Valley Fever in Los Angeles County:
A Presentation for the Santa Susana Field Laboratory Community Advisory Group

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What is Valley Fever?

• AKA: Coccidioidomycosis, or “cocci”
• Caused by fungi
  – *Coccidioides immitis*
  – *Coccidioides posadasii*
• Major cause of community-acquired pneumonia in the southwestern U.S.
Where Can You Get Valley Fever?

• Only in the Western Hemisphere / the Americas
  – Southwestern United States:
    • California (ex. San Joaquin and Central Valleys)
    • Arizona (ex. Phoenix and Tucson areas)
    • Parts of Nevada, Utah, New Mexico, Texas (ex. El Paso)
  – Northern Mexico (ex. Sonora and Chihuahua)
  – Semiarid and arid parts of Central and South America
What Type of Environment Supports Valley Fever?

• Arid to semiarid (dry and parched with heat)
• Low to moderate rainfall (5-20 inches/year)
• Long hot seasons, high summer temperatures
• Mild winter temperatures
How Do You Get Valley Fever?

Breathing in fungus can cause infection in vital organs.
How Do You Get Valley Fever?

• Fungal spores
  – Inhalation
  – Puncture wound by contaminated object
  – Organ transplant
  – Generally no person-to-person transmission

• Soil disturbance: dust storms, strong winds, earthquakes, archaeological digs, agriculture, construction activity

• Note: animals and pets can get valley fever
How Does the Disease Progress? (1)

• Most cases (60%) have very mild/no symptoms
• Primary infection
  – Fatigue, cough, chest pain, fever, headache and joint aches (influenza-like illness)
  – Profuse night sweats
  – Loss of appetite/weight
  – Pneumonia or other pulmonary lesion by chest x-ray
  – Red painful bumps that gradually turn brown (erythema nodosum rash)
How Does the Disease Progress? (2)

- Disseminated disease: fungus spreads outside of the lungs
  - Bones
  - Joints
  - Skin
  - Eye
  - Brain: meningitis
  - Abdominal organs and lymph nodes
Some Images Presentation (2)
Some Images Presentation (3)
Some Images Presentation (4)
Some Images Presentation (5)
Theory of Spectrum of Disease

100 Infected

40 w/ Symptoms

60 w/o Symptoms

37 Recover

2-4 Disseminate

3-4 Recur (Drop in Immunity)

Life-long Immunity

Life-long Immunity
Aspects of Disease (1)

• Complete recovery in 6 months
  – Usual course in otherwise healthy people
  – No treatment needed & life-long immunity obtained

• Nodules in the lung
  – 5% of cases with pneumonia
  – Often no symptoms
  – Resembles lung cancer on chest x-ray, problematic because diagnosis requires biopsy
Aspects of Disease (2)

• Lung Cavities
  – 5% of cases after primary infection
  – Most often in older adults usually without symptoms
  – 50% of lung cavities disappear in two years
  – Occasionally, cavities rupture and cause chest pain & difficulty breathing. Ruptures require surgical repair.
Treatment

• Antifungal medication (e.g., amphotericin B, itraconazole, fluconazole, ketoconazole, nikkomycin)

• Recommended for
  – disseminated disease or
  – primary lung infection with increased risk for disseminated disease

• Surgical removal cavities in lung

• Surgical drainage of abscesses in bones / joints
At Risk for Disseminated Disease

• Male
• Race: African-American/Black, Filipino
  – Possibly Asian, Native American, Hispanic
• Pregnant women (3rd trimester)
• Weak immune systems
  – Ex. HIV+/AIDS, organ transplants, Hodgkin’s lymphoma, diabetes, chronic corticosteroid therapy, advanced age
Cocci Exposure

- Cocci fungus grows in first 6-8 inches of soil
- Soil undisturbed for long periods of time can grow the fungus
- Soil disturbance from earthquakes, strong winds, and human or animal activity can release fungal spores that can infect people and animals
High Risk of Exposure

• Residents and travelers in endemic areas, especially from non-endemic areas/no immunity
• Prisoners & correctional facility workers
• Military
• Border patrol
• Construction
• Agricultural workers
• Archaeologists
The Challenge of Valley Fever

• Awareness and recognition of valley fever is low in the medical community (non-specific sx)
• Laboratory testing must be specified by clinician
• Multiple medical visits and specialists are often required before testing for valley fever occurs
• Missed or delayed diagnosis increases chances of severe disease and death
• CDC: “150,000 cases per year go undiagnosed”
Significance of Valley Fever

• Costly and debilitating
  – 75% of patients miss work or school due to illness
  – >40% require hospitalizations (avg. $50,000/stay)

• Small percent develop life-long disease, chronic pulmonary disease, disseminated disease, disfigurement, meningitis, death

• Fungus is endemic in areas with potential of large population growth
  – 1998 in US endemic areas 5.3 cases/100K pop.
  – 2011 in US endemic areas 42.6 cases per 100K pop.
Number of Valley Fever Cases (N=3296), LA County, CA, 1973-2011.
Valley Fever Cases (N=304) by Age Groups, LA County, CA, 2011
Rates by Health District, Los Angeles County, 2011*

Cases Per 100,000 Population
- 0.0 - 0.6
- 0.7 - 2.2
- 2.3 - 3.8
- 3.9 - 8.9
- 9.0 - 24.9

*Excludes Long Beach and Pasadena Data.
Environments At-Risk:
- High temperatures
- Arid/semiarid regions
Annual incidence rate of coccidiomycosis, Los Angeles County, 1992-2005
Annual incidence rate of coccidiomycosis, Los Angeles County, 1992-2005

Cases/million population/year

Year


LAC
West Coast
San Fernando HD
West Valley HD
Antelope Valley HD
Valley Fever Case Characteristics (N=2543), LA County, CA, 1992-2011.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Number (%)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1722</td>
<td>68%</td>
</tr>
<tr>
<td>Lives in “endemic” area (AV, SF, WV)</td>
<td>1215</td>
<td>48%</td>
</tr>
<tr>
<td>Hispanic Race</td>
<td>837</td>
<td>33%</td>
</tr>
<tr>
<td>White Race</td>
<td>800</td>
<td>31%</td>
</tr>
<tr>
<td>65 Years Old or More</td>
<td>466</td>
<td>18%</td>
</tr>
<tr>
<td>Work-Related Outdoor Exposed*</td>
<td>356</td>
<td>26%</td>
</tr>
<tr>
<td>Died**</td>
<td>218</td>
<td>9%</td>
</tr>
<tr>
<td>Correctional Facility Resident</td>
<td>71</td>
<td>3%</td>
</tr>
<tr>
<td>Correctional Facility Worker</td>
<td>7</td>
<td>0.3%</td>
</tr>
</tbody>
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*Of 1349 cases with known occupation or work-related outdoor exposure.

**13% (range 8%-19%) among 781 cases during 1997-2005 when 0-4% of survival status was missing for annual cases.
Simple Prevention / Risk Reduction

• During high winds
  – Stay indoors
  – Drive with windows up & air condition on “recycle air”
  – Wear protective gear (ex. Masks, handkerchief) to limit exposure to airborne dirt

• Water down dirt during construction work

• Environmental engineering: Tall grass, natural wind breaks (trees, vines, hedges), high walls
Take Home Messages

• Request blood test (serology) from primary care physician if suspect sick with valley fever

• Be aware of environment and weather
  – Stay away from activities that kick up dirt
  – Stay indoors during high winds and dust storms

• Educate others
  – New residents
  – Those at high risk of disseminated disease or high levels of exposure to airborne dirt
Pop Quiz

• What do you do if you see a dust storm like this coming at you?
Evidence of Cocci at the Santa Susana Field Laboratories

- At least two articles from 1950s finding pockets of the cocci fungus in San Fernando Valley
- History of high incidence and rates in West Valley HD
- Epidemiology and medical literature on January 1994 Northridge earthquake: 203 cocci cases in Ventura County, Jan 24 - Mar 15 vs. <60 cases in all of 1993; 3 deaths; 56% of cases at foot of Santa Susana Mountains
Concerns About the Environmental Cleanup

• Cocci cases after 1994 earthquake attributed to landslides, dust clouds, and (strong) wind

• Shielding of soil when put into transport trucks
  – Is there an accounting of the wind?

• Sealing of soil during transport
  – What are the methods for effectiveness and safety?

• Education and awareness of the community (medical and general) for signs, symptoms, tests, risks, and treatment of cocci disease
Contact

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