UWTASP tele-antimicrobial stewardship program | echo

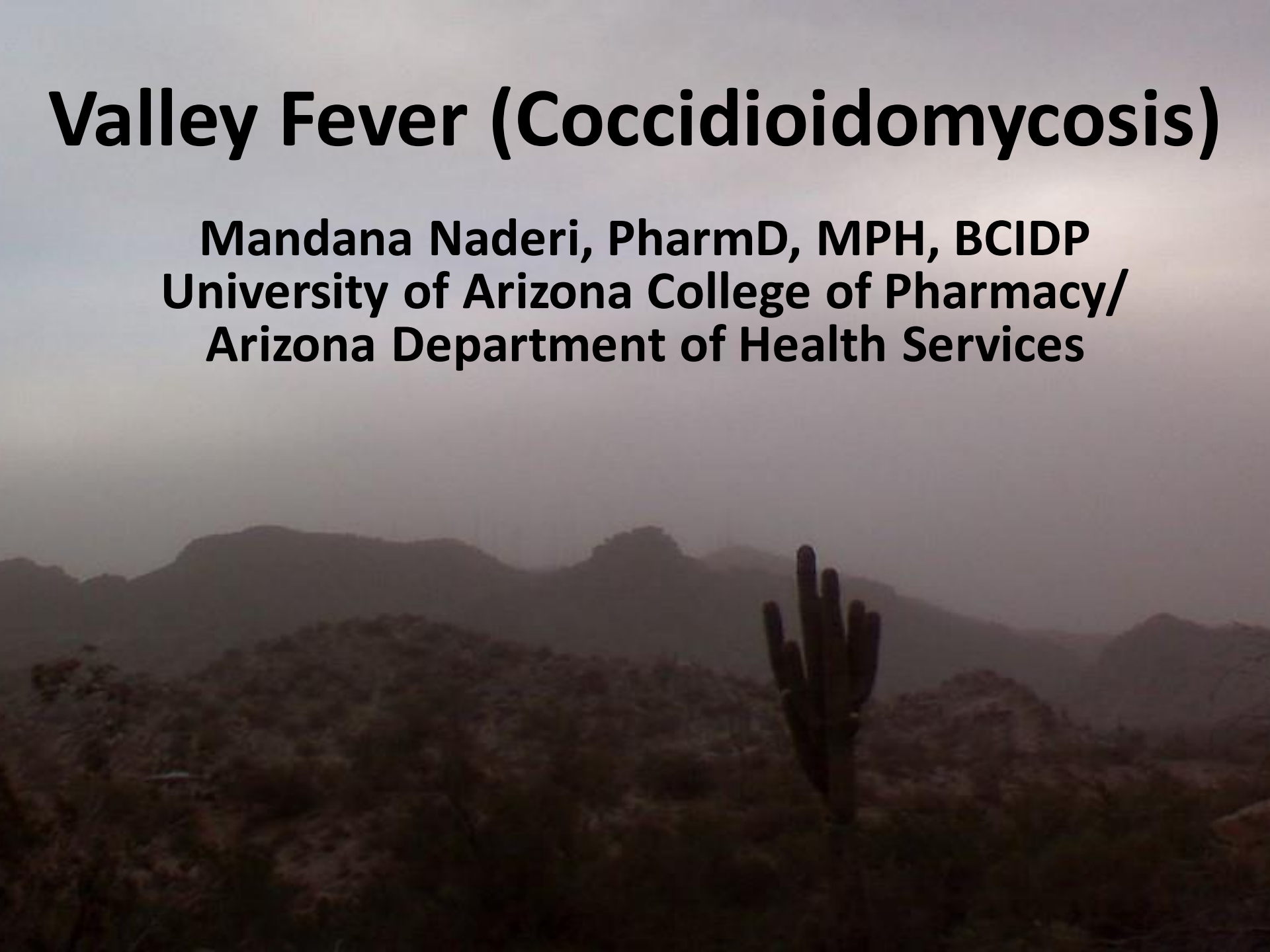
August 8, 2023

Valley Fever

- Speaker: *Mandana Naderi*
- Case Discussions
- Open Discussions

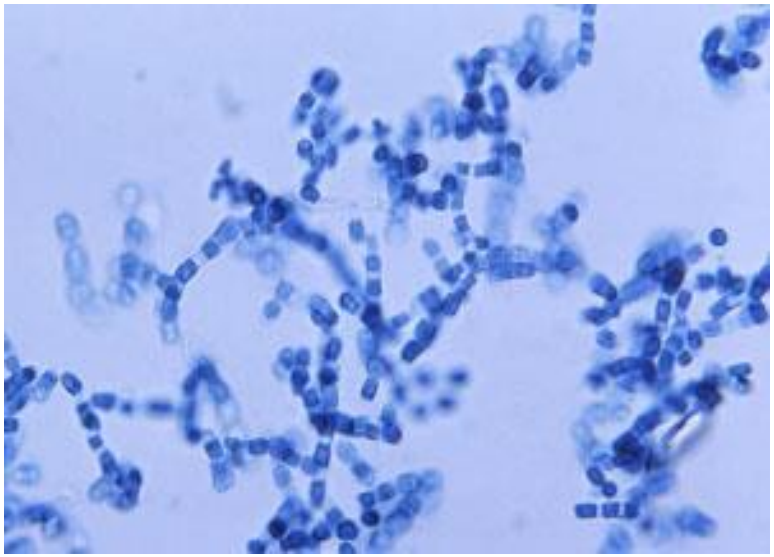
Valley Fever (Coccidioidomycosis)

Mandana Naderi, PharmD, MPH, BCIDP
University of Arizona College of Pharmacy/
Arizona Department of Health Services

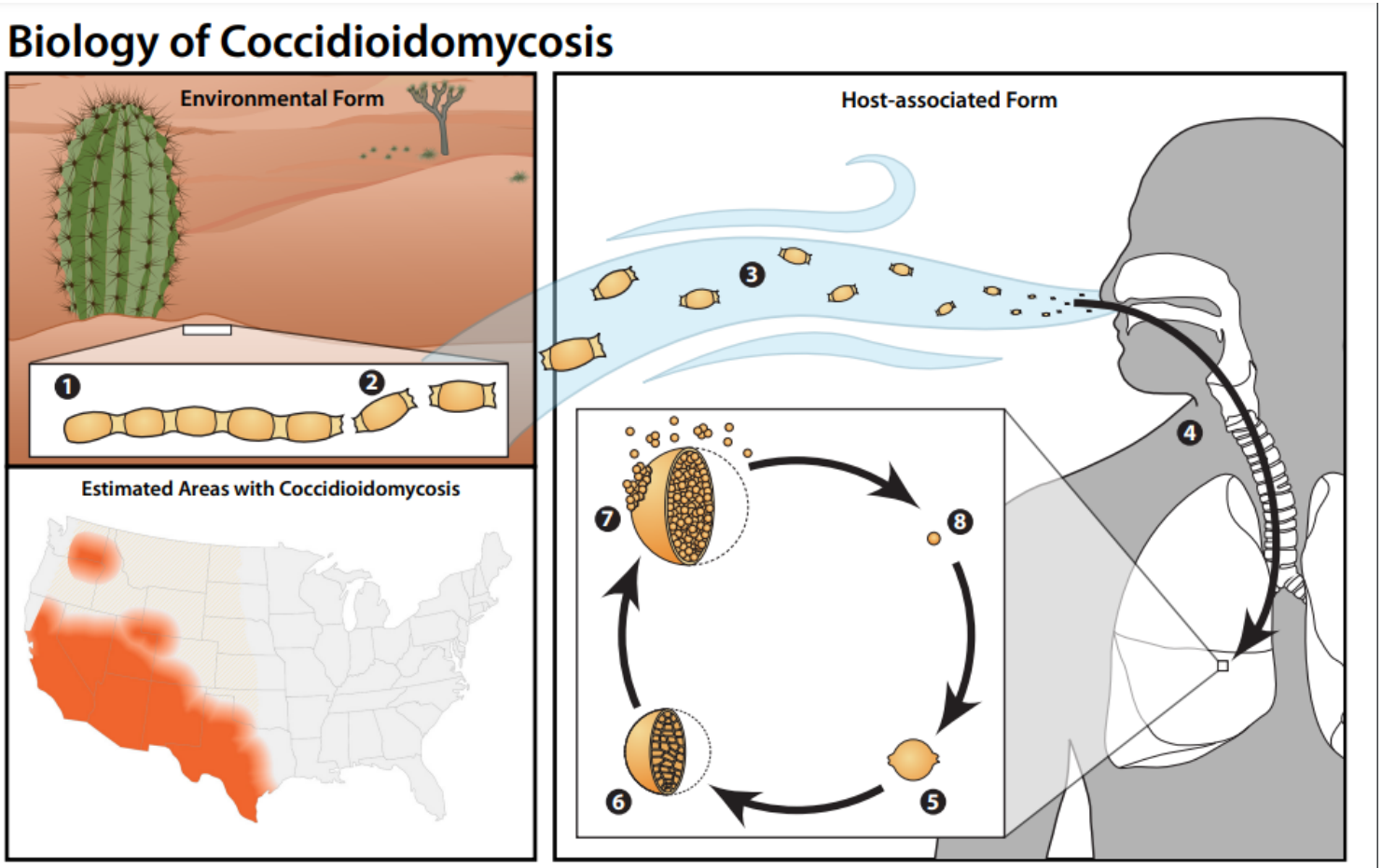


What is Valley Fever?

- Valley Fever is a fungal infection caused by the *Coccidioides* species
  - AKA coccidioidomycosis or “cocci”
  - *Coccidioides immitis* and *posadasii*
- Infection is caused by inhalation of airborne fungal spores

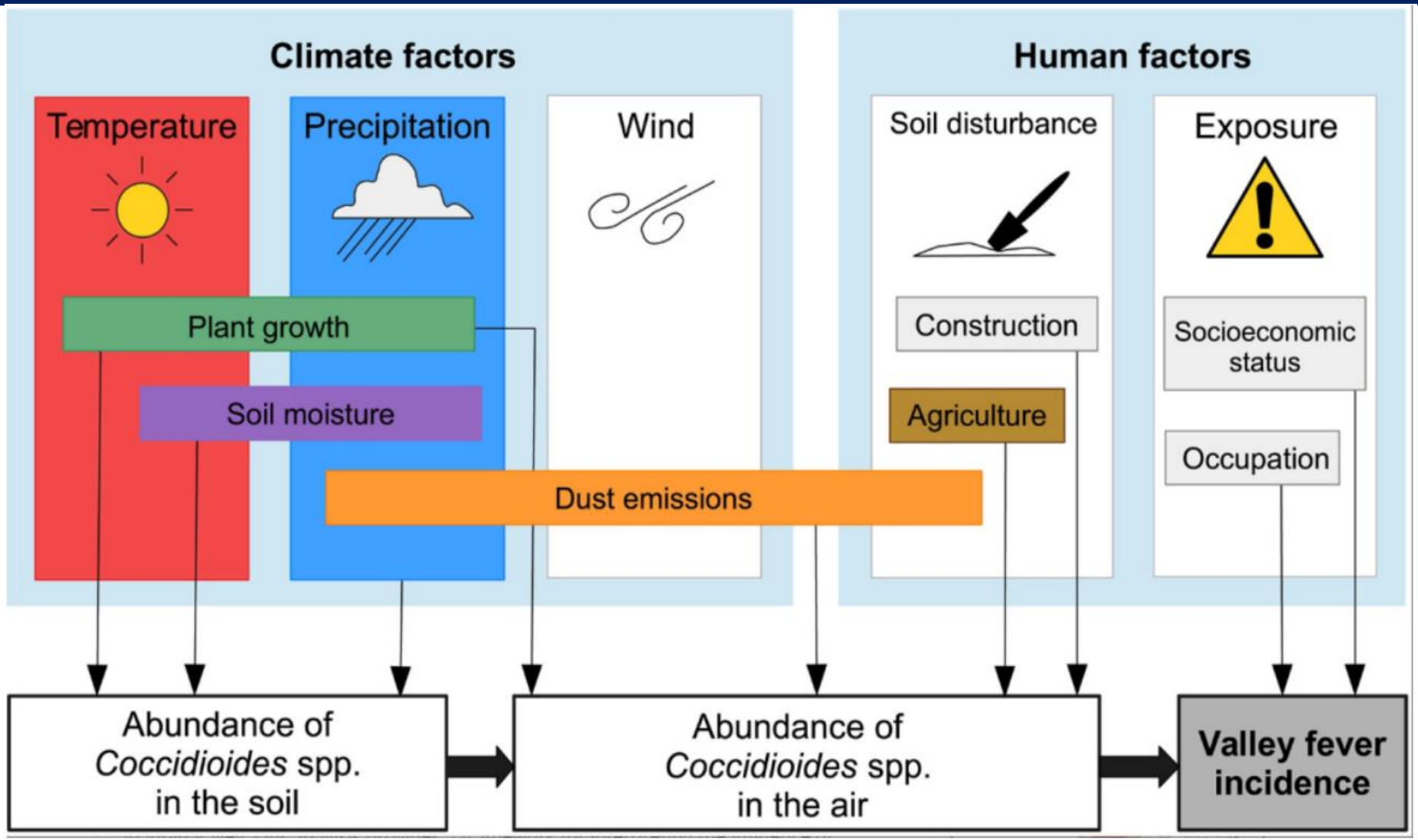


Life Cycle of the Fungus



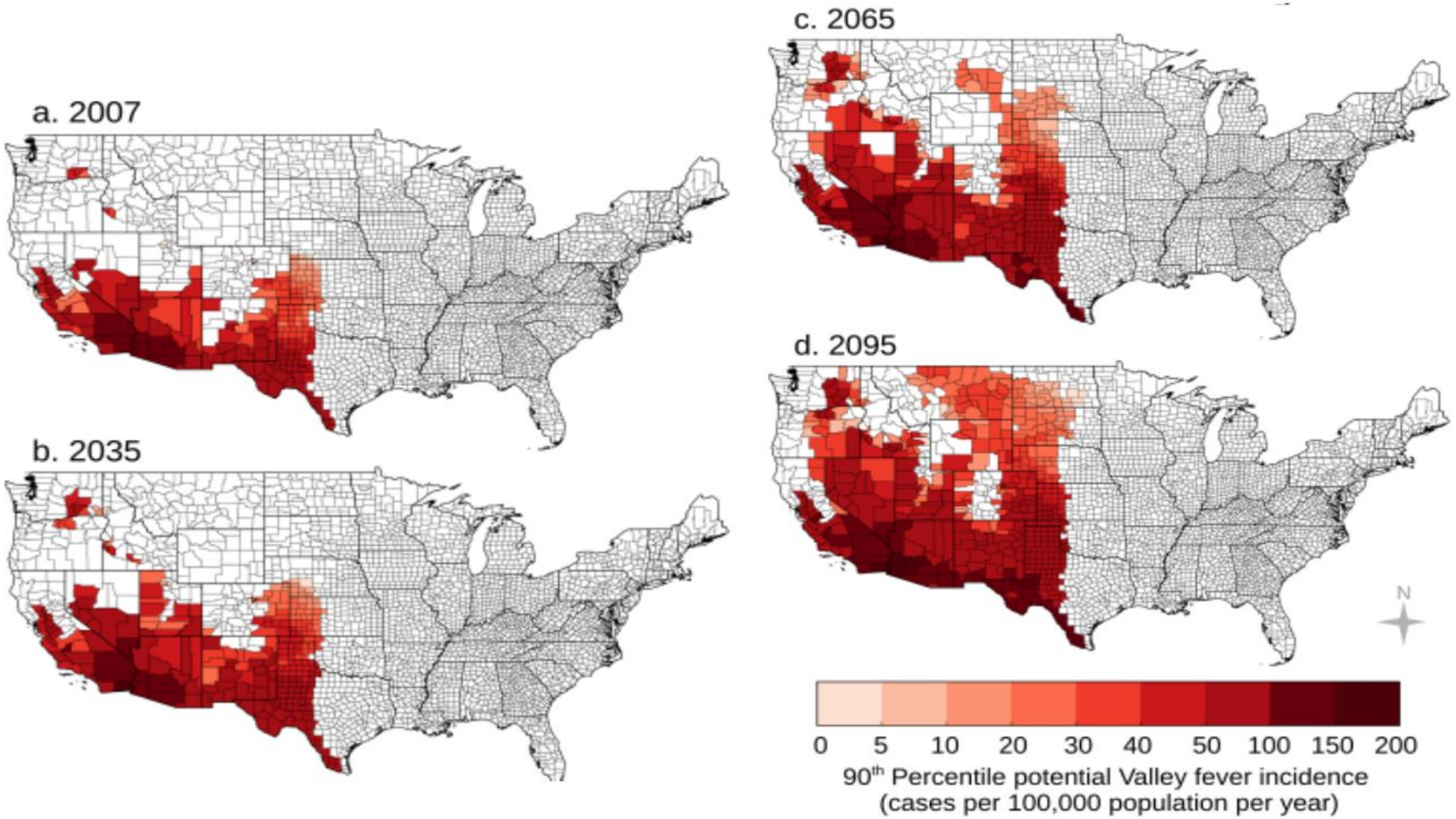
CDC Link

Climate Impacts



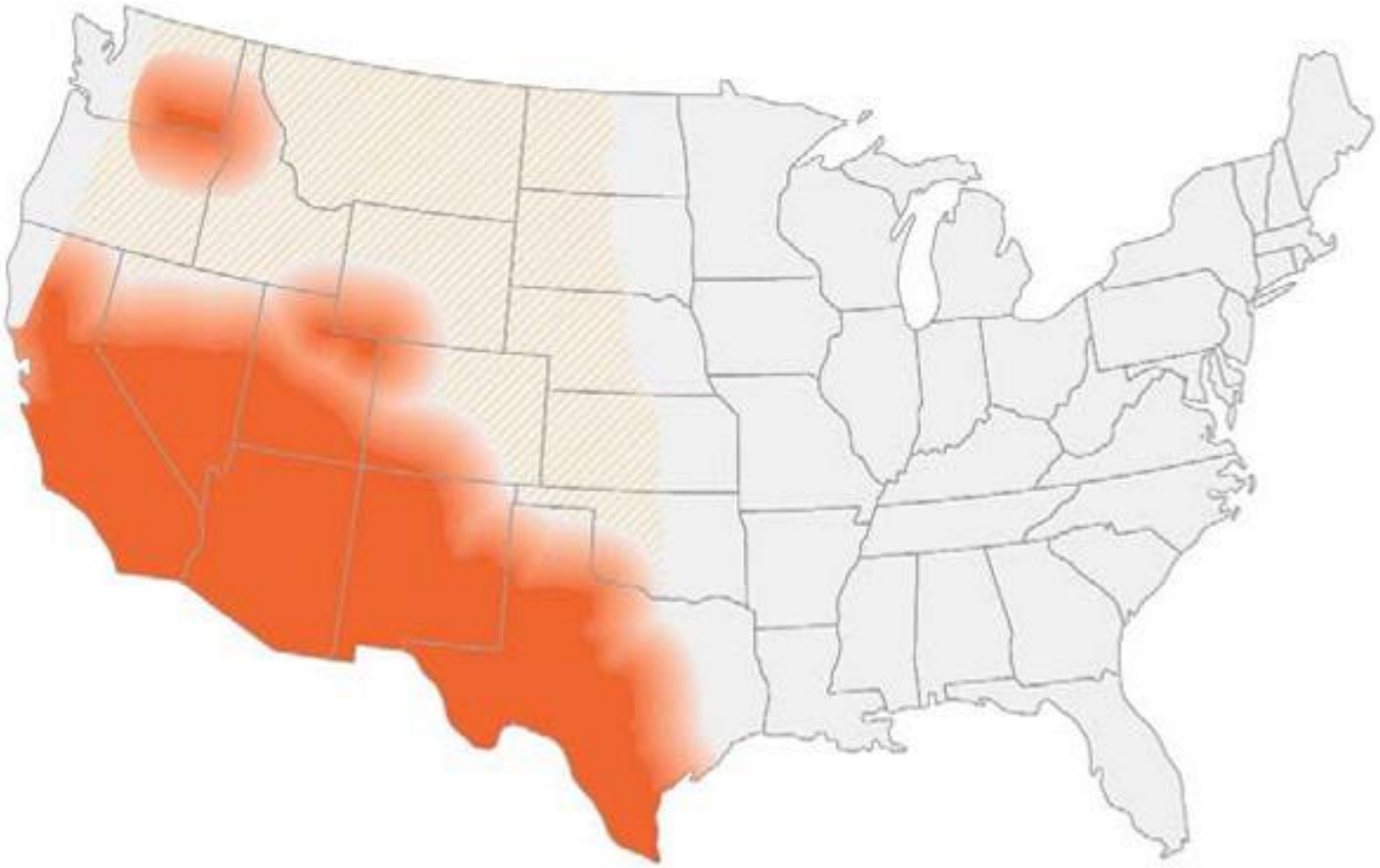
Gorris, ME et al. *GeoHealth*, 2017

Predicted Valley Fever Incidence



Gorris, ME et al. *GeoHealth*, 2019

Estimated Areas with Valley Fever



https://www.cdc.gov/fungal/pdf/more-information-about-fungal-maps-508.pdf

Expanding Geographic Range

Geographic range of Valley fever expands to Washington State

Scientists believed that *Coccidioides* only lived in the Southwestern United States and parts of Latin America until discovering it in south-central Washington in 2013 after several residents developed Valley fever without recent travel to areas where the fungus is known to live. Samples from one patient and soil from the suspected exposure site were analyzed using a laboratory technique called whole genome sequencing and were found to be identical, proving that the infection was acquired in Washington.

Coccidioides lives in dry, dusty soil. It was recently found in south-central Washington.

After this discovery, many unanswered questions remain: How widespread is *Coccidioides* in Washington? How did it get there? How long has it been living there? Information about where a person was most likely infected with Valley fever, how strains are related, and which areas could pose a risk is essential for raising awareness about the disease among public health officials, healthcare providers, and the public. CDC is working with state and local public health officials and other agencies to better understand where the fungus lives so that healthcare providers and the public can be aware of the risk for Valley fever.

https://www.cdc.gov/fungal/pdf/314949-A_FS_ValleyFever_Coccidioides_508.pdf

Arizona Valley Fever Dashboard

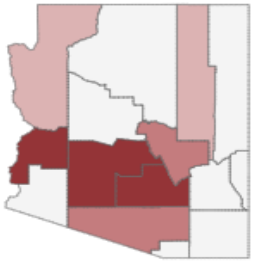
Valley fever reported cases in Arizona.

Select a year: 2021

Hover over the icon to get more information on the Valley fever data in this dashboard.

Which counties have had the largest burden of Valley fever?

Select a county below to filter the charts.

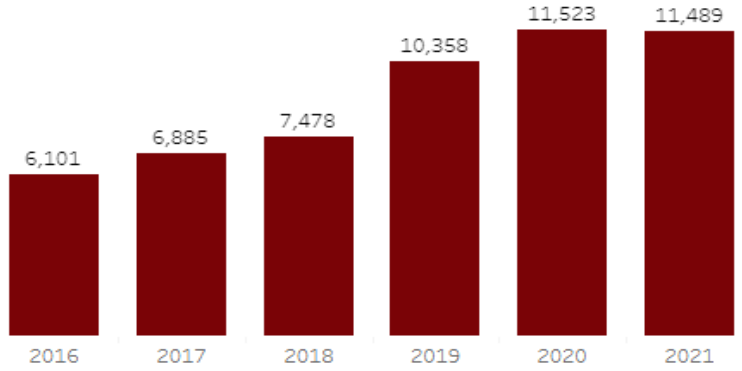


Rates per 100,000 population

20.8 — 225.9

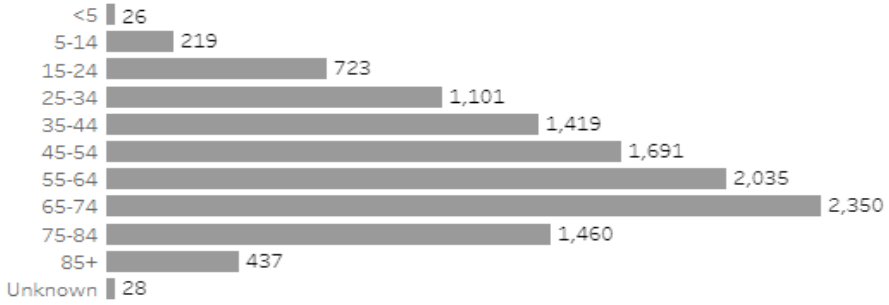
Which years have seen the most Valley fever cases?

County: All



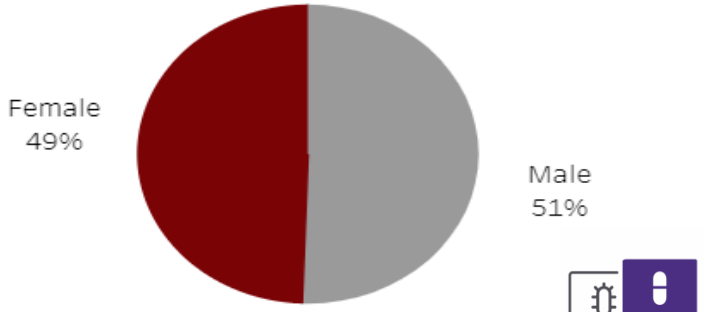
Which age groups are most affected by Valley fever?

All|2021



Which sex is most affected by Valley fever?

All|2021



https://www.azdhs.gov/preparedness/epidemiology-disease-control/valley-fever/index.php#reports-publications

Arizona Valley Fever 2021 Annual Report

2021 Surveillance Highlights

11,489 reported cases of Valley fever

94% of cases were reported in 3 counties

75 – 84 years is the age group with the highest case rate

862 hospitalizations with a primary diagnosis of Valley fever

$84.2 million in total hospitalization charges for Arizonans with a primary diagnosis of Valley fever

$55,990 was the median charge per hospitalization with a primary diagnosis of Valley fever

102 deaths attributable to Valley fever

https://www.azdhs.gov/preparedness/epidemiology-disease-control/valley-fever/index.php#reports-publications

Transmission

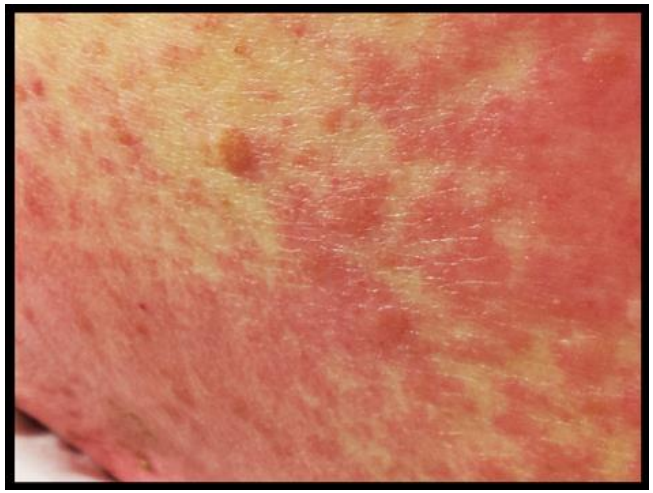
- Inhalation of airborne spores from the soil
  - Wind
  - Soil disturbance
  - Dust storms
  - Outdoor activities: hiking, gardening, 4-wheeling, etc.
- Incubation period: 1 – 4 weeks before symptom onset
- No person-to-person spread

Risk Factors

- Primary Disease
  - Exposure to an endemic area
  - Male sex
- Disseminated
  - Immunocompromising conditions including HIV, solid organ transplant, cancer, chronic steroid use
  - Male sex
  - Racial (African American, Filipino)
  - Pregnancy, especially 3rd trimester
  - Diabetes

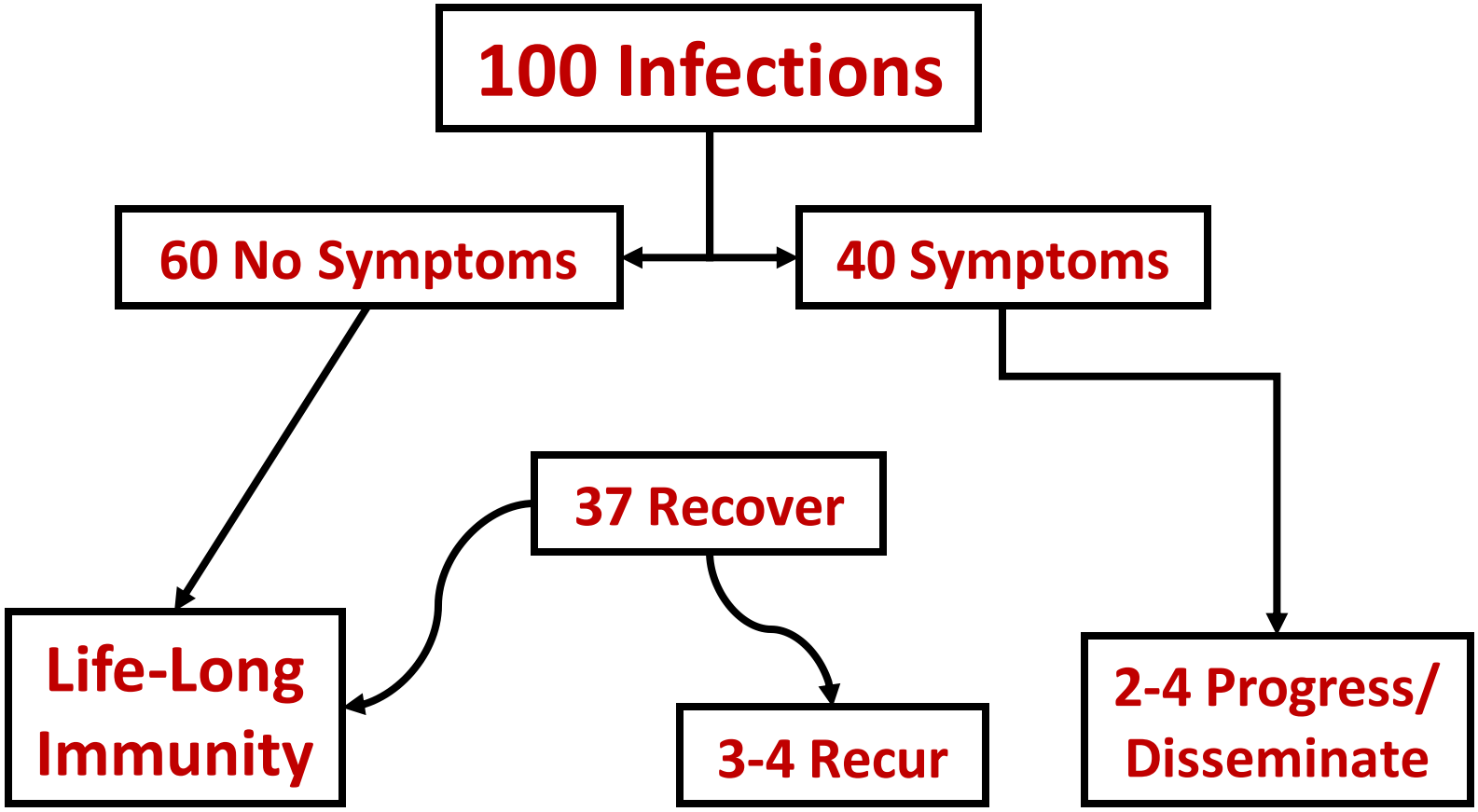
Signs and Symptoms

- 40% of infected people with symptoms develop a **pulmonary infection** 7-28 days after exposure and experience one or more of the following symptoms:
  - **Fatigue**
  - **Cough**
  - **Fever**
  - Rash
  - Night sweats
  - Loss of appetite
  - Weight loss
  - Achy joints
  - Headaches
  - Muscle aches
  - Chest pain



- Symptoms can last weeks or months

Spectrum of Disease



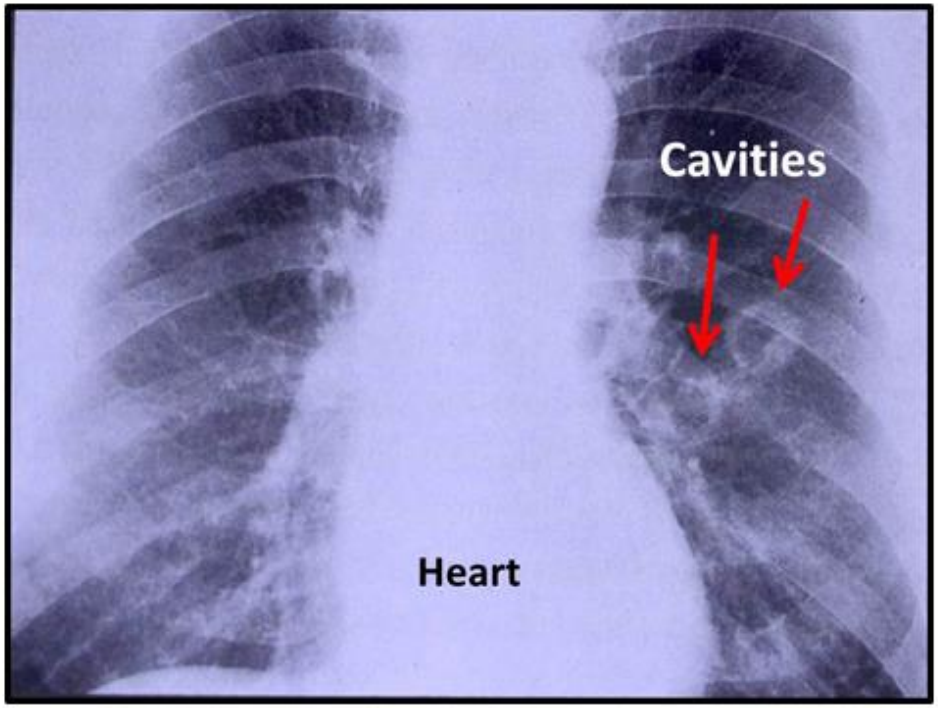
Adapted from "Valley Fever in Arizona" by Clarisse Tsang, 2011

Severe and Disseminated Disease

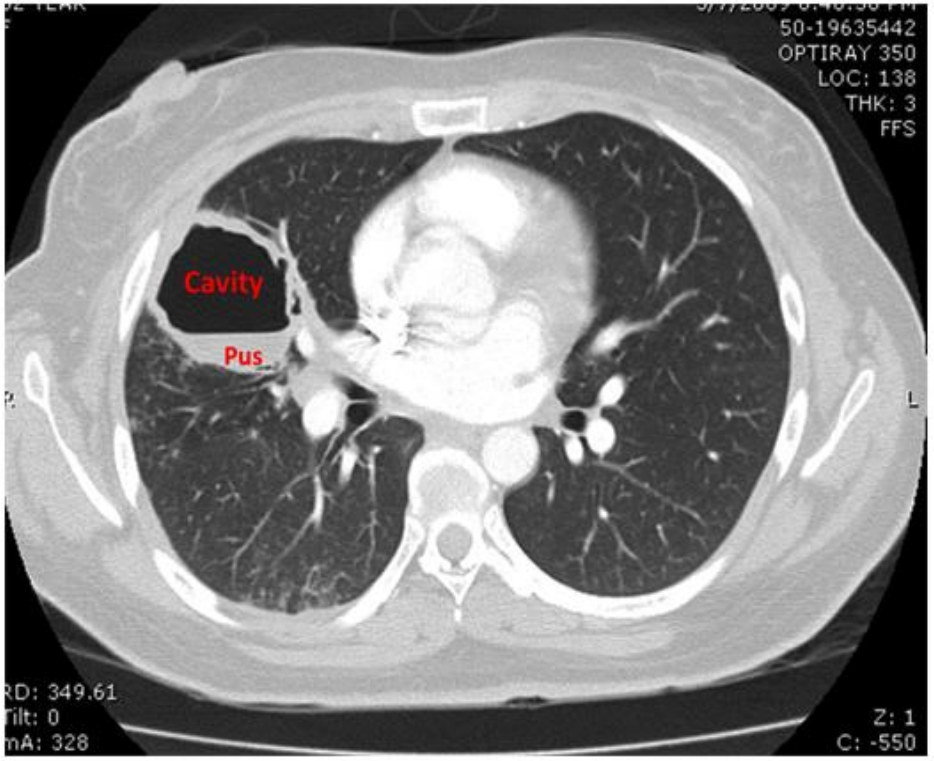
- In 5% of cases, pulmonary infection becomes severe or chronic
  - Infiltrates, cavities, pleural effusion
- In <1% of cases, infection disseminates outside of the lungs
  - Bones
  - Joints
  - Skin
  - Brain (meninges)

- Symptoms can recur and may be lifelong
- Rarely fatal (meningitis, fungemia)

Imaging Findings



Coccidioides left lung cavitary pneumonia



Coccidioides right lung cavitary pneumonia with bacterial abscess.

Images from the Valley Fever Center for Excellence at the University of Arizona

When to Consider Testing

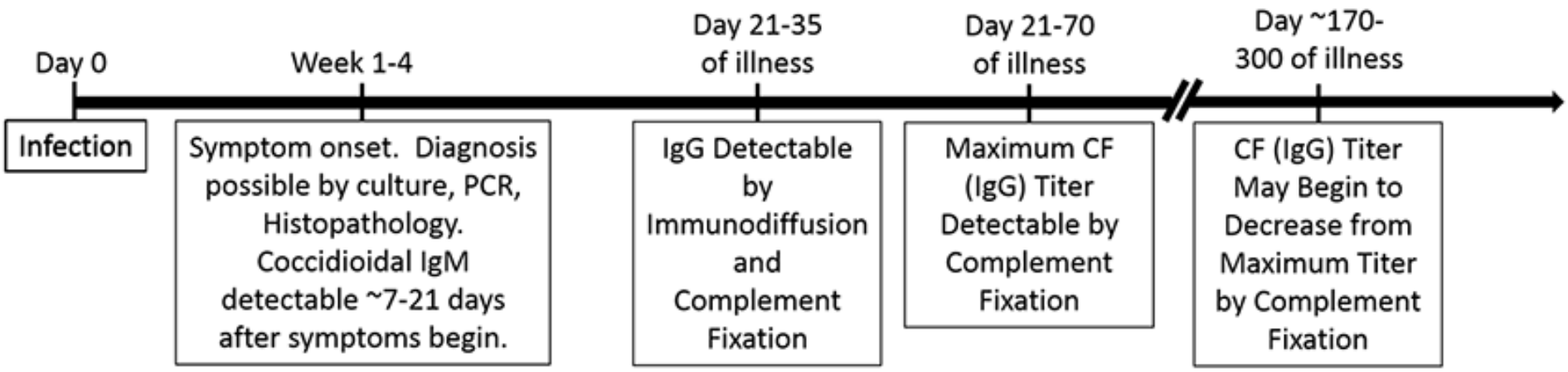
- **Consider testing patients for coccidioidomycosis if they have been to endemic areas and have:**
  - Respiratory symptoms that have required:
    - More than 1 office visit
    - A chest x-ray
    - Antibiotics
  - Two of the following for a prolonged period:
    - Fever
    - Fatigue
    - Arthralgia
  - Skin lesions consistent with erythema nodosum and/or erythema multiforme
  - Unexplained peripheral blood eosinophilia

https://www.azdhs.gov/preparedness/epidemiology-disease-control/valley-fever/index.php#resources-healthcare

Diagnosis

- Cultural, histopathologic, or molecular evidence of *Coccidioides* species
- Immunologic/Serologic (blood, CSF, or other body fluid)
  - Tube precipitin (TP): tests IgM
  - Complement fixation (CF): tests IgG
    - Titer from blood of $\geq$ 1:4 is considered positive
    - Any titer from CSF is considered positive
  - Enzyme Immunoassays (EIA): tests IgM and IgG
    - Most sensitive of all tests, positive results may have to be confirmed by other tests
  - Immunodiffusion (ID): tests IgM and IgG

Serologic Timeline



https://health.ucdavis.edu/valley-fever/about-valley-fever/coccidioides-diagnostic-testing/index.html

Treatment

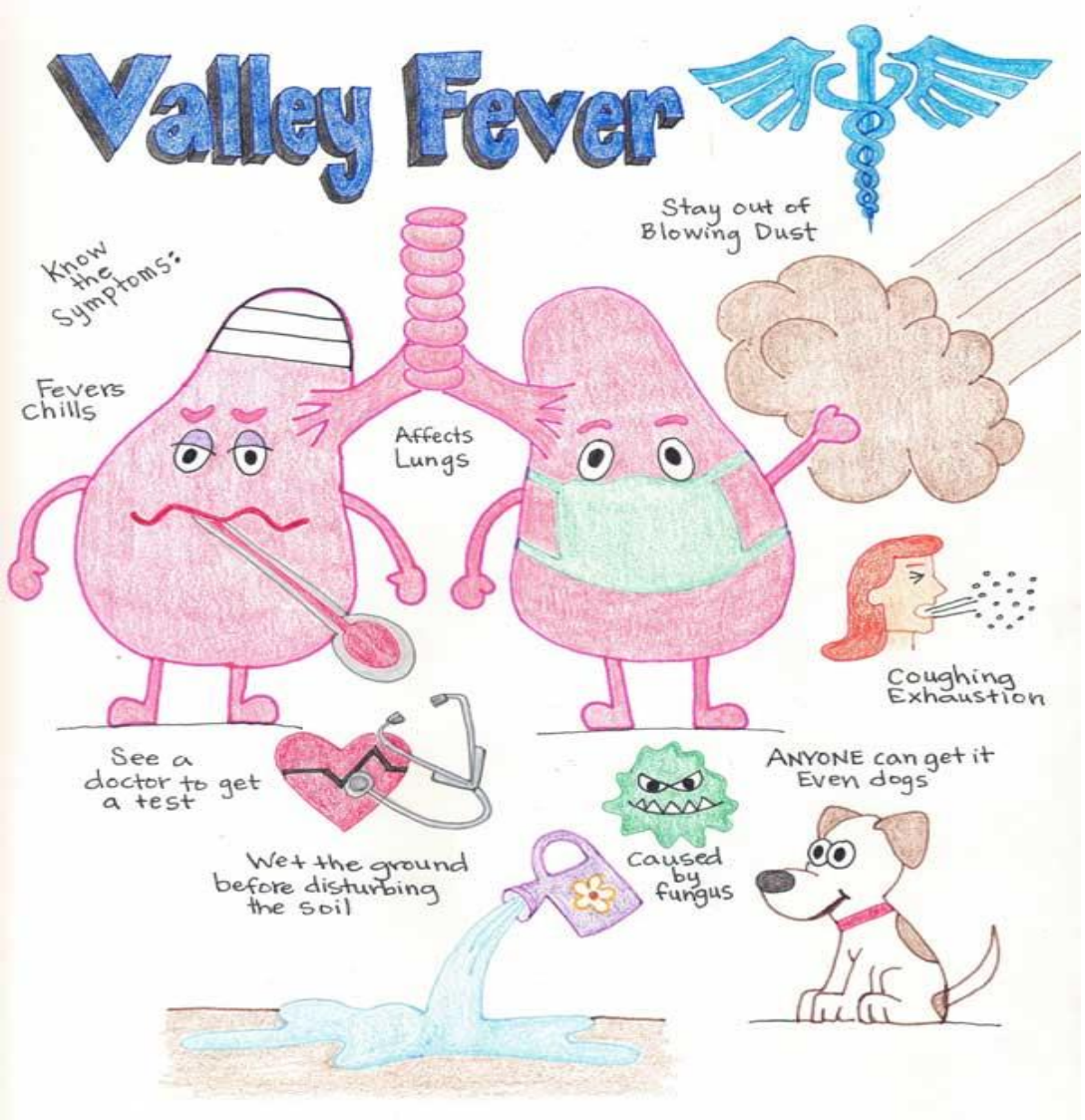
- Mild infection - no treatment
- Moderate - Fluconazole ≥400 mg PO daily for 6 weeks
  - Side effects include nausea/vomiting, headache, increased LFTs, dry skin
  - Other azoles with coverage include voriconazole, posaconazole, isavuconazole, itraconazole
- Severe - Amphotericin for 4-8 weeks, then fluconazole or itraconazole - often for life
  - Side effects for amphotericin include nephrotoxicity, infusion-related reactions

Additional Resources

- 2016 Infectious Diseases Society of America Guidelines for Coccidioidomycosis
- A Training Manual for Primary Care Professionals
- Valley Fever Center for Excellence clinician resources
- Centers for Disease Control and Prevention resources for healthcare professionals

citations

Thank you!


Valley Fever
Know the Symptoms:
Fevers
Chills
Affects Lungs
Stay out of Blowing Dust
Coughing
Exhaustion
See a doctor to get a test
Wet the ground before disturbing the soil
caused by fungus
ANYONE can get it
Even dogs