

Coccidioidomycosis (Valley Fever) What Is It and How Is it Different From Tuberculosis

Tuberculosis and Cocci Webinar
December 5, 2019

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Banner-University Health Valley Fever Program



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Disclosures

Drs. Galgiani

Has no conflicts of interest to disclose



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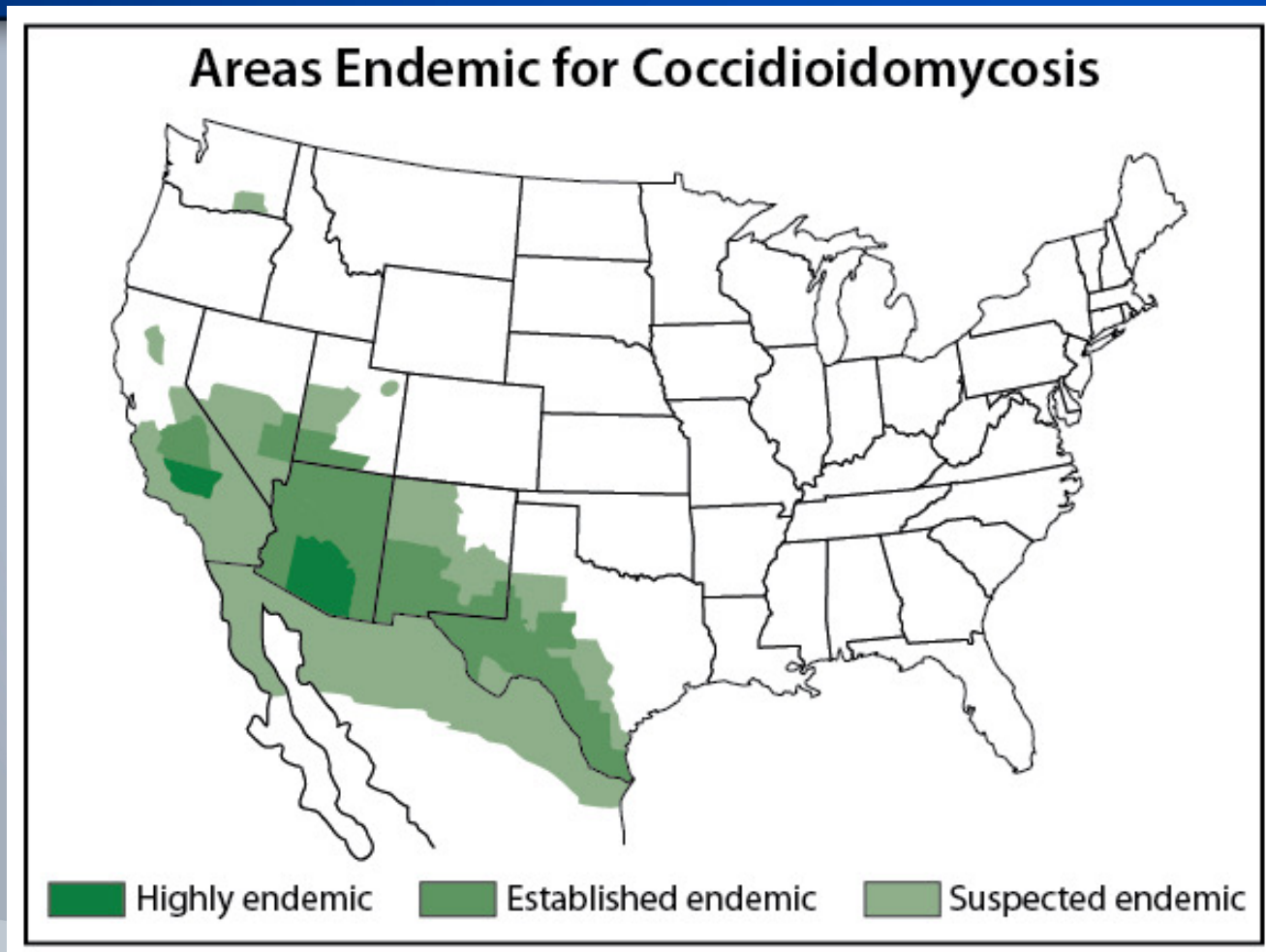
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What Is Valley Fever?

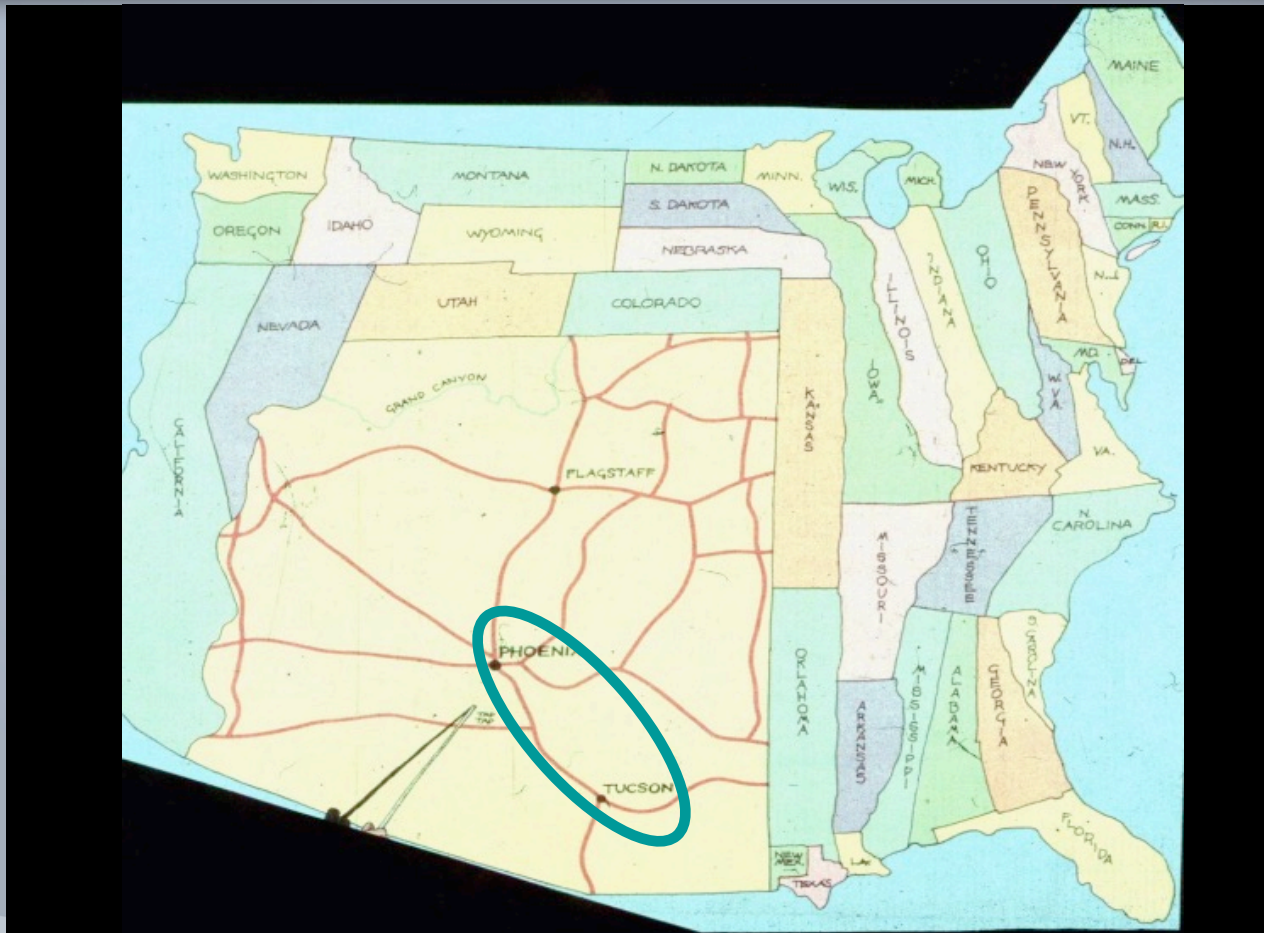
- Caused by soil fungi
 - Coccidioides immitis*
 - Coccidioides posadasii*
- Other names:
 - Coccidioidomycosis
 - “COCCI”
- Inhalation of one spore causes infection
- Spectrum of disease
 - Sub-Clinical: 60%
 - Self-Limited: 30%
 - Complicated: 10%
- After infection, most persons develop life-long immunity to a second infection



Valley Fever Endemic Regions

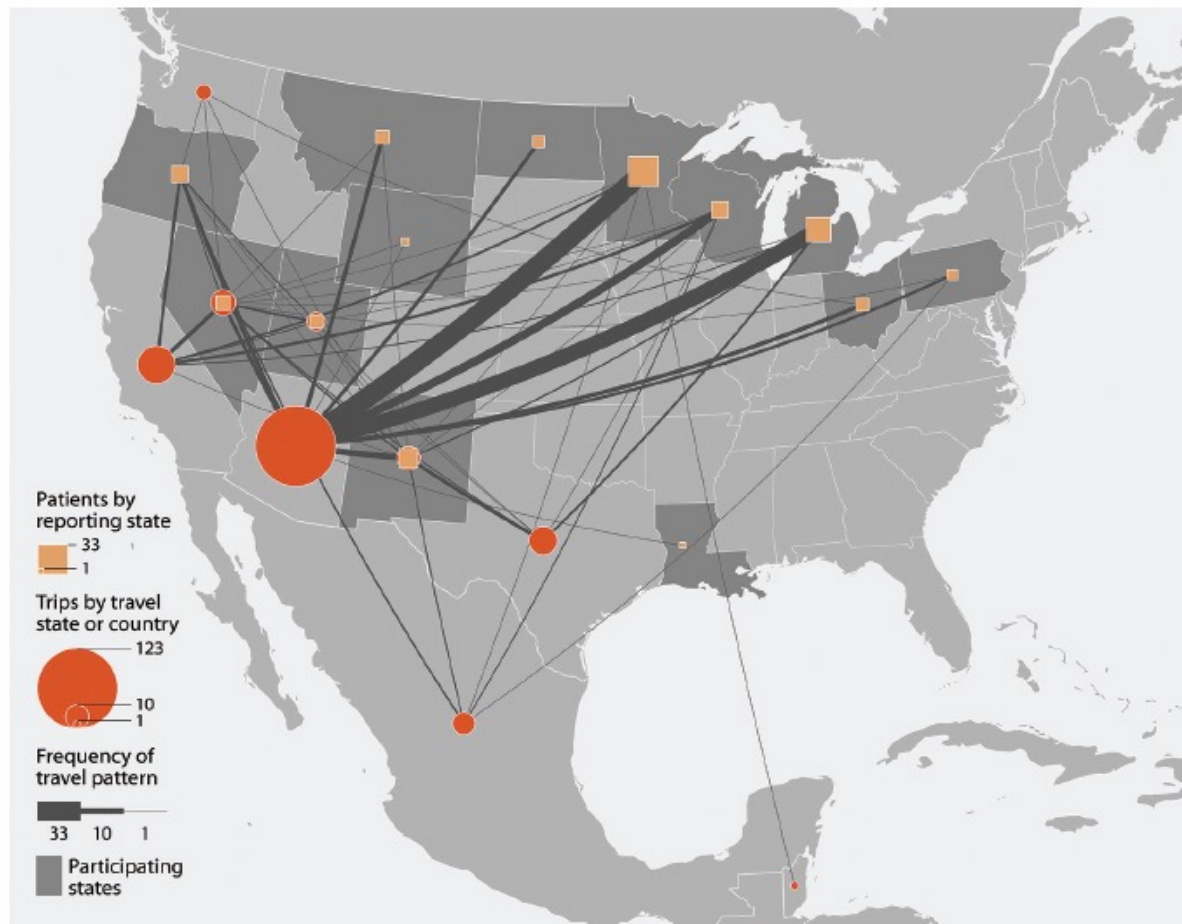


The Valley Fever Corridor: 2/3 of all U.S. disease occurs here



Valley Fever in Non-endemic States

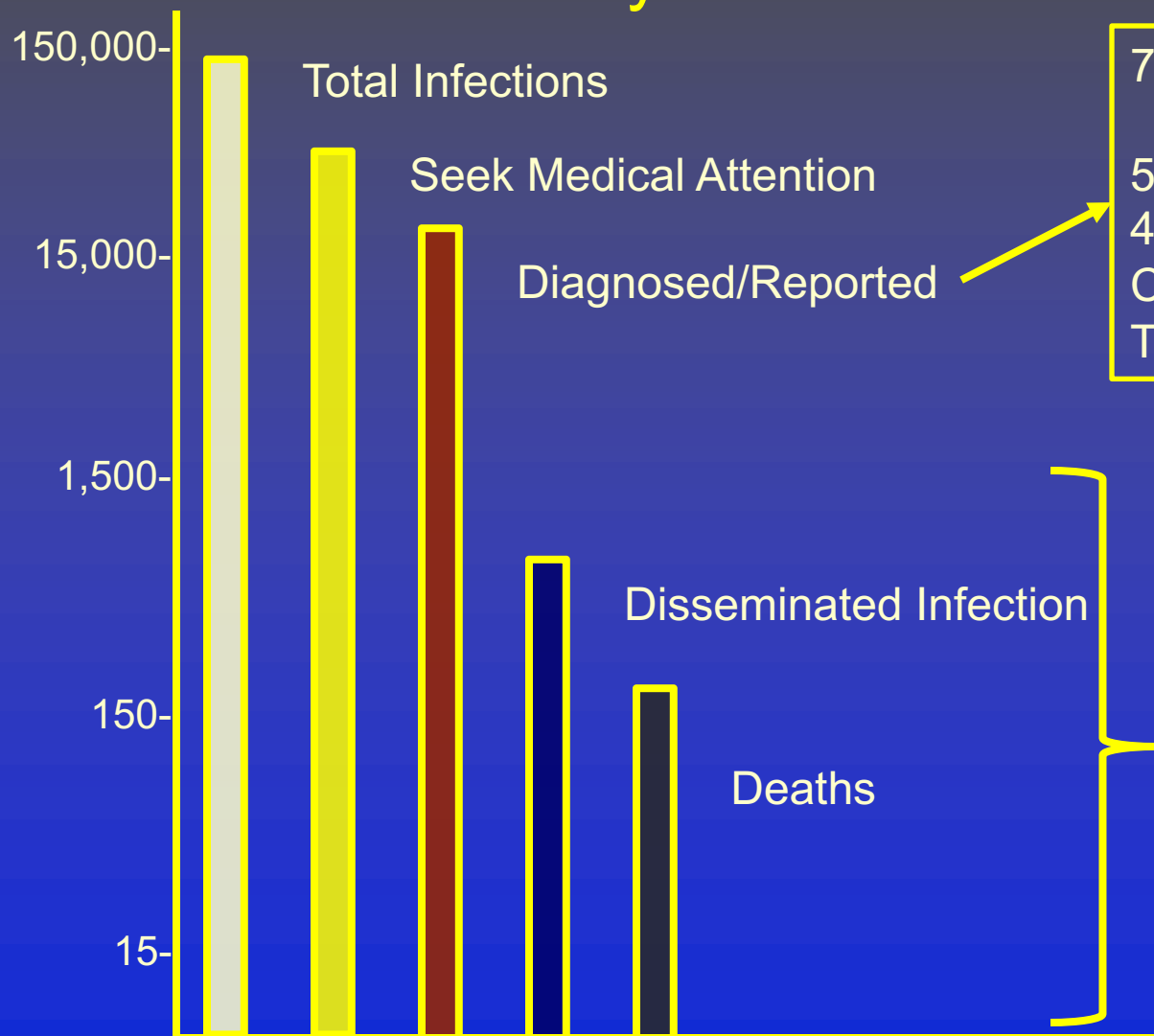
Figure 1. Reporting state and frequency of travel to coccidioidomycosis-endemic areas (Arizona, California, Nevada, New Mexico, Texas, Utah, Washington, Mexico, and Central or South America) in the 4 months before symptom onset or first positive coccidioidomycosis test among coccidioidomycosis patients reported from 14 low-endemic and nonendemic US states, 2016.



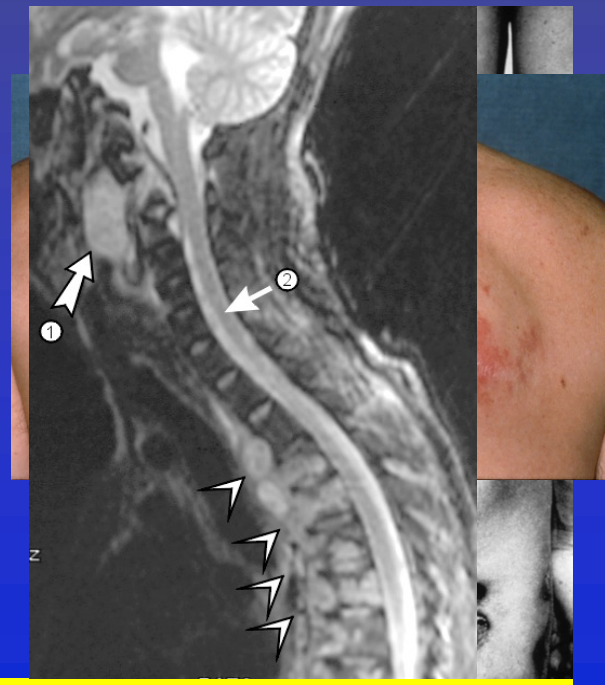
Benedict et al.
EID, 2018



Valley Fever in the U.S.



75% Stopped working,
50% lost > 2 weeks
50% Illness >4 months
40% Hospitalized (Az)
Cost=\$700M (CA, 2017)
Total US Impact: >\$1 B/year



Common "Mild" Self-Limited Valley Fever

Signs and Symptoms, < 1 months from exposure:

- Cough, chest pain, fever, weight loss
- Fatigue
- Bone and joint pains (a.k.a. Desert Rheumatism)
- Skin rashes (painful or intense itching)

Course of illness:

- Weeks to months
- 25% of college students are sick for > 4 months
- 50% of workers lose > 2 weeks



Current Clinical Practice for Valley Fever in Arizona

Arizona CAP

- ~ 25% - 30% due to Coccidioides

BUT

- < 15% are tested for Coccidioides

~ 1,000 new AZ medical licenses/year

- 12% received MD in AZ
- 40% no AZ GME

80% didn't know:

- VF is reportable
- Vaccine does not exist

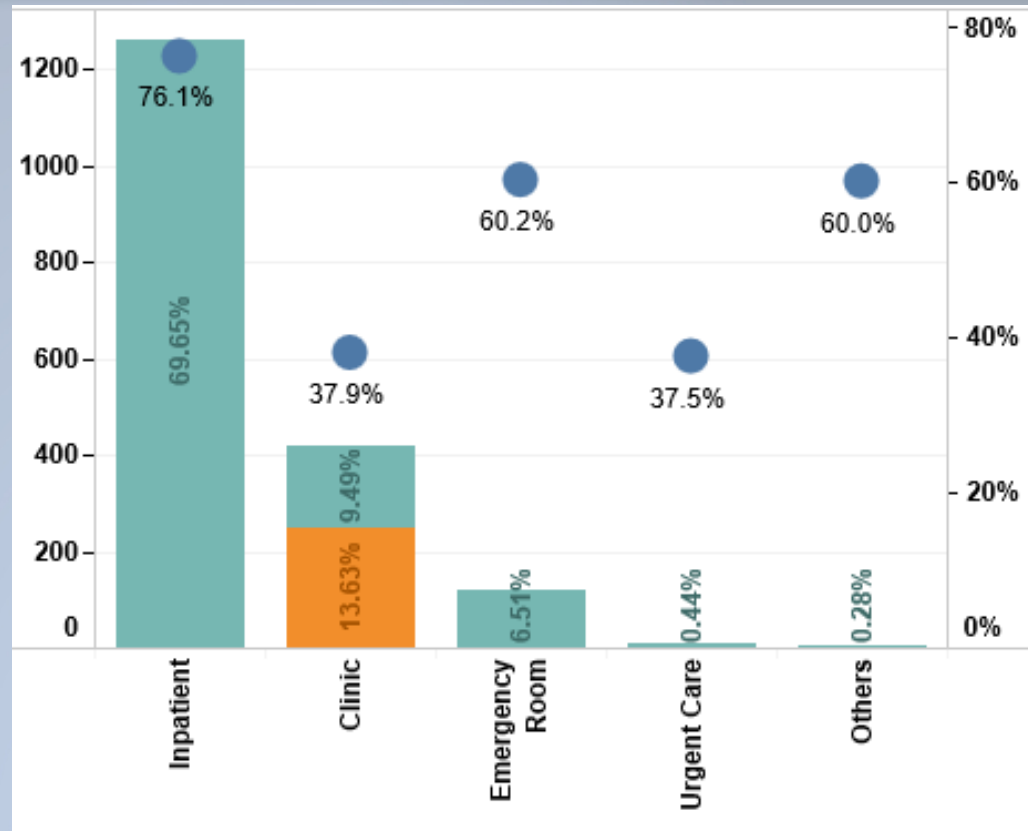
40% of clinicians are not confident to treat VF



All Cocci Diagnoses in Az Banner Health, 2017-19

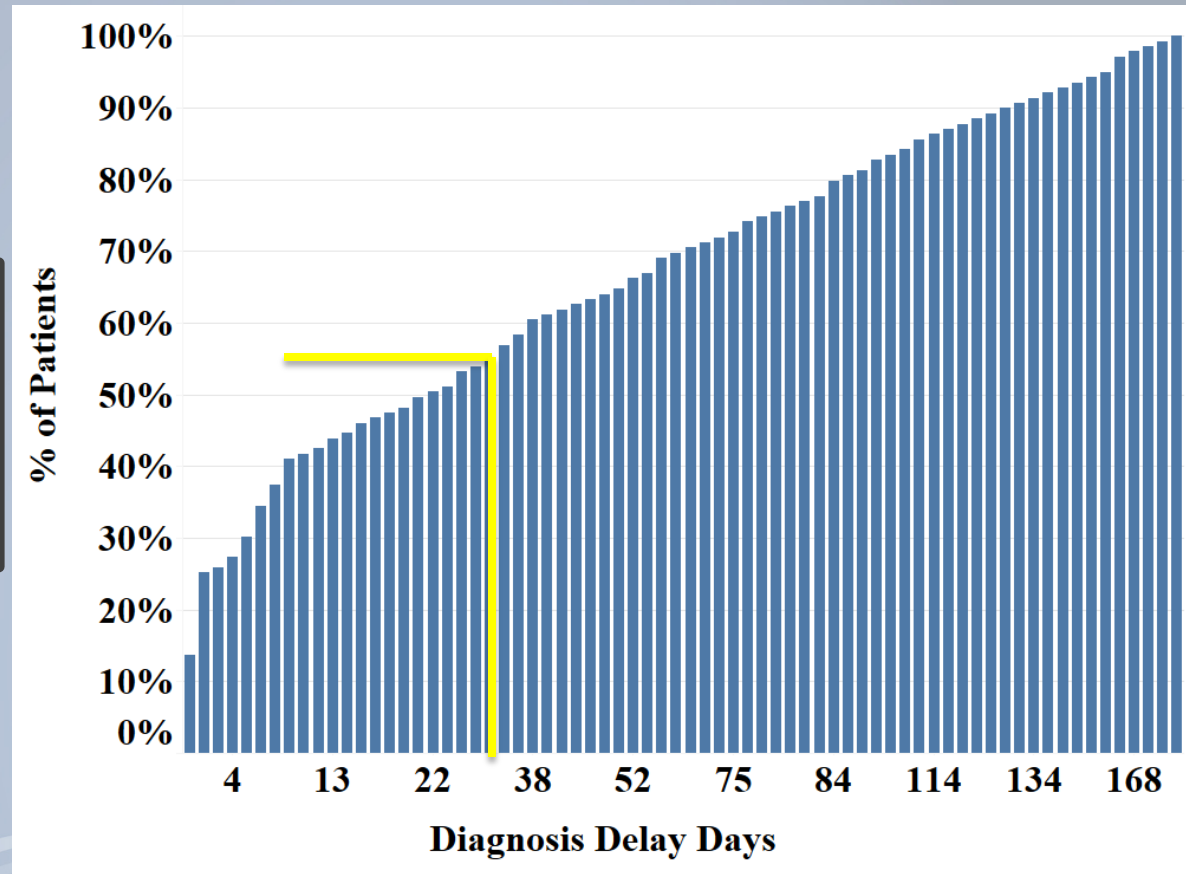
Only 247 out of 1,812 unique patients (13.6%) who were newly diagnosed as Cocci in primary care clinics (orange bar)

Dots indicate percent of patients receiving anti-bacterial drugs.



Delay of Valley Fever Diagnosis

BUMC-P
45% of Diagnoses
Delayed > 1 month



Ginn et al. EID, 2019



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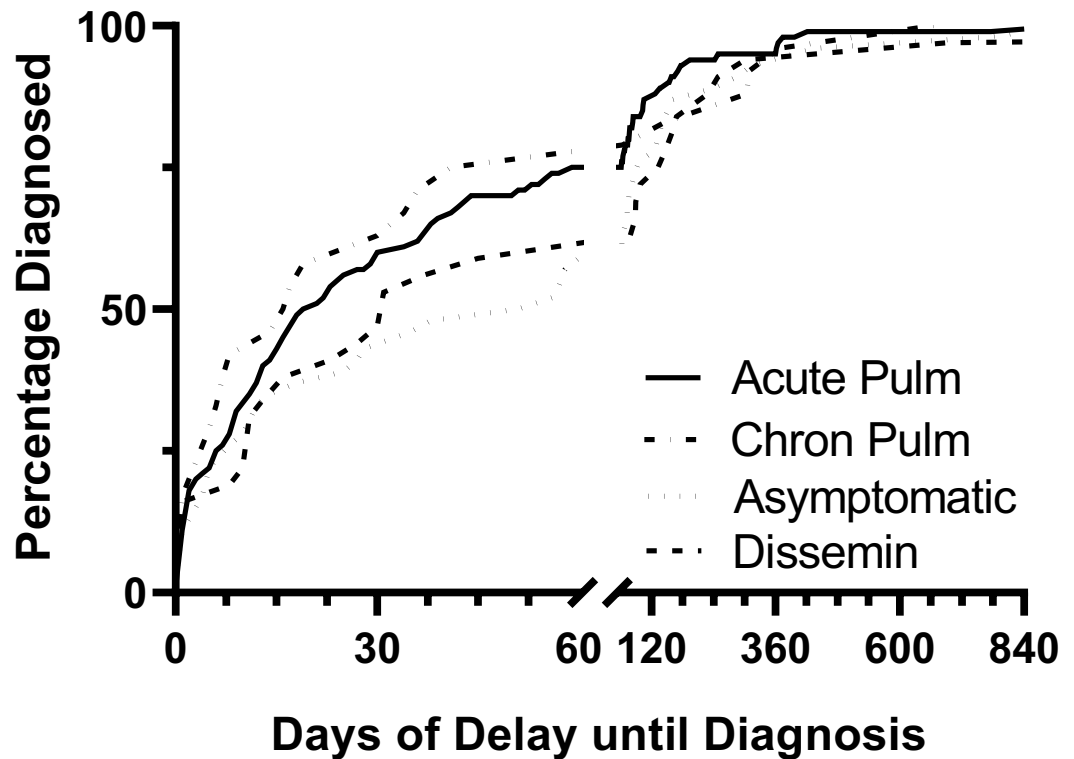


Delay of Valley Fever Diagnosis

BUMC-T
43% of Diagnoses
Delayed > 1 month

Donovan et al. EID, 2019

Figure 1.



What Do Weeks of Delayed Diagnosis Mean?

- Unnecessary anti-bacterial drug use
- Protracted patient anxiety and fear
- Over-utilization CT scans and bronchoscopies, even thoracotomies

Hypothesis: Earlier diagnosis would improve outcomes and reduce cost





Valley Fever (Coccidioidomycosis)

A Training Manual for
Primary Care Professionals

Prepared by



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Available online:
VFCE.ARIZONA.EDU



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Primary Care of Coccidioidomycosis

C onsider the diagnosis
O rder the right tests
C heck for risk factors
C heck for complications
I nitiate management



Consider the diagnosis

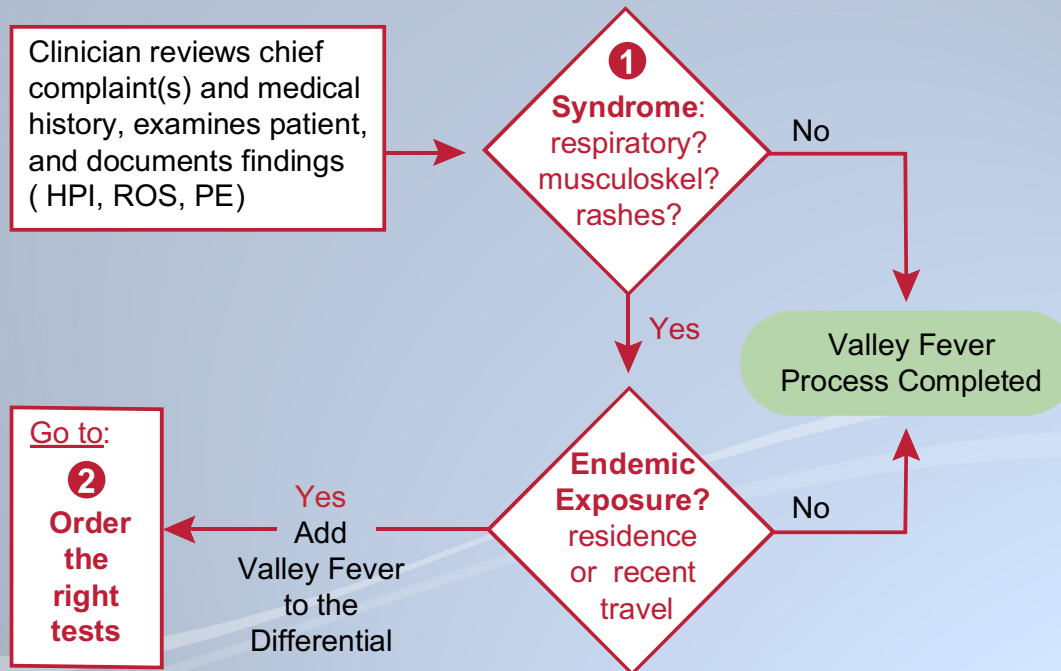
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1 Consider the diagnosis

Respiratory: Previous visit, needs X-ray or antibacterial Rx?

Musc/Skel: More than one week, associated with fever or fatigue.

Rashes: *E. nodosum* or *E. multiforme*



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Have you diagnosed a patient with Valley Fever in the last 12 months?

A. Yes

B. No



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Have you tested for Valley Fever in the last 12 months?

A. Yes

B. No



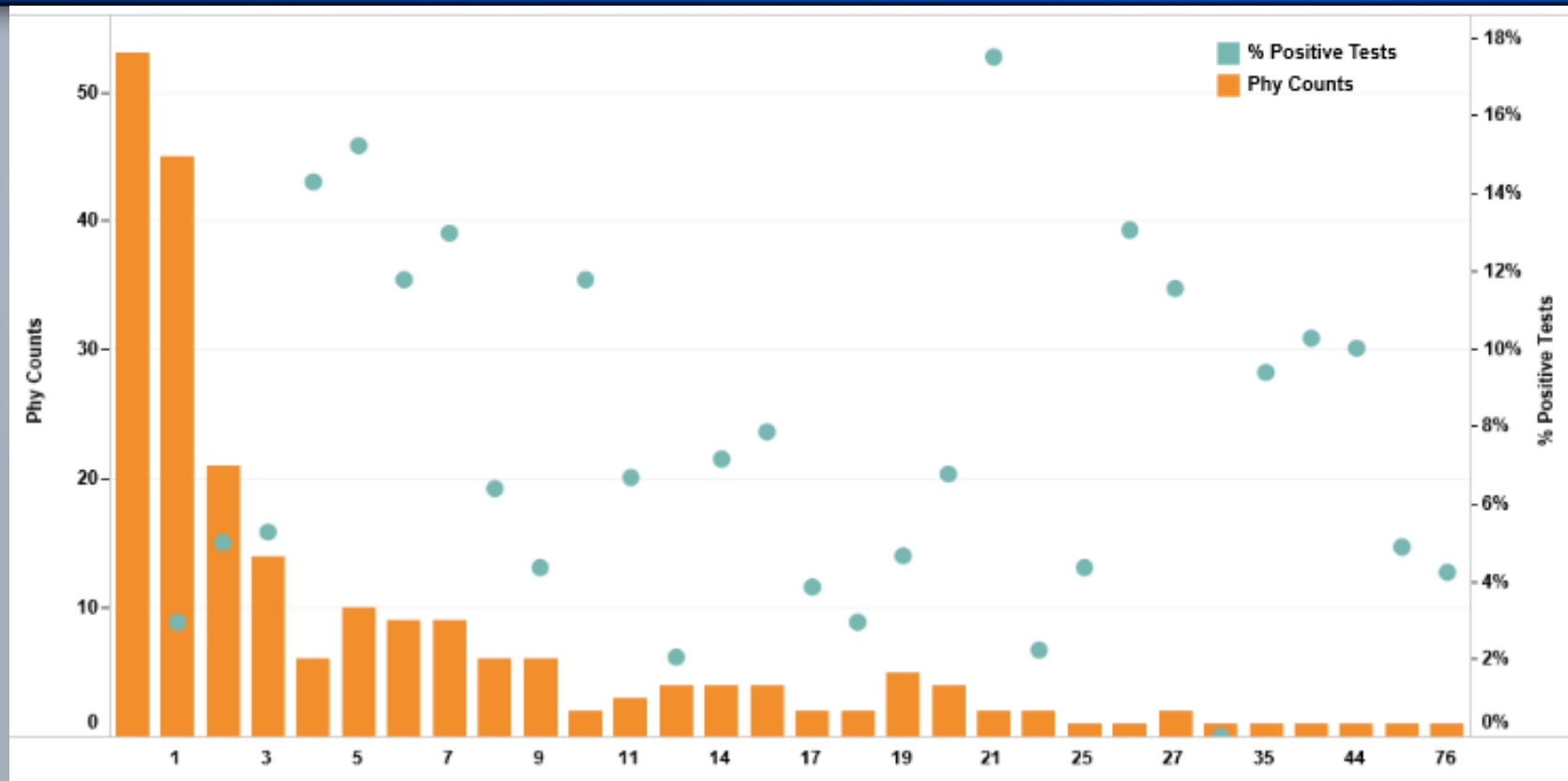
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Number of Clinicians for Each Test Count BMG and BUMG, total, 2018



Total Clinicians: 223
≤ 2 tests ordered: 119
% ≤ 2 tests ordered: 53%

Table 5. Consider testing for coccidioidomycosis if endemic history and any of the following:

- Respiratory symptoms plus one of:
 - More than 1 office visit
 - Chest X-ray ordered
 - Antibiotic prescribed
- Two of the following for a week or more:
 - Fever, Fatigue, Arthralgia
- Unexplained peripheral blood eosinophilia
- Skin lesions of:
 - *Erythema nodosum* or *Erythema multiforme*

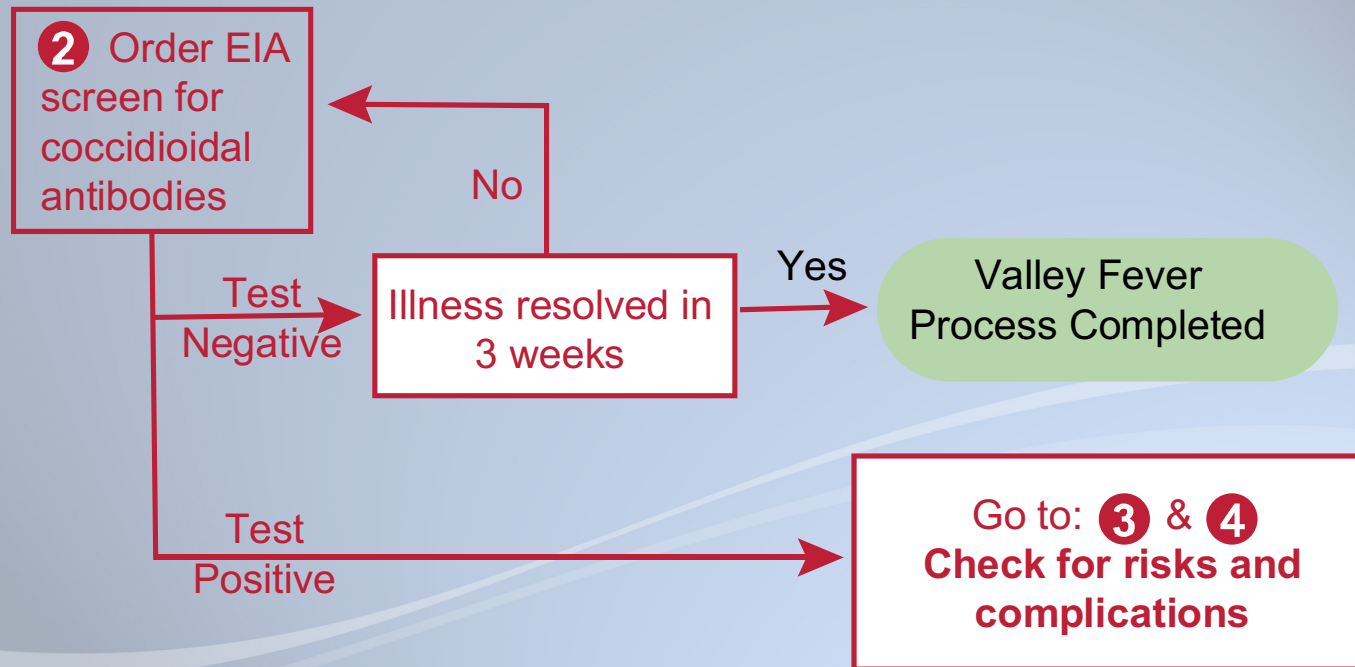


Order the right tests



2 Order the right tests

EIA screen for coccidioidal antibodies with reflex to immunodiffusion and quantitative CF.



Orders the Right Tests: EIA screen for Coccidioidal Antibodies

Enzyme Immunoassay (EIA) test

- **A positive test** is very specific and usually is diagnostic.
- **A negative test** never rules out Valley Fever. Repeated testing improves diagnostic sensitivity.



Check for Risk Factors

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③ Check for Risk Factors

Immunosuppression (HIV, organ recipient, Rheum/GI/Derm response modifier Rx, renal failure)

Diabetes, major cardiac or pulmonary comorbidities, pregnancy



Risk Factors

Pulmonary Complications

- Diabetes mellitus
- Cardio-pulmonary or other co-morbidities (Evidence: “common sense”).

Disseminated Infection

- Major and critical
 - Cell immunodeficiency
 - Pregnancy
- Minor and small effect
 - Males > Females
 - Racial background
 - Adults > Children

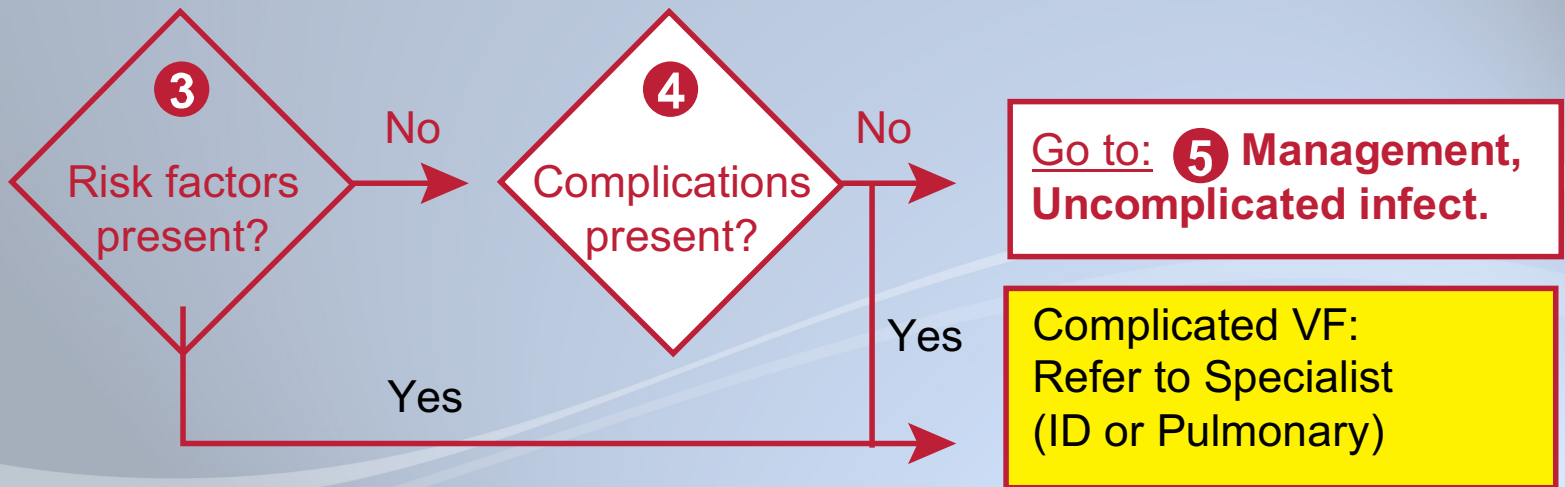


Check for Complications



④ Check for complications evident by physical exam or imaging

Focal ulceration or skin/soft tissue inflammation.
Asymmetric skeletal pain, joint effusions.
Progressive or unusual headache.



Detecting Focal Lesions in Coccidioidomycosis

- Review of Systems: Pain or discomfort
 - Headache
 - Back pain
 - Joint pain or loss of function
- Physical Examination:
 - Skin lesions
 - Subcutaneous fluctuation
 - Joint effusions



Disseminated Coccidioidomycosis



Disseminated Coccidioidomycosis



Disseminated Coccidioidomycosis



Disseminated Coccidioidomycosis



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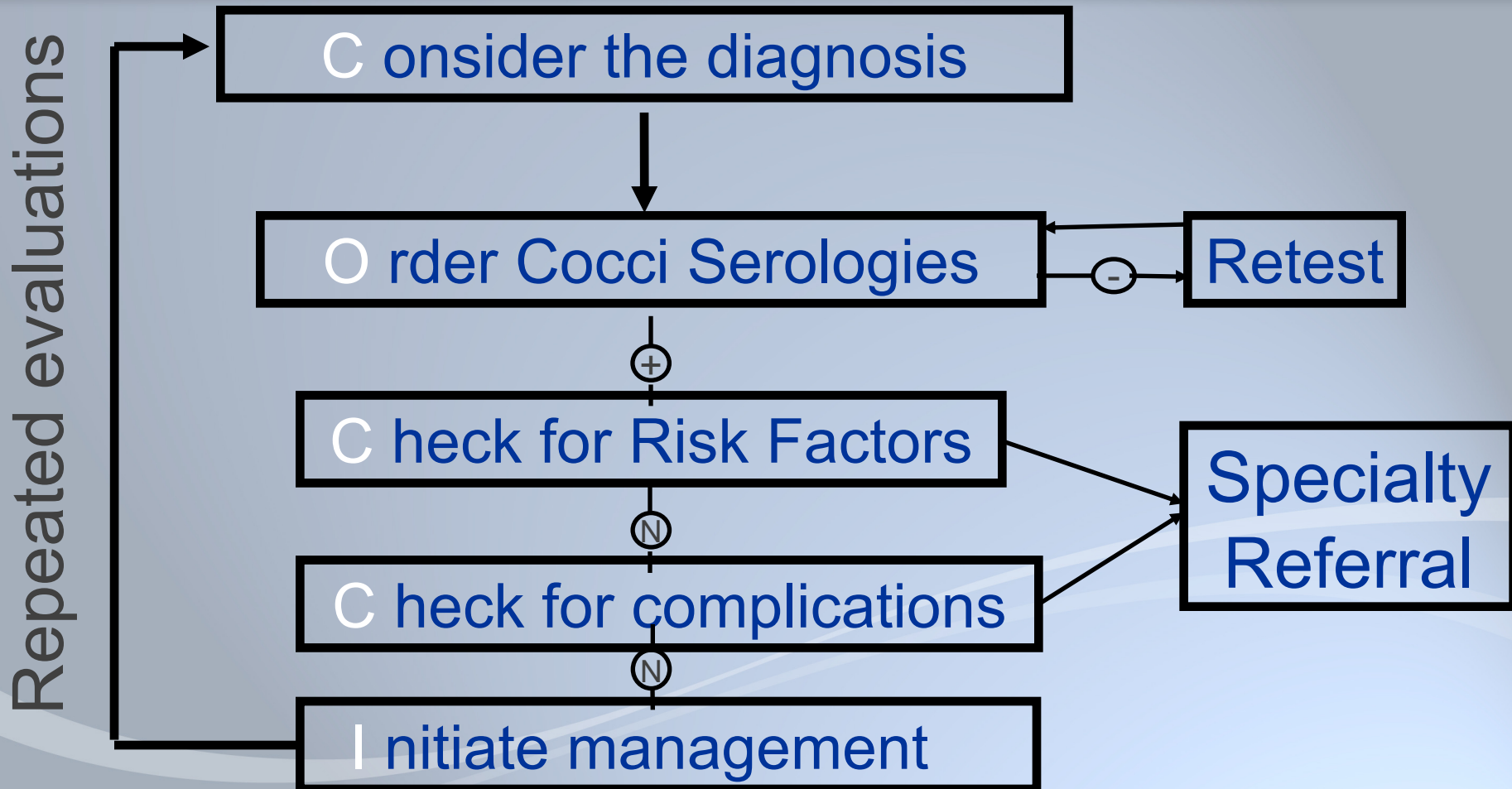


Check for Complications

- Most complications are focal
- **A review of systems and physical examination will usually detect or exclude the possibility of complications.**
- New focal findings warrant either evaluation or referral for Infectious Diseases or Pulmonary consultation.



Primary Care of Coccidioidomycosis



Management

Low Risk, Simple Early Infection

- Follow-up office visits
- Serial body weights
- Check for new symptoms or signs
- Repeat coccidioidal antibody testing
- Repeat Chest PA and Lateral X-rays
- Most patients do not need therapy



Clinical Infectious Diseases

IDSA GUIDELINE



OXFORD

2016 Infectious Diseases Society of America (IDSA) Clinical Practice Guideline for the Treatment of Coccidioidomycosis

John N. Galgiani,¹ Neil M. Ampel,² Janis E. Blair,³ Antonino Catanzaro,⁴ Francesca Geertsma,⁵ Susan E. Hoover,⁶ Royce H. Johnson,⁷ Shimon Kusne,³ Jeffrey Lisse,⁸ Joel D. MacDonald,⁹ Shari L. Meyerson,¹⁰ Patricia B. Raksin,¹¹ John Siever,¹² David A. Stevens,¹³ Rebecca Sunenshine,^{14,15} and Nicholas Theodore¹⁶

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Clin Infect Dis, 2016



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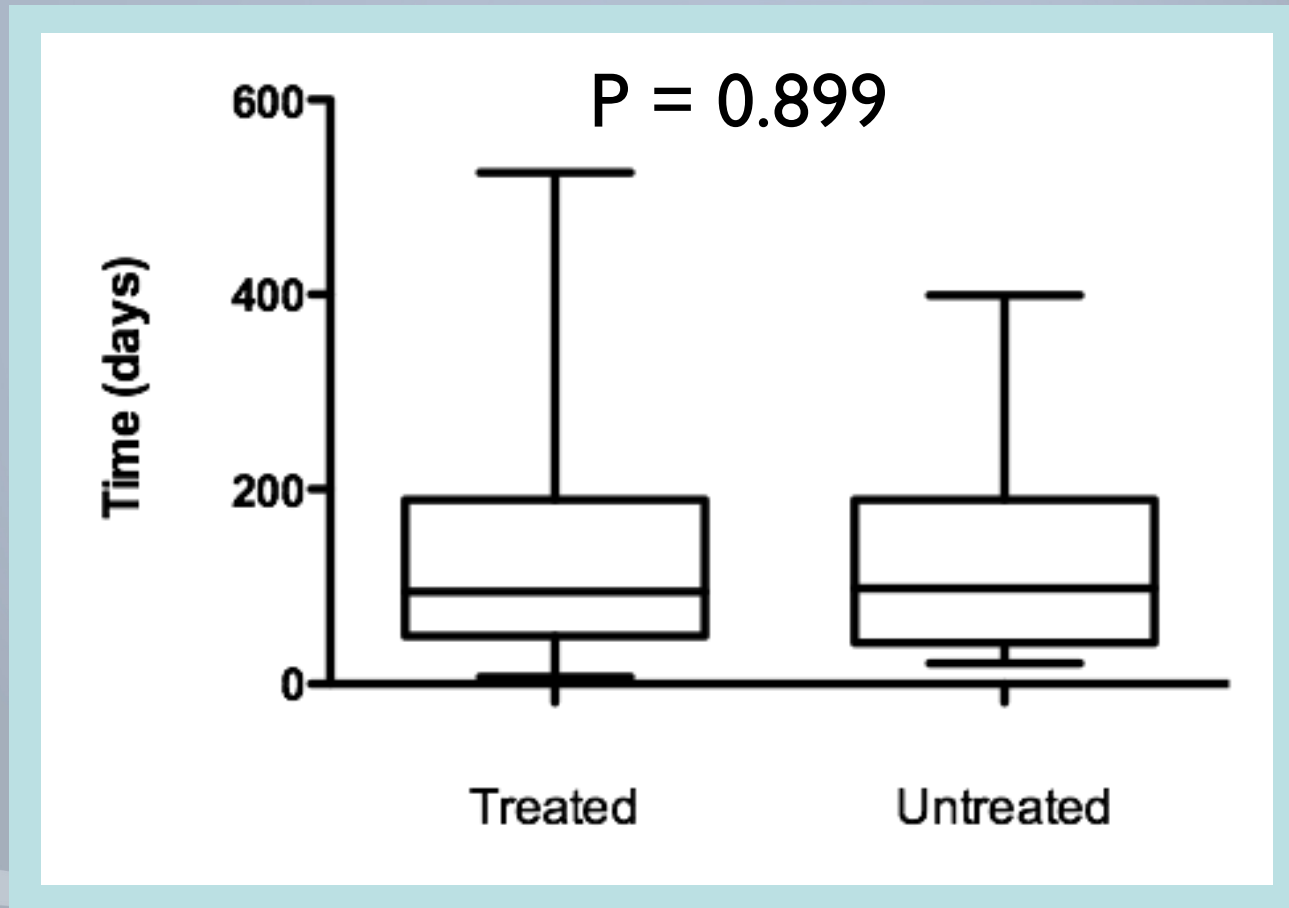


2016 IDSA Guidelines Treatment of Coccidioidomycosis

“It should be emphasized that no randomized trials exist to assess whether antifungal treatment either shortens the illness of early uncomplicated coccidioidal infections or prevents later complications.”



Median days to $\geq 50\%$ decline in total clinical score



Outcome of Subjects (> 1 month follow-up)

- 50 not treated
 - Median follow-up: 3.1 years
 - All without complications
- 51 treated
 - Median follow-up: 2.9 years
 - 38 off-therapy and without complications
 - 5 remained on treatment
 - 8 had relapses
 - 5 with pulmonary disease
 - 3 with extrapulmonary dissemination
 - Relapses occurred up to 2 years after stopping treatment

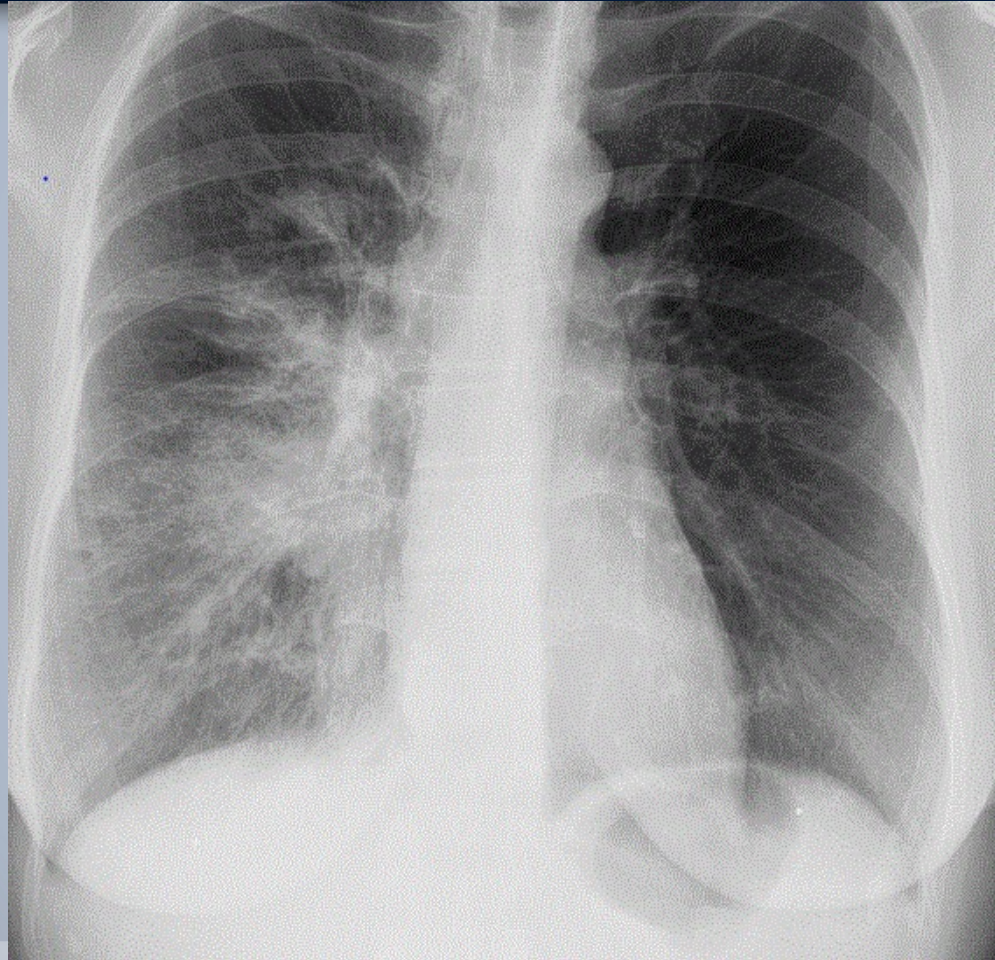


Valley Fever Can Look Like TB

- Illness is often subacute or chronic pulmonary syndrome.
 - Nights sweats, weight loss, hemoptysis and fatigue are common symptoms.
 - Treatment for bacterial pneumonia has failed is a common history.
 - Chest X-rays may show fibrocavitary lung lesions.



TB or Cocci?



TB or Cocci?



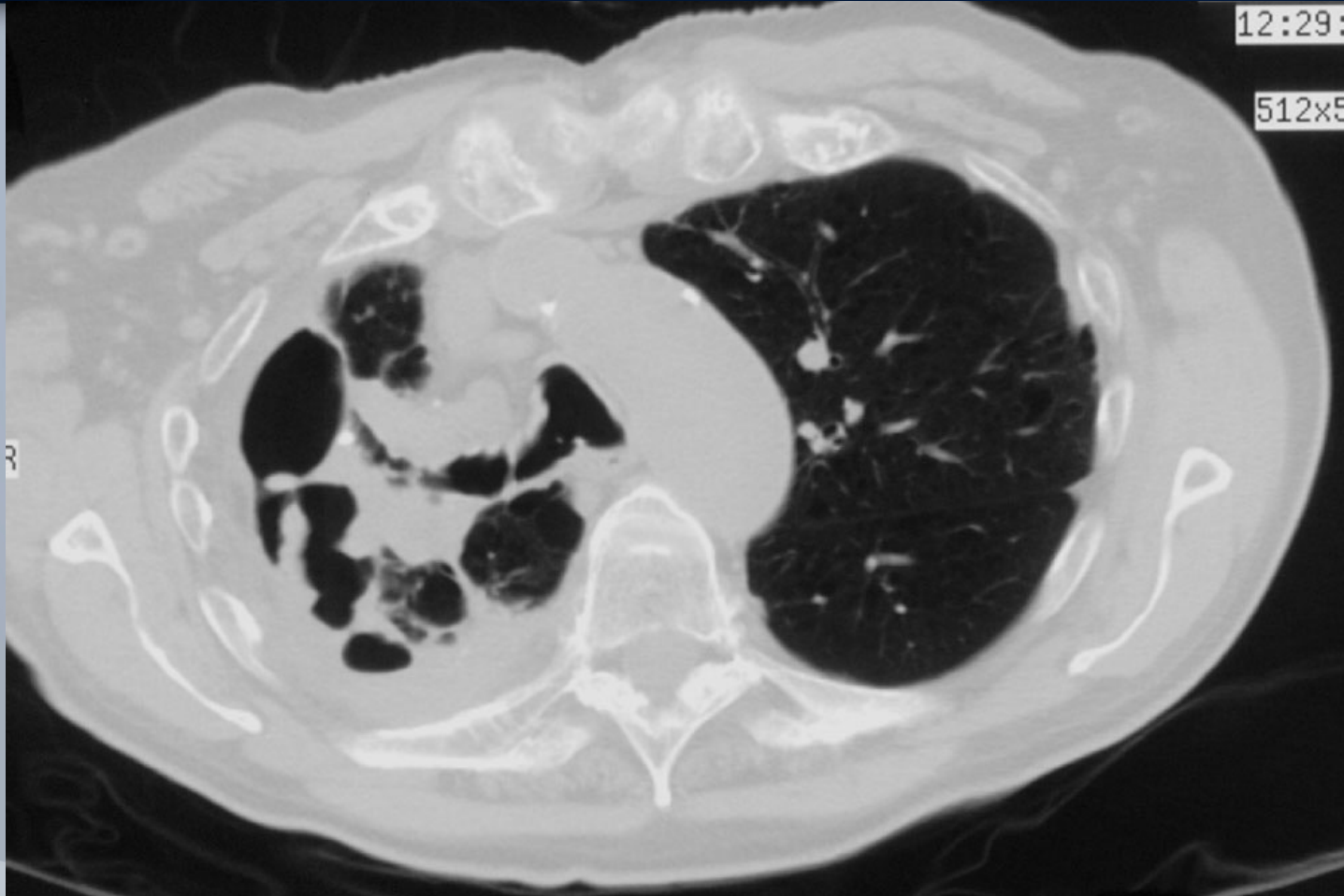
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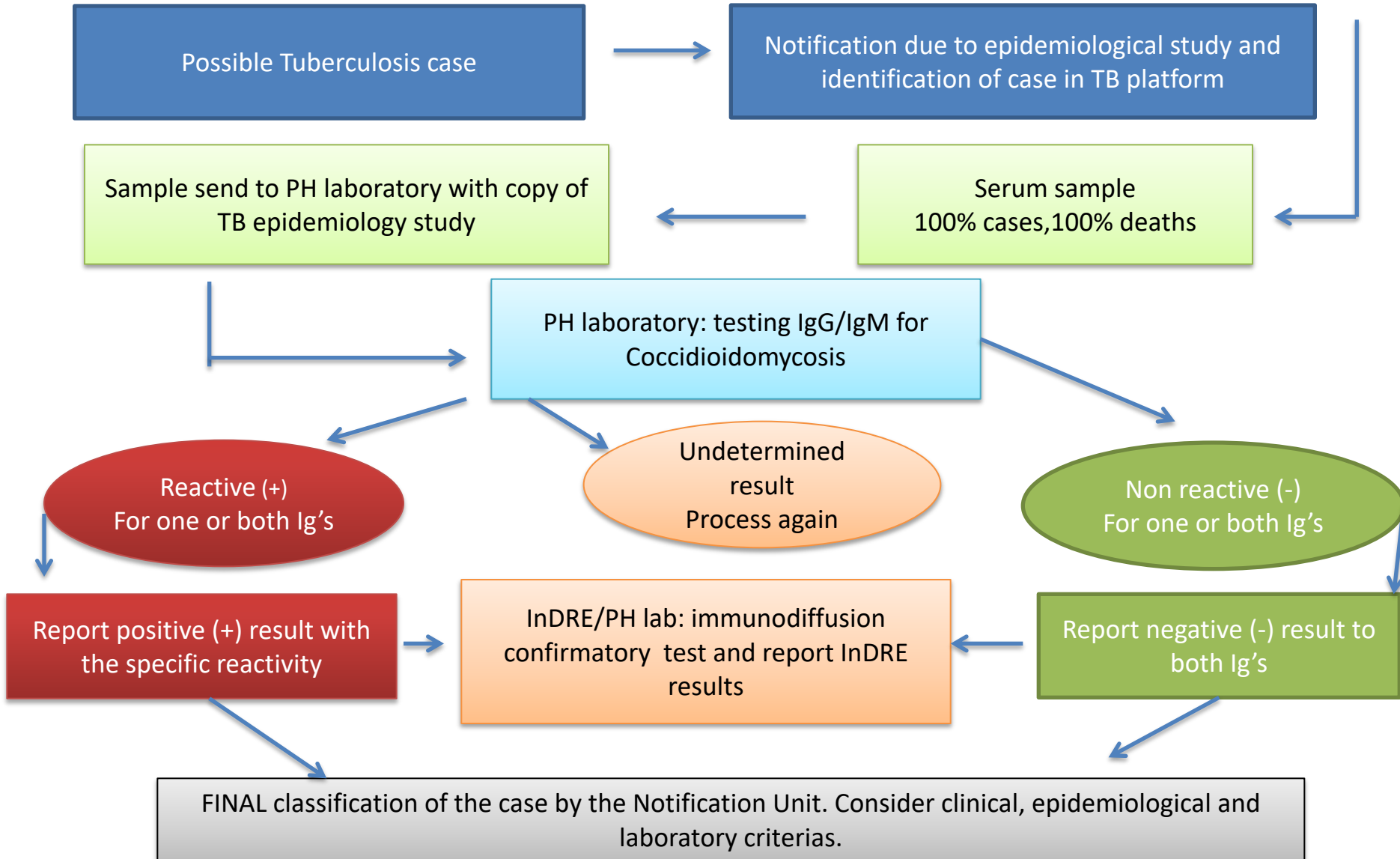


The Binational Project improving the Diagnosis and Surveillance of Coccidioidomycosis in the Border Region of “Four Corners” Arizona-Sonora and New Mexico-Chihuahua

Dra Nubia Hernandez , Orion McCotter, Katherine Perez-Locket, Mariana Casal, Cristhian Tapia, Robert Guerrero, Dr. Gumaro Barrios, Dr Francisco Navarro Galvez, Olvera Alba Sergio, QC Rosario Aguayo, Frida Adams, Marta Alicia Bueno, Cesar Vera, Gloria Carrete, Ken Komatsu

**Secretaría de Salud Pública de Sonora
Secretaría de Salud Pública de Chihuahua
Arizona Department of Health Services
New Mexico Department of Health Services**

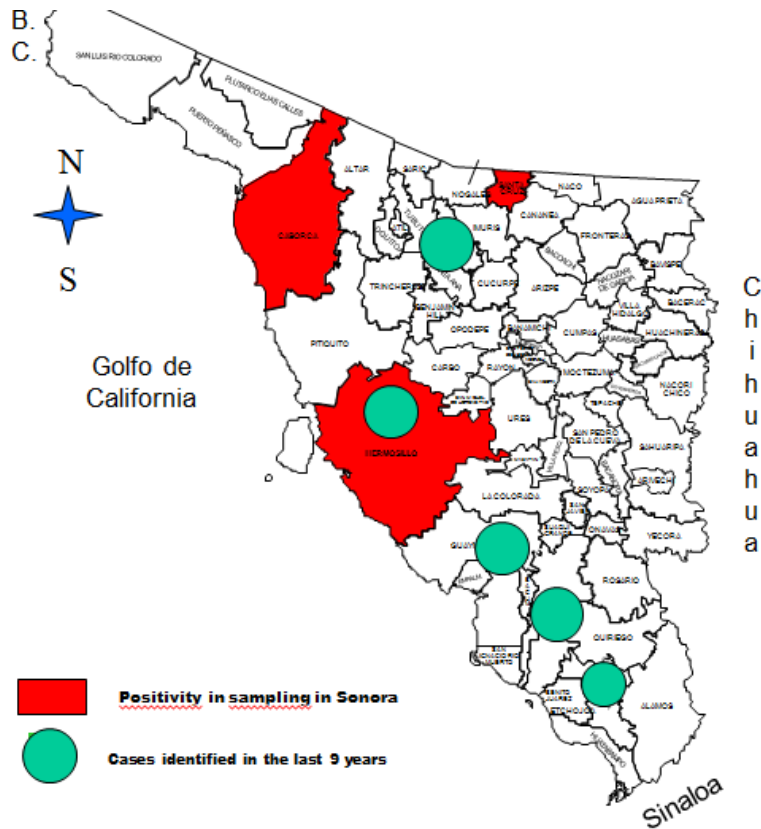
Algorithm for detection, notification and sample for Coccidioidomycosis cases.



Sonora Preliminary Results

Total samples 2012-2013		
samples tested	159	17%
Negatives	132	

Positive samples 2012-2013		
IgM	IgG	9
IgG		13
IgM		5





- Persistent cough?
- Constant fatigue?
- Fever or night sweats?
- Weight loss?
- *¿Tos constante?*
- *¿Cansancio constante?*
- *¿Fiebre o sudores nocturnos?*
- *¿Pérdida de peso?*

**Ask your doctor to test you for
Tuberculosis or Valley Fever **TODAY!****

***¡Solicite a su médico hacerle exámenes de
Tuberculosis o Fiebre del Valle **AHORA!*****

New Mexico Department of Health

Funded in part by the U.S. Centers for Disease Control and Prevention under Grant No. U52PS600488



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New Banner Clinical Practice for Ambulatory Management of Valley Fever Thank-You

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For more information:

<http://vfce.arizona.edu/toolkit>



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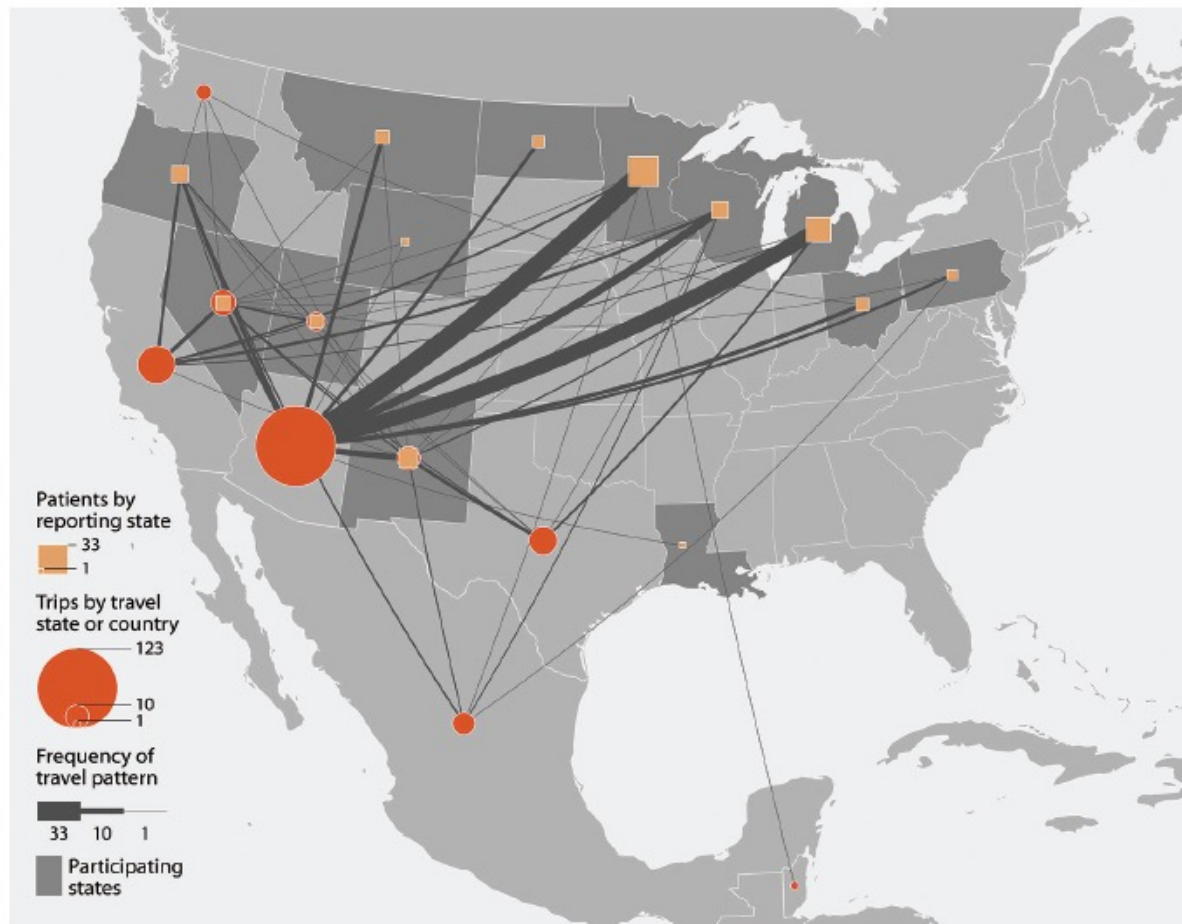
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Valley Fever in Non-endemic States

Figure 1. Reporting state and frequency of travel to coccidioidomycosis-endemic areas (Arizona, California, Nevada, New Mexico, Texas, Utah, Washington, Mexico, and Central or South America) in the 4 months before symptom onset or first positive coccidioidomycosis test among coccidioidomycosis patients reported from 14 low-endemic and nonendemic US states, 2016.



Benedict et al.
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