

## How Common are Fungal Diseases?



### Oral, oesophageal and vulvovaginal candidiasis (thrush)

- Oral thrush occurs in ~9.5 million people worldwide based on ~90% of HIV/AIDS patients<sup>1</sup> not taking but needing anti-retroviral therapy, estimated at by the WHO in 2009<sup>2</sup>.
- Oral thrush also occurs in normal babies, people taking inhaled steroids for asthma, following radiotherapy to the head and neck for cancer, in denture wearers and in some leukaemia and transplant patients.
- Candida infection of the oesophagus (gullet) affects an estimated ~2 million people as ~20% of HIV/AIDS patients<sup>3</sup> not on anti-retroviral therapy, and ~0.5% if on antiretroviral therapy<sup>4</sup> develop it.
- Repeated attacks of vulvovaginal affect at least 75 million women annually as 5-8% have at least 4 attacks annually<sup>5</sup>. About 70% of all premenopausal woman develop thrush at some point in their lives<sup>6</sup>.

### Invasive and life-threatening fungal infection

#### Candida infection

- Candidaemia occurs at a population rate of 2-11/100,000<sup>7</sup>, so ~300,000 cases are predicted worldwide, with a mortality of 30-55%. The numbers rose in the US by 52% between 2000 and 2005<sup>8</sup>.
- Around 150,000 of the 7.5 million patients admitted to intensive care (ICU) in Europe, USA and Japan each year grow Candida in their urine (a rate of 2.7% of ICU admissions<sup>9</sup>) and is a common finding in hospitalised patients<sup>10</sup> and those with catheters (~16%)<sup>11</sup> especially those in ICU.

#### Invasive aspergillosis

- About 10 million patients in Europe, USA and Japan are at risk of invasive aspergillosis (IA) each year because of corticosteroid or other therapies. Over 50% of patients with IA die, even with treatment.
- Over 200,000 patients develop IA annually. Key groups include ~10% of acute leukaemia (300,000 new cases annually)<sup>12</sup> (30,000 IA cases) and stem cell and other transplants (>75,000 annually in the USA, Europe and Japan) (7,500 IA cases) and 1.3% of COPD patients admitted to hospital<sup>13</sup> (7% of the global number of moderate and severe COPD = 65M (WHO)) (60,000 confirmed and IA cases). These patients probably account for 50-65% of patients, with those admitted to intense care (ICU), with lymphoma or chronic leukaemia and various immunological disorders and treatments accounting for the remainder. Under diagnosis is a major problem in this disease.

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### Cryptococcal meningitis

- Over 1 million people develop cryptococcal meningitis in AIDS, each year, resulting in ~600,000 deaths, of which ~70% are in sub-saharan Africa<sup>14</sup>.

### Pneumocystis pneumonia

- All of the ~9.5 million HIV/AIDS infected patients<sup>2</sup> who should be receiving anti-retroviral therapy are at risk of Pneumocystis pneumonia (PCP), as well as many other immunocompromised patients, unless taking oral antifungal prophylaxis with cotrimoxazole.
- In most countries 60% of new AIDS cases are recognised because they develop Pneumocystis pneumonia, with a 10-30% mortality<sup>15,16</sup>.
- Precise estimates of annual incidence are difficult because of diagnostic deficiencies but case numbers certainly exceed 200,000 globally per year.

### Allergic fungal disease

#### Allergic bronchopulmonary aspergillosis (ABPA)

- Approximately 4 million people develop ABPA among the 193 million adults with active asthma worldwide<sup>17</sup>.
- ~ 15% of people with cystic fibrosis develop ABPA, ~9,000 affected.

#### Severe Asthma with Fungal Sensitisation (SAFS)

- SAFS is predicted to affect 3.25-13 million adults worldwide depending on the frequency of severe asthma (5-20% of all asthmatics)<sup>17</sup>.

#### Allergic fungal sinusitis

- Allergic fungal sinusitis and rhinitis affects ~12 million people at any time. Allergic sinusitis and rhinitis affects ~15% of the world's population or around 900 million people<sup>18</sup> and ~1.3% is predominantly fungal allergy (assuming a 50% endoscopic examination rate)<sup>19</sup>.

### Chronic fungal disease

- Estimates of global burden of chronic pulmonary aspergillosis exceed 3 million, with ~1.1 million cases following tuberculosis<sup>20,21,22</sup>. Chronic pulmonary aspergillosis complicates many respiratory disorders including tuberculosis, ABPA, sarcoidosis and COPD.
- Between 100,000 and 300,000 cases of coccidioidomycosis occur in the US each year<sup>23</sup>, and many more in Central and South America.
- Up to 50 million people are thought to have been infected with histoplasmosis, with ~500,000 new infections each year<sup>24</sup>. Histoplasmosis may be a life-threatening infection in newborns and AIDS patients, and is common in Central and South America.

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### Fungal eye infections

- In Asia and Africa ~1 million new eye infections occur annually caused by filamentous fungi such as *Aspergillus* and *Fusarium*. Among causes of avoidable blindness corneal opacities (caused by fungi or bacteria) accounts for 10% of the 284 million people visually impaired worldwide<sup>25</sup>.

### Cutaneous fungal infections

- Fungal infection of the skin, hair or nails affects ~25% of the world's population (~1.5 billion) <sup>26</sup> and in the US alone accounted for 4M outpatient medical visits<sup>27</sup>.
- Fungal nail infection (onychomycosis) is common in the general adult population, probably 5-25% rate with an increasing incidence in elderly people<sup>28,29</sup>.
- Athlete's foot (tinea pedis) is more common than onychomycosis and is more common in younger people and sportsmen<sup>21</sup>.
- Hair infection (tinea capitis) is most common among children, often resulting in bald patches with psychological consequences. In a recent US survey, tinea capitis was found in 6.6% with ranges from 0% to 19.4%<sup>30</sup>, is more common in deprived areas and black children<sup>31</sup>, suggesting a global prevalence of 200 million cases.

**The Fungal Research Trust**

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## How Common are Fungal Diseases?



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