Background
Extrapulmonary manifestation of Coccidioidomycosis have been reported to have an incidence of 4.7% of recognized infections and 0.2% of total infections. Among them, extrapulmonary manifestations cardiac disease and especially pericardial dissemination has not been well reported in the literature. Five cases of pericardial disease with Coccidioidomycosis at Kern Medical Center / UCLA are described.

Methods
We queried the UCLA/Kern Medical Center database of 1,771 patients spanning between the years 1992 and 2014. Five cases were selected based on an institutional review board approved chart review.

Results
Five different cases were encountered. Of the five, four were African American, one was Filipino. The median age was 25 with an average of 30.2. The Range was 23-52. All patients were male. 3 were oil field workers. The Complement Fixation titer ranged between 1:32 to >1:512. two patients had a pericardial window, two had a pericardiectomy. One was managed medically. One patient had a post-surgical death. Medical management involved Posaconazole for between six weeks to three months. Average amphotericin treatment course was 16 weeks. Echocardiography was performed on all five patients with an ejection fraction ranging between 30% and 75%.

Conclusion
Studies have shown some ethnic groups such as Filipinos and African Americans are more susceptible to severe disseminated coccidioidomycosis. Our data from a public teaching hospital located in an endemic region of the US shows that majority of patients affected were African American male. Coccidioidomycosis is a great imitator and can be mistaken for Tuberculosis and other granulomatous diseases, however histories of patient indicating exposure to this fungus at an endemic area along with serologic tests are diagnostic tools available to clinicians to make the diagnosis. In pericardial Coccidioidomycosis the prolonged therapy at one is center is a lipid emulsion which can give the disease control. Our data from a public teaching hospital located in an endemic region of the US shows that majority of patients affected were African American male. Coccidioidomycosis is a great imitator and can be mistaken for Tuberculosis and other granulomatous diseases, however histories of patient indicating exposure to this fungus at an endemic area along with serologic tests are diagnostic tools available to clinicians to make the diagnosis. In pericardial Coccidioidomycosis the prolonged therapy at one is center is a lipid emulsion which can give the disease control.

Table 1: Case Summary

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Ethnicity</th>
<th>Occupation</th>
<th>Date of Exposure to fungus</th>
<th>Antigen</th>
<th>Ejection Fraction</th>
<th>Cardiac Symptoms</th>
<th>Medical Treatment</th>
<th>Follow-up</th>
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<tr>
<td>1</td>
<td>23</td>
<td>Male</td>
<td>Hispanic</td>
<td>6/21/2012</td>
<td>1:32</td>
<td>EF 75% / LVH</td>
<td>Asymptomatic, improved slowly</td>
<td>Posaconazole 500mg PO BID</td>
<td>Unknown</td>
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<tr>
<td>2</td>
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<td>Male</td>
<td>African American</td>
<td>6/21/2012</td>
<td>1:32</td>
<td>EF 75% / LVH</td>
<td>Asymptomatic, improved slowly</td>
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Case #1
A 23-year-old Hispanic man with history of pulmonary coccidioidomycosis diagnosed June 2012 in an outside facility, treated with Fluconazole 800 mg daily dose, he presented to the ER at our hospital with worsening bilateral chest pain, shortness of breath, and non-productive cough for two weeks. His vitals were significant for a pulse of 146 with normal blood pressure. Complement fixation titers at this time were 1:64. His CXR showed moderate cardiomegaly, and pulmonary congestion. CT chest showed large pericardial effusion, bilateral pleural effusion, mediastinal lymphadenopathy with largest node measuring 2cm (Figure 1a). TTE confirmed pericardial effusion of moderate size (18-38 mm deep) with evidence of constriction (Figure 1b). His blood pressure was 120/70 with a heart rate of 146 and respiratory rate of 24 at the time of this echo.

Because of the constriction, he was taken to the operating room for a successful pericardial window. Perioperative cultures including a thoracentesis done earlier for a large pleural effusion, did not reveal any fungal organisms. He was started on Amphotericin initially. Unfortunately he had severe reaction to the drug and therefore switched to posaconazole 400mg twice daily (Figure 1c). 4 years later he continues to suffer from exertional dyspnea. A repeat CXR done 4 months after initial presentation reported a mild decrease in size of the cardiac silhouette.

Case #2
A 28-year-old African American man who is an oil field worker in San Joaquin Valley presented to our hospital with 4 week duration of intermittent fevers, malaise and non-productive cough. He complained of dyspnea at exertion that progressed to dyspnea at rest. His pulse was significantly elevated with elevated blood pressure as well. Primary pulmonary coccidioidomycosis was confirmed with reactive immunoglobulin assays and titer of 1:32. Imaging revealed Cardiomegaly, Bilateral honeycombing infiltration of the lungs, large mediastinal lymph nodes, and a moderate amount of pericardial effusion (Figure 2a). TTE showed a posterior pericardial effusion measuring 11mm (Figure 2b).

This patient in particular did not have any severe cardiac function compromise. He was medically managed initially with Amphotericin 5mg/kg/day. After 16 weeks of treatment his titers in fact increased to 1:256 despite improvement in clinical symptoms. He was switched to posaconazole 400mg twice daily. After 12 week therapy his repeat titer were 1:32 He is currently being treated with posaconazole. His exertional capacity is much improved (Figure 2c).

Case #3
23 year old African American male had presented to an outside institution for progressive fatigue, dyspnea upon exertion, and intermittent fevers. His CF titers at the time of presentation were greater than 1:512. CXR report was significant for bilateral peri-hilar pulmonary infiltrates, mediastinal lymphadenopathy, normal heart size (Figure 3a). TTE was performed and was significant for a large pericardial effusion without mention of constriction (Figure 3b).

He underwent a pericardial window outside of our institution. The pericardial and pleural fluids were sent for analysis and did not reveal any fungal organisms. The pericardial lymph nodes however revealed coccic spherules per the pathology report (Figure 3c). The patient was started on Amphotericin but unfortunately was lost to follow up in 2010.

Case #4
25 year old African American oil field worker male who was diagnosed with disseminated osseous coccic of the right ilium and posterior iliac crest while being treated with Fluconazole. Several weeks after oral treatment he developed progressively worsening shortness of breath with symptoms at minimal exertion. At the time of presentation his vitals were significant for pulse of 139 and normal blood pressure. He was hospitalized and found to have a titer of 1:256. Chest XR was significant for Diffuse granular infiltrates in bilateral lung fields (Figure 4a). There was no cardiomegaly or pericardial effusion. Subsequent TTE for the evaluation of shortness of breath revealed an ejection fraction of 65% and an 8mm thickened and noncompliant pericardium which is suggestive of constriction (Figure 4b).

The patient was started on amphotericin infusion and referred to a cardiothoracic surgeon. He but did not require any surgical intervention due to improvement in signs and symptoms with medical After 22 weeks of Amphotericin, the bone dissemination was well controlled and he was switched to posaconazole (Figure 4c).

Case #5
52-year-old African American man with history of seizure disorder presented to the emergency department for altered mental status, he was found to have chronic coccic meningitis. Serum CF titers were greater than 1:512. A CT of the chest was performed and showed diffuse pneumonia with interstitial pattern, mediastinal lymphadenopathy, and moderate sized pericardial effusion (Figure 8). The effusion was sampled, it was sterile, exudative by criteria, but no fungal pathogens were isolated. This patient was started on fluconazole 1gm IV daily targeting his CNS disease. Given the magnitude of constriction he was transferred to a cardiac center for pericardiectomy and unfortunately had a post operative death.