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Valley Fever Is an Occupational Illness: Let's Get the Data to Prevent It

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ABSTRACT

Valley fever is a fungal disease acquired through inhalation of spores of the fungus *Coccidioides*. Spores become airborne when soil is disturbed, making outdoor workers, such as agricultural or construction workers, at higher risk of exposure and disease. Valley fever is endemic and increasing in the American Southwest, with numerous documented outbreaks among construction crews, archeologists, prison employees, wildland firefighters, and military personnel. Valley fever is recognized as a work-related disease in California, but not Arizona or other states with endemic disease. Epidemiologists require surveillance data with patient industry and occupation to make the case to clinicians, legislators, and employers that Valley fever is an occupational disease that can be prevented through tailored interventions. Valley fever is a reportable disease in 28 states, including California and Arizona, and Washington, D.C.; however, most case reports are sent through automated lab reports or manual case reporting, which seldom include information about industry or occupation. Electronic case reporting (eCR), in which automated disease reports are sent to public health agencies from health care facilities via electronic medical records, provides a new pathway to streamline case reporting and is more conducive to inclusion of industry and occupation data in case reports. Occupational reporting through eCR would help build the epidemiological base to identify worker populations with excess cases of Valley fever, to identify occupational clusters, facilitate early outbreak detection, provide evidence for worker compensation claims of work-related infections, and support the development of more protective legislation to train and educate workers on prevention methods.

The location and nature of an individual's work directly influence their socioeconomic status and their risk of toxic exposures, making occupation a critical social and environmental determinant of health [1]. Workers generally have higher exposures to chemical and physical hazards than the general population, and workplace exposures are not evenly distributed across workplaces. Work-related disease rates also vary differ by race, ethnicity, income, and nativity, due in part to occupational segregation leading to higher exposures among marginalized groups [2, 3]. This is the case for Valley fever, a disease caused by inhalation of spores of the fungus *Coccidioides*, with symptoms including fatigue, cough, fever, headache, muscle ache and joint pain, shortness of breath, night sweats, or rash on upper body and legs. *Coccidioides* grows in the soil of states in the American Southwest, including California and Arizona. Spores become airborne when soil is disrupted, making outdoor workers, such as agricultural or construction workers, at higher risk of exposure and disease.

Incidence of Valley fever has been increasing in the last decade: surveillance data indicate record numbers of Valley fever cases

reported statewide in California (> 12,500) and Arizona (> 15,000) in 2024, almost tripling in California and doubling in Arizona since 2015 [4, 5]. There have been numerous documented outbreaks of Valley fever among construction crews, archeologists working at field sites [6], prison employees, wildland firefighters [7], and military personnel [8], and elevated incidence among agricultural workers [9]. These outbreaks have primarily been detected through reporting by local health jurisdictions; review of doctors' first reports; and outreach from concerned patients, unions, clinicians, or other organizations, as opposed to generating reports through passive disease surveillance. Valley fever is recognized as a work-related disease in California, where employers are required to report workers with suspected Valley fever symptoms and physicians must submit reports under Title 8 of the California Code of Regulations [10]. However, it is not recognized as work-related in Arizona, which reports roughly two-thirds of all Valley fever cases in the US.

In California, the recognition of the high risk for Valley fever among construction workers led to the passage of Assembly Bill 203 (AB 203) in 2019, which requires employers to educate construction workers annually on the risks of contracting the disease through disruption of soil in counties where Valley fever is highly endemic [11]. AB 203 was a step forward in recognizing—and mitigating—the increased risk of Valley fever posed by outdoor work in California. However, the bill only pertains to construction work, even as other outdoor workers are known to be at risk. In Arizona, a high baseline incidence of Valley fever has made occupation-related outbreak detection challenging and has underpinned the rejection of several workers' compensation lawsuits [12].

It is imperative that diseases like Valley fever, for which worker populations may be at much greater risk of exposure than the general population, are recognized as work-related illnesses. First, recognition of the disease as work-related may help to raise clinical suspicion of Valley fever as a cause of community-acquired pneumonia (CAP). The current US Centers for Disease Control and Prevention testing algorithm for Valley fever, which recommends testing in patients with CAP who have links to known outbreaks, live or have traveled to endemic areas, or have symptoms that did not improve with antibiotics [13], could be updated to include recommendations to test for Valley fever among those with occupations known to have high-risk for exposure. Testing for Valley fever as the cause of CAP [14], especially among populations at higher risk of contracting the disease, enables earlier diagnosis, more responsive treatment, and case management that could reduce the risk of prolonged, severe disease and time off work. Second, identification of occupations with higher risk would support public health and legislative actions (similar to AB 203) to protect workers through increased training and education requirements, to educate workers on their risks and enable them to talk to their doctors about Valley fever, and to promote control measures such as wetting soil to reduce dust exposures.

To make the case to clinicians, legislators, and employers that Valley fever is an occupational disease that can be prevented through tailored interventions, epidemiologists need surveillance data to include patients' current or most recent job. These industry and occupation data would allow researchers to assess variations in incidence rates across occupations and to identify occupations with higher rates of infection. Valley fever is a reportable disease in 28 states, including California and Arizona, and Washington, D.C., meaning that all diagnosed cases should be reported to the local and state public health agency. However, the vast majority of case reports are sent through automated lab reports, which do not include information about industry or occupation. Some case reports are received through manual case reporting. While reportable infectious disease case forms include sections for occupational history and other exposure information, most cases reported to the state lack usable information on current or most recent job and work-related exposures (Figure 1).

New pathways for infectious disease case reporting may be more conducive to incorporating industry and occupation data. For example, electronic case reporting (eCR), in which automated disease reports are sent to public health agencies from health care facilities via electronic medical records, has been implemented in the U.S. to facilitate initial case reports of COVID-19 and mpox. Initial case reports are generated via eCR when certain trigger criteria, such as diagnosis codes or laboratory results, are entered into patient medical records by healthcare providers.

eCR provides a promising opportunity for increasing the number and completeness of infectious disease case reports. A preliminary study of the use of eCR for surveillance of silicosis in California from December 2022 to July 2023 found that almost 80% of probable silicosis cases reported through eCR were not identified through other reporting mechanisms like manual case reporting forms; of confirmed cases, almost 90% of case reports included industry and occupation information [15]. It is true that healthcare providers are more likely to collect industry and occupation data for silicosis than Valley fever, as silicosis is widely recognized as an occupational illness, and California state law suggests that silicosis case reports should include employer information and information about occupational exposure to respirable crystalline silica [16]. Providers may be less likely to collect occupational data as part of their diagnosis for Valley fever, with the exception of work in construction, leading to less frequent inclusion of recent occupational history in patient records. Diseases not yet considered to be work-related may be even less likely to have accompanying occupational data with diagnoses, limiting our ability to detect and protect workers at high risk for work-related illness.

While eCR is an excellent method to streamline case reporting, it will not improve the availability of occupational data for epidemiological study unless those fields are completed by healthcare providers in the electronic health record (EHR). It is imperative that clinicians collect occupational data as part of the patient's social history in the EHR. Efforts by the National Institute for Occupational Safety and Health to provide guidance, improve interoperability, and streamline coding of occupation and industry in health information technology and medical record systems support patient care and public health [17]. It is especially important for clinicians to collect industry and occupation data for patients living or working in highly endemic states. Although electronic medical records and eCR are not standardized across all reporting entities, models of occupational data collection for health are being updated in efforts to standardize

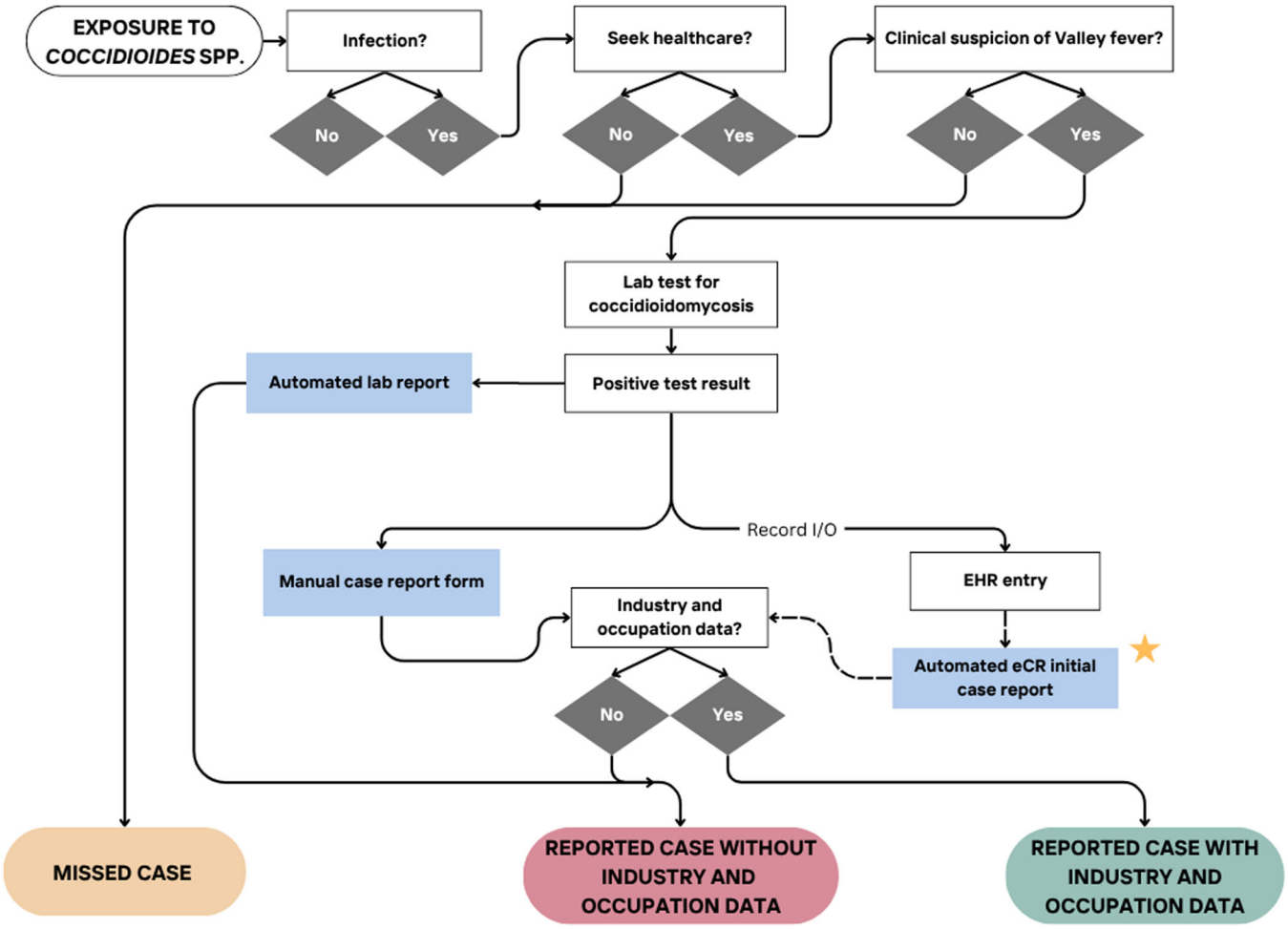

FIGURE 1 | Process from exposure to *Coccidioides* spp. to case reporting for public health surveillance with or without industry and occupation data. Dashed arrow and yellow star indicate potential method of reporting cases to surveillance through automated initial case reports via electronic case reporting (eCR). Blue boxes show three reporting mechanisms for cases. Red oval indicates cases in surveillance record without occupational data, yellow oval indicates missed cases in the surveillance record, and green oval indicates reported cases with occupational data. I/O, industry and occupation data; EHR, electronic health record.

work information [18]. Education about occupational exposure risks for Valley fever could help clinicians to understand the importance of their roles in eliciting a recent work history for patients who seek care [19, 20].

Infectious disease reporting through eCR with completed industry and occupation data would help build the epidemiologic base to identify worker populations with excess cases of Valley fever. Our understanding of the relationship between work and Valley fever would remain limited to states that report Valley fever [21], but eCR would be especially useful to understand work-relatedness in states of high endemicity with locally acquired cases. While outbreaks have already provided strong initial evidence of high occupational risk of exposure [8], they are likely an undercount. Reporting of occupation through eCR would allow for rapid and real-time identification of potential occupational outbreaks, as opposed to relying on reports from local health jurisdictions, doctors' first reports, or patients themselves. This would also help to provide evidence for workers' compensation claims of work-related infection and support the development of more protective legislation, like AB 203, to train and educate workers on prevention methods. Occupational reporting in Valley fever surveillance data is an essential step to prevent this disease among highly-exposed worker populations.

Author Contributions

Juliana G.E. Bartels wrote the first draft of the manuscript, and Jennifer R. Head, Simon K. Camponuri, and Ellen A. Eisen provided critical feedback. Ellen A. Eisen made the final decision to submit for publication.

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Conflicts of Interest

The authors declare no conflicts of interest.

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