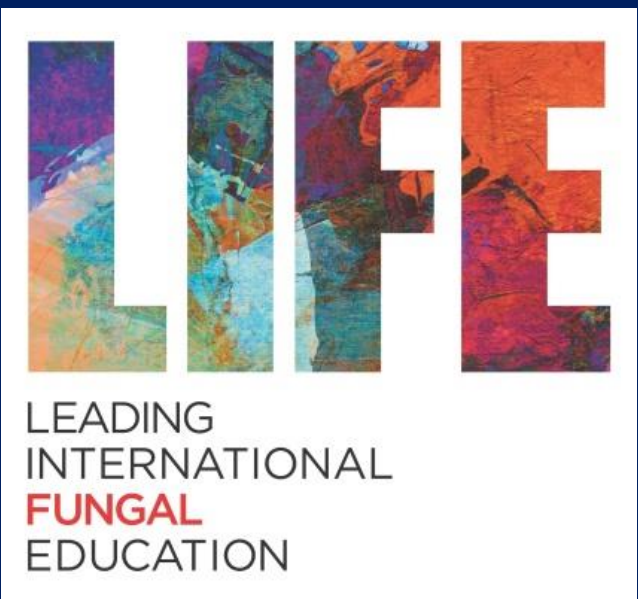




Fungal diseases in Taiwan – National Insurance Data and Estimation



Yu-Shan Huang¹, David W. Denning², Yee-Chun Chen¹

¹Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan

²National Aspergillosis Center, Wythenshawe Hospital, Manchester, UK in association with the LIFE program at www.LIFE-Worldwide.org

Introduction

- The burden of fungal diseases is different between countries
- Almost all Taiwanese population of 23.6 million people are registered on the National Health Insurance Research Database (NHIRD) of Taiwan, yet no national analysis of fungal diseases has been undertaken using the NHIRD.
- This study aimed to estimate the incidence and prevalence of various fungal diseases with NHIRD.

Methods

- Using the one-in-three sampling ratio, the NHIRD was queried using ICD-9 fungal disease codes to estimate the disease burden in 2013.
- The definition of the cases was the appearance of corresponding ICD-9 fungal disease codes for at least 2 outpatient visits or 1 inpatient claim in the database.
- Documented numbers were compared with modelling as previously undertaken for total and at-risk populations.

Results

- Estimates for the annual incidence of HIV-related life-threatening fungal disease include cryptococcal meningitis (243 cases, 51 in HIV), *Pneumocystis* pneumonia (1251 cases, 630 in HIV) and histoplasmosis (54 cases, 3 in HIV).
- We estimate 4,798 cases of invasive aspergillosis annually, whereas NHIRD had 567 and a prevalence of 7,646 chronic pulmonary aspergillosis cases, compared to NHIRD’s 531.
- Fungal asthma, including allergic bronchopulmonary aspergillosis (ABPA), probably affects over 100,000 adults, yet 63 cases were captured by NHIRD.
- Sixty-three mucormycosis cases were documented by NHIRD (0.28/100,000).
- The annual burden of candidaemia and *Candida* peritonitis is recorded at 861 (3.68/100,000) and 27 cases, respectively.
- Over 20,000 oral candidiasis cases were documented by NHIRD and 1,440 oesophageal candidiasis (6.2/100,000).
- Over 350,000 women are estimated to be affected by recurrent vulvovaginal candidiasis each year (2,758/100,000 females).
- Fungal keratitis is found in 8.2% of microbial keratitis, but no total caseload recorded.
- Only a small number of tinea capitis, chomoblastomycosis and sporotrichosis cases are seen each year.

Table 1. The Annual Incidence of Fungal Disease by ICD-9 Codes in 2013 in Taiwan

Serious Fungal Infection	ICD-9	Rate(case/100,000)	General Population	HIV	Respiratory Disease	Cancer	Critical Care	Abdominal Surgery	Others*
Cryptococcal meningitis	321.0	Annual incidence	1.040	0.218	0.103	0.231	0.231	0.013	0.205
Pneumocystis pneumonia	136.3	Annual incidence	5.352	2.695	0.719	1.617	1.335	0.026	0.398
Invasive aspergillosis	117.3, 484.6	Annual incidence	2.426	0.039	0.578	0.937	0.436	0.026	0.565
Chronic pulmonary aspergillosis post TB	484.6/010-0.	Annual incidence	0.257	0.000	0.103	0.064	0.064	0.000	0.039
	18, 771.2	Prevalence	0.321	0.000	0.128	0.090	0.064	0.000	0.051
Chronic pulmonary aspergillosis (All)	484.6	Annual incidence	0.975	0.000	0.321	0.436	0.244	0.013	0.116
		Prevalence	1.296	0.000	0.385	0.603	0.244	0.013	0.180
Allergic bronchopulmonary aspergillosis (ABPA)	518.6	Annual incidence	0.077	0.000	0.039	0.039	0.000	0.000	0.000
		Prevalence	0.193	0.000	0.103	0.039	0.000	0.000	0.051
Candidaemia	112.5	Annual incidence	3.684	0.103	0.552	1.579	1.450	0.154	0.513
Candida peritonitis	112.85	Annual incidence	0.116	0.000	0.026	0.000	0.039	0.000	0.039
Oral candidiasis	112	Annual incidence	90.128	1.681	7.983	10.255	0.911	0.308	64.021
Oesophageal candidiasis	112.84	Annual incidence	6.161	0.578	1.296	1.309	0.424	0.077	1.348
Candida vaginitis	112.1	Annual incidence	193.771	0.026	3.453	2.567	0.039	0.231	173.003
Recurrent Candida vaginitis (>4x/year)	112.1	Annual incidence	40.058	0.013	0.809	0.680	0.000	0.103	35.553
Mucormycosis	117.7	Annual incidence	0.282	0.000	0.026	0.026	0.026	0.000	0.167
Histoplasmosis	115.0-115.9	Annual incidence	0.244	0.013	0.039	0.039	0.013	0.013	0.077

*The subgroup “others” includes patients without ICD-9s of Charlson Comorbidities (Ref: Quan et al. Med Care. 2005 Nov;43(11):1130-9.)

Conclusions

About 2% of the Taiwanese population have a serious fungal infection each year, and the NHIRD database documents most of these, with some notable gaps, especially invasive, chronic and allergic aspergillosis, probably a function of limited awareness and diagnosis use.