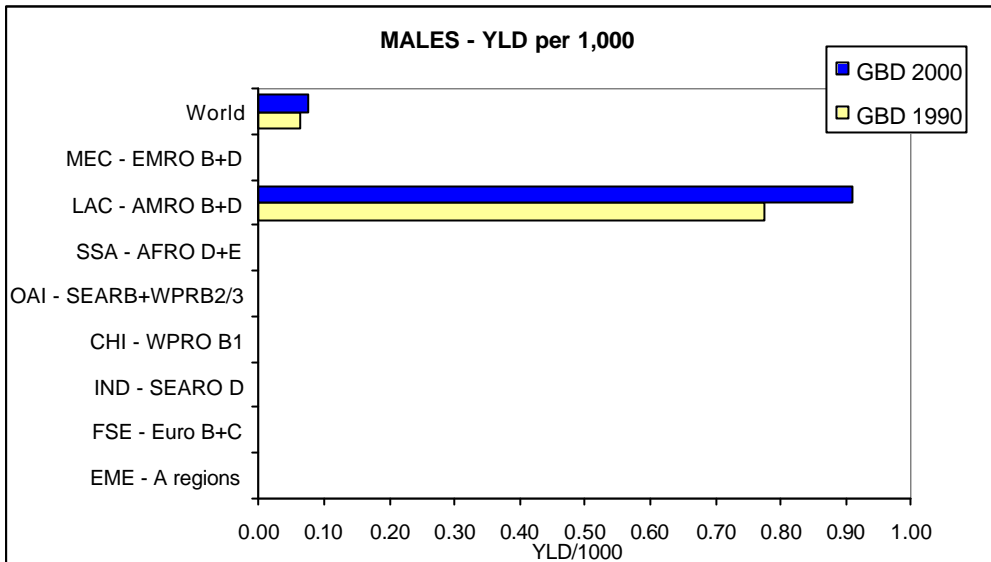
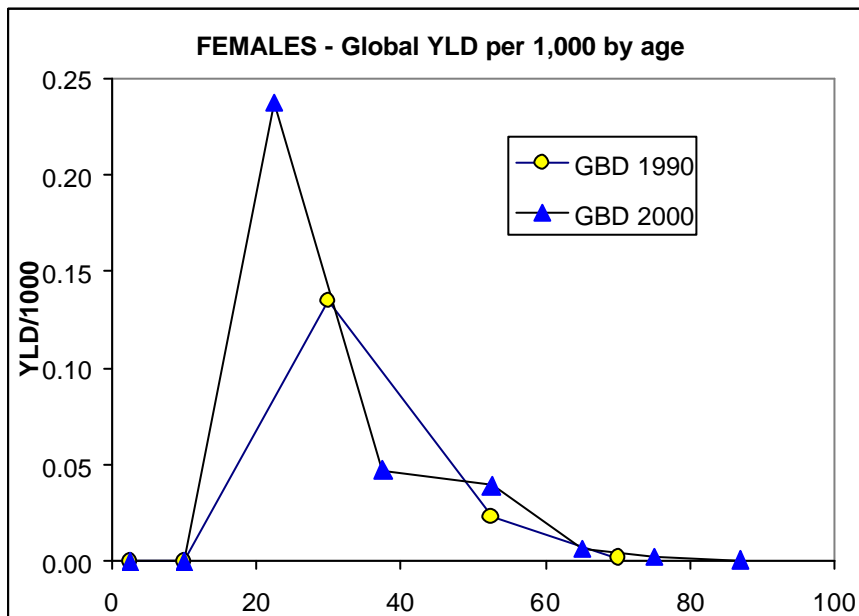
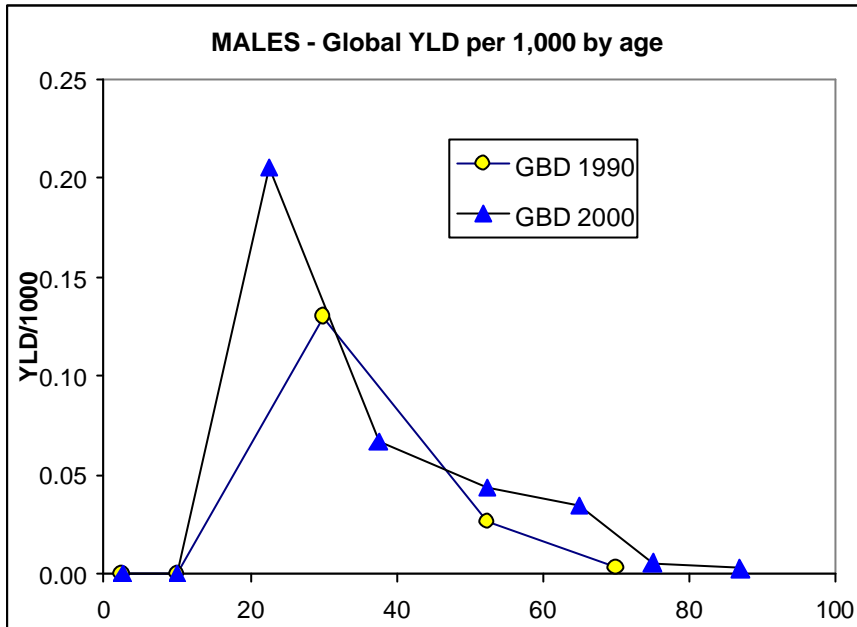


Figure 7.2*. Chagas' disease YLD rates, by sex, broad regions, 1990 and 2000.



* : The number of DALYS in 2000 is higher than in 1990 despite the interruption of transmission in the Southern Cone countries. This is due to survival of individuals who have previously developed chronic cardiac and digestive lesions.

Figure 7.3. Global Chagas' disease YLD rates, by age and sex, 1990 and 2000.



8. Uncertainty analysis

General methods for uncertainty analysis of estimates for the Global Burden of Disease 2000 are outlined elsewhere (37). Uncertainty analysis for Chagas' disease has not yet been completed.

9. Conclusions

These are version 2 estimates for the GBD 2000. Apart from the uncertainty analysis, updating estimates to reflect revisions of mortality estimates and any new or revised epidemiological data or evidence, it is not intended to undertake any major addition revision of these estimates. However, there is a need for improved and updated data in some countries, which can be incorporated into the model.

We welcome comments and criticisms of these draft estimates, and information on additional sources of data and evidence. Please contact Claudia Stein (EBD/GPE) on email steinc@who.ch

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