

# **Banner Clinical Practice for Ambulatory Management of Valley Fever Training Presentation**

John Galgiani MD or Fariba Donovan MD PhD  
Banner University Valley Fever Program



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence



# Disclosures

Drs. Galgiani and Donovan  
Have no conflicts of interest to disclose



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence

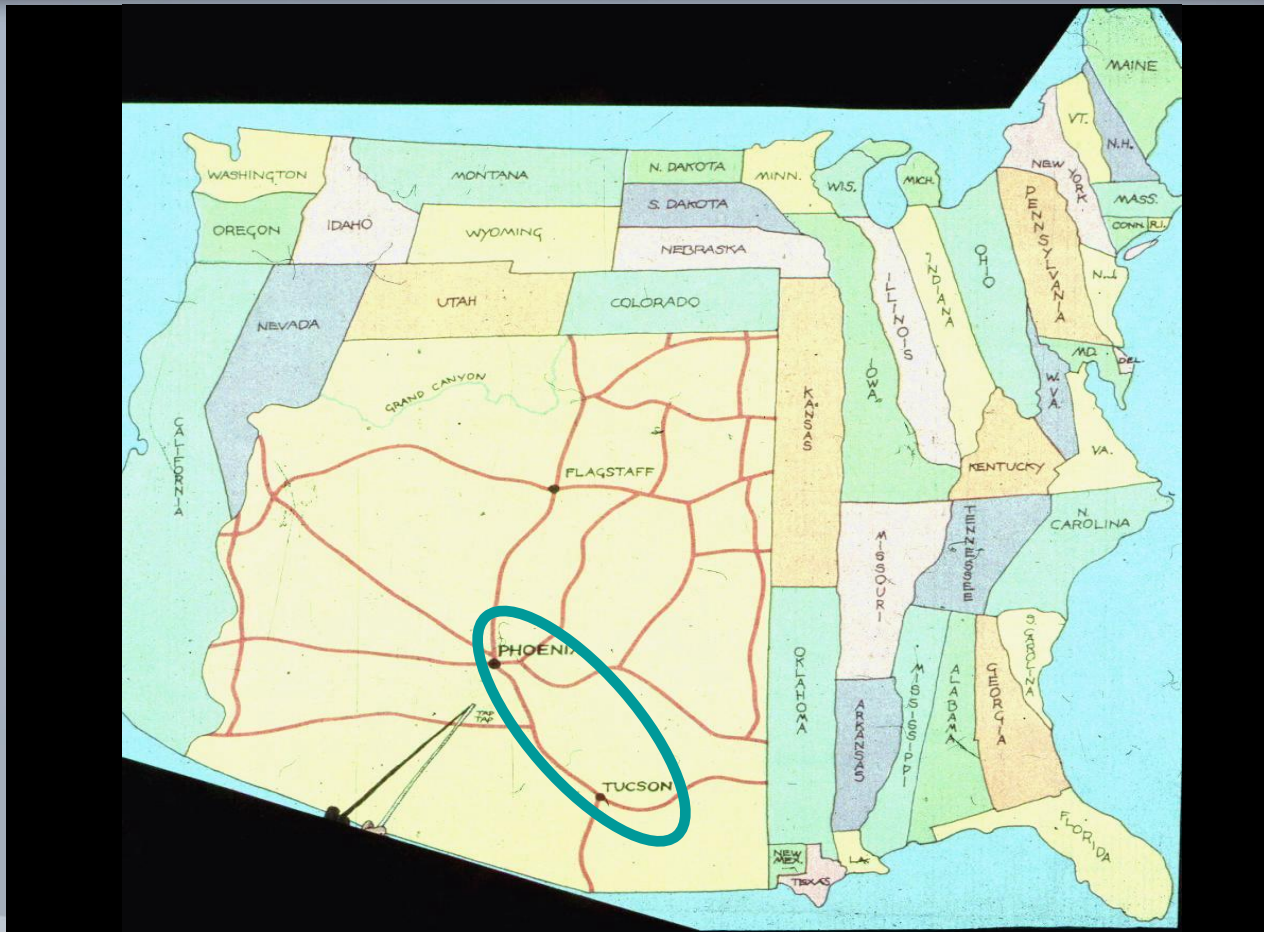


# What Is Valley Fever?

- 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



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



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence



Banner Health®

# 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

## 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:

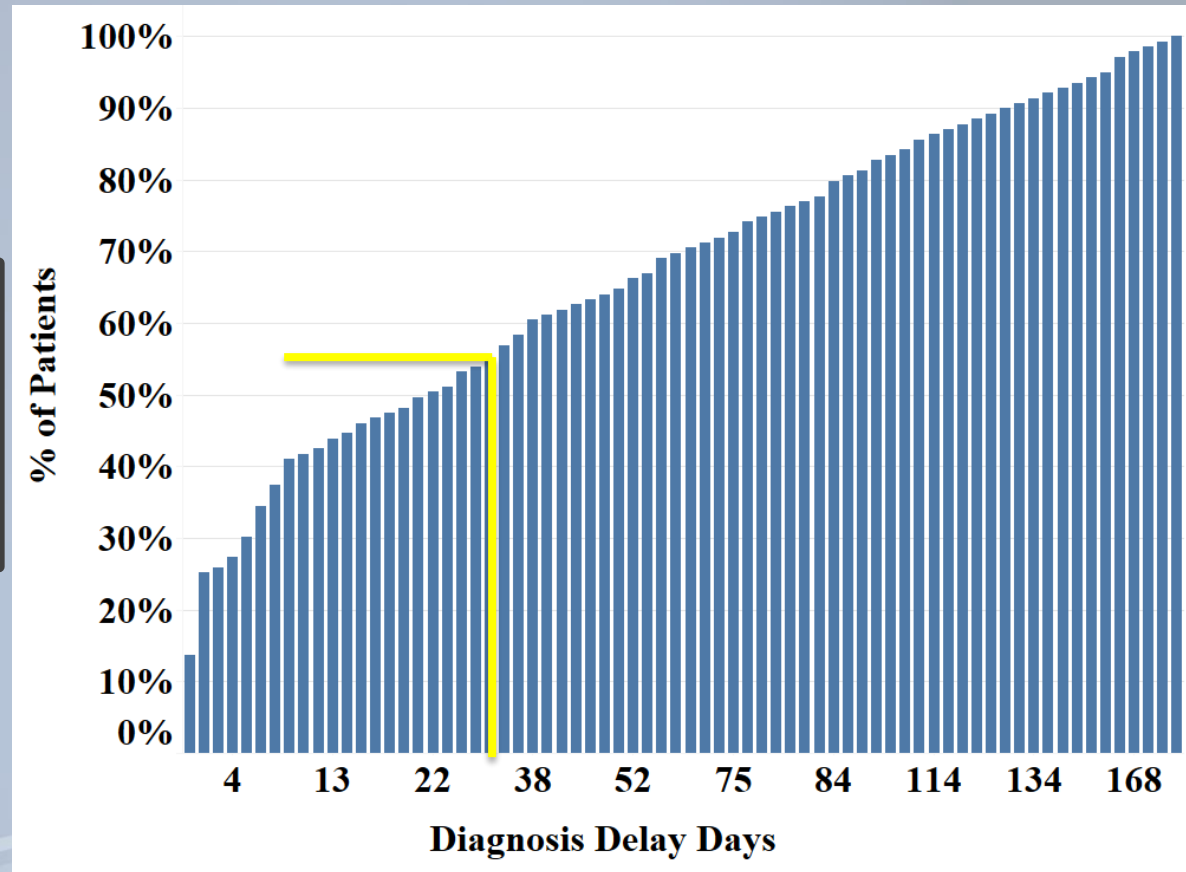
- VF is reportable
- Vaccine does not exist

40% of clinicians are not confident to treat VF



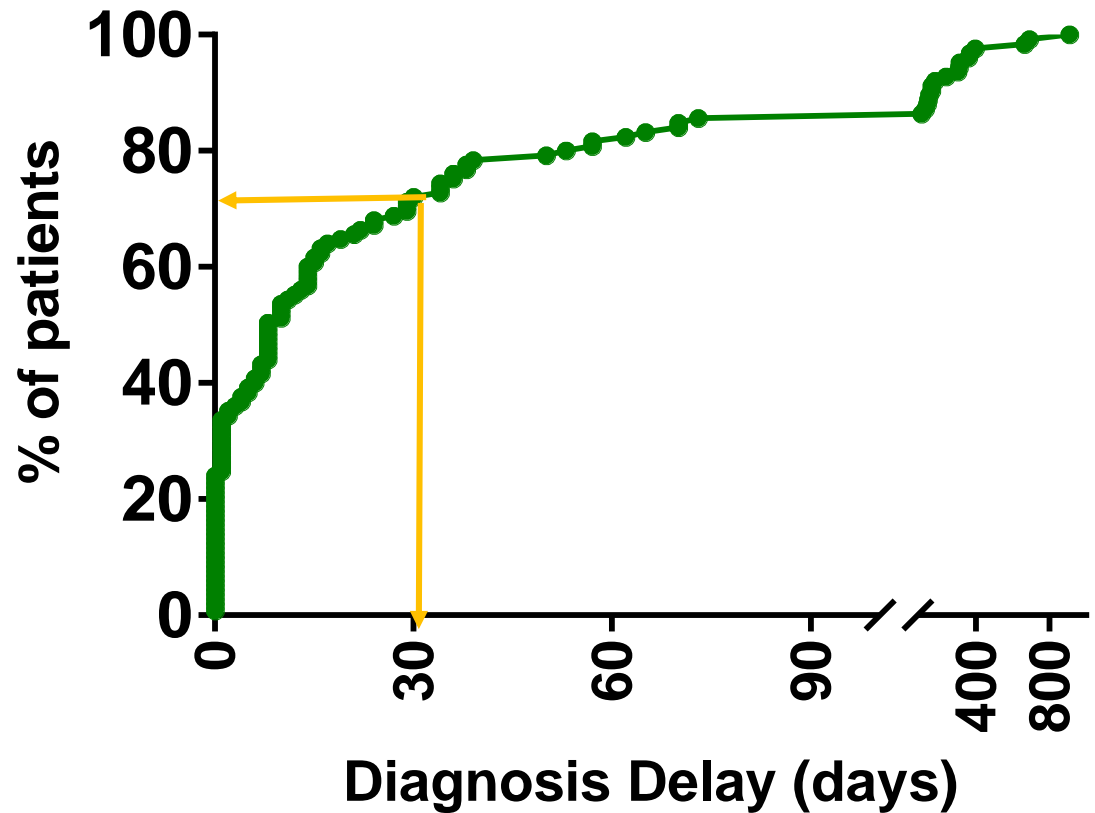
# Delay of Valley Fever Diagnosis

**BUMC-P**  
45% of Diagnoses  
Delayed > 1 month



# Delay of Valley Fever Diagnosis

**BUMC-T**  
30% of Diagnoses  
Delayed > 1 month





# 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



# 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



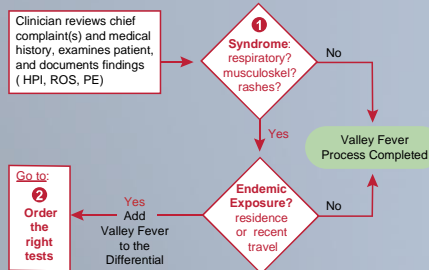
## Recognition, Evaluation and Management of *Coccidioidomycosis* (Valley Fever)

Just Remember **C-O-C-C-I**

### RECOGNITION

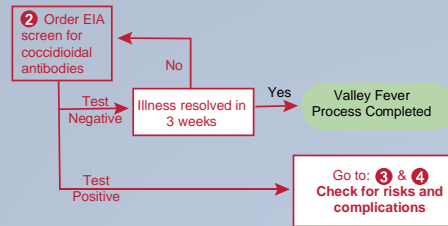
#### **C** 1 Consider the diagnosis

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*



### RECOGNITION *continued*

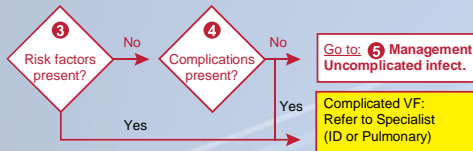
**O** 2 Order the right tests  
EIA screen for coccidioidal antibodies with reflex to immunodiffusion and quantitative CF.



### EVALUATION

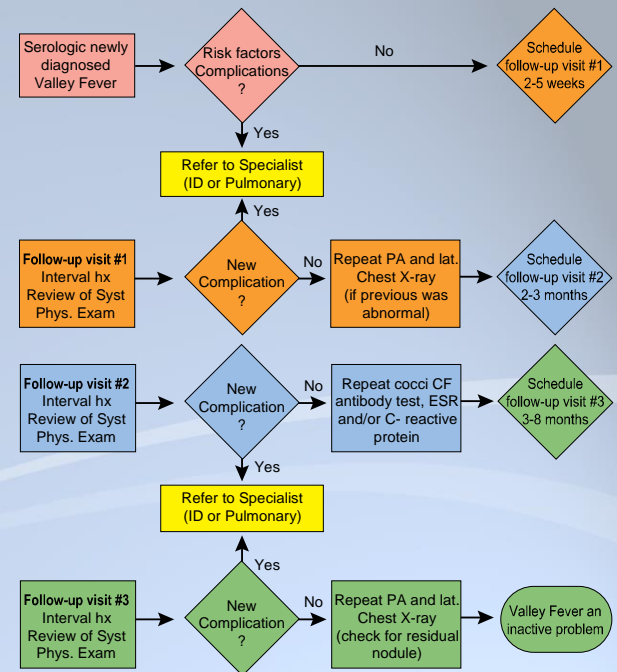
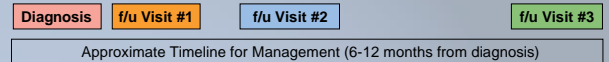
**C** 3 Check for Risk Factors  
Immunosuppression (HIV, organ recipient, Rheum/GI/Derm response modifier Rx, renal failure)  
Diabetes, major cardiac or pulmonary comorbidities, pregnancy

**C** 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.



### MANAGEMENT

#### **I** 5 Initiate Management, Uncomplicated VF



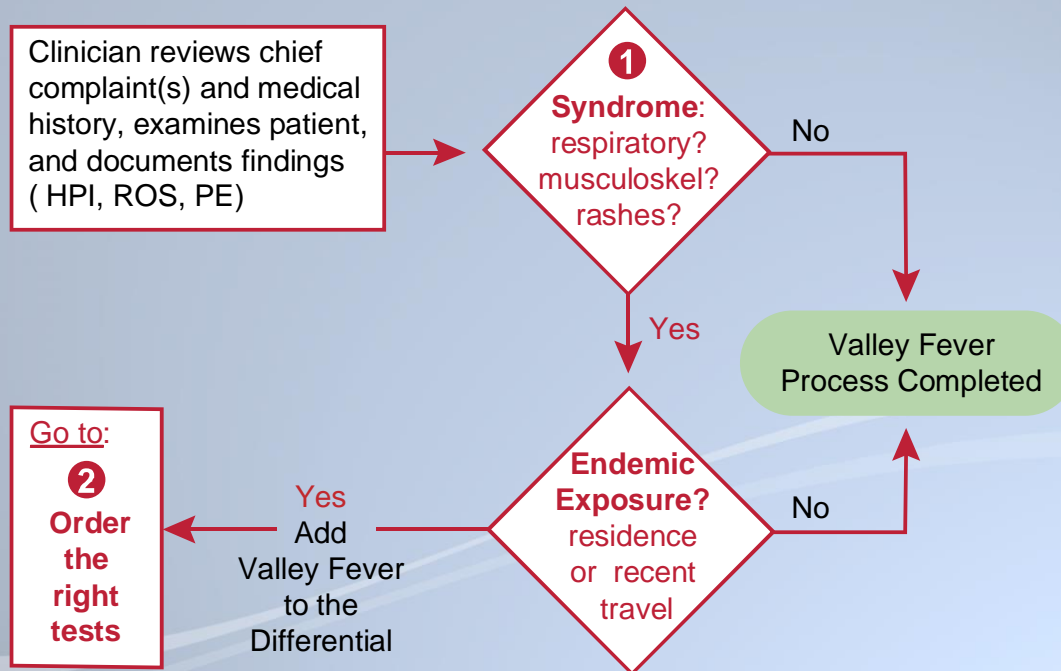
# Consider the diagnosis

C

## 1 Consider the diagnosis

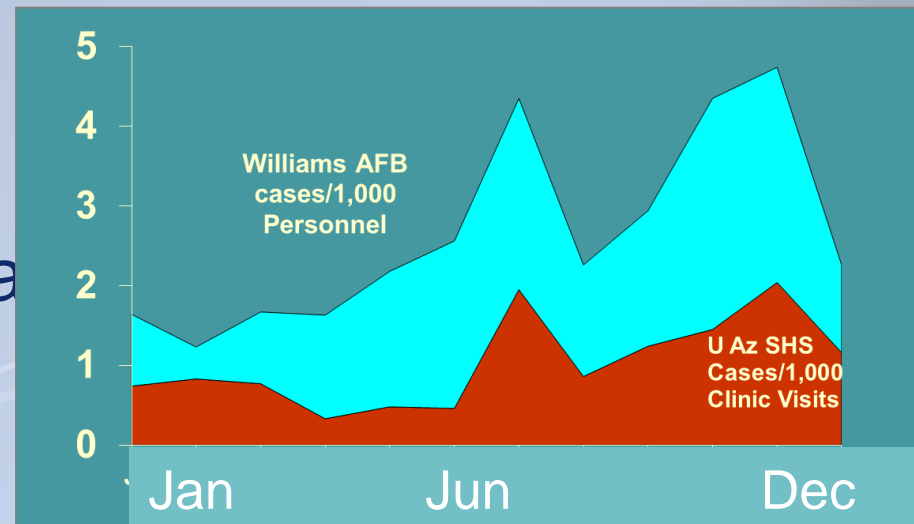
Respiratory: Previous visit, needs X-ray or antibacterial Rx?  
Musc/Skel: More than one week, associated with fever or fatigue.

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



# Consider the diagnosis in Arizona

- In Arizona, Valley Fever is very common. It should be in the differential often.
- More frequent between the monsoons and the winter rains.
- Syndromes:
  - Always in community and
  - Rheumatism.
  - Rashes.

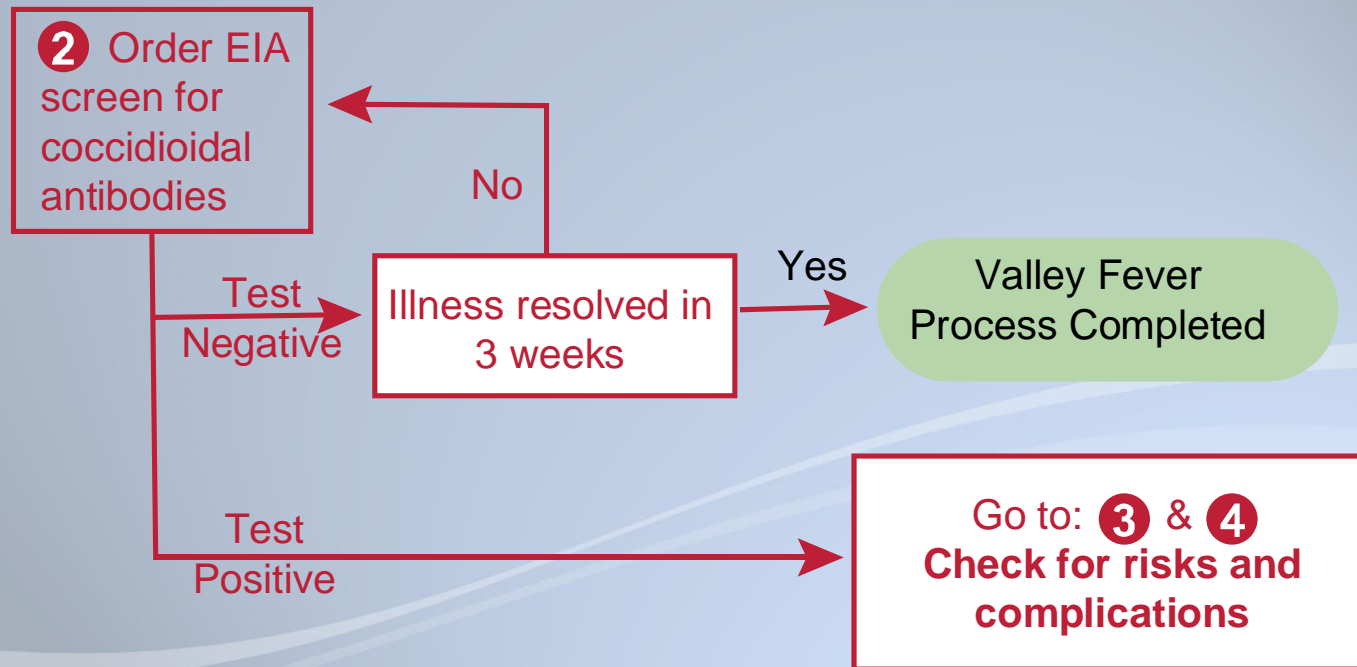


# Order the right tests



## 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

C

## ③ Check for Risk Factors

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

Diabetes, major cardiac or pulmonary comorbidities, pregnancy





# Check Risk Factors for

## 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

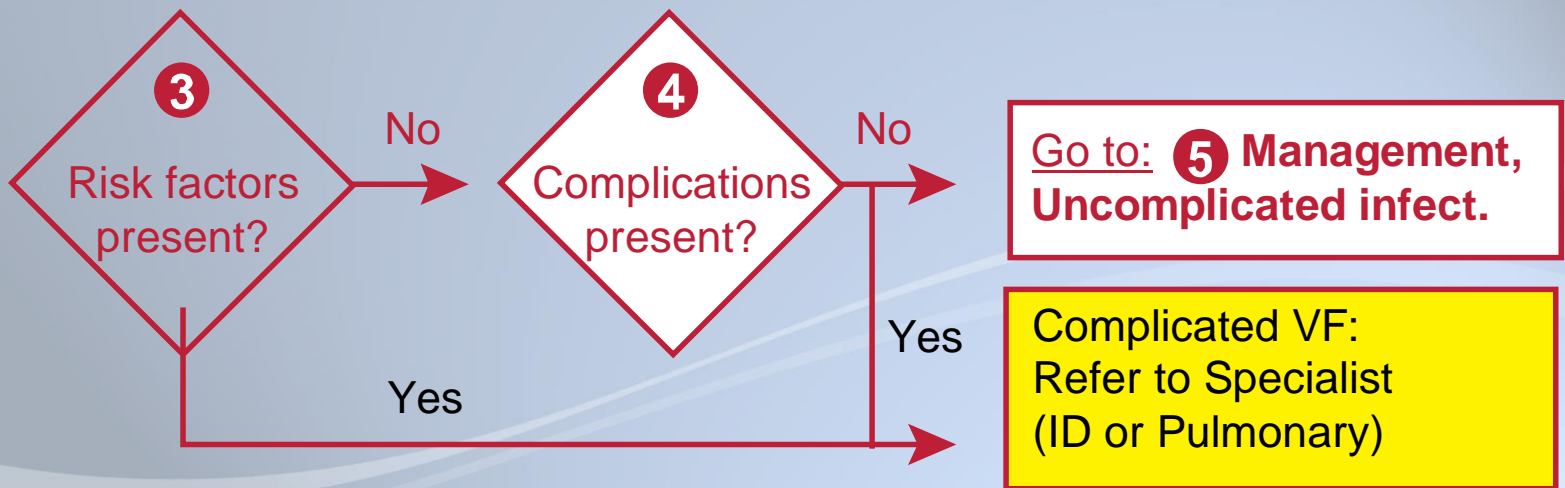


# Check for complications evident by PE exam or imaging



## 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



# Fibro-cavitary Coccidioidomycosis



Complex



Thin-walled



# Widely Disseminated Coccidioidomycosis



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence



# Disseminated Coccidioidomycosis





# Disseminated Coccidioidomycosis



# Disseminated Coccidioidomycosis





# Disseminated Coccidioidomycosis



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence



# Disseminated Coccidioidomycosis



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence

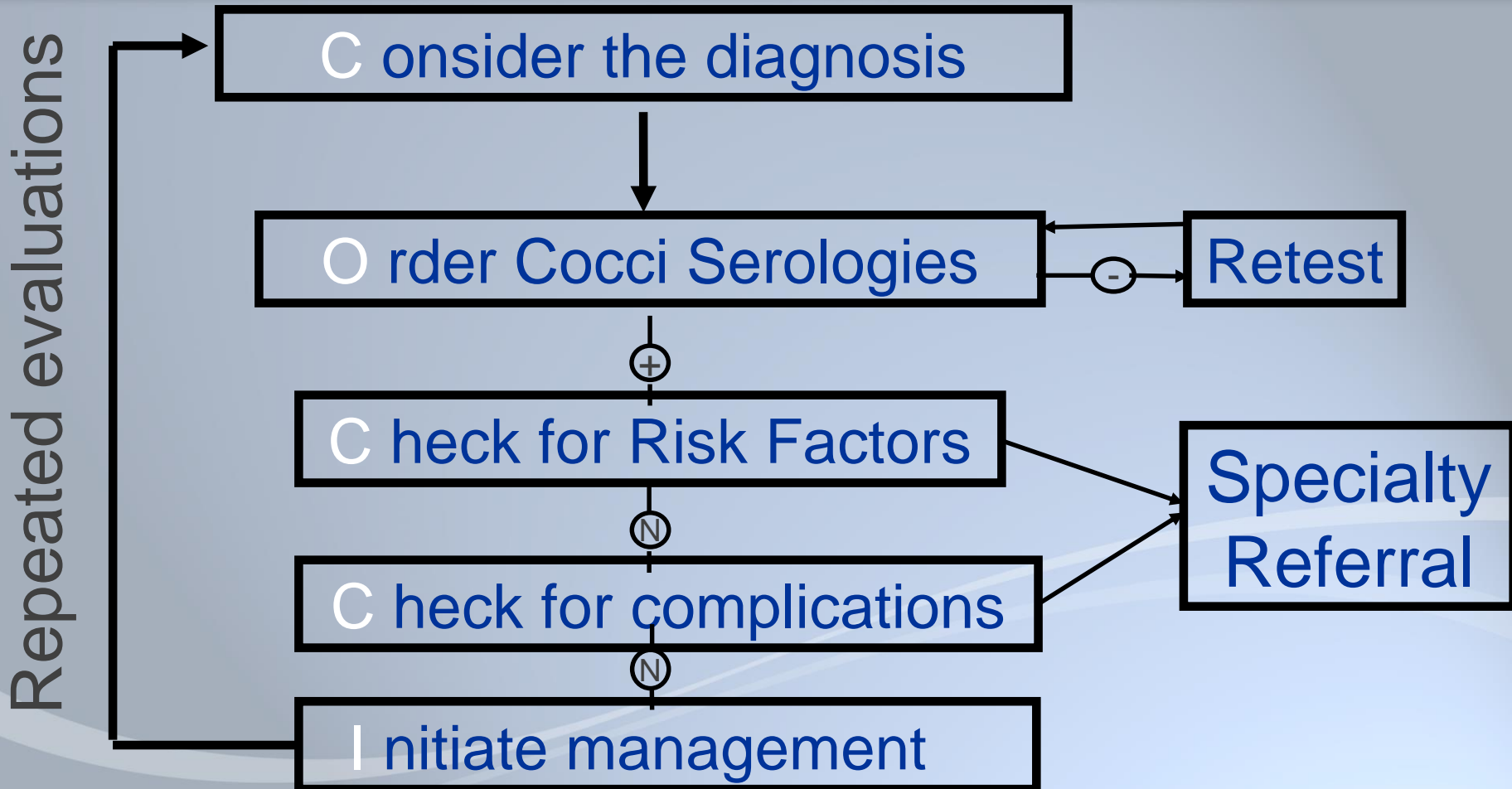


# Check for Complications

- 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



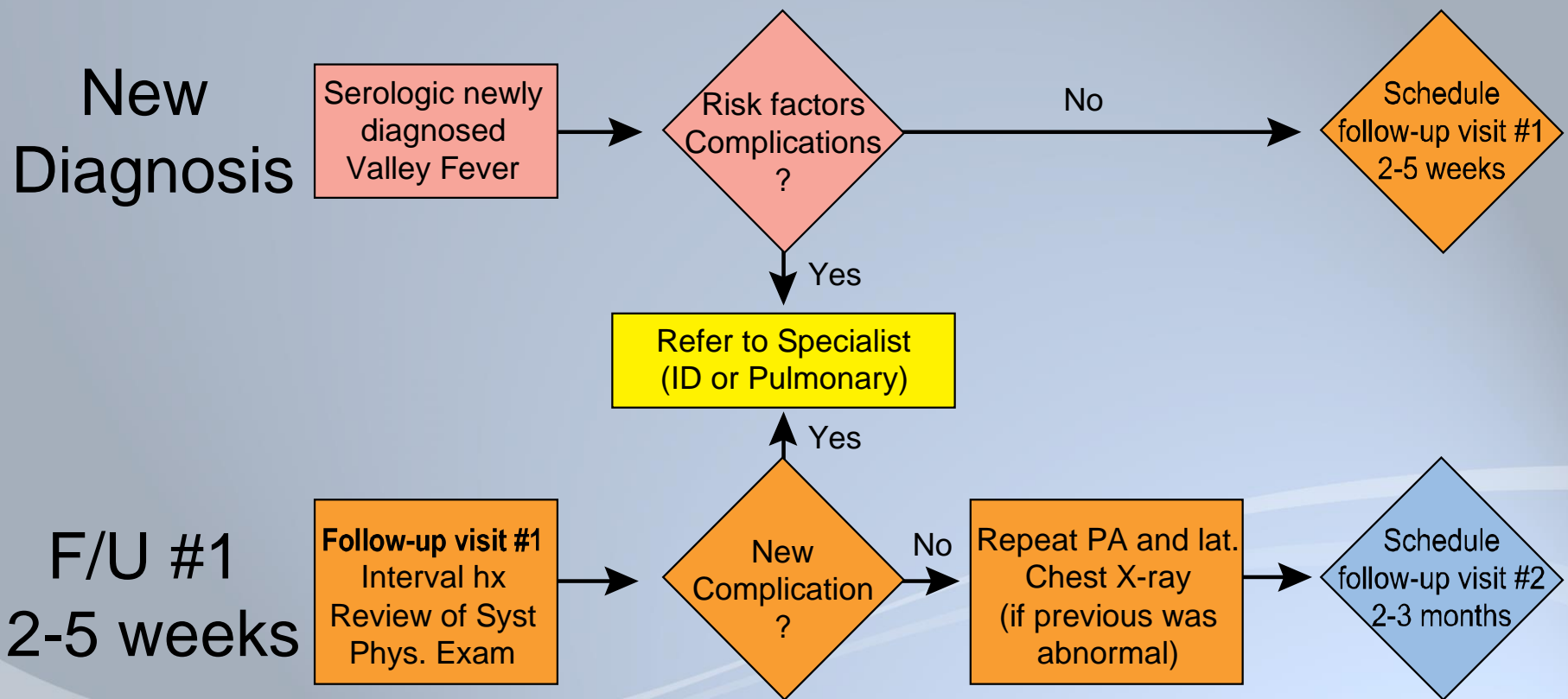
# Management

## 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

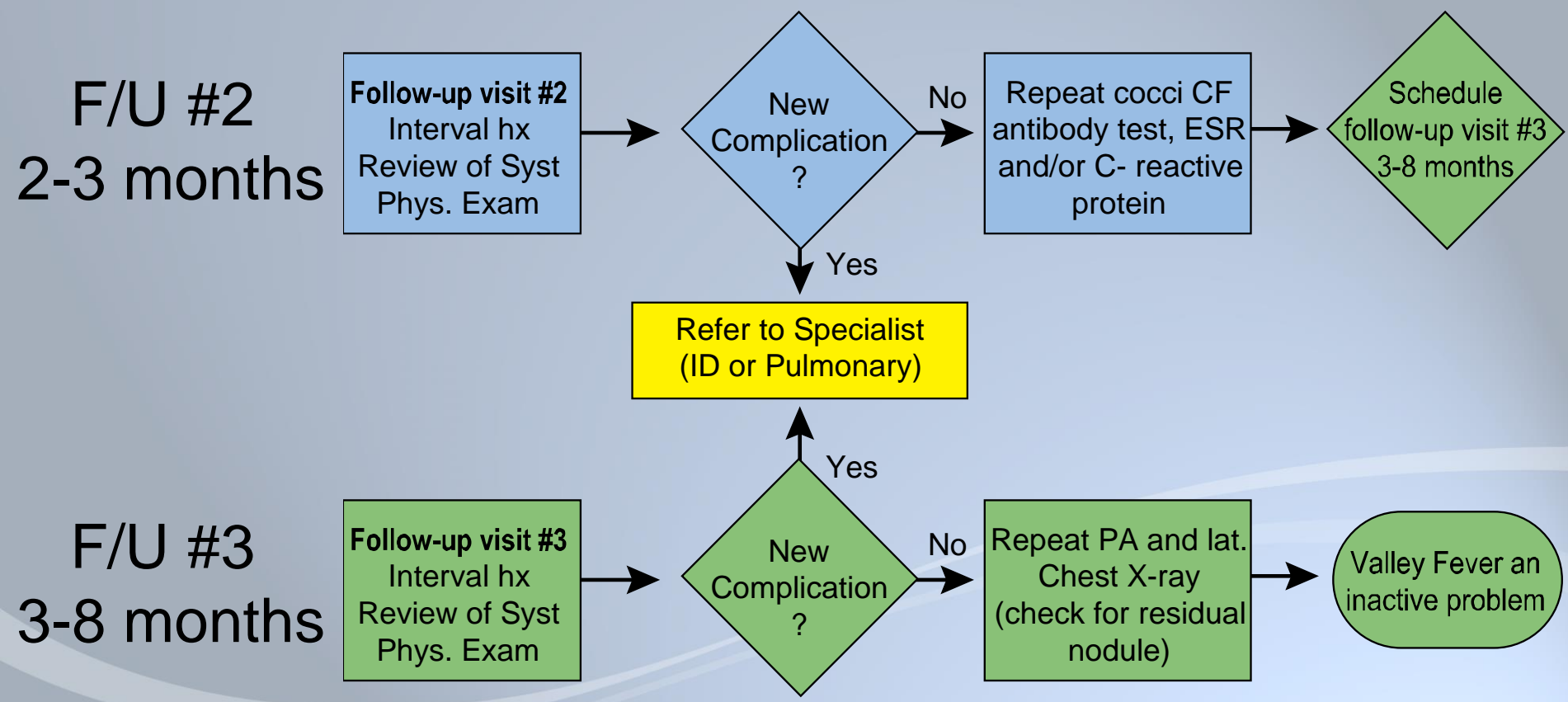


# Optimize Management, Uncomplicated Valley Fever





# Intermediate Management, Uncomplicated Valley Fever



# Management

## Low Risk, Simple Early Infection

- Follow-up office visits for one year
  - 2-3 weeks ROS; Exam; Chest X-ray
  - 2-3 months ROS; Exam; serology
  - 3-8 months ROS; Exam; Chest X-ray





# Follow-up Chest X-rays

## What to order?

### Purposes:

- Identify if infiltrate cavitates.
- Determine if there is a residual nodule (could be confused with cancer in later years)

In most patients, these objectives can be accomplished with simple PA and lateral X-rays; CT scans are usually not needed.



# Primary Coccidioidal Pneumonia

Study date:10.26.2011  
Study time:11:31.07

Series number:1  
Image number:1



WW/WC:4096/2047

KVP:kV  
X-ray tube current:mA  
Exposure:mAs

October 26



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence



# Primary Coccidioidal Pneumonia

Study date:11.03.2011  
Study time:11:44.03

Series number:1  
Image number:1



WW/WC:4096/2047

KVP:kV  
X-ray tube current:mA  
Exposure:mAs

November 3



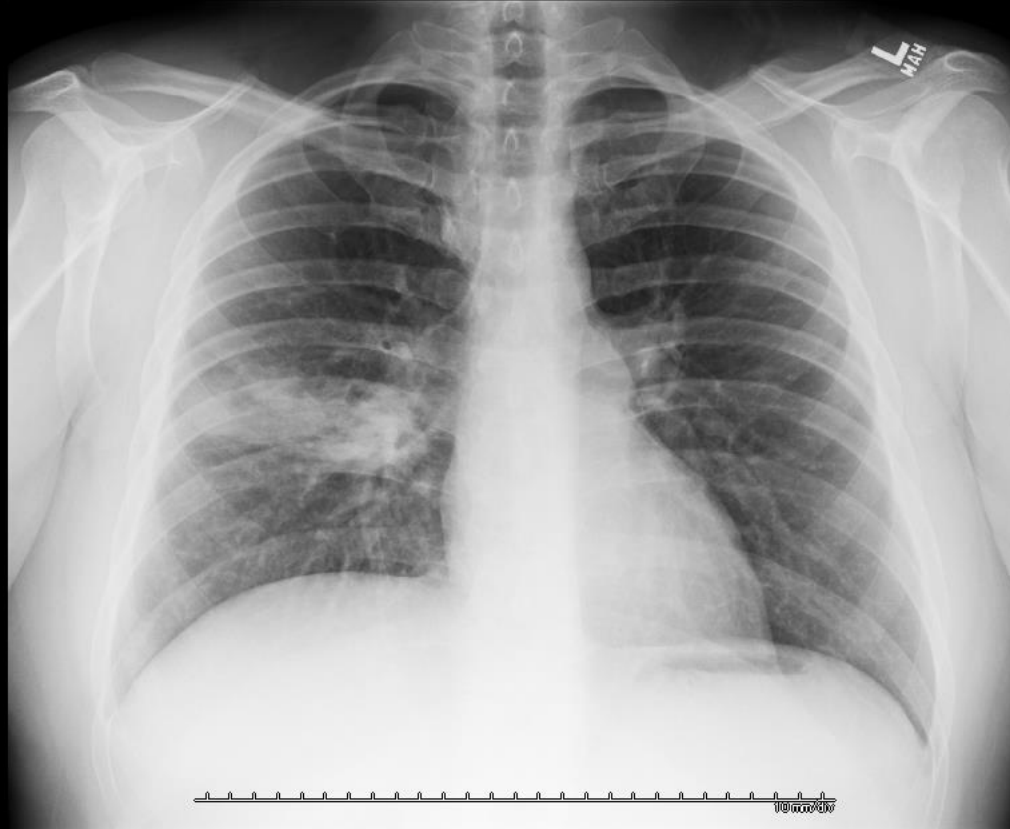
THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence



# Primary Coccidioidal Pneumonia

Study date:11.14.2011  
Study time:14:39.29

Series number:1  
Image number:1



WW/WC:4096/2047

KVP:kV  
X-ray tube current:mA  
Exposure:mAs

November 14

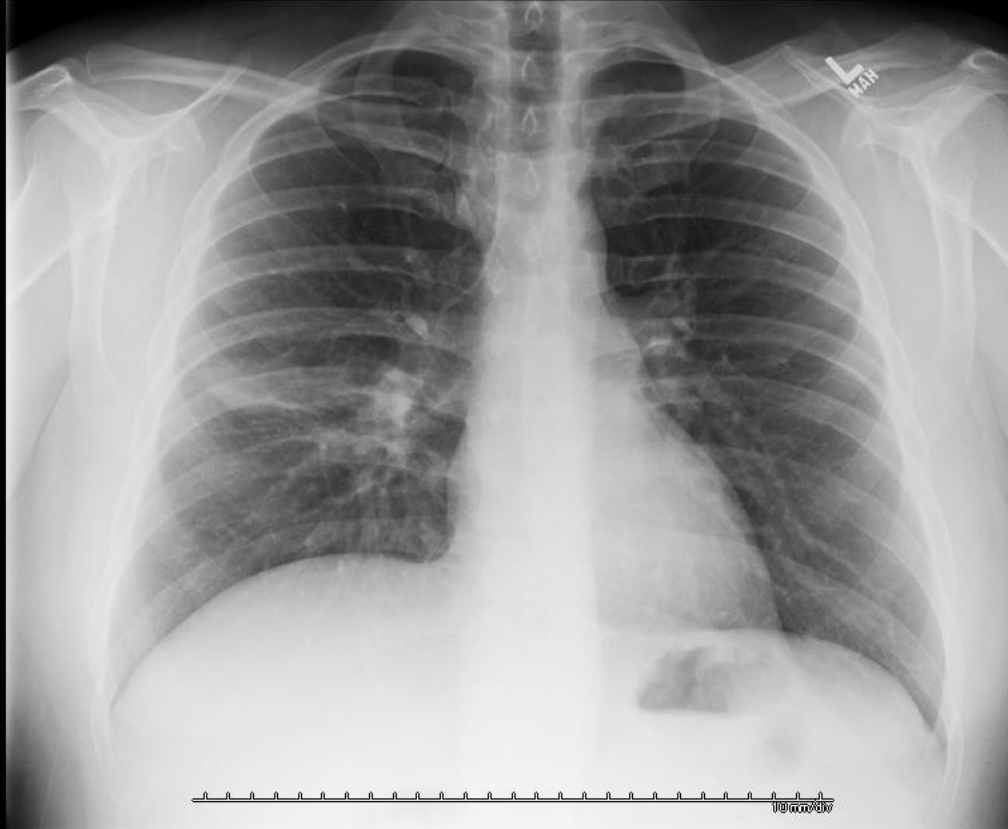


THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence



# Primary Coccidioidal Pneumonia

Study date:12.15.2011  
Study time:14:38.55



Series number:1  
Image number:1

WW/WC:4096/2047

KVP:kV  
X-ray tube current:mA  
Exposure:mAs

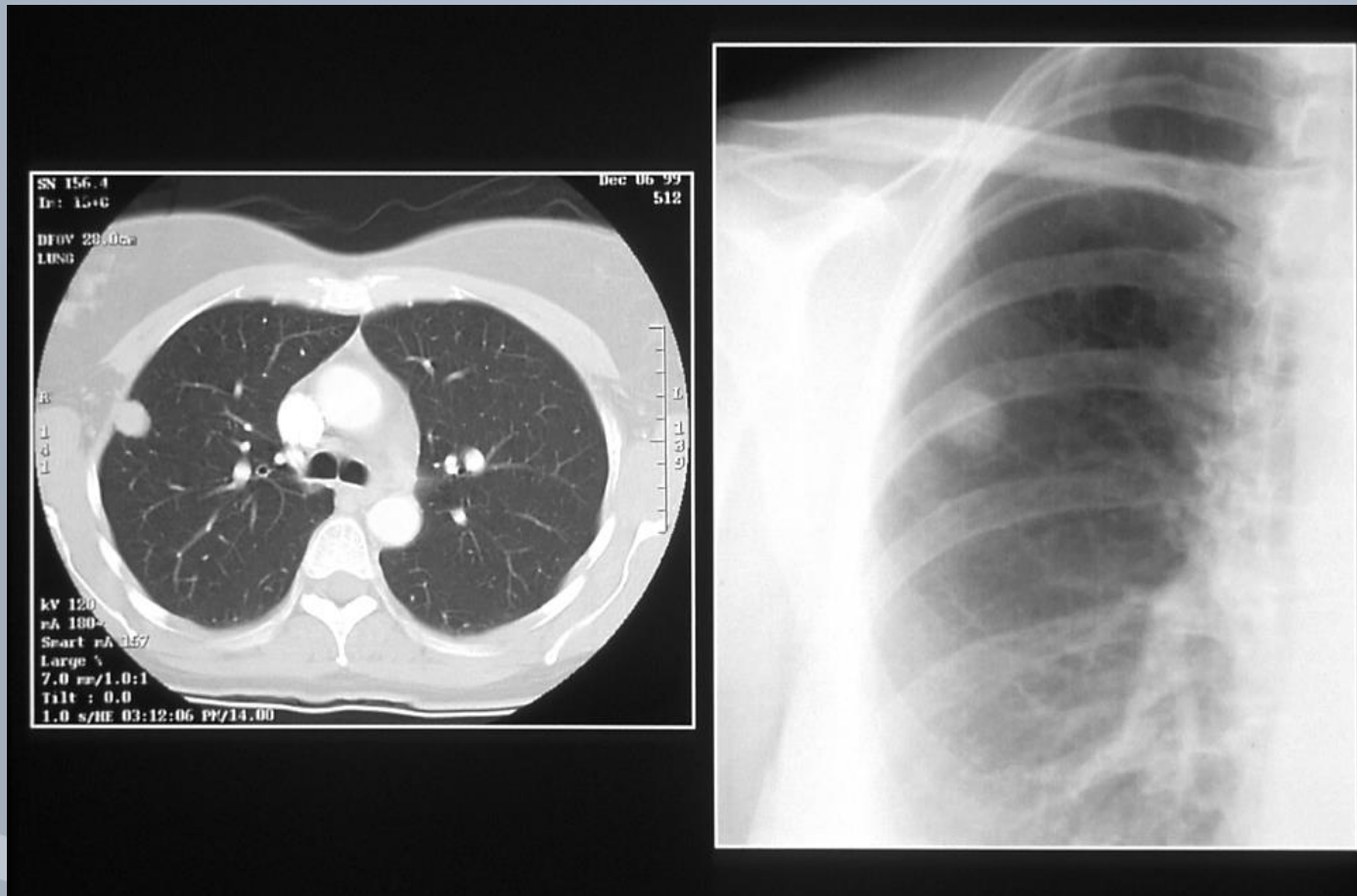
December 15



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON  
Valley Fever Center  
for Excellence



# Peripheral Coccidioidal nodule





# Follow-up Coccidioidal Serology

## How do they help?

- As patients improve, titers generally decrease
- The decrease typically occurs over several months, occasionally even slower.
- If titers increase, re-evaluate for possible complications.
- Titers are a marker, not a disease



# Fatigue: Often the Last Symptom Typical Problem

- Primary coccidioidal pneumonia diagnosed serologically in an otherwise healthy active person.
- Over several weeks, weight returns to normal, fever resolves and pulmonary symptoms gone. ESR becomes normal. CF low or neg.
- However, patient complains of profound inability to carry out normal activities.
- How should this be managed?





# Potential Causes of Fatigue

- In some, striking deficit in O<sub>2</sub> utilization (VO<sub>2</sub> peak <10% of predicted)\*
- Physical deconditioning because of decreased activity.
- Lack of experience by the patient with subacute or chronic disability.
- Patient with excessive expectations of own performance.



# Management Strategies for fatigue

- **Exclude objective evidence of tissue destruction or focal lesions.**
- **Patient Education**
  - Prolonged fatigue common and resolves
  - No evidence of permanent damage
  - Deconditioning and unrealistic expectations
- **Patient Actions**
  - Keep a journal
  - Refer patient to Physical Therapist for reconditioning
- **Antifungal drugs? May or May Not be Helpful**



*Clinical Infectious Diseases*

**IDSA GUIDELINE**



OXFORD

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

**John N. Galgiani,<sup>1</sup> Neil M. Ampel,<sup>2</sup> Janis E. Blair,<sup>3</sup> Antonino Catanzaro,<sup>4</sup> Francesca Geertsma,<sup>5</sup> Susan E. Hoover,<sup>6</sup> Royce H. Johnson,<sup>7</sup> Shimon Kusne,<sup>3</sup> Jeffrey Lisse,<sup>8</sup> Joel D. MacDonald,<sup>9</sup> Shari L. Meyerson,<sup>10</sup> Patricia B. Raksin,<sup>11</sup> John Siever,<sup>12</sup> David A. Stevens,<sup>13</sup> Rebecca Sunenshine,<sup>14,15</sup> and Nicholas Theodore<sup>16</sup>**

<sup>1</sup>Valley Fever Center for Excellence, and <sup>2</sup>Division of Infectious Diseases, University of Arizona, Tucson, and <sup>3</sup>Division of Infectious Diseases, Mayo Clinic, Scottsdale, Arizona; <sup>4</sup>Division of Pulmonary and Critical Care, University of California, San Diego, and <sup>5</sup>Department of Pediatrics, Infectious Diseases, Stanford University School of Medicine, California; <sup>6</sup>Division of Sanford Health, Sioux Falls, South Dakota; <sup>7</sup>David Geffen School of Medicine at UCLA, Department of Medicine, Kern Medical Center, Bakersfield, California; <sup>8</sup>Department of Rheumatology, University of Arizona, Tucson; <sup>9</sup>Department of Neurosurgery School of Medicine, University of Utah, Salt Lake City; <sup>10</sup>Division of Thoracic Surgery, Northwestern University, Feinberg School of Medicine, and <sup>11</sup>Division of Neurosurgery, John H. Stroger Jr Hospital of Cook County, Chicago, Illinois; <sup>12</sup>Arizona Pulmonary Specialists, Ltd, Phoenix; <sup>13</sup>Division of Infectious Diseases, Stanford University School of Medicine, California; <sup>14</sup>Career Epidemiology Field Officer Program, Division of State and Local Readiness, Office of Public Health Preparedness and Response, Centers for Disease Control and Prevention; <sup>15</sup>Maricopa County Department of Public Health, and <sup>16</sup>Department of Neurosurgery, Barrow Neurological Institute, Phoenix, Arizona

**Clin Infect Dis, 2016**



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON

**Valley Fever Center  
for Excellence**



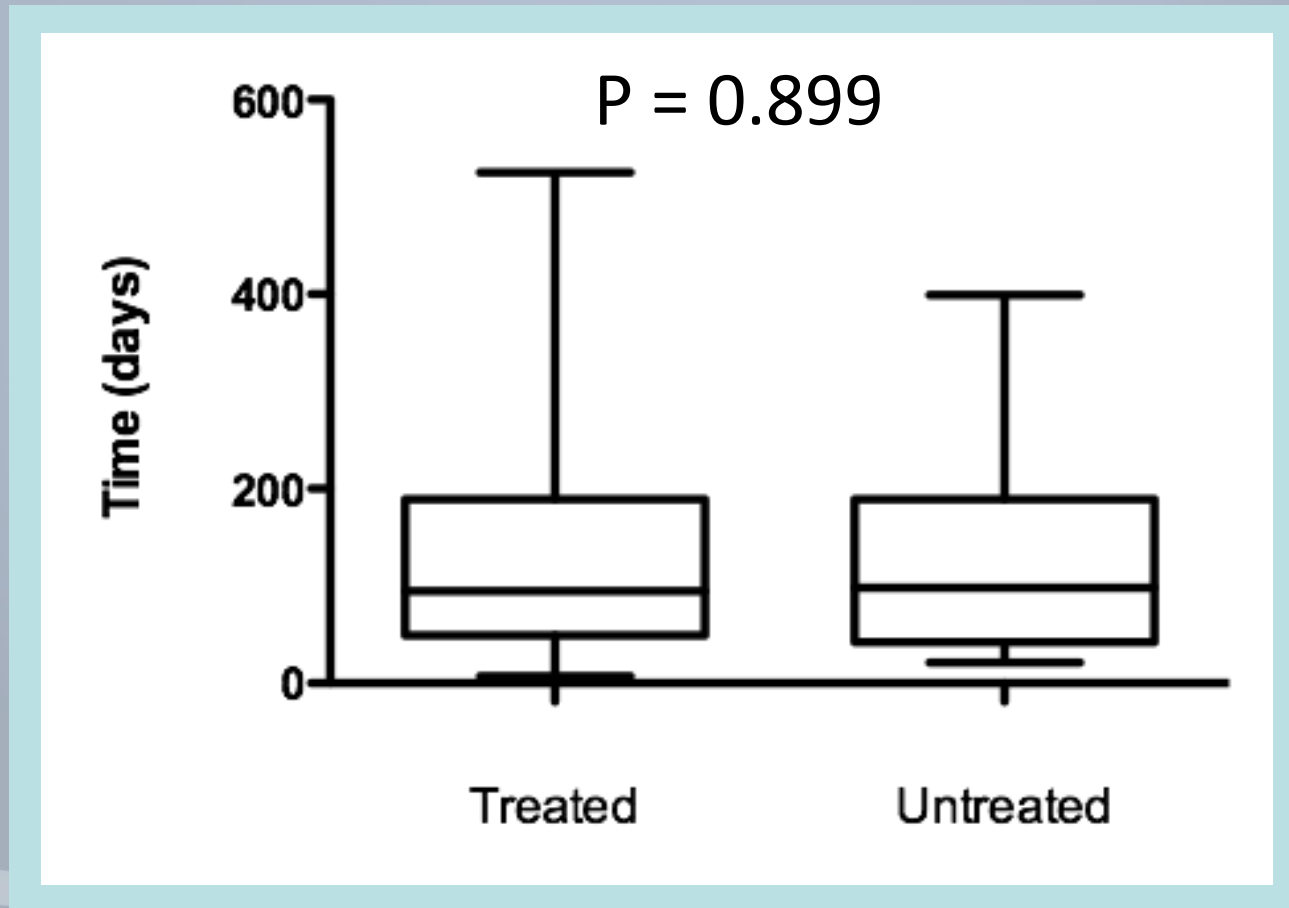
# 2016 IDSA Guidelines

## 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



# The Valley Fever Tool Kit

## Support Resources

- Process Flow pocket guide.
- Wall posters and patient educational brochures
- Nurse Navigator referral support? (proposed)
- EMR alerts? (only if wanted by the clinicians)

## Training Resources

- Webinar Overview
- Primary Care Tutorial
- Powerpoint presentation online
- CME presentations at individual clinical practices.





# Metrics to Track Implementation

- # of EIA serologies ordered
- % of EIA tests that are positive
- # of new ICD10 diagnoses of Valley Fever
- # of antibacterial Rx are written before Valley Fever diagnosis
- % of new Valley Fever patients are referred for Infectious Diseases or Pulmonary consultation



# Summary

- Banner Health and the UA Valley Fever Center for Excellence are changing the way Arizona clinicians recognize and manages patients with Valley Fever.
- Central to this change will be the expanded roll of primary care clinicians in earlier diagnosis and management of uncomplicated Valley Fever.



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

Valley  
Fever



Center for  
Excellence



Banner Health®

For more information:

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