

# Estimating the Burden of Serious Fungal Diseases in Thailand



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## INTRODUCTION

Invasive fungal disease (IFD) in Thailand is common and a major cause of death, especially in those with immunocompromised conditions. Although the number of HIV-infected patients in Thailand is still high, increase in incidence of IFD seems to be associated with the increasing number of patients who received organ transplantation, stem cell transplantation and those who were critically ill. However, data regarding IFD incidence and prevalence is lacking.

## OBJECTIVES

To estimate the incidence and prevalence of serious fungal diseases in Thailand based on the size of the populations at risk and available epidemiological databases to indicate the national burden of these conditions.

## METHODS

The methodology of the LIFE program was used (www.LIFE-worldwide.org) to estimate the burden of fungal diseases in Thailand. Where the information was not available, risk populations were used to estimate frequency of each fungal infection. Data related to population and HIV infection was derived from The Bureau of Epidemiology and Department of Disease Control of Thai Ministry of Public Health and World Health Organization (WHO). Data related to transplant recipients was derived from Thai Transplantation Society. International and local reports were used to estimate each invasive fungal disease in the present study.

## RESULTS

The population of Thailand is around to 65,000,000; 18% are children, and 14% are women >60 years of age. Recurrent vulvovaginal candidiasis (>4 episodes/year) is estimated to occur in 1,655/100,000, giving a total burden of 1,077,721 each year. Using a previously described rate that 14 out of 10,000 admissions had fungemia and 94% were *Candida*, we estimate 8,650 patients with candidemia. Due to a relatively high incidence of pulmonary tuberculosis (TB) in Thailand, the prevalence of chronic pulmonary aspergillosis are relatively high—a total of 13,092, approximately half following TB. Invasive aspergillosis is estimated to affect 941 patients following leukaemia therapy, transplantation and COPD, ~1.4/100,000. In addition, allergic bronchopulmonary aspergillosis (ABPA) and severe asthma with fungal sensitisation (SAFS) were estimated in around to 58.4/100,000 and 77/100,000 respectively, in 1.5 million adult asthmatic patients. Given a 400,000 HIV population (18,000 had CD<sub>4</sub><100 cells/mm<sup>3</sup>), with around to 8,134 new cases of AIDS annually, *Pneumocystis pneumonia* and *Talaromyces marneffei* infection are estimated at 2.6/100,000 and 0.3/100,000, respectively. Cryptococcal meningitis can also affect immunocompetent individuals and those with non-HIV immunocompromised conditions. According to a previous study, there were a proportion of ~15 cryptococcal meningitis cases in non-HIV patients per 100 HIV-infected patients with cryptococcal meningitis. Therefore, the burden of cryptococcal meningitis was calculated to be 4.2/100,000. The complete data is shown in the table below.

Infection	Number of infections per underlying disorder per year					Total burden	Rate /100K
	None	HIV/AIDS	Respiratory	Cancer/Tx	ICU/Non-neutropenics		
Oesophageal candidiasis	-	45,396	-	-	-	45,396	69.7
Candidaemia	-	-	-	89	8,561	8,650	13.3
Recurrent vaginal candidiasis (4x/year +)	1,077,721	-	-	-	-	1,077,721	1654.9
ABPA	-	-	38,009	-	-	38,009	58.4
SAFS	-	-	50,172	-	-	50,172	77.0
Chronic pulmonary aspergillosis	-	-	13,092	-	-	13,092	20.1
Invasive aspergillosis	-	-	-	276	666	941	1.4
Mucormycosis	-	-	-	30	-	30	0
Cryptococcal meningitis	108	2,389	-	251	-	2,747	4.2
<i>Pneumocystis pneumonia</i>	-	1,708	-	-	-	1,708	2.6
Histoplasmosis	-	32	-	-	-	32	0
<i>Talaromyces marneffei</i> infection	-	184	-	-	-	184	0.3
Fungal keratitis	9,765	-	-	-	-	9,769	15.0
Tinea capitis	59	-	-	-	-	59	0.1
<b>Total burden estimated</b>						<b>1,248,510</b>	<b>1,917</b>

SAFS; Severe asthma with fungal sensitisation, ABPA; Allergic bronchopulmonary aspergillosis, Tx; transplantation, ICU, intensive care unit

## CONCLUSION

The present study indicates that around to 1.92% (1,248,510) of the population is affected by non-cutaneous fungal infections. Due to the lack of data, reports and statistics, the number of patients with mycoses in Thailand can only be estimated. Further epidemiological studies are needed to validate and extend these estimates.

## REFERENCES

- (1) Denning *et al.* Global burden of chronic pulmonary aspergillosis as a sequel to pulmonary tuberculosis. *Bull World Health Organ.* 2011;89:864-72.
- (2) Denning *et al.* Global burden of allergic bronchopulmonary aspergillosis with asthma and its complication chronic pulmonary aspergillosis in adults. *Med Mycol.* 2013;51(4):361-70.
- (3) Chayakulkeeree *et al.* Clinical characteristics and outcomes of patients with cryptococcal meningoencephalitis in a resource-limited setting. *J Med Assoc Thai.* 2014 Mar;97 Suppl 3:S26-34.
- (4) Lindsley *et al.* Evaluation of a newly developed lateral flow immunoassay for the diagnosis of cryptococcosis. *Clin Infect Dis* 2011;53(4):321-325.
- (5) Harris *et al.* High Prevalence of Cryptococcal Infection Among HIV-Infected Patients Hospitalized With Pneumonia in Thailand. *Clin Infect Dis* 2012;54(5):e43-50.
- (6) Jaijakul *et al.* *Pneumocystis jirovecii* in HIV/AIDS patients: detection by FTA filter paper together with PCR in noninvasive induced sputum specimens. *J Med Assoc Thai.* 2005 Sep;88 Suppl 4:S294-9.
- (7) Dejsomritrui *et al.* Prevalence of bronchial hyperresponsiveness and asthma in the adult population in Thailand. *Chest* 2006;129:602-9.