

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

Ramon E. Guevara, Ph.D., MPH

# 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.

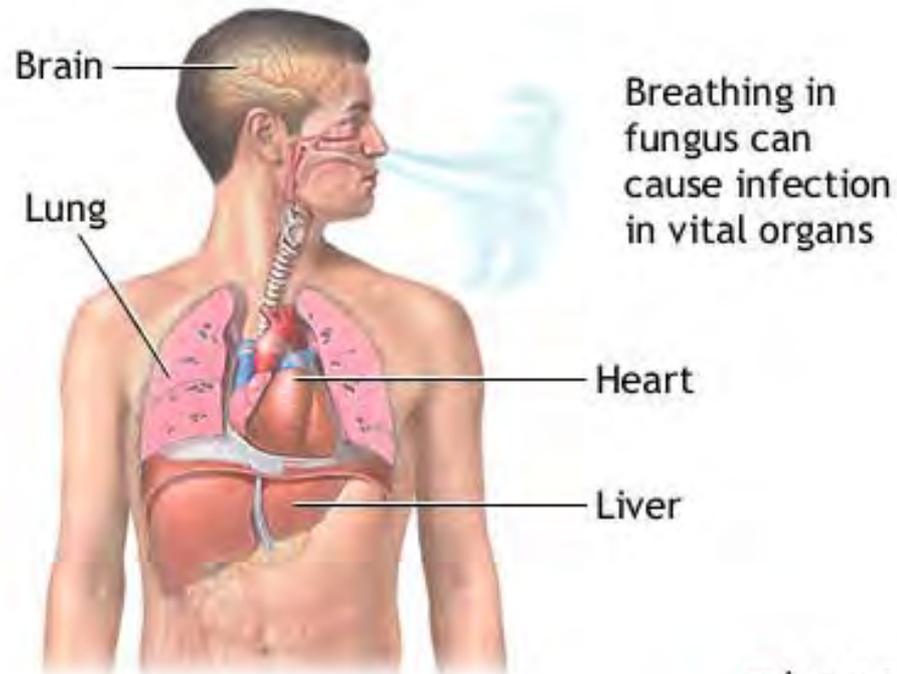
# Where Can You Get Valley Fever?

- 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?



ADAM.

# 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 (1)



# Some Images Presentation (2)



# Some Images Presentation (3)



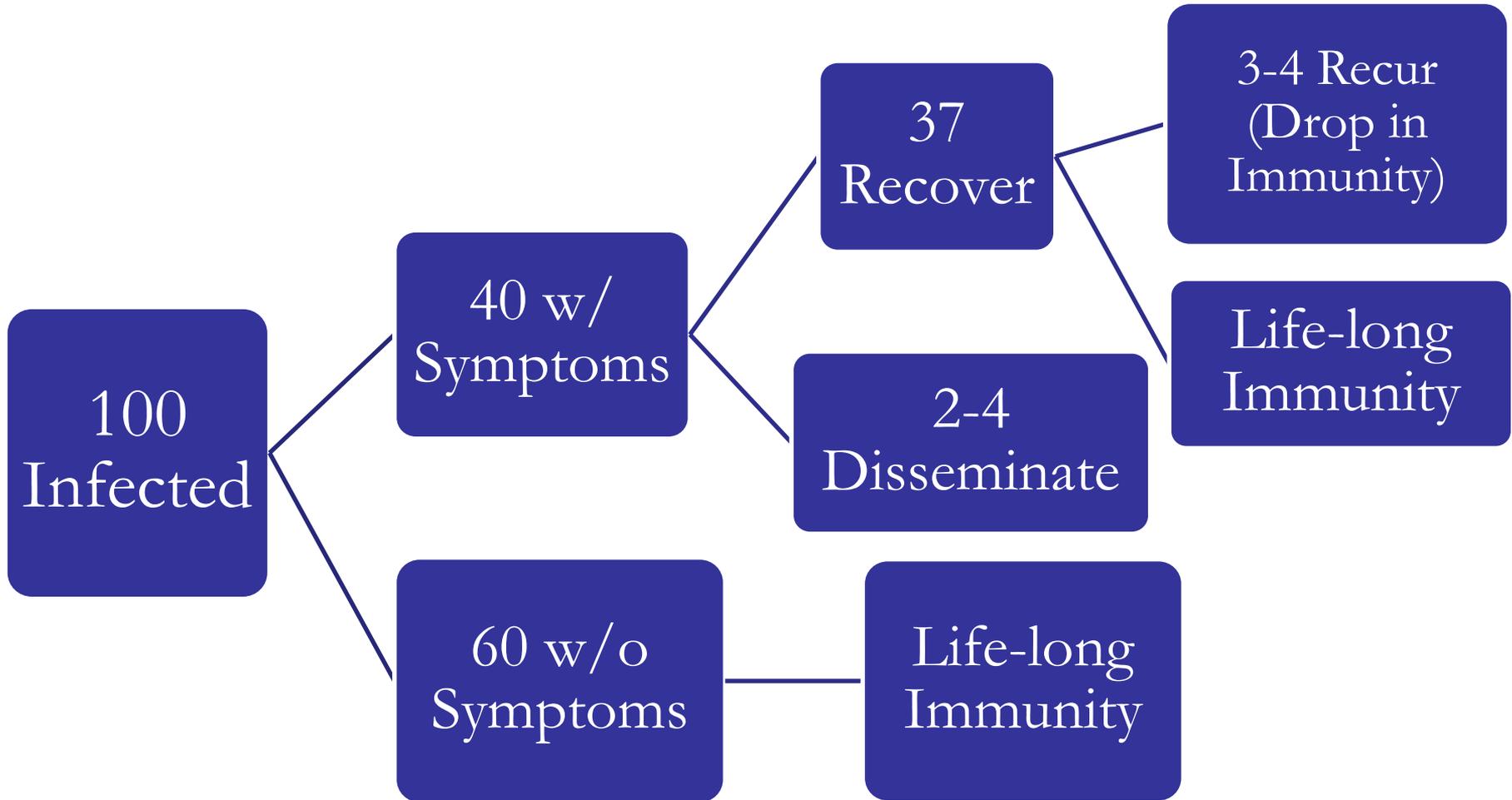
# Some Images Presentation (4)



# Some Images Presentation (5)



# Theory of Spectrum of Disease



# 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, **nikkomyacin ???**)
- 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 (3<sup>rd</sup> 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

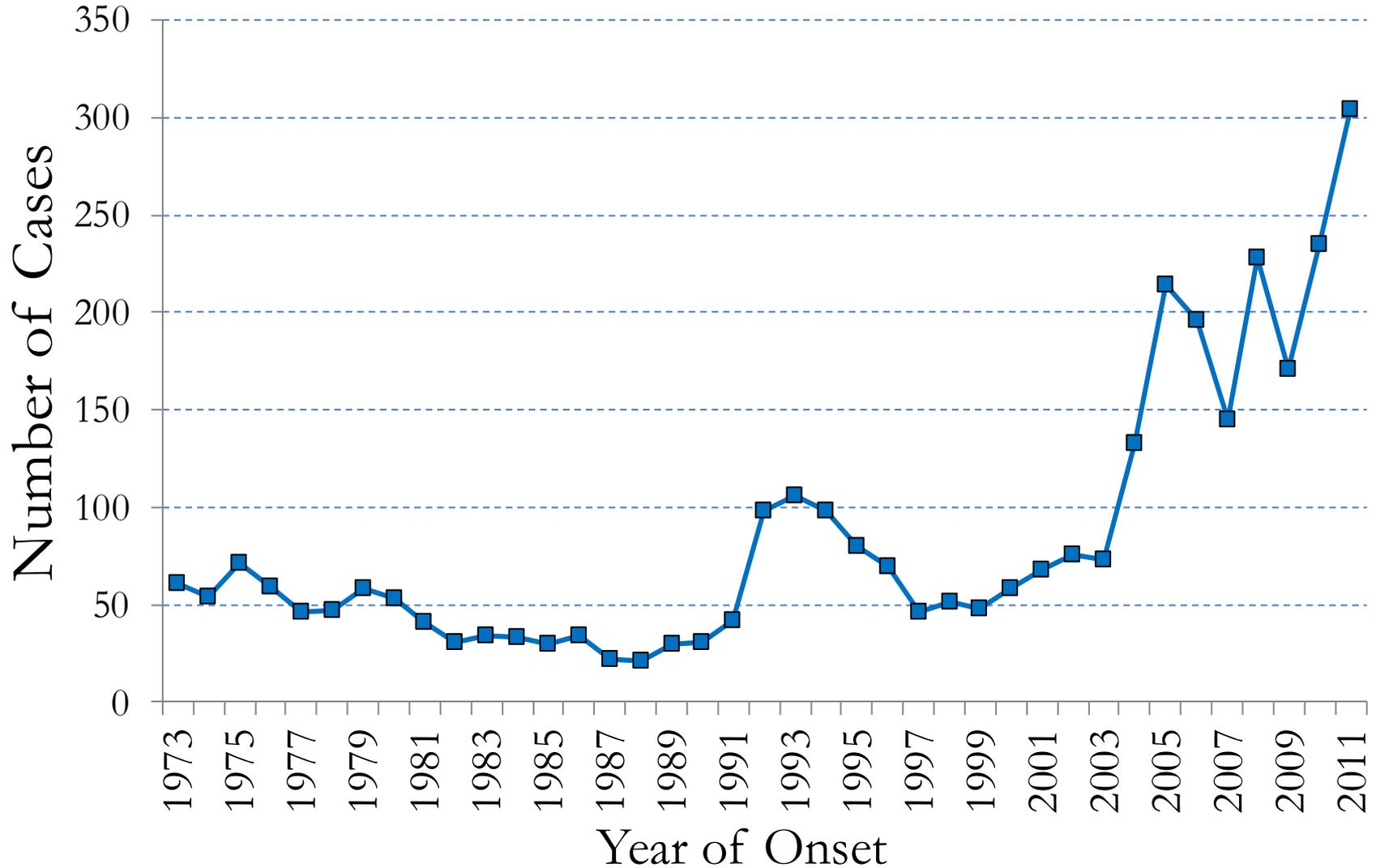
# The Challenge of Valley Fever

- 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”

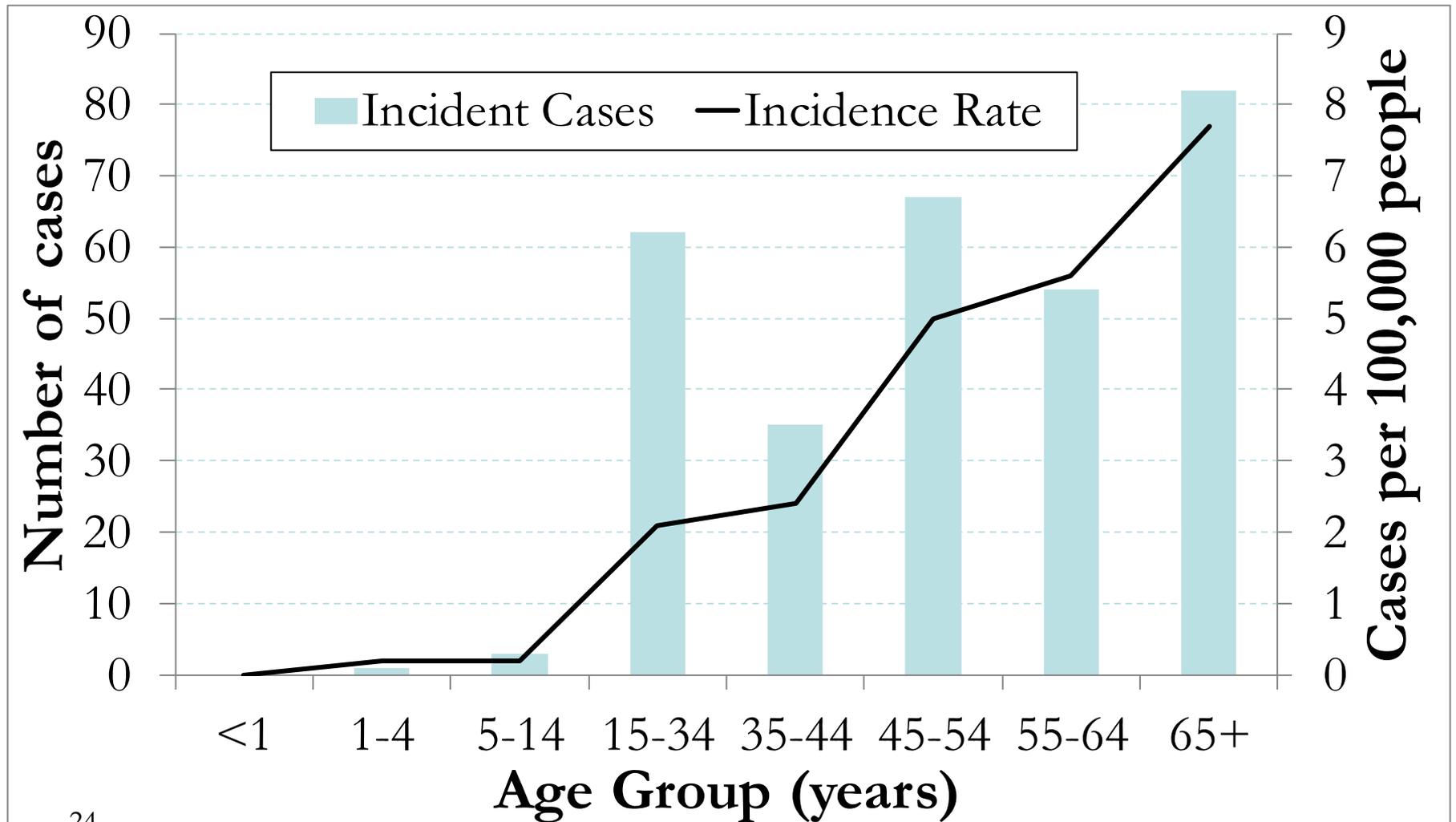
# Significance of Valley Fever

- 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.

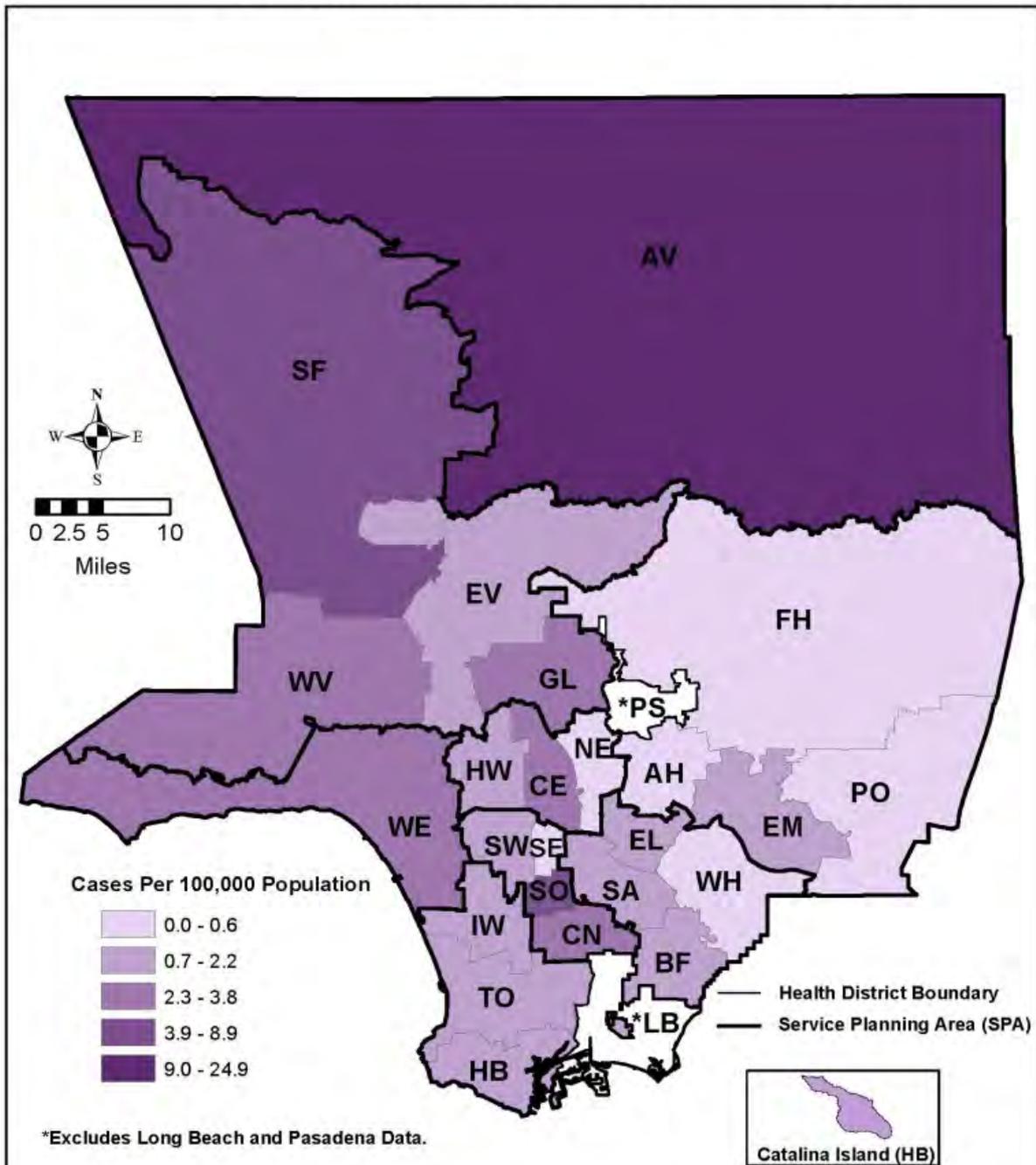
# Number of Valley Fever Cases (N=3296), LA County, CA, 1973-2011.



# Valley Fever Cases (N=304) by Age Groups, LA County, CA, 2011



# Rates by Health District, Los Angeles County, 2011\*



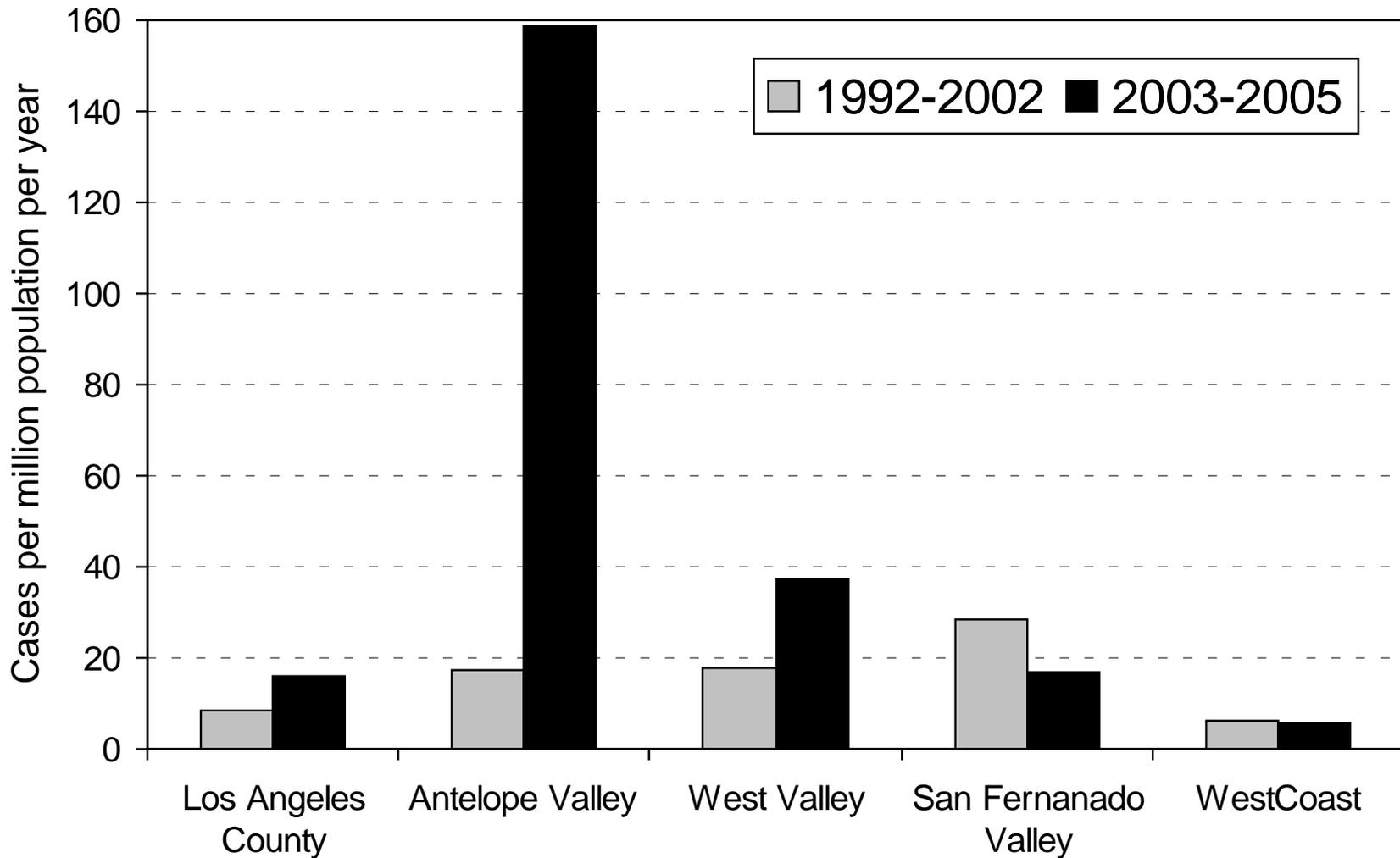




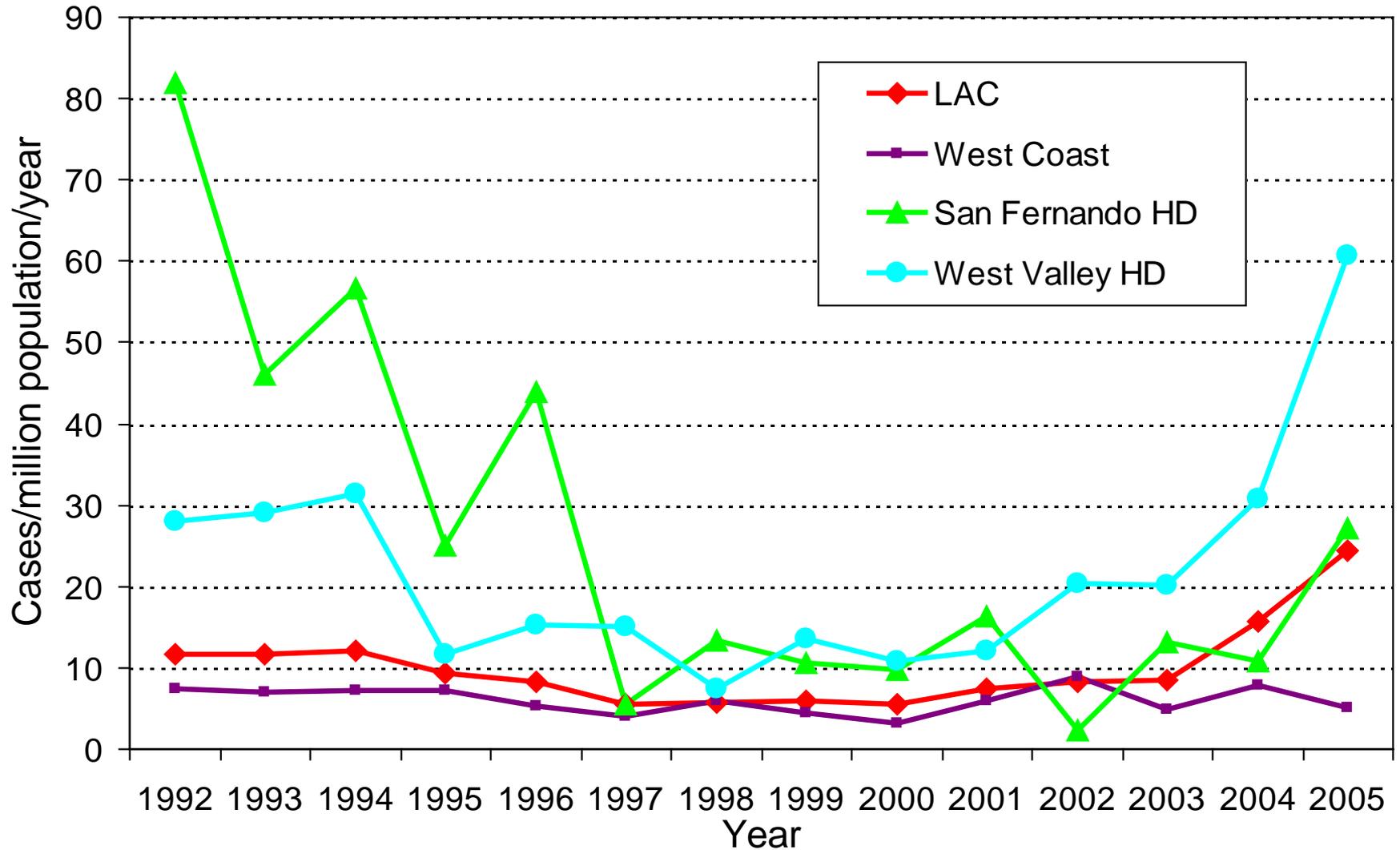
**Environments At-Risk:**

- High temperatures
- Arid/semiarid regions

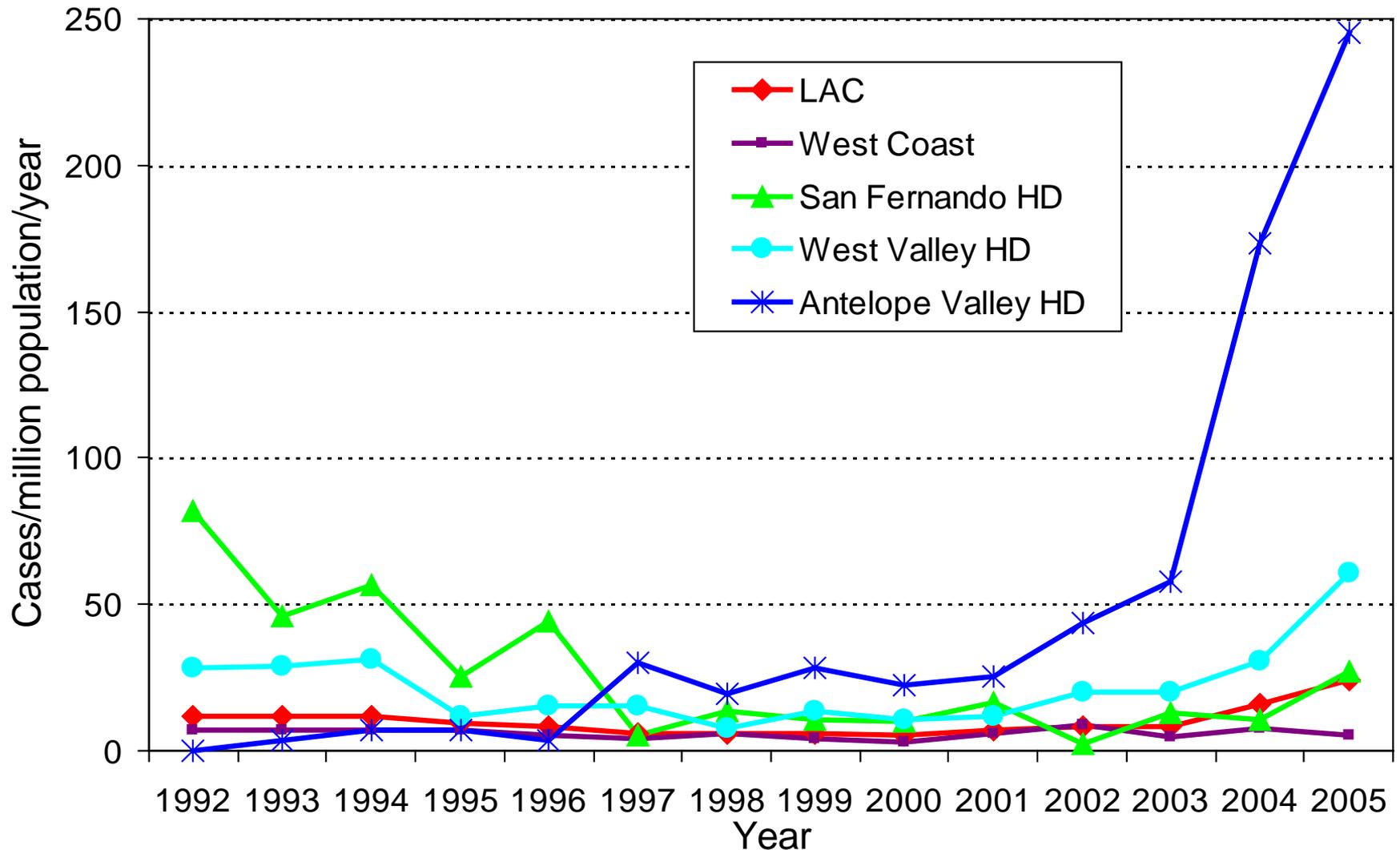
Average annual incidence coccidiomycosis rates,  
1992-2002 vs. 2003-2005 among various geographic  
regions, Los Angeles County



# Annual incidence rate of coccidiomycosis, Los Angeles County, 1992-2005



# Annual incidence rate of coccidiomycosis, Los Angeles County, 1992-2005



# Valley Fever Case Characteristics (N=2543), LA County, CA, 1992-2011.

Measure	Number (%)	Percent
Male	1722	68%
Lives in “endemic” area (AV, SF, WV)	1215	48%
Hispanic Race	837	33%
White Race	800	31%
65 Years Old or More	466	18%
Work-Related Outdoor Exposed*	356	26%
Died**	218	9%
Correctional Facility Resident	71	3%
Correctional Facility Worker	7	0.3%

\*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

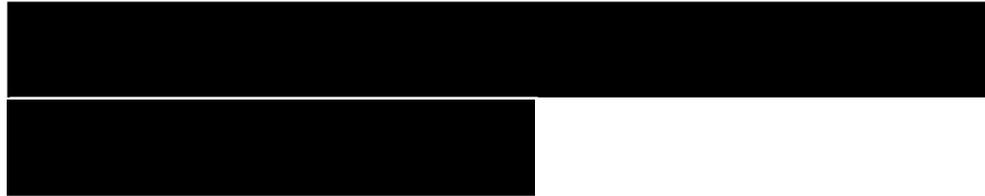
# Concerns About the Environmental Cleanup

- 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

Ramon E. Guevara, Ph.D., MPH

Epidemiologist



Emergency Preparedness and Response Program  
County of Los Angeles Department of Public Health  
600 S. Commonwealth Ave, Suite 700  
Los Angeles, CA 90005