

# Impact of COVID-19 Pandemic on Primary Pulmonary Coccidioidomycosis Diagnosis

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## Introduction

The COVID 19 pandemic has overwhelmed healthcare systems across the world. As hospitals and clinics try to contain the surge in COVID cases, it is reasonable to ask whether patients with other medical conditions are getting time-appropriate care. Published data shows there has been a delay or reduction in patients getting urgent or emergent care<sup>1,2,3</sup>. However, outpatient care has also been impacted<sup>4</sup>. The impact of COVID19 on diagnosis and management of community acquired pneumonia has not been looked at in depth, particularly, how it may delay diagnosis of other atypical pneumonias. One such community acquired pneumonia, which is endemic to the Southwest United States, is pulmonary coccidioidomycosis. We conducted a retrospective chart review looking at the time between the onset of symptoms and initial diagnosis of primary pulmonary coccidioidomycosis in years 2020 and 2019. The aim of our study was to identify if there was a delay in diagnosis of acute primary pulmonary coccidioidomycosis in 2020 compared to 2019.

## Methods

- Retrospective chart review was conducted using the Mayo Data Explorer data retrieval tool.
- Included patients over the age of eighteen diagnosed with Acute Primary Pulmonary Coccidioidomycosis between the dates of March 1<sup>st</sup> to December 1<sup>st</sup> in years 2019 and 2020.
- ICD code B38.0 and B38.2 were used as the primary search diagnosis. Location was limited to Mayo Clinic in Arizona.
- The search resulted in 962 patients total, with 483 from 2019 and 479 from 2020.
- Patients had to meet criteria for one of the following categories: proven, probable, or possible pulmonary coccidioidomycosis.
- The chart review process is still ongoing for the 2020 cohort, but preliminary results showed 80 patients in 2019 and 29 patients in 2020 who met the inclusion criteria thus far

## Classification Criteria

|                             |                               |
|-----------------------------|-------------------------------|
| Proven Coccidioidomycosis   | Symptoms + PCR/Culture/Biopsy |
| Probable Coccidioidomycosis | Symptoms + Serology + Imaging |
| Possible Coccidioidomycosis | Symptoms + Serology           |

Table 1: Diagnostic criteria for each classification of primary pulmonary coccidioidomycosis diagnosis

## Demographics

|   | 2019 (N=83)  | 2020 (N=29)  | Total (N=112) | P-value           |
|---|--------------|--------------|---------------|-------------------|
| <b>Age at Diagnosis</b>                 |              |              |               |                   |
| Mean (SD)                               | 56.5 (16.06) | 56.6 (17.38) | 56.5 (16.33)  | 0.99 <sup>1</sup> |
| Median                                  | 58.0         | 54.0         | 57.5          |                   |
| Range                                   | 18.0, 95.0   | 17.0, 88.0   | 17.0, 95.0    |                   |
| <b>Ethnicity, n (%)</b>                 |              |              |               | 0.18 <sup>2</sup> |
| Black or African American               | 1 (1.2%)     | 2 (7.1%)     | 3 (2.7%)      |                   |
| Hispanic or Latino                      | 3 (3.7%)     | 2 (7.1%)     | 5 (4.5%)      |                   |
| Not Hispanic or Latino                  | 78 (95.1%)   | 24 (85.7%)   | 102 (92.7%)   |                   |
| <b>Tobacco Use, n (%)</b>               |              |              |               | 0.70 <sup>2</sup> |
| Active                                  | 2 (2.4%)     | 0 (0.0%)     | 2 (1.8%)      |                   |
| Never                                   | 52 (62.7%)   | 19 (65.5%)   | 71 (63.4%)    |                   |
| Previous                                | 29 (34.9%)   | 10 (34.5%)   | 39 (34.8%)    |                   |
| <b>Sex, n (%)</b>                       |              |              |               | 0.57 <sup>2</sup> |
| Female                                  | 35 (42.2%)   | 14 (48.3%)   | 49 (43.8%)    |                   |
| Male                                    | 48 (57.8%)   | 15 (51.7%)   | 63 (56.3%)    |                   |
| <b>DM, n (%)</b>                        | 11 (13.3%)   | 1 (3.4%)     | 12 (10.7%)    | 0.14 <sup>2</sup> |
| <b>CVD, n (%)</b>                       | 34 (41.0%)   | 7 (24.1%)    | 41 (36.6%)    | 0.11 <sup>2</sup> |
| <b>Pulmonary Disease, n (%)</b>         | 11 (13.3%)   | 4 (13.8%)    | 15 (13.4%)    | 0.94 <sup>2</sup> |
| <b>Immunosuppressive Agents, n (%)</b>  | 9 (10.8%)    | 2 (6.9%)     | 11 (9.8%)     | 0.54 <sup>2</sup> |
| <b>Active Chemotherapy, n (%)</b>       | 3 (3.6%)     | 0 (0.0%)     | 3 (2.7%)      | 0.29 <sup>2</sup> |
| <b>Connective Tissue Disease, n (%)</b> | 4 (4.8%)     | 0 (0.0%)     | 4 (3.6%)      | 0.23 <sup>2</sup> |
| <b>Transplant, n (%)</b>                | 6 (7.2%)     | 1 (3.4%)     | 7 (6.3%)      | 0.47 <sup>2</sup> |

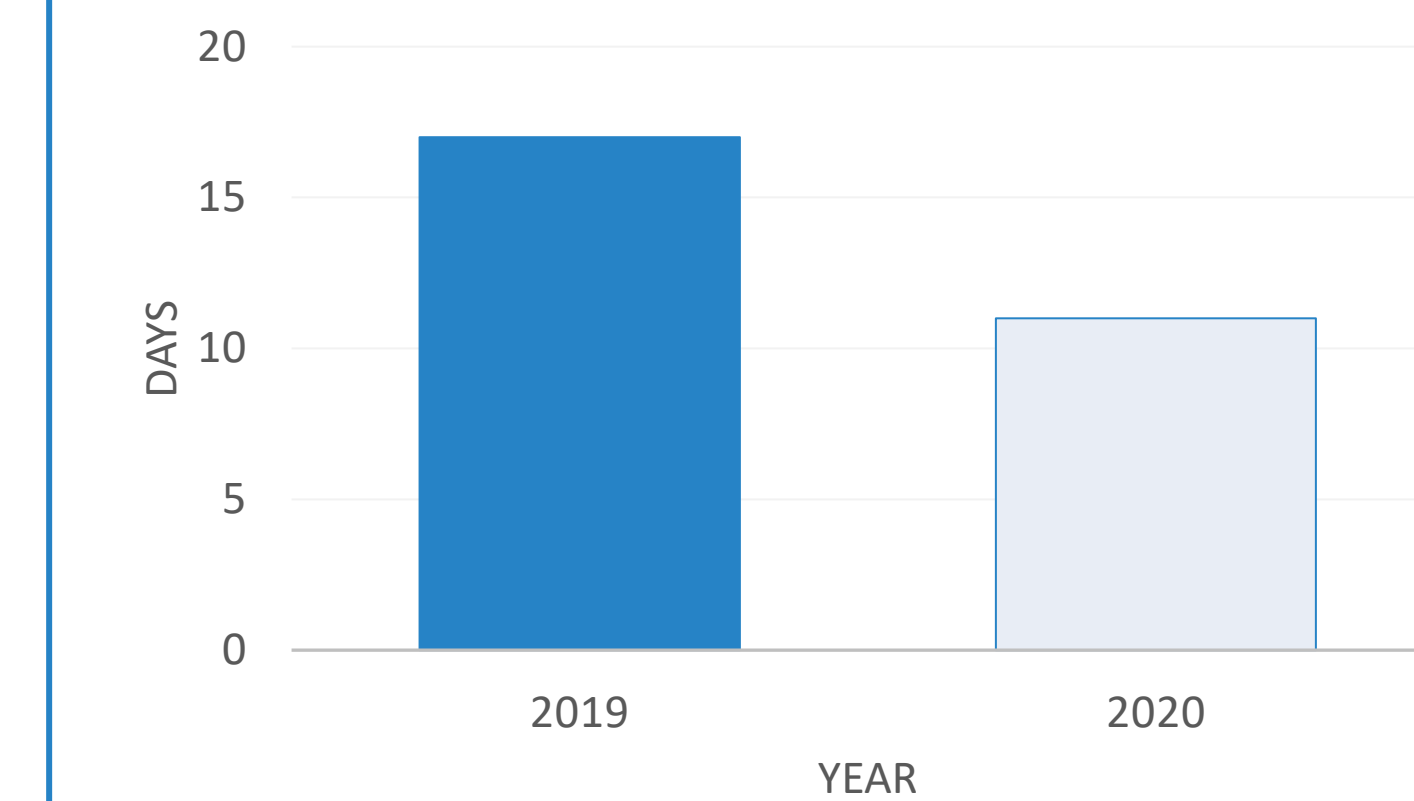
Table 2: Demographic data comparing the 2019 and 2020 patient cohorts; <sup>1</sup>Kruskal-Wallis p-value; <sup>2</sup>Chi-Square p-value

## Results

|  | 2019 (N=83)  | 2020 (N=29)  | Total (N=112) | P-value             |
|--|--------------|--------------|---------------|---------------------|
| <b>Days from symptoms to diagnosis</b> |              |              |               | 0.05 <sup>1</sup>   |
| Mean (SD)                              | 28.4 (40.04) | 21.1 (40.89) | 26.5 (40.20)  |                     |
| Median                                 | 17.0         | 11.0         | 14.0          |                     |
| Range                                  | 2.0, 225.0   | 0.0, 227.0   | 0.0, 227.0    |                     |
| <b>Number of in-person Visits</b>      |              |              |               | 0.04 <sup>1</sup>   |
| Mean (SD)                              | 2.0 (0.91)   | 1.6 (0.87)   | 1.9 (0.92)    |                     |
| Median                                 | 2.0          | 1.0          | 2.0           |                     |
| Range                                  | 1.0, 5.0     | 0.0, 3.0     | 0.0, 5.0      |                     |
| <b>Number of video visits</b>          |              |              |               | <.0001 <sup>1</sup> |
| Mean (SD)                              | 0.0 (0.00)   | 0.3 (0.53)   | 0.1 (0.29)    |                     |
| Median                                 | 0.0          | 0.0          | 0.0           |                     |
| Range                                  | 0.0, 0.0     | 0.0, 2.0     | 0.0, 2.0      |                     |
| <b>Total number of visits</b>          |              |              |               | 0.34 <sup>1</sup>   |
| Mean (SD)                              | 2.0 (0.91)   | 1.9 (0.95)   | 2.0 (0.92)    |                     |
| Median                                 | 2.0          | 2.0          | 2.0           |                     |
| Range                                  | 1.0, 5.0     | 1.0, 4.0     | 1.0, 5.0      |                     |

Table 3: Preliminary data comparing time to diagnosis and number of visits prior to diagnosis between years 2019 and 2020; <sup>1</sup>Wilcoxon rank sum p-value

## Median Days to Diagnosis



Graph 1: Median days from onset of symptoms to diagnosis of primary pulmonary coccidioidomycosis

## Results

- 2020 group had a lower median for days to diagnosis (11 days) compared to the 2019 cohort (17 days).
- The 2020 cohort had a lower median number of in-person visits compared to 2019, 2 compared to 1.
- There was no statistically significant difference between the two cohorts in total number of visits.

## Conclusion

- Our preliminary data suggests that patients with acute pulmonary coccidioidomycosis experienced a shorter time to diagnosis from the onset of symptoms in year 2020, compared to their counterparts in the year prior
- After completion of data collection, future direction is to evaluate whether diagnostic imaging or location of diagnosis played a role in the difference in time to diagnosis

## References

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