

BURDEN OF SERIOUS FUNGAL INFECTIONS IN NEW ZEALAND

Philip Drennan¹, Alan Pithie¹, Nigel Dickson², Arthur Morris³, David W Denning⁴, Stephen Chambers^{1,5}

¹Department of Infectious Diseases Christchurch Hospital, ²Department of Preventive and Social Medicine, University of Otago, Dunedin,

³Department of Microbiology, Auckland City Hospital, Auckland, ⁴University of Manchester UK, in association with LIFE programme at www.LIFE-worldwide.org,

⁵Department of Pathology, University of Otago, Christchurch

Objectives

To **estimate the annual burden of serious fungal infection in New Zealand (NZ)**, a temperate high-income country in the South Pacific.

Methods

The **national database of discharge diagnoses** from hospitals for 2011 was searched by ICD codes. HIV related infections were obtained from surveillance data. The expected number of cases of fungal infection were **estimated in people with other predisposing conditions** including: asthma; chronic obstructive pulmonary disease (COPD); acute myeloid leukaemia (AML); those having haematopoietic and solid organ transplants; and women in the general population having recurrent candida vaginitis. Transplant numbers came from the national registries, asthma rates from the Global Initiative for Asthma report, COPD hospitalisation rates from the Organisation for Economic Co-operation and Development.

Results

Of a population of 4.4 million, 20% were younger than 16 years, and 13% 65 years or older. The estimated number of **serious fungal infections was 91,658**. The largest contributor was **recurrent candida vaginitis (65.8%), followed by severe asthma with fungal sensitisation (SAFS) and allergic bronchopulmonary aspergillosis (ABPA) that together comprised 33.6%**. Less common were candidaemia (0.2%), invasive aspergillosis (0.2%), chronic pulmonary aspergillosis (0.2%), cryptococcal meningitis (0.1%), pneumocystis pneumonia (0.1%) and fungal keratitis (0.3%). There were insufficient data to reliably estimate the incidence of candida peritonitis. Those most at risk had received a transplant, immune suppressive therapy, had HIV infection, or management in the intensive care unit (ICU).

Conclusion

Based on these estimates, approximately **2% of the population suffer from a significant fungal disease every year**. Notable were the estimated high number of women with recurrent candida vaginitis, and a high rate of respiratory-related fungal disease, driven by the high asthma prevalence in NZ. Other sources contribute a small but medically important number of cases. The number of cases with estimated rates of fungal disease calculated by the same methods are shown in table 2. This study serves as a basis for future research. Improved surveillance of these conditions would be valuable.

Table 1. Rates of fungal infections in New Zealand.

	Number of Infections per underlying disorder per year					Total	Rate/100K
	Not defined	HIV/AIDS	Respiratory	Cancer/Transplant	ICU/Surgery		
Candida							
<i>Oesophageal</i>	58*					58	1.32
<i>Blood</i>				122	66	188*	4.27
<i>Vaginitis (≥4x/year)</i>	60,037					60,037	2729
ABPA			13,319			13,319	303
SAFS			17,540			17,540	399
IA				39	176	215	4.89
CPA			189			189	15.71
PCP		13		55		68*	1.55
Cryptococcus meningitis		1		12		13*	0.3
Fungal keratitis	31					31	0.70
Total						91,658	

ABPA = Allergic bronchopulmonary aspergillosis, SAFS = Severe asthma with fungal sensitisation, IA = Invasive aspergillosis, CPA = Chronic Pulmonary Aspergillosis, PJP = Pneumocystis jirovecii pneumonia

Table 2. Comparison of published rates of fungal infections from various countries using the same methods

Organisms Rate/100K	Rate of infection per 100,000 population								
	New Zealand	Austria	China	Ireland	Kenya	Netherlands	Nigeria	Singapore	Spain
Candida									
<i>Oesophageal</i>	1.3	6.3	3.7	9.4	194	7.2	9.3	5.0	23.9
<i>Blood</i>	4.3	8.6	5.0	6.3	5	2.6	0.6	5.1	10.7
<i>Vaginitis (≥4x/year)</i>	2729	2516	2929	2968	2845	2612	3800		874
ABPA	303	91.7	36.1	140	100	78	6		126
SAFS	399	121	47.6	182.4	132	102	7		198
IA	4.9	4.1	11.9	7	0.6	3.4	0.1	7.0	2.9
CPA	15.7	4.7	19.5	3.1	144		8		9.2
PJP	1.6		1.8	0.8	70		48	1.6	3.4
Cryptococcus meningitis	0.3	0.06	0.17	0	20	0	1	0.6	0.03
Fungal keratitis	0.70		1.3					0.1	

ABPA = Allergic bronchopulmonary aspergillosis, SAFS = Severe asthma with fungal sensitisation, IA = Invasive aspergillosis, CPA = Chronic Pulmonary Aspergillosis, PJP = Pneumocystis jirovecii pneumonia

