Current status of Valley fever surveillance and trends: Incidence of human disease

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Impact and Control of Valley fever

National Academies of Sciences, Engineering, and Medicine

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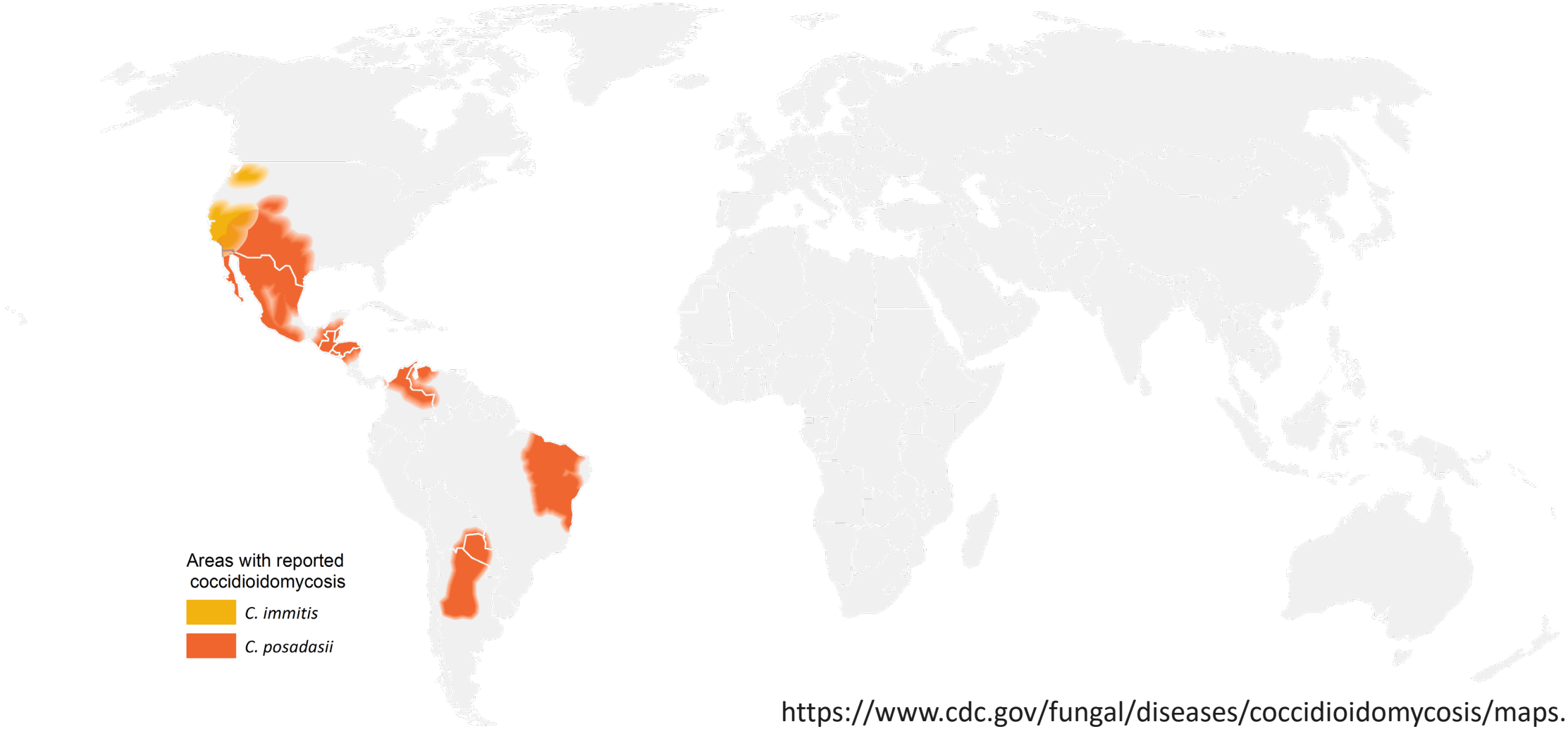
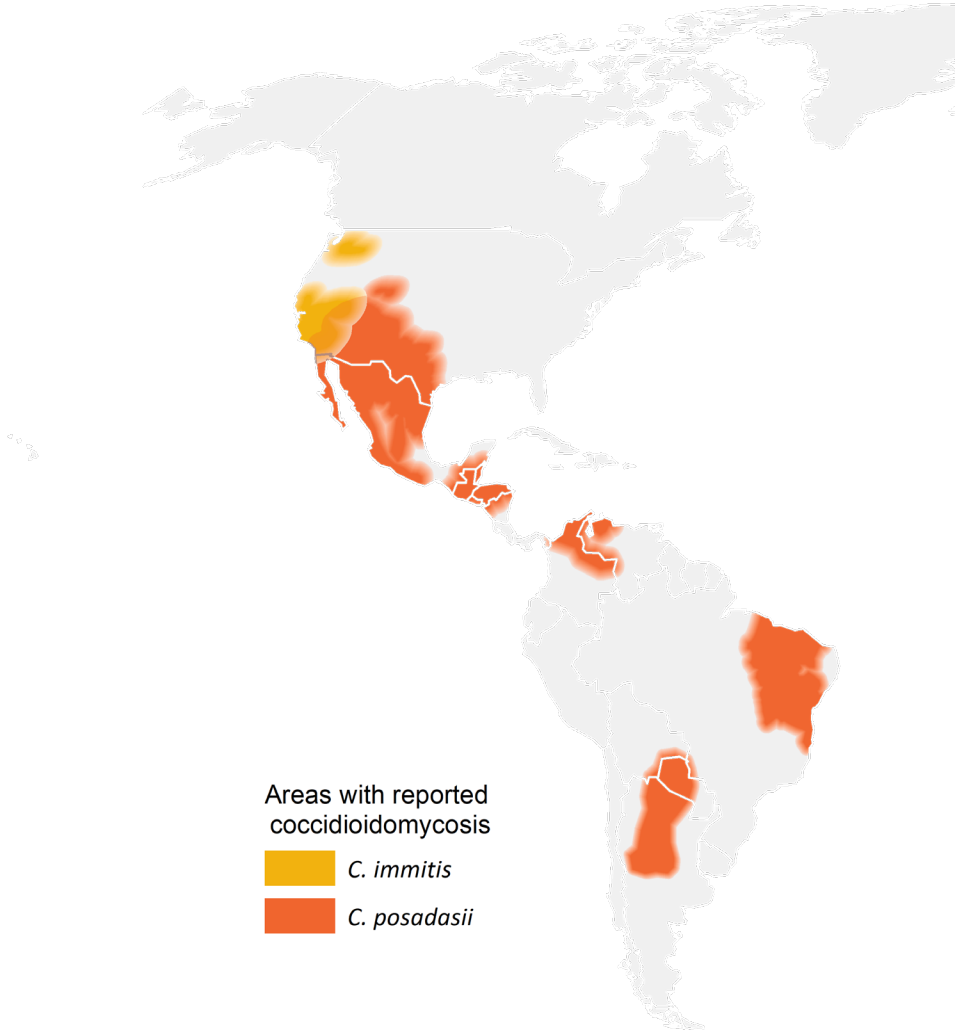
Overview of Valley fever surveillance in the Americas

Valley fever (coccidioidomycosis) has a global presence



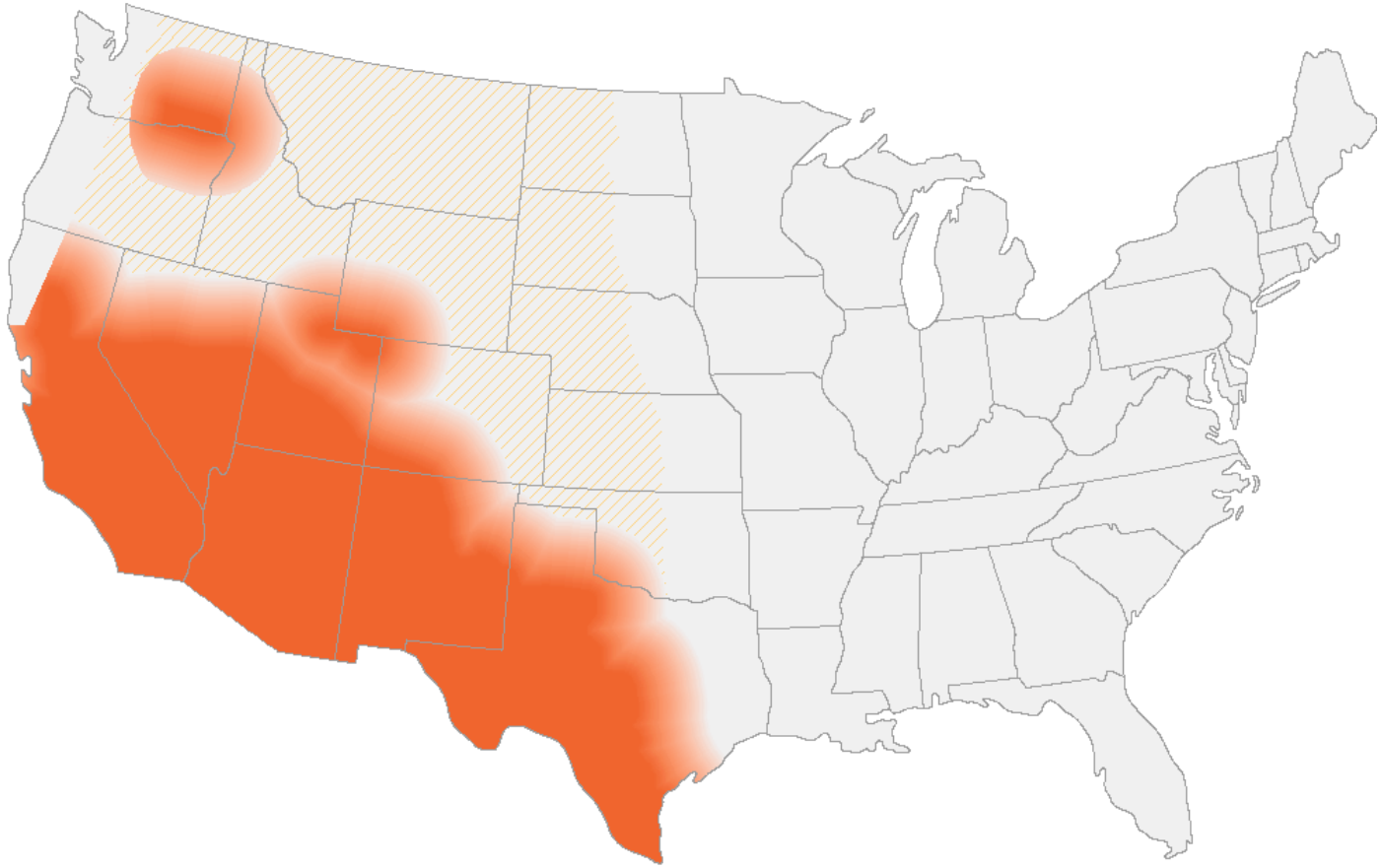
https://www.cdc.gov/fungal/diseases/coccidioidomycosis/maps.html

Valley fever is reportable in only one country in Latin America



Reportable in **Guatemala** and one state in Argentina

In the United States, Valley fever is a nationally notifiable disease



Estimated areas where coccidioidomycosis exists in the environment

Theoretical areas where coccidioidomycosis exists in the environment

https://www.cdc.gov/fungal/diseases/coccidioidomycosis/maps.html

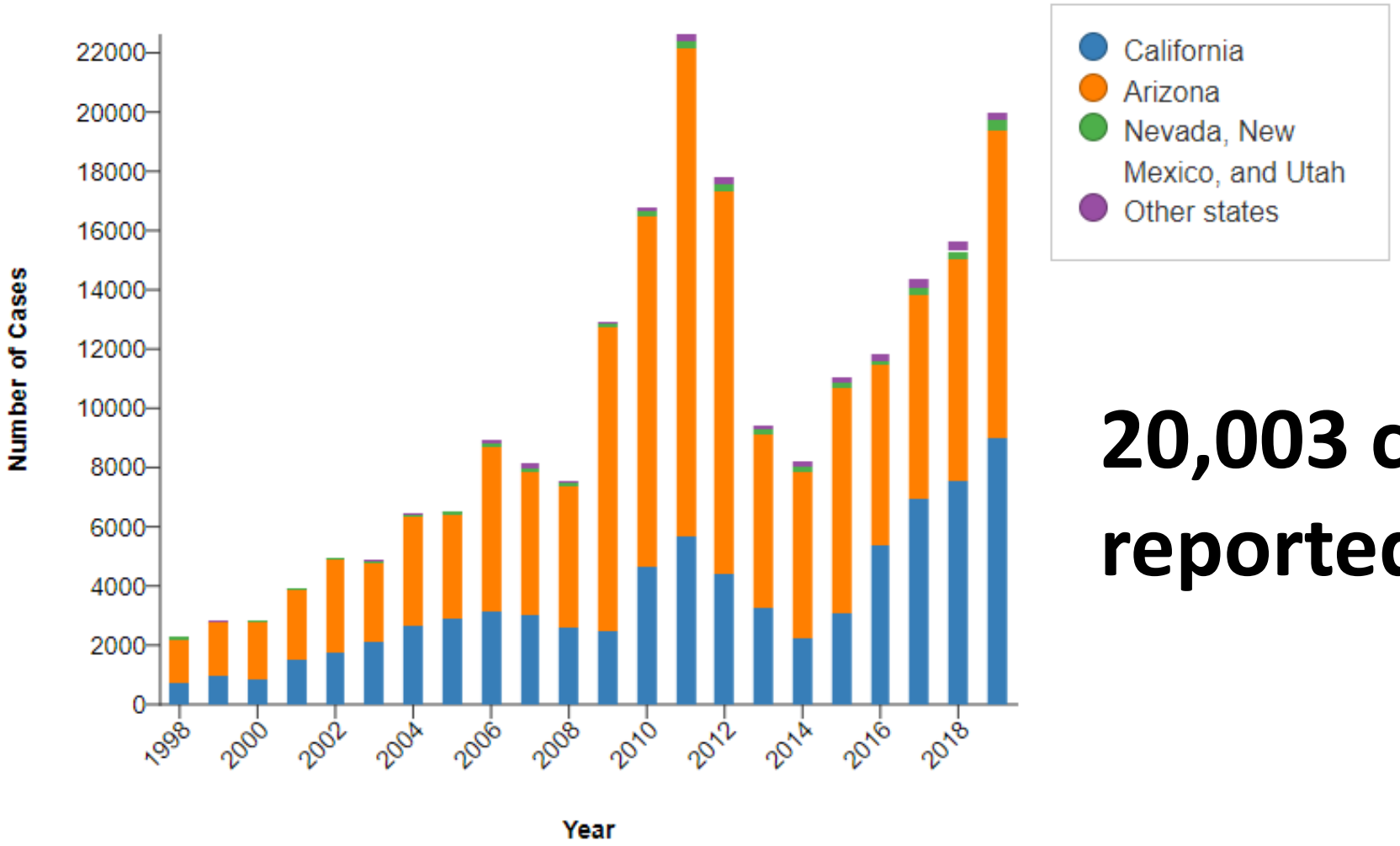
Valley fever has a revised case definition

- Updated 2022 Valley fever case definition passed at the Council of State and Territorial Epidemiologists (CSTE)

- Tiered designation of endemic vs. low/non-endemic states

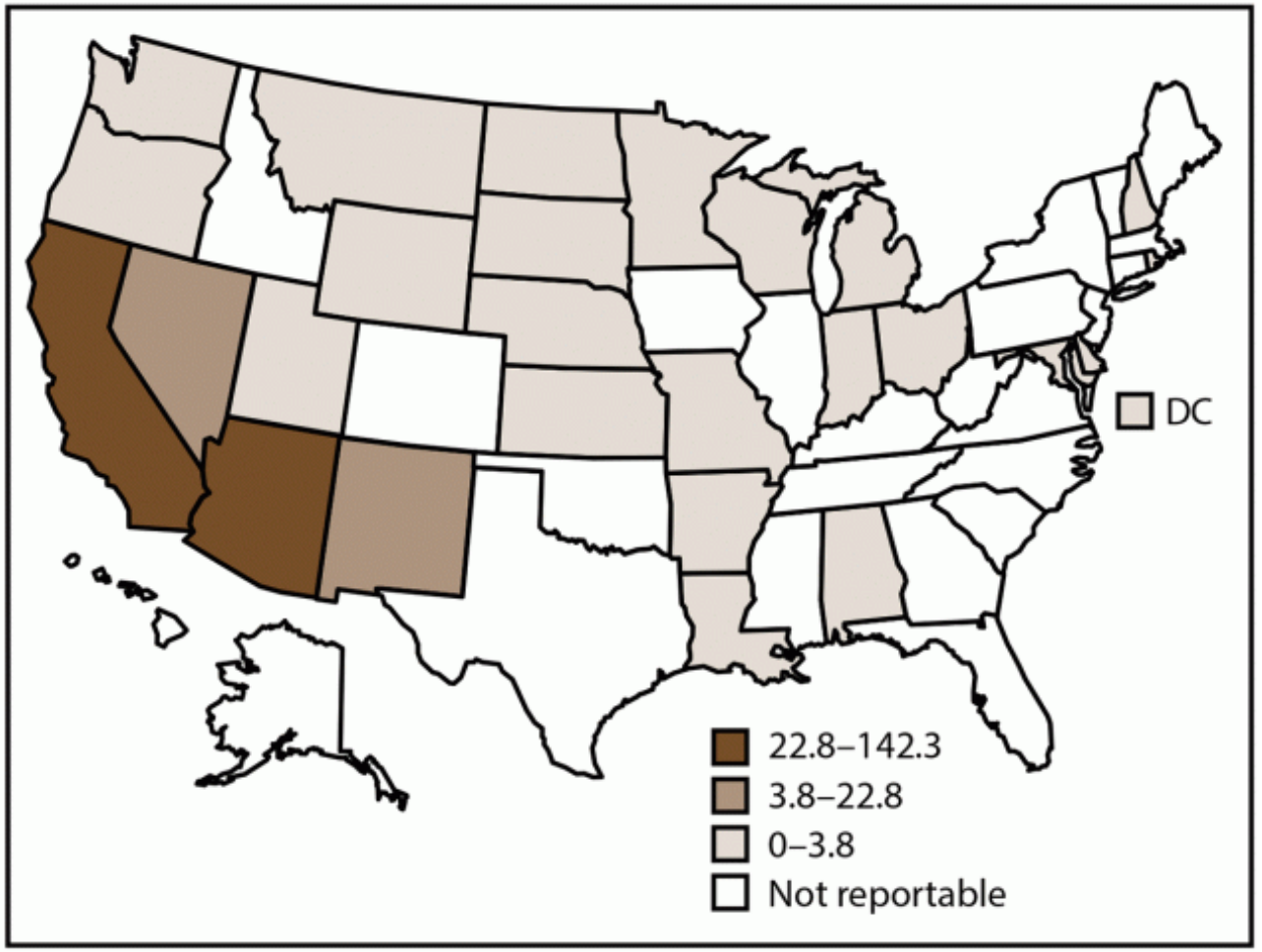
https://cdn.ymaws.com/www.cste.org/resource/resmgr/ps/ps2022/22-ID-07_Coccidioidomycosis.pdf

CDC tracks national Valley fever incidence through the National Notifiable Disease Surveillance System



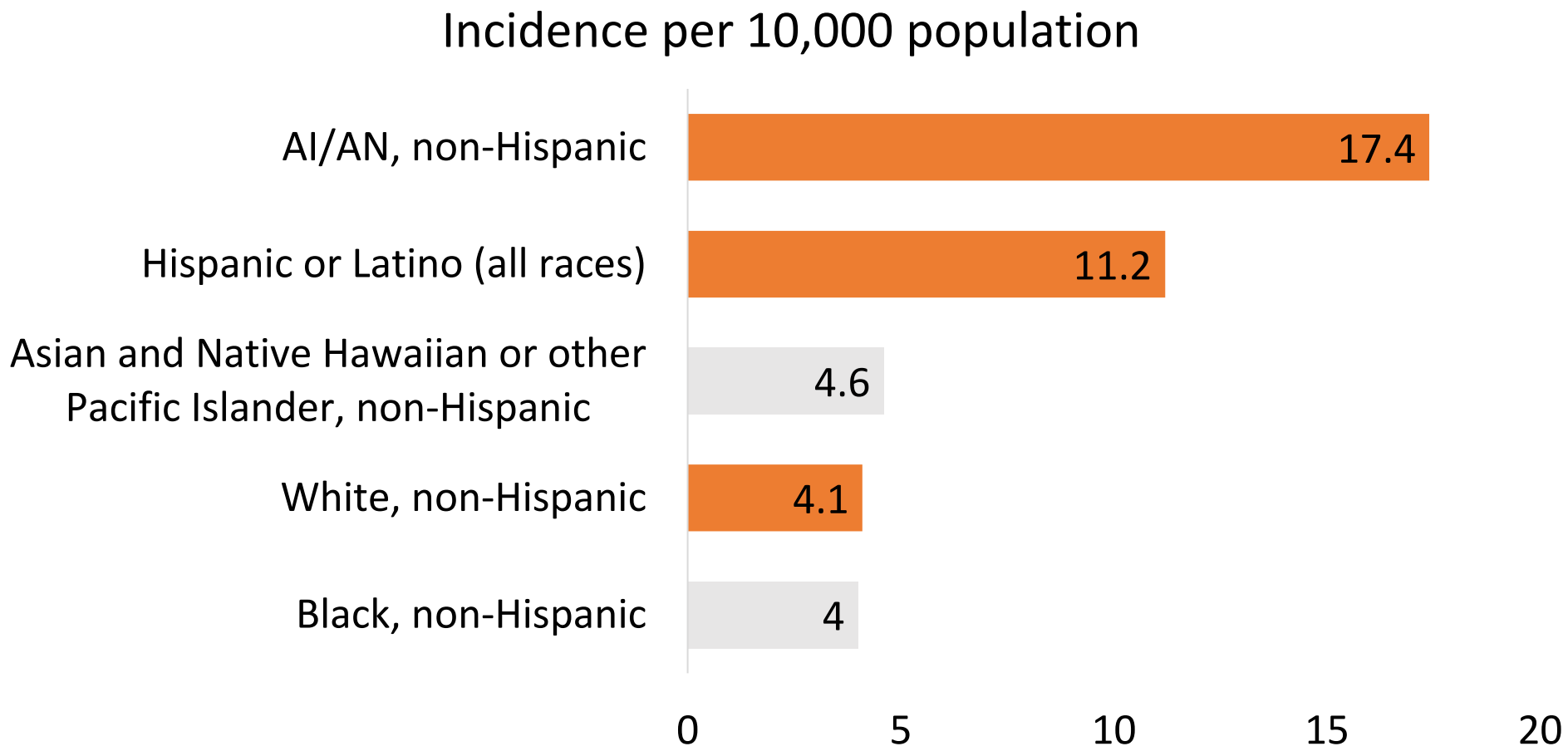
20,003 cases reported in 2019

In 2019, Valley fever incidence ranged from 3.8 to 22.8 per 100,000 in low/non-endemic states



Smith DJ, Williams SL, Endemic Mycoses State Partners Group, et al. Surveillance for coccidioidomycosis, histoplasmosis, and blastomycosis —United States, 2019. MMWR. 2022; 71(7);1–14

AI/AN and Hispanic persons are disproportionately affected by Valley fever



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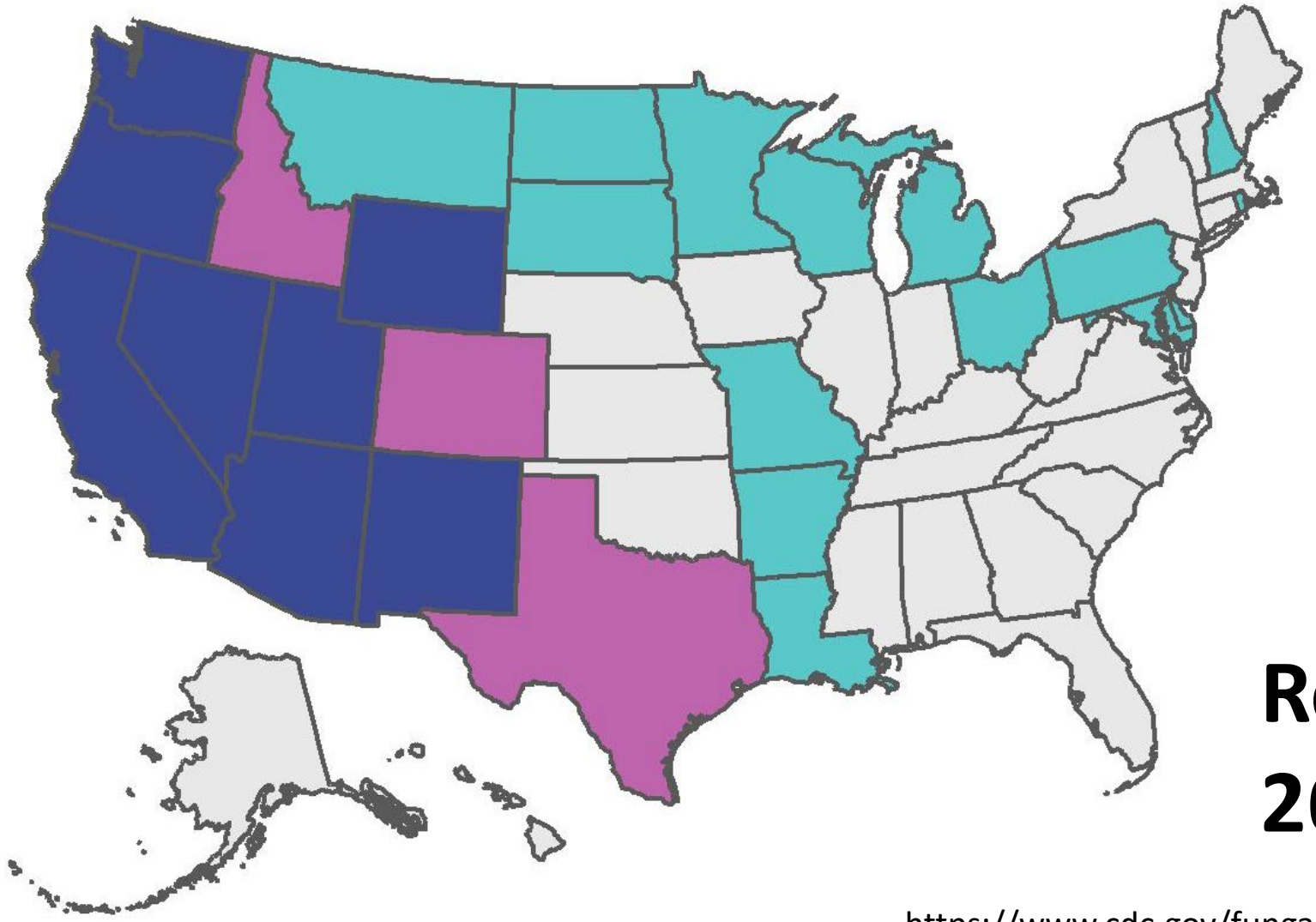
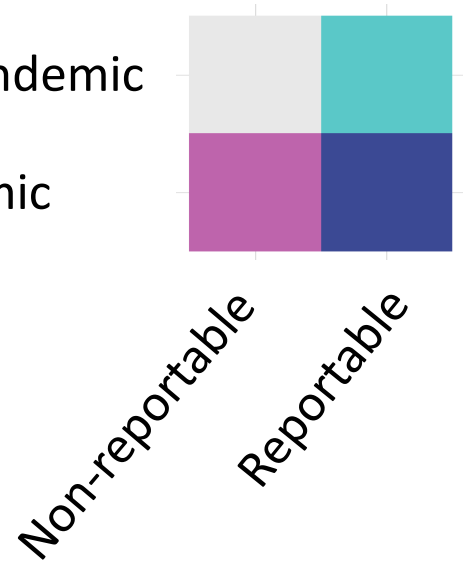
Challenge: Valley fever is not reportable everywhere

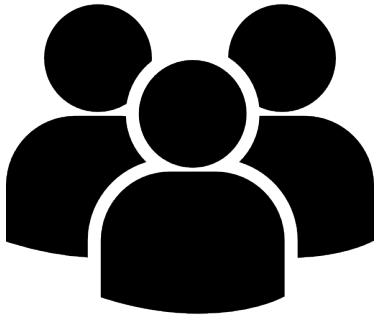




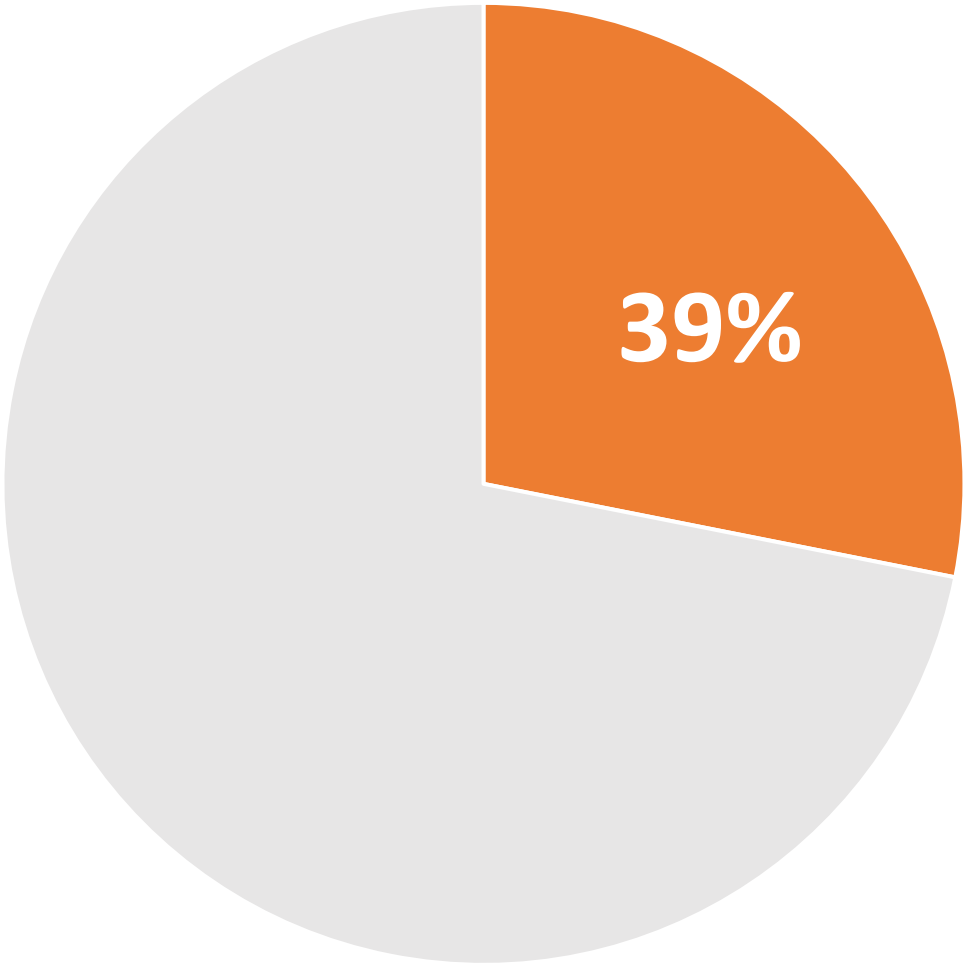
Reportable in only 26 states and DC

https://www.cdc.gov/fungal/fungal-disease-reporting-table.html

Challenge: Race and ethnicity data were available for 39% of Valley fever cases



Race/ethnicity



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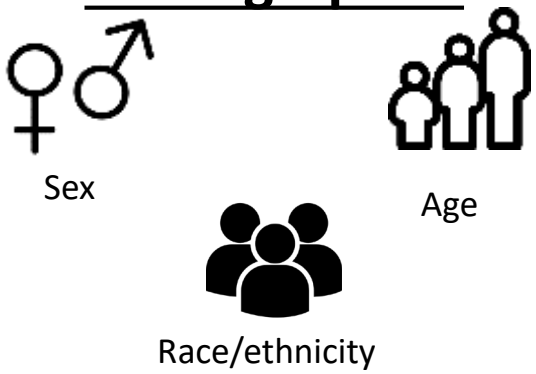
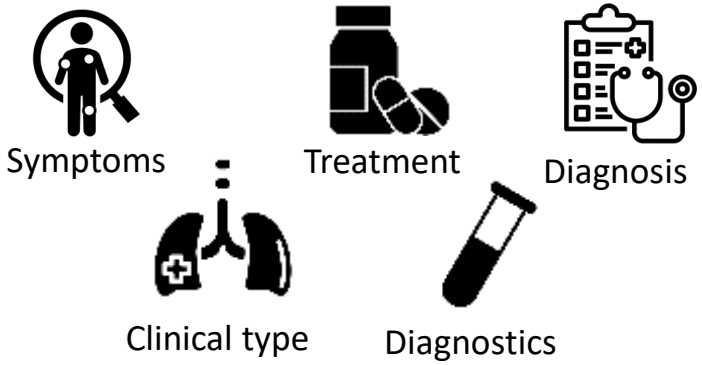
Challenge: Many more pieces are needed

Demographics

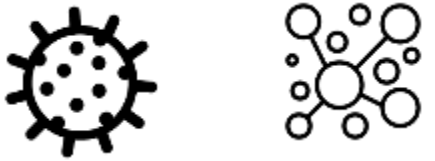


Patient characteristics

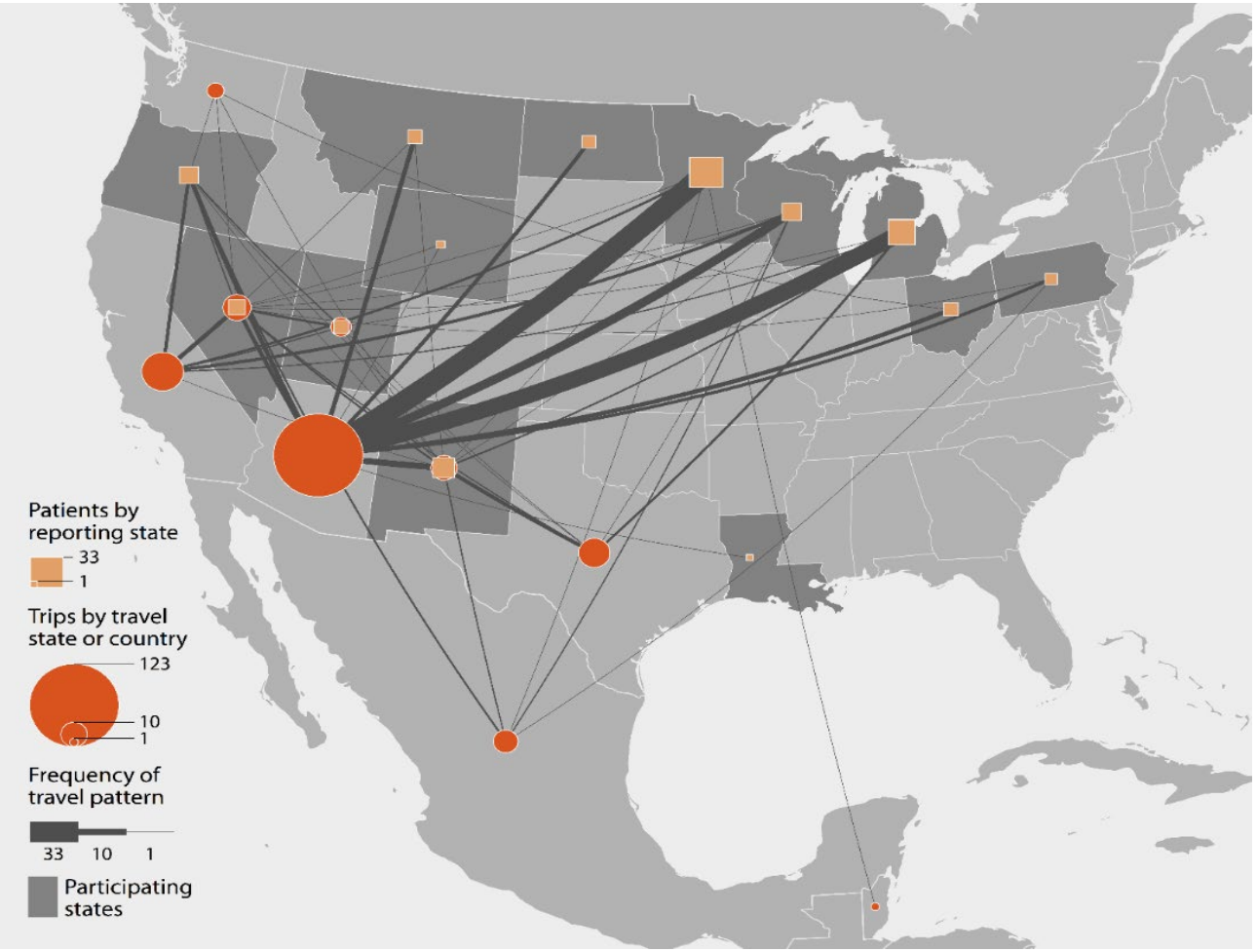
Clinical features



Special circumstances



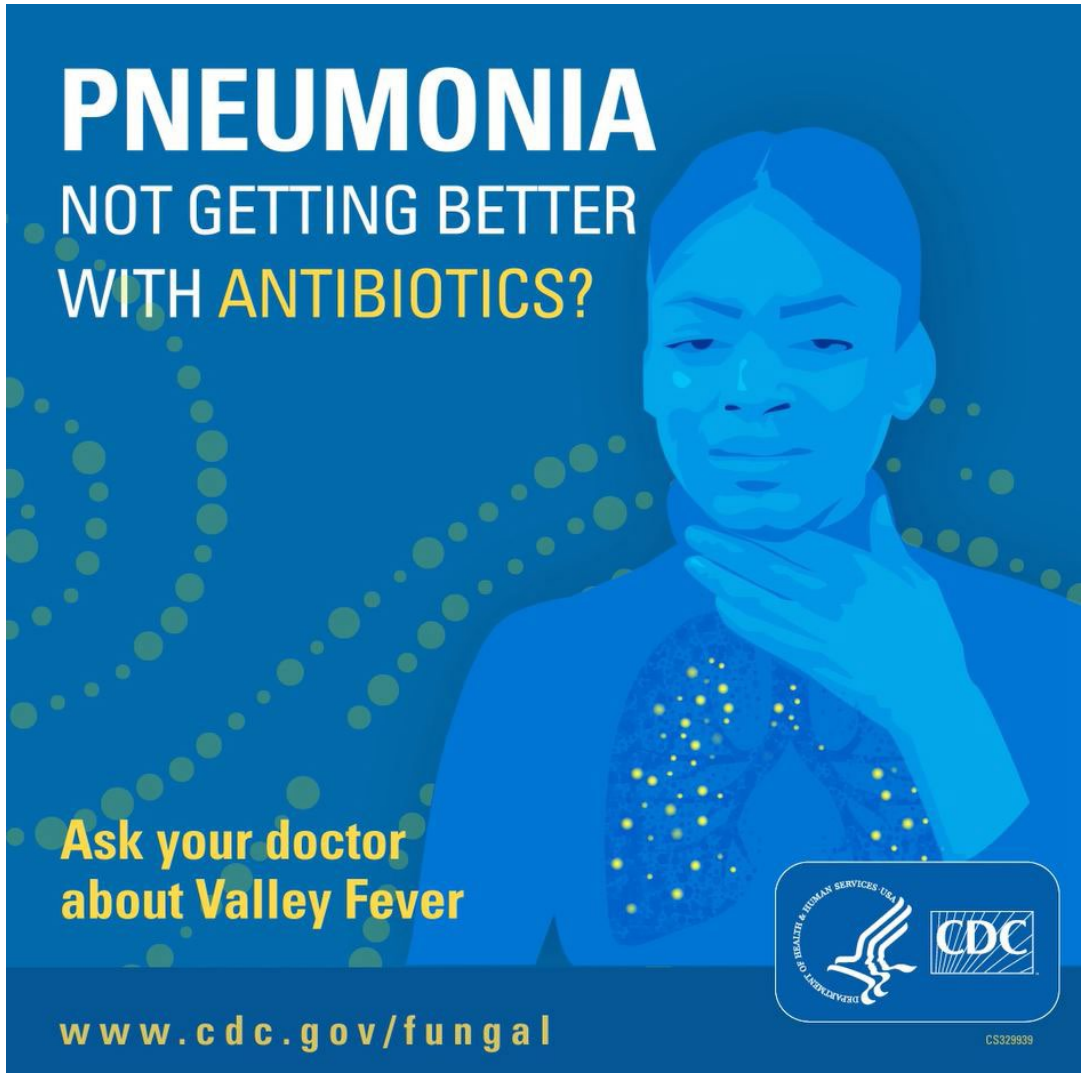
In low and non-endemic states, travel information is critical



- **83%** from nonendemic states traveled to endemic area
- **63%** sought care in endemic state
- 59% from low-endemic and 17% from nonendemic states did not report travel to endemic areas

Benedict K, McCotter OZ, Brady S, Komatsu K, Sondermeyer-Cooksey GL, Nguyen A, Jain S, et al. Surveillance for coccidioidomycosis — United States, 2011–2017. MMWR. 2019; 68:1–15

Valley fever is often mistaken with other conditions



- 54% visited healthcare provider **≥3 times** before being tested
- Median time from seeking healthcare to diagnosis was **38 days** (range 1–1,654 days)
- **70%** had another condition diagnosed first. Prescribed **antibacterial** medications

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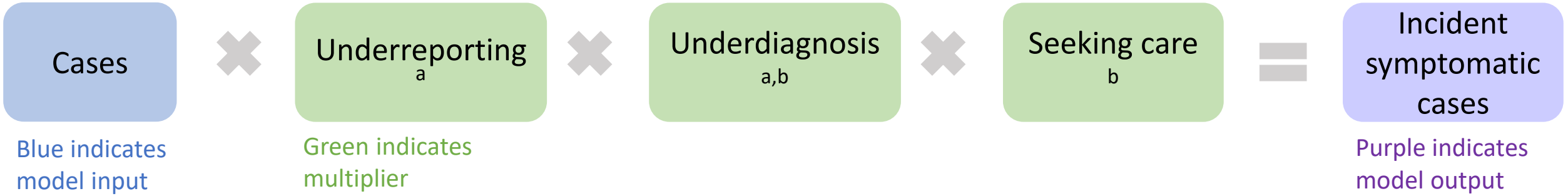
Preliminary national burden estimates

Developed multiplicative model to estimate incident symptomatic cases



a=multipliers are distinct by endemicity (high, low, non-endemic) of state of residence
b=multipliers are distinct by severity of disease (mild vs. hospitalized)

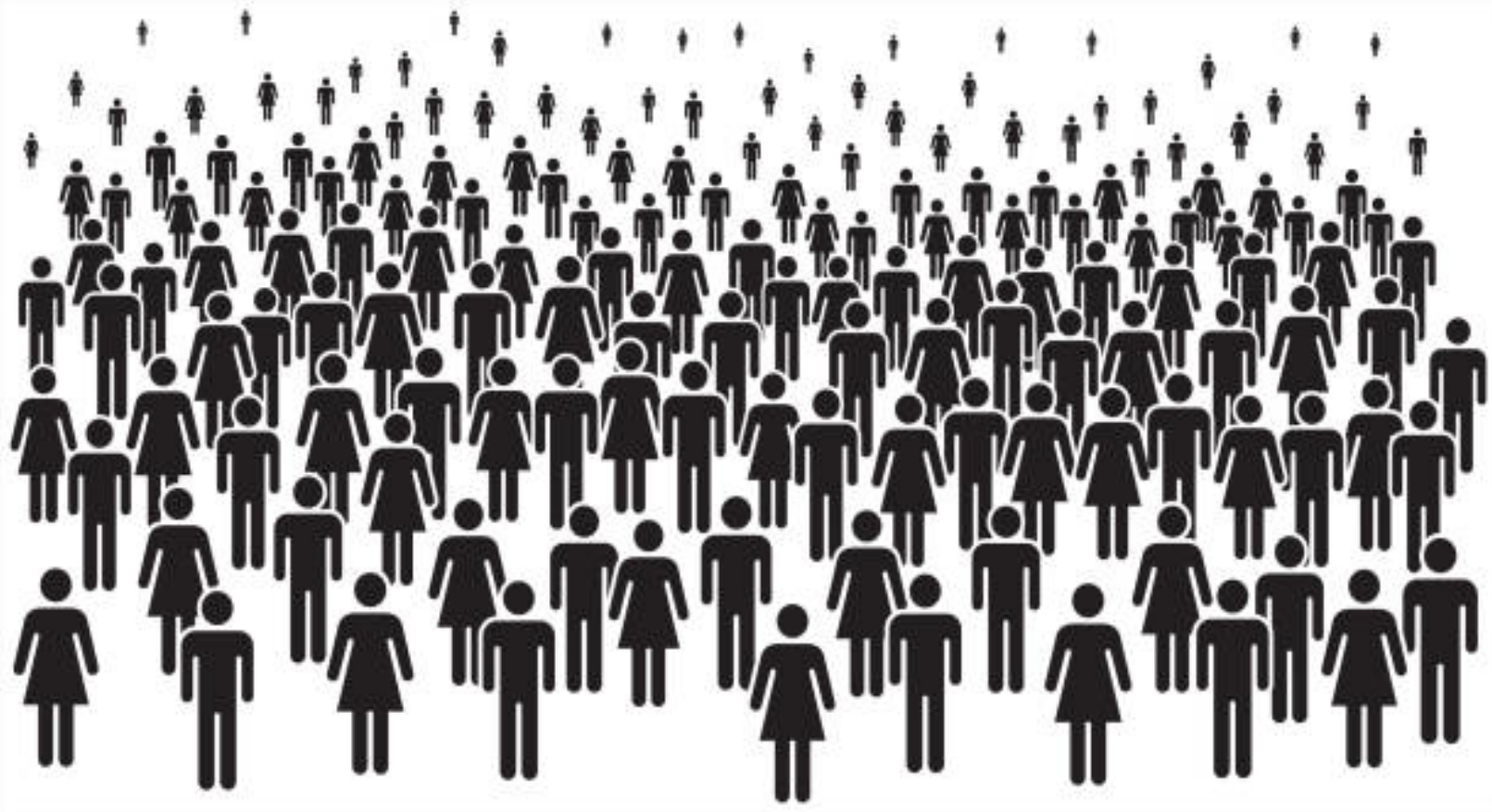
Endemic (CA, AZ)
Low-endemic (NM, NV, UT, WA, TX)
Non-endemic (rest of the states)

Estimation of national burden of Valley fever is challenging!

Underreporting

Underdiagnosis

Healthcare-seeking behavior



Solicited input from clinicians and public health officials

Endemic, low-endemic, and non-endemic regions

Requested estimates from each expert and asked them to rank certainty for each multiplier

1=Not certain at all

5=Very certain

Responses were weighted according to self-reported certainty and area of expertise

Multipliers: Percent reported

- Endemic: 58%
- Low-endemic: 32%
- Non-endemic: 13%

Multipliers: Percent diagnosed: Mild cases

- Endemic: 20%
- Low-endemic: 10%
- Non-endemic: 6%

Multipliers: Percent diagnosed: Hospitalized cases

- Endemic: 28%
- Low-endemic: 14%
- Non-endemic: 8%

Multipliers: Percent seeking care

- Mild: 30%
- Hospitalized: 99%

- Sought care in endemic states*:
  - Non-endemic: 44%
  - Low-endemic: 4%

*Based on enhanced surveillance project

Other considerations

- Applied incidence for non-reportable states

- 40% patients hospitalized
- 60% patients with mild disease

- Multipliers are buffered to add uncertainty
- Estimates based on mean value of 100,000 iterations

Preliminary estimated national burden of symptomatic Valley fever is 33 times reported cases

33 times

reported cases

671,076 [506,257–881,747]

Preliminary estimated national burden of symptomatic Valley fever is 33 times reported cases

Endemic: 385,693 [278,675–527,945]

Low-endemic: 114,323 [77,867–164,895]

Non-endemic: 171,062 [111,960–254,815]

Next steps

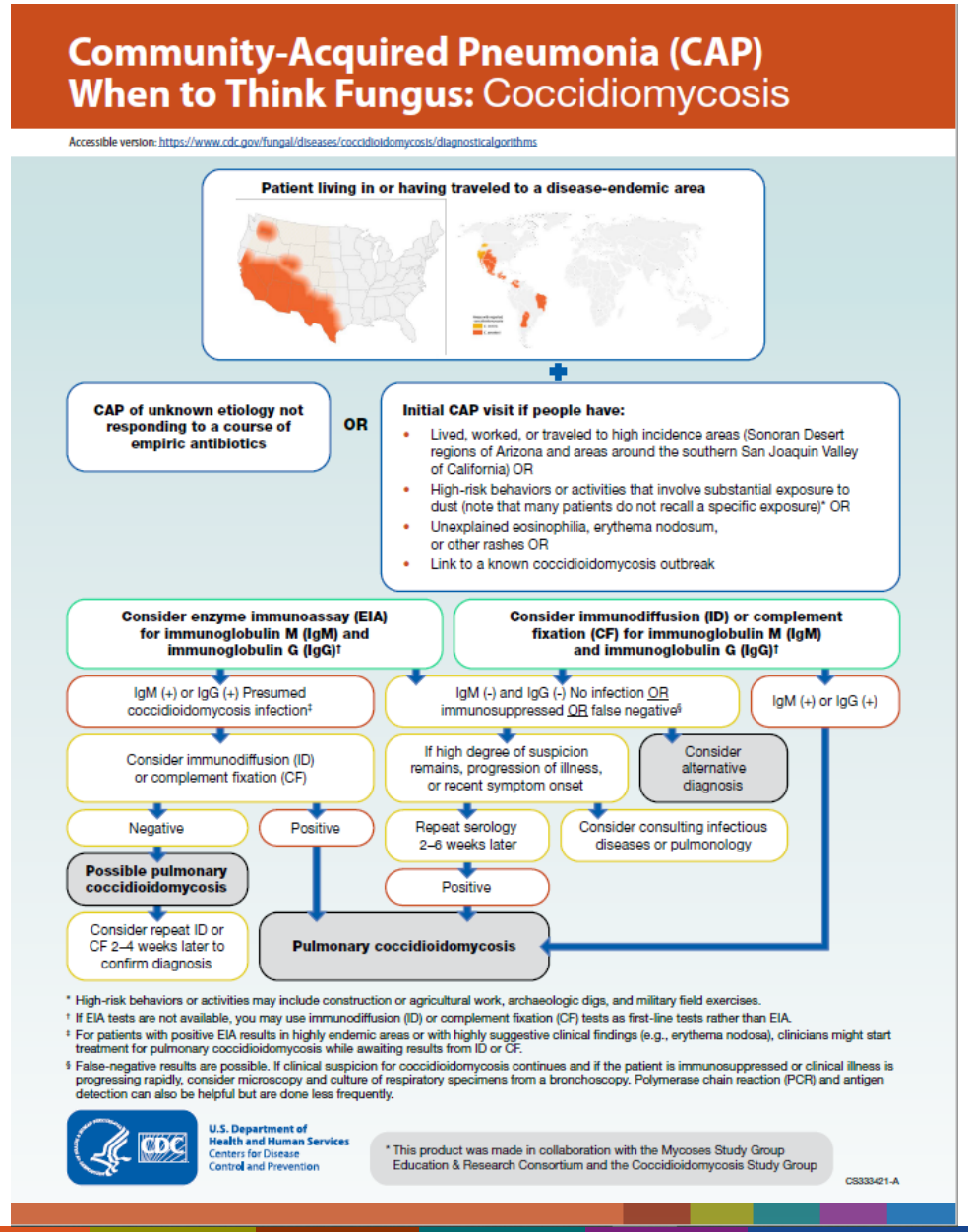
- Include additional years
- Produce secondary outcomes (e.g., hospitalization, death)

Three proposed initiatives

Clinical diagnostic algorithm can help primary and urgent care doctors to diagnose patients earlier

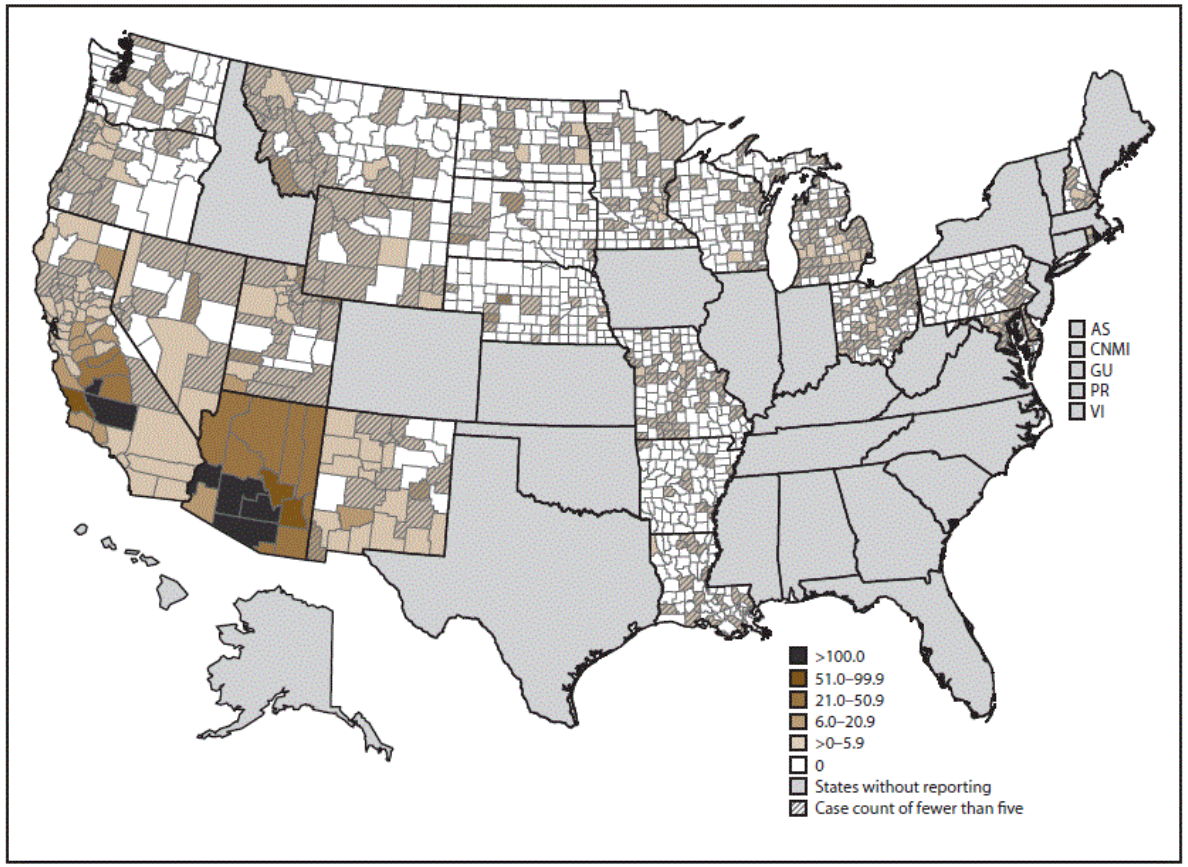
Collaborated with

- Mycoses Study Group
- Coccidioidomycosis Study Group



National fungal surveillance will help enhance our understanding of Valley fever

Collaborate with state partners to implement Fungal Disease Enhanced Surveillance (FungiSurv)



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CocciHub will bring people together

Forecast incidence/risk

Predict endemicity

Predict the impacts of climate change

Collaborative Hubs: Making the Most of Predictive Epidemic Modeling

Nicholas G. Reich PhD, **Justin Lessler**, , **Sebastian Funk** PhD, **Cecile Viboud** PhD, **Alessandro Vespignani** PhD, **Ry**
Tibshirani PhD, **Katriona Shea**... (show all authors)

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Collaborative Hubs: Making the Most of Predictive Epidemic Modeling

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provided governments, healthcare agencies, and the public with assessments and forecasts that reflect the consensus in the modeling community.[3-6] This has been achieved by openly synthesizing uncertainties across different modeling approaches and facilitating comparisons between them.

USING MODELS TO SEE INTO THE FUTURE

Epidemic models can give insight into the future course of an epidemic,

Quick summary

Summary

- Valley fever is nationally notifiable in the United States, but suffers from many challenges
- Estimated burden of symptomatic cases is approximately 33 times more than what is reported nationally
- Partnership is essential to improve our understanding of Valley fever in the Americas

Thank you

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TTY: 1-888-232-6348 www.cdc.gov