Environmental Fungal Diseases

*What can we learn together?*

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HAQAST
Madison, WI
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Coccidioidomycosis (Valley fever)

Environmental form
*Coccidioides* spp.

Host-associated form
Coccidioidomycosis (Valley fever)
Valley fever impact on Patients

Symptoms last median of 120 days

- 40% require hospitalization
  - ~$50,000 a visit
- 1% life-threatening or disseminated disease
- 75% miss >14 workdays

http://www.centerforhealthjournalism.org/valleyfever/putting-valley-fever-front-burner
Reported Cases of Coccidioidomycosis in the U.S., 1998-2016

- Experts estimate 150,000 cases annually
- Preliminary 2017 data: over 15,000 cases for AZ + CA

As reported in the National Notifiable Diseases Surveillance System
Where is it?
Skin Testing Studies late 1940s early 1950s

Outbreaks

Coccidioidomycosis Outbreaks, United States and Worldwide, 1940–2015

Michael Freedman, Brendan R. Jackson, Orion McCotter, and Kaitlin Benedict

Author affiliations: Children’s Hospital of Pittsburgh, Pittsburgh, Pennsylvania, USA (M. Freedman); Centers for Disease Control and Prevention, Atlanta, Georgia, USA (B.R. Jackson, O. McCotter, K. Benedict)
Understanding the geographic range
Environmental Aspects
Precipitation, Drought, Soil Moisture

- Complex life cycle in environment
- Preceding precipitation, soil moisture for fungus to grow
- Period of drought for soil to be disturbed


What is the role of dust storms in transmission?

Regional dust storm modeling for health services: The case of valley fever

William A. Sprigg, Slobodan Nickovic, John N. Galgiani, Goran Pejanovic, Slavko Petkovic, Mirjam Vujadinovic, Ana Vulovic, Milan Dacic, Scott DiBiase, Anup Prasad, Hesham El-Askary
Environmental sampling techniques have improved

Molecular detection of airborne *Coccidioides* in Tucson, Arizona

Nancy A. Chow¹, Dale W. Griffin², Bridget M. Barker³,⁴,⁵, Vladimir N. Loparev⁶ and Anastasia P. Litvintseva¹,*
Histoplasmosis

EMERGING INFECTIOUS DISEASES

Volume 22, Number 3—March 2016
CME ACTIVITY - Synopsis
Epidemiology of Histoplasmosis Outbreaks, United States, 1938–2013

Kaitlin Benedict and Rajal K. Mody
Author affiliations: Centers for Disease Control and Prevention, Atlanta, Georgia, USA

EMERGING INFECTIOUS DISEASES

Volume 24, Number 3—March 2018
Synopsis
Multistate Epidemiology of Histoplasmosis, United States, 2011–2014

Paige A. Armstrong,3, Brendan R. Jackson, Dirk Haselow, Virgil Fields, Malia Ireland, Connie Austin, Kimberly Signs, Veronica Fialkowski, Sreema Patel, Peggy Ellis, Peter C. Ives, Caitlin Pedati, Suzanne Gibbons-Burgner, Jennifer Anderson, Thomas Dobbs, Sherri Davidson, Mary McIntyre, Kimberly Warren, Joanne Midla, Nhien Luong, and Kaitlin Benedict

Histoplasmosis
In the environment, *Blastomyces* exists as mold (1) with septate aerial hyphae. The hyphae produce spores (2). These spores are either inhaled, or inoculated into the skin (3) of a susceptible host. The warmer temperature inside the host signals a transformation (4) into a broad-based budding yeast. The yeast may continue to colonize the lungs or disseminate in the bloodstream (5) to other parts of the body, such as the skin, bones and joints, organs, and central nervous system.
Known endemic areas cover most of the US

Much more to be learned about the environmental aspects
Conclusions

- We need to build more collaborations to help better define ecological niche and understand areas of geographic risk.

- Increased work and modeling can help improve understanding of environmental factors.

- How can we work utilize some of these tools for fungal diseases?
COUGH? FEVER? EXHAUSTED?

ASK YOUR DOCTOR TO TEST YOU FOR VALLEY FEVER

For more information, contact CDC 1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Thank You omccotter@cdc.gov