



Burden of Serious Fungal Infections in Belgium

¹K. Lagrou, ¹E. Van Even, ¹J. Maertens, ²DW. Denning

¹University Hospitals Leuven, Leuven, Belgium

²The University of Manchester, Manchester, UK, and the LIFE program at www.LIFE-worldwide.org



ABSTRACT

Objective

The incidence of fungal infections in Belgium is unknown. We aimed to estimate the total number of serious fungal infections occurring yearly in Belgium.

Methods

Methodology of the LIFE program was used. Number of cryptococcal infections was retrieved from the National Reference Center (NRC) for Mycosis. Populations at risk and fungal infections frequencies in these populations were used to estimate incidence or prevalence of other fungal infections. Numbers were retrieved from the Civil Registration Data Base Belgium (2013), Registry of the Belgian AIDS Reference Centers (2012), *Pneumocystis jirovecii* (PCP) distribution (HIV versus non-HIV) in UZ Leuven, Belgian tuberculosis (TB) register (2012), Eurotransplant (2011), Belgian Cancer Register and European Cystic Fibrosis (CF) Society (2013).

Results

The Belgian population consists of 11.10 million people including 17% children under the age of 18 and 24% women older than 60.

Cryptococcal meningitis is rare (~10 cases yearly). 15 of the 1227 newly diagnosed HIV/AIDS cases presented with PCP as AIDS indicator disease. This accounts for +/-14% of total PCP cases (n=120).

The incidence of candidemia is estimated as 5/100,000 resulting in 555 cases, additionally we assume 83 *Candida* peritonitis cases (50% of candidemia cases in ICU).

A total number of 675 invasive aspergillosis (IA) cases was obtained based on following assumptions: 10% rate in AML patients which accounts for +/- 50% of the total number of IA cases in the hematological population, 0.5-4% rate in solid organ transplant recipients and 1.3% rate in COPD hospital admissions. Chronic pulmonary aspergillosis is estimated to be prevalent in 662 cases (including 132 post-TB).

ABPA cases was estimated to be 23,119 applying a 2.5% and 15% rate in adult asthma and CF patients respectively. Severe asthma with fungal sensitization cases was estimated to be 30,402 (3.3% of 921,262 adult asthmatics).

There were 174,760 women with recurrent *Candida* vaginitis assuming a 6% rate in women aged between 15 and 50.

Conclusion

Based on available data approximately 233,000 people of the Belgian population (2.1%) are estimated to suffer from a fungal infection on a yearly basis. This estimate needs further validation but is important to increase the awareness of the burden of fungal infections.

METHODS

- The methodology of the LIFE program was used (www.LIFE-worldwide.org) to estimate the burden of fungal disease in Belgium.
- The number of cryptococcal infections was retrieved from the National Reference Center (NRC) for Mycosis.
- The incidence or prevalence of other fungal diseases was estimated based on populations at risk and fungal infections frequencies in these populations. Following sources were consulted to retrieve data about the at risk populations.
 - Civil Registration Database 2013 (<http://bestat.economie.fgov.be/>) for demographic data.
 - Registry of the Belgian AIDS Reference Centers (2012) for numbers of HIV/AIDS cases that presented with PCP as AIDS indicator disease.
 - Retrospective study (2010-2013, non-published data) of PCP cases in UZ Leuven (1900 bed tertiary care hospital, Leuven, Belgium) for the ratio of PCP diagnosis in HIV versus non-HIV patients.
 - The Belgian tuberculosis register (2012) for the number of pulmonary tuberculosis (TB) patients.
 - Eurotransplant (2011) for the number of solid organ transplantations.
 - Belgian Cancer Register for the number of patients with acute myeloid leukemia (AML).
 - European Cystic Fibrosis Society (2013) for the number of cystic fibrosis (CF) patients.

RESULTS

The Belgian population in 2013 was 11,099,544 million with 17% under the age of 18 and 24% women over the age of 60 years.

Cryptococcal meningitis: between 3 and 12 Cryptococcal isolates were received by the NRC for mycosis during the period 2005-2014 (sending these isolates or reporting of these infections is not mandatory).

Pneumocystis pneumonia. The PCP ratio in HIV versus non-HIV patients was calculated from the UZ Leuven data (2010-2013): 8/49. Based on this ratio and the total number (=15) of registered PCP infections in the 1227 HIV patients newly diagnosed in 2012, the total number of PCP cases is estimated to be 120.

Candidemia. No population based data on the incidence of candidemia are available for Belgium. A candidemia incidence of 5/100,000 was assumed (30% in ICU)^{1,2}.

Recurrent *Candida* vaginitis. A rate of 6% was assumed in women aged between 18 and 50.

Invasive aspergillosis. Calculated based on the assumption of a 10% rate in AML patients (n=1641), an equal number in the non-AML patient population; 0.5% in renal transplant recipients (Tx) (n= 437), 4% in lung Tx (n= 106), 6% Heart Tx (n=67), 4% liver Tx (232) and 1.3% in COPD hospital admissions (n=21,005).

Chronic pulmonary aspergillosis (CPA). In 2011, there were 1044 TB patients in Belgium. Following assumptions were made for the calculations: CPA incidence of 22% in TB with cavities (12% of all TB) and CPA incidence of 2% in TB without cavities.

Allergic bronchopulmonary aspergillosis (ABPA). Calculated based on the assumption of a prevalence of 2.5% in adult asthmatics (10% asthma rate in adults) and 15% in adult CF patients.

Severe asthma with fungal sensitization (SAFS). Calculated based on the assumption of a prevalence of 3.3% in adult asthmatics.

Table. Burden of fungal diseases in Belgium according to the risk population

Infection	Number of infections per underlying disorder per year					Total burden	Rate /100K
	None	HIV/AIDS	Respiratory disease	Cancer/ Tx	ICU		
Candidemia				388	165	555	5.0
<i>Candida</i> peritonitis					83	83	0.75
Recurrent <i>Candida</i> vaginitis (≥ 4x/year)	174,760					174,760	3,148.9*
Invasive aspergillosis				402	273	675	6.08
Chronic pulmonary aspergillosis			662			662	22.74
ABPA			23,119			23,119	208.3
Severe asthma with fungal sensitization			30,402			30,402	273.9
Cryptococcal meningitis						10	
<i>Pneumocystis pneumoniae</i>		15	105			120	1.08
Total burden estimated						233,000	2,099

*In females only



CONCLUSION

There is no mandatory systematic national surveillance system for fungal infections in Belgium as such there is a high uncertainty about the burden of fungal disease in this country. This study is a first attempt to estimate the fungal disease burden but improved diagnostic testing and reporting is needed to further validate these data.

1. Arendrup MC. Epidemiology of invasive candidiasis. *Curr Opin Crit Care* 2010;16:445-52.

2. Montravers P. A multicentre study of antifungal strategies and outcome of *Candida* spp. peritonitis in intensive-care units. *Clin Microbiol Infect.* 2011 Jul;17(7):1061-7