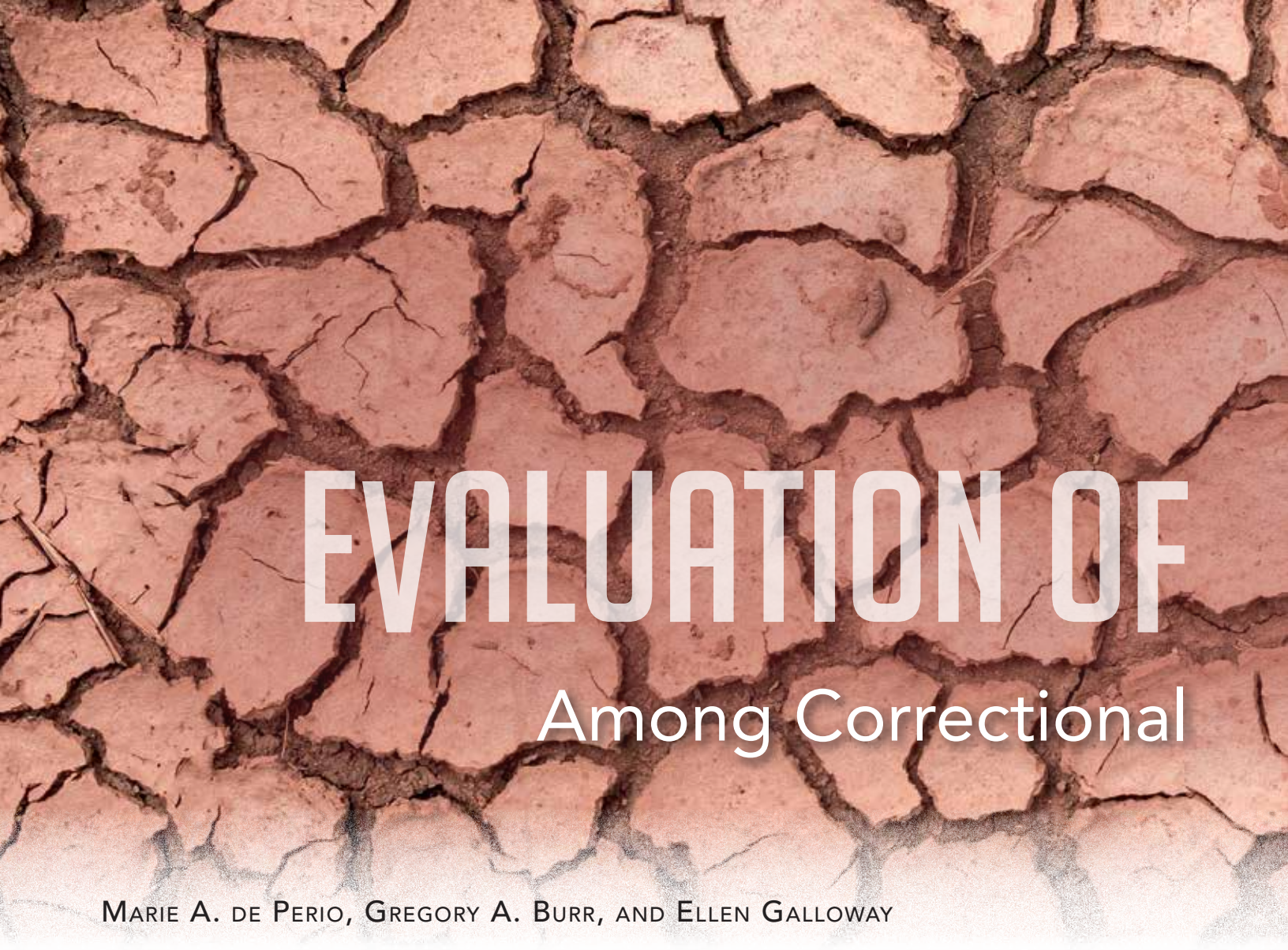


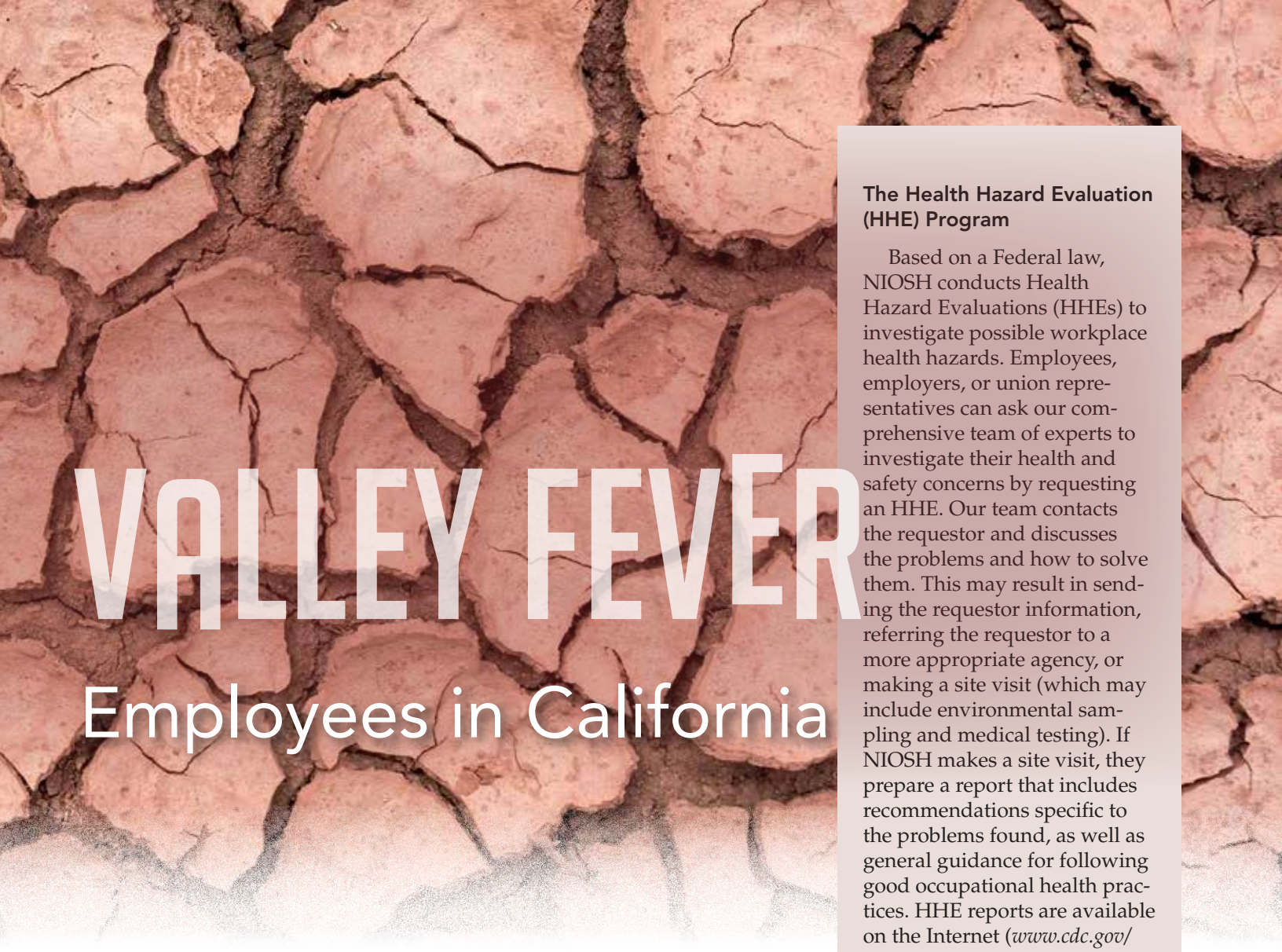
EVALUATION OF Among Correctional

Marie A. de Perio, Gregory A. Burr, and Ellen Galloway

California corrections agency managers asked the Health Hazard Evaluation (HHE) Program to investigate Valley Fever among employees in two prisons in the Central Valley of California. The HHE Program is in the National Institute for Occupational Safety and Health (NIOSH), a part of the Centers for Disease Control and Prevention (CDC). The HHE Program investigates possible workplace health hazards under the authority of the Occupational Safety and Health Act of 1970 and provides recommendations to prevent occupational injury and illness and hazardous exposures.

Valley Fever, also known as coccidioidomycosis, is an infection caused by inhaling spores of the fungus *Coccidioides*. The fungus grows in soil in semiarid areas including the southwestern United States, the Central Valley of California, Mexico, and parts of Central and South America (CDC, 2014). In the United States, an estimated 150,000 new infections occur each year (Galgiani et al., 2005). Most people who get the disease live in, work in, or visit places where the fungus is in the soil and engage in activities that expose them to soil dust. Such activities include construction, agricultural work, military field training, and archeological exploration.

Approximately 60 percent of Valley Fever infections are asymptomatic (Chiller, Galgiani, & Stevens, 2003), meaning that the infected person has no signs or symptoms related to the infection. People who develop symptoms may experience a flu-like illness with fever, cough, headache, rash, and muscle aches that resolves without treatment. Sometimes doctors prescribe antifungal medications for the infection. A small percentage of infected persons (less than 1%) develops widespread (disseminated) disease where the infection spreads from the lungs to other parts of the body, such as the skin, bones, and central nervous system (Chiller, Galgiani, & Stevens, , 2003). People at increased risk for severe lung disease are the elderly, those with diabetes or who have smoked, and those of lower socioeconomic status (CDC, 2014). People at greater risk for developing disseminated disease include African-Americans and those of Asian (particularly Filipino) descent, pregnant women during their third trimester, and immunocompromised persons (CDC, 2014).



VALLEY FEVER

Employees in California

The two correctional facilities included in the investigation are on 640 acres in two of six California counties where Valley Fever is considered hyperendemic (that is, it has high and continued incidence). Facility A, a minimum-maximum security facility, employed about 1,300 custody and support staff, while Facility B, a minimum-medium security facility, employed about 1,500. In the two counties, annual rates of new cases of Valley Fever are higher than rates for the State. In addition, annual rates of new cases of Valley Fever have been much higher among inmates at these two correctional facilities. Corrections agency managers asked the HHE Program to investigate the incidence of Valley Fever among employees at the two facilities and to recommend ways to decrease the risk for exposure.

The Evaluation

We used corrections employee rosters and California Department of Public Health records for 2009 to mid-2013 to identify confirmed cases of Valley Fever among corrections staff. We counted people who had certain symptoms and a positive laboratory test for the infection. We identified 103 cases of Valley Fever over the 4.5-year period; 65 among Facility A employees and 38 among Facility B employees. One hundred of the cases lived in one of the six hyperendemic counties.

Of the 103 employees with Valley Fever, 84 (82%) were male; the median age was 43 (range: 24–67) years, and the median time worked at the facility before symptoms began was 5 years (range: 2 months–23 years). The most common job categories were custody

The Health Hazard Evaluation (HHE) Program

Based on a Federal law, NIOSH conducts Health Hazard Evaluations (HHEs) to investigate possible workplace health hazards. Employees, employers, or union representatives can ask our comprehensive team of experts to investigate their health and safety concerns by requesting an HHE. Our team contacts the requestor and discusses the problems and how to solve them. This may result in sending the requestor information, referring the requestor to a more appropriate agency, or making a site visit (which may include environmental sampling and medical testing). If NIOSH makes a site visit, they prepare a report that includes recommendations specific to the problems found, as well as general guidance for following good occupational health practices. HHE reports are available on the Internet (*www.cdc.gov/niosh/hhe/*).

For resources and links:

- **NIOSH HHE Program information**
  www.cdc.gov/niosh/hhe/HHEprogram.html
- **CDC/NIOSH Valley Fever website**
  www.cdc.gov/niosh/topics/valleyfever/default.html

For more detailed information on the methods, results, and recommendations of this evaluation, visit *www.cdc.gov/niosh/hhe/reports/pdfs/2013-0113-3198.pdf* and the article entitled, "*Coccidioides* Exposures and Coccidioidomycosis Among Employees at Two California Prisons" in the June 2015 issue of *Emerging Infectious Diseases*.

Prison B located in an arid, hyperendemic area of the Central Valley of California. There is little natural vegetation on the grounds and in the surrounding areas. Photograph by NIOSH.

(72%), healthcare (11%), administration (10%), and plant operations (2%).

We invited a non-random sample of 172 employees from all job categories at both facilities to participate in confidential interviews about their work, exposures, and medical history. Five percent of interviewed employees reported their race as Filipino, and 3 percent as black or African-American. Both races are associated with a higher risk of developing disseminated disease. The median number of years living in any hyperendemic county in California was 35 (range: 0.5–67) years. Of the interviewed employees, 35 (20%) reported that they had one or more underlying medical conditions that placed them at high risk for severe disease or disseminated disease. These medical conditions included asthma, emphysema, diabetes mellitus, immunosuppression from medication, heart disease, kidney disease, and cancer requiring chemotherapy or radiation therapy.

We interviewed employees from all job categories, including custody, administration, plant operations, healthcare, and education. Nearly all interviewed employees reported engaging in outdoor work activities including walking around the grounds, performing security checks, patrolling, performing maintenance, and landscaping. The median time spent outdoors during the work day for these employees was 1.5 hours (range: 10 minutes–9 hours). Forty-two (24%) employees reported engaging in soil disruption activities during their job, including grid searches, digging for contraband, and drilling or digging for maintenance and repairs. For these employees, the median time spent performing outside work was two hours per day (range: 0–9 hours).

In addition to individual interviews, investigators met with staff to learn about efforts to lessen the dust generated during outdoor job tasks. Efforts to reduce dust exposure at both facilities included wetting soil before disrupting it, reducing shallow plowing, applying a soil stabilizer, and planting grass and other vegetation. Maintaining or restoring vegetation and grass on the grounds is challenging because of water restrictions.

Discussion and Recommendations

Anyone who lives in endemic areas in the southwestern United States (Arizona, California, Nevada, New Mexico, Texas, or Utah) can get Valley Fever. Those in correctional facilities in these areas, particularly those working outdoors, may be at higher risk. We identified 103 cases of Valley Fever among facility A and B employees from 2009–mid 2013. The majority of corrections employees with Valley Fever lived in a hyperendemic area, and our interviews found that employees are likely exposed to *Coccidioides* both at work and outside of work. Correctional facilities in endemic areas should familiarize themselves with the infection and ways to prevent it.

Although the correctional facilities have attempted to maintain and/or restore vegetation and grass on their grounds, which would help secure the soil—this task is difficult because of water restrictions in these drought-prone areas. In addition, they tried various methods to decrease the disruption of soil, such as reducing soil disking, paving roads, and wetting soil before disturbing it. Although these methods can reduce dust levels and reduce dispersion of *Coccidioides* spores, little data are available to show the effectiveness of these measures in reducing airborne spore levels and preventing work-related Valley Fever. Airborne spores can travel for miles. In addition, these reduction measures neither destroy the organ-

ism nor prevent dust outside the facility grounds from coming inside.

It is important that workers understand the potential hazards related to their work and how to protect themselves. We recommend the following actions to managers of corrections agencies in endemic areas:

- Weigh the advantages and disadvantages of various environmental control efforts to reduce dust exposures.
- Provide employees with education and training about Valley Fever symptoms and transmission, risk factors for disseminated disease, and ways to minimize exposures.
- Close prison yards and stop work during dust storms or high winds.
- Consider using the recently available coccioioidal spherulin skin test to determine if employees have been exposed to *Coccidioides* and to identify at-risk employees.
- Use NIOSH-approved respirators as part of a respiratory protection program for employees who work outside on unusually dusty days or who may perform job tasks that disturb soil.

These recommendations would apply to other correctional facilities in endemic areas where workers may be at risk. Workers that develop symptoms of Valley Fever should contact their healthcare providers. ■

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Author's Disclaimer: The findings and conclusions in this report presented here are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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