



# Burden of fungal infections in Ecuador

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## INTRODUCTION

The pathogenic role of invasive fungal infections (IFI) has increased during the past two decades. HIV, hematopoietic stem cell transplantation, chemotherapy for cancer patients, autoimmune diseases, surgery and medical intensive care have largely increased the number of patients with an immunosuppressive state (1) resulting in considerable morbidity and high mortality rates.

Also, the diagnostic tools have been improved and have contributed to elevate the number of cases. Working habits (agriculture, livestock activities) and leisure activities (extreme sports, invasion and alteration of tropical and subtropical areas) have also been the focus of attention by public health officials, as a number of outbreaks of endemic mycoses (EM) have been considered to be a result of exposure to inoculums of microorganisms in their natural habitat (2,3)

Ecuador, located in the middle of the world has a variety of climates from the cold of the Andes through temperate to humid hot weather in the coast and Amazon basin. Ecuador has a population of 15,223,680 people and an average life expectancy of 75 years. The total number of HIV/AIDS is 37,000 and AIDS related deaths as of 2009 was 2,200 [index mundi.com]. There is dearth of data from Ecuador on the burden of these life threatening disease entities, where only a very few groups of scientists have reported their experiences, mainly discussing epidemiologic surveillance (incidence, prevalence, morbidity and mortality rates, and risk factors). We therefore estimated the burden of serious fungal infections in Ecuador based on the populations at risk.

## MATERIALS Y METHODS

A full literature search using Google Scholar, Pubmed website, Journals Online and grey literature was done to identify all epidemiology papers reporting fungal infection rates from Ecuador. WHO population statistics, WHO HIV infection and ARV treatment rates; National Data (INEC, MSP, SOLCA, ONDOT), TB statistics, Index Mundi, Global Asthma Report when no data existed, risk populations were used to estimate frequencies of fungal infections, using previously described methodology by LIFE.

## RESULTS

Ecuador, located in the middle of the world has a population of 15,223,680 people. The median estimates 52,000 HIV/AIDS The population at risk (<200 CD4 cell counts) is ~10,000, with a rate of 11.1% (1,100) of histoplasma, 7% (700) of cryptococcal meningitis and 32% (3,200) of *Pneumocystis pneumonia*. The burden of candidaemia is 684 and *Candida peritonitis* is 103. For recurrent *Candida vaginitis* (more than 4 per year) is 256,327. Chronic pulmonary aspergillosis probably affects ~1,205 patients, 50% following TB. Invasive aspergillosis is estimated to affect 82 patients (~0.60/100,000) not including COPD patients. In addition, ABPA in asthma and CF and SAFS were estimated to affect 36.7/100,000 (5,028) and 48.5/100,000 (6,637) people respectively (Table 1 and 2).

Table 1. -Serious invasive fungal infections

Serious invasive fungal infections: AIDS and Transplants					
	Type of disease	Predominant groups at risk	Risk population size	Estimation for burden (%)	Total burden
HIV/AIDS	Pneumocytosis	HIV/AIDS	52,000	32	15,600
	Histoplasmosis	HIV/AIDS	52,000	11	5,720
	Cryptococcosis	HIV/AIDS	52,000	7	3,640
	Candidiasis	HIV/AIDS	52,000	50	26,000
Transplantation	Aspergillus mold infections	Hematopoietic stem cell transplantation	27	3	1
		Renal	127		
		Hepatic	26	1,3	1
		All transplantation	531	3	16

Table 2. -Serious invasive fungal infections

Aspergillosis and Candida infections			
	Type of disease	Risk population size	Total burden
Aspergillosis	Aspergillosis	54,809 Men 18,005 Women 36,804	1,644
	CPA		1,205
	Invasive Aspergillosis not including COPD patients	0.60/100,000	82
	ABPA in asthma and FQ	36.7/100,000	5,028
Candida Infections	ABPA and SAFS	48.5/100,000	6,637
	Candidemia	Incidence per 1,000 admissions: 0.90	684
Not serious invasive fungal infection	Candida peritonitis	Incidence per 1,000 patients/day 0,16	103
	Recurrent candida vaginitis	5,126,552 total women	256,327
<b>TOTAL BURDEN</b>			<b>322,688 (2%)</b>

## CONCLUSION

Our estimates indicate that around 300,000 (2%) of the population in Ecuador is affected by serious fungal infection.

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