

# No More Mr. Fungi: Mycotic Diseases in the Age of Travel and Climate Change

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## Background

Fungal disease should be considered when patients have:

- Antibiotic-nonresponsive fever
- Nodular, cavitory, or lobar pulmonary lesions
- Osteolytic bone lesions
- Ocular inflammation i.e. uveitis or chorioretinitis
- Diskospondylitis
- Lymphadenomegaly
- Cutaneous nodules
- Intestinal masses
- Classical clinical signs in an endemic area
- Immunocompromise

## Histoplasmosis

*Hosts:* Humans, cats, dogs

*Regions:* Worldwide, Common in Ohio, Missouri, Tennessee, and Mississippi river valleys of the United States

*Transmission:* Microconidia aerosolizes into lungs & thoracic lymph nodes → Organisms enters bloodstream from primary site and can cause wide spread disease

*Zoonosis:* Direct transmission from animals to humans **does not** occur.

*Clinical Findings:* Gastrointestinal in dogs (Large bowel diarrhea), Chronic cough, Fever, Anemia, Emaciation, Hepatomegaly, Splenomegaly, Lymphadenopathy (Cats), Skin lesions

*Diagnosis:* Urine or Serum Antigen Test (Cross reacts with Blasto) + Cytologic/Histologic Observation of Organism (“Half-empty, Half-Full”) +/- culture (Warn your lab!), Rectal Scraping for GI.

*Treatment:* Fluconazole or Itraconazole; Unknown utility of monitoring Antigen titers to monitor treatment, Lipid Amphotericin B for advanced disease.

*Prognosis:* Acute histoplasmosis can be fatal; Single organ involvement= Better

## **Blastomycosis**

*Hosts:* Humans, **dogs** > cats

*Regions:* North America → south-central and upper mid-western states of the United States, areas that border the **Great Lakes**, Near the **St. Lawrence** river (Canada & U.S.)

*Transmission:* Inhalation of conidia from the environment, Rare cutaneous inoculation

*Zoonosis:* *Direct* transmission from animals to humans does not occur, Exception of rare bite wound transmission

*Clinical Findings:* Remember **BELLS** (Bones, Eyes, Lungs, Lymph Node and Skin)

*Diagnosis:* Urine or Serum Antigen Test (Cross reacts with Histo) + Cytologic/Histologic Observation of Organism (“Broad Based Budding”) +/- culture (Warn your lab!), Rectal Scraping for GI.

*Treatment:* Itraconazole, Based on serial monitoring of clinical signs and radiographic lesions, 3 to > 12 months of treatment, Longer with osteoarticular infections or widespread dissemination

*Prognosis:* Can get worse before better with treatment +/- anti-inflammatory prednisone, Supportive care, Cure rates: **DOGS** = 50% to 75% but 20% relapse after treatment is discontinued.

## **Coccidiomycosis**

*Hosts:* Humans, dogs >> cats, farm animals, wildlife

*Regions:* Semi-arid to DRY, Southwestern United States

*Transmission:* Inhalation of arthroconidia ESP after rain/dry/disruption cycle. Rare cutaneous inoculation

*Zoonosis:* Direct transmission from animals to humans does not occur, Sharps injuries OR bite wounds potential infection

*Clinical Findings:* MOST subclinical, Variable & often mild systemic signs: intermittent fever, lethargy, inappetence, and weight loss **BUT** a small percentage become **DISSEMINATED** (Lungs and lymph nodes, Multi-organ involvement, BONE lesions).

*Diagnosis:* Antigen tests are VERY nonsensitive, Antibody test (IgM and IgG) are gold standard and Identification of organism (difficult).

*Treatment:* Amputate limbs with severe bone lesions, Enucleated eyes w/ disease. Most cases & CNS involvement: fluconazole or if Bone involvement: itraconazole

*Prognosis:* Depends on severity, residual radiographic changes, Localized pulmonary is good prognosis, CNS is very poor.

### **Cryptococcosis**

*Hosts:* Cats, dogs, human, **MOST COMMON SYSTEMIC MYCOSIS IN CATS**

*Regions:* Worldwide (neoformans); patchier but diffuse distribution i.e. PNW (gatti).

*Transmission:* Nasal inhaled conidida, Bird guano & decaying plant matter

*Zoonosis:* No direct transmission, Environmental, immune compromised

*Clinical Presentation:* Nasal ulcers or nodules, Nodular or ulcerative cutaneous lesions, Upper respiratory tract signs, Chorioretinitis, Neurologic signs secondary to meningoencephalitis

*Diagnosis:* **Latex Agglutination Capsular AG test.** Detects the fungal polysaccharide capsule. **In CATS** 96-98% sensitivity and 97-100 % specificity. Cytologic Identification.

*Treatment:* ORAL Fluconazole +/- other azoles for many months ! Continue until antigen test is zero. Recheck within month **but** relapse is common (15-20%).

*Prognosis:* Good if no CNS or Ocular Involvement