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COVID-19 Case Investigations Among Federally Quarantined Evacuees From Wuhan, China, and Exposed Personnel at a US Military Base, United States, February 5-21, 2020

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Abstract

In February 2020, during the early days of the COVID-19 pandemic, 232 evacuees from Wuhan, China, were placed under federal 14-day quarantine upon arrival at a US military base in San Diego, California. We describe the monitoring of evacuees and responders for symptoms of COVID-19, case and contact investigations, infection control procedures, and lessons learned to inform future quarantine protocols for evacuated people from a hot spot resulting from a novel pathogen. Thirteen (5.6%) evacuees had COVID-19-compatible symptoms and 2 (0.9%) had laboratory-confirmed SARS-CoV-2. Two case investigations identified 43 contacts; 3 (7.0%) contacts had symptoms but tested negative for SARS-CoV-2 infection. Daily symptom and temperature screening of evacuees and enacted infection control procedures resulted in rapid case identification and isolation and no detected secondary transmission among evacuees or responders. Lessons learned highlight the challenges associated with public health response to a novel pathogen and the evolution of mitigation strategies as knowledge of the pathogen evolves.

Keywords

COVID-19, coronavirus, federal quarantine, repatriation

COVID-19 is a predominantly respiratory illness caused by SARS-CoV-2. The disease was first reported in December 2019 in Wuhan, the capital of Hubei Province, China.^{1,2} Because little was known about the infectiousness and pathogenicity of SARS-CoV-2 and to slow the introduction of COVID-19 to the United States, the US government announced a policy on January 31, 2020, to quarantine for 14 days people entering the United States from Hubei Province.³ During January and February 2020, the US Department of State chartered 5 flights to evacuate US citizens, permanent residents, and their family members from Hubei Province.⁴ Two flights carrying a total of 232 evacuees arrived at a military base in Southern California on February 5 and 7, 2020.

The purpose of this case study is to inform future public health responses with evacuees from hot spots resulting from novel pathogens. We describe monitoring of evacuees and responders for signs and symptoms of COVID-19, case and contact investigations, infection control procedures related to the quarantine of evacuated people from Hubei

Province, and lessons learned about the operation of federal quarantine.

Methods

Setting

Evacuees were assigned to 1 of 2 sites on the military base in San Diego, California, for the required 14-day quarantine.⁵

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The sites typically serve as hotels for military personnel and their families. A fence surrounded each site to create a contained quarantine zone, and the US Marshals Service safeguarded entrances to the sites from unauthorized entry or exit. One site housed primarily families and the other primarily couples and solo travelers. The flights arrived 2 days apart, and each site housed evacuees from both flights. Responders from the US Department of Health and Human Services (HHS) provided medical services, daily temperature and symptom screenings, and case management services at both sites. Other quarantine site responders included emergency medical services (EMS) for the transport of evacuees to the hospital as needed and local public health officials to assist with coordination of the response. Contract staff members provided meals, janitorial services, laundry, and language interpretation.

Monitoring of Evacuees and Responders

Because time spent in Hubei Province constituted a high-risk exposure to COVID-19, evacuees were issued federal quarantine orders upon arrival at the base.^{6,7} Evacuees self-monitored their temperature and had their temperature taken by a responder each day. Evacuees were also monitored twice per day for signs and symptoms of COVID-19. Responders deployed to the quarantine zone monitored their temperature and performed a daily self-assessment for cough and shortness of breath. If signs or symptoms of COVID-19 were present, an evacuee or responder was referred for onsite medical assessment and consultation with Centers for Disease Control and Prevention (CDC) clinicians for further clinical management and laboratory testing.

We defined a suspected case of COVID-19 as subjective or measured fever, cough, or shortness of breath in an evacuee or responder.^{5,8} Evacuees who met the definition of a suspected case were transferred by ambulance to a local hospital for isolation, medical evaluation, and testing for SARS-CoV-2. We collected nasopharyngeal and oropharyngeal swabs and sent them to CDC, where they were tested using a validated real-time reverse transcription polymerase chain reaction (real-time RT-PCR) test to detect SARS-CoV-2 RNA. We defined a confirmed case of COVID-19 as receipt of a positive SARS-CoV-2 real-time RT-PCR test result.

Case and Contact Investigations

Evacuees with confirmed COVID-19 were issued federal isolation orders and isolated in a local hospital.⁶ Per agreements with the military base, no person with confirmed COVID-19 isolated on the base. We interviewed evacuees with confirmed COVID-19 using a standardized case report form. Responders and evacuees identified as having any contact with the evacuee with COVID-19 while they were

symptomatic, as elicited from the case report form, were interviewed using a standardized contact interview form including details about interactions with the evacuee, including the length of time and physical distance during each interaction, personal protective equipment (PPE) worn and PPE breaches, and current signs and symptoms of COVID-19.

We classified contacts as having a low-, medium-, or high-risk exposure to an evacuee with COVID-19 according to CDC guidance available at the time, taking into account time spent, proximity, and, for deployers, PPE in use during interaction that may have affected the risk of COVID-19 transmission to the contact.⁹⁻¹¹ Close contact was defined as being within approximately 6 feet for a prolonged period, which was qualified as anything longer than a brief (eg, less than 1-2 minutes) exposure.¹⁰ Exposure risk levels for responders were classified using CDC Interim Guidance for Healthcare Personnel with Potential Exposure in a Healthcare Setting.¹¹ Guidance for evaluating health care personnel was used because the daily activities and PPE recommendations for responders more closely resembled a health care setting than a community setting. A team of CDC epidemiologists reviewed each contact's interactions to achieve a consensus exposure risk category based on CDC guidance at the time of investigation.

Infection Prevention and Control Practices

Evacuees could spend time outside their rooms and were asked to adhere to social distancing, clean their hands frequently, and wear face masks when out. An N95 respirator, eye protection, gown, and gloves were recommended for clinical assessment and for any other interactions with an evacuee who had signs or symptoms of COVID-19. A face mask and eye protection were recommended for responders working within 6 feet of evacuees with no signs or symptoms of illness; gloves were worn if physical contact with an evacuee or potentially contaminated surface was likely.⁷ This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy (see eg, 45 CFR part 46, 21 CFR part 56, 42 USC §241(d), 5 USC §552a, 44 USC §3501 et seq.)

Outcomes

Monitoring of Evacuees

During the quarantine period, 13 evacuees had symptoms that met the definition of a suspected COVID-19 case. Evacuees who developed symptoms were housed in both facilities and transported on both flights. All 13 evacuees with suspected COVID-19 were sent by ambulance to regional hospitals for medical evaluation and were tested for SARS-CoV-2; 2 evacuees had positive test results. The 2

evacuees with confirmed COVID-19 arrived on separate flights and were housed in different facilities; both developed symptoms within 2 days of arrival at the military base.

Case and Contact Investigations

Evacuee case 1 with confirmed COVID-19. Evacuee case 1 had 27 close contacts after her illness onset: 3 evacuees, 19 quarantine facility staff members, and 5 EMS and public health staff members. Two responders reported breaches in PPE use: 1 EMS transporter briefly (<1 minute) removed his or her respirator while transporting evacuee case patient 1 in an ambulance, and 1 responder wore an N95 for which the responder was previously, but not currently, fit tested while providing medical care. All exposures were classified as low risk.

Evacuee case 2 with confirmed COVID-19. Evacuee case 2 had 16 close contacts: 1 family member, 2 EMS transporters, and 13 quarantine staff members. The family member was a minor aged <18 years and an evacuee who traveled in the care of evacuee case 2 and shared a room with her. The minor was classified as a high-risk contact, and quarantine was extended until 14 days after last interaction. All other contacts had low-risk exposures. One responder developed symptoms consistent with COVID-19 2 days after the responder's interaction with evacuee case 2, was tested for SARS-CoV-2 infection, and had a negative test result.

After completion of the contact investigation for evacuee case 2, active monitoring of responders who had low-risk exposures to an evacuee case with COVID-19 was implemented. A staff supervisor or CDC personnel observed a temperature check and reviewed any current symptoms before the start of the shift. Responders returning to clinical roles postdeployment were advised to self-monitor for 14 days after their last interaction with an evacuee case with supervision of self-monitoring delegated to their employer's occupational health program.¹¹ All people who had exposure to an evacuee with confirmed COVID-19 and who departed San Diego before the end of their 14-day monitoring period were advised to self-monitor for fever and symptoms of COVID-19, and the health department of their state of residence was notified.

Lessons Learned

During federally mandated quarantine of evacuees from a region with an active outbreak of a novel pathogen with pandemic potential, regular symptom monitoring resulted in identification of 2 evacuees with confirmed infection and no secondary transmission of COVID-19. Performing twice-daily temperature and symptom checks of this high-risk cohort resulted in the isolation of people with COVID-19 shortly after symptom onset. Federally mandated quarantine

had not been implemented in the United States in more than 50 years, including for the severe acute respiratory syndrome (SARS) outbreak of 2003, in which only 8 people in the United States had laboratory evidence of SARS coronavirus (SARS-CoV-1) infection, all with a history of international travel.¹² COVID-19 federally mandated mass quarantine that included case isolation, along with active monitoring and quarantine of contacts, provided early containment to minimize the risk of disease spread within the quarantine setting.¹³⁻¹⁵

No known responders were infected, even though most close contacts of evacuee cases were responders working with the evacuees. Daily evaluation of responders working in a quarantine facility for fever and respiratory symptoms serves to protect quarantined people and other responders from the introduction of other viral respiratory illnesses by monitoring for potential secondary transmission of disease. All suspected cases were also tested for influenza and received a negative test result. Because influenza activity was moderate to high in San Diego County during the quarantine period, concerns were raised about the introduction of influenza to the quarantine facility by a responder.¹⁶ Although influenza vaccination was not mandatory for deployment and no universal recommendation was in place to use face masks for source control among responders, these strategies would be prudent in other, similar situations. In addition, the nature of deployment teams means responders could have extensive contact with one another. A team member who interacts with other team members while ill could result in high- or medium-risk exposures for a substantial number of responders. Because of the potential for transmission within a team, the operational structure and functions of teams, including travel, meals, and worksite, should be considered to minimize the potential for routine, prolonged close contact among team members.

Developing engineering and administrative controls to reduce potential responder exposures should be prioritized in future quarantine planning. The protection conferred to workers by PPE depends on consistent and correct use. The breaches identified in our investigation were deemed low risk but highlight the possibility of errors in PPE use, particularly in unfamiliar and high-stress environments. In addition, active daily monitoring for PPE breaches may simplify contact investigations by highlighting interactions of concern immediately after they have occurred. Engineering and administrative controls, in addition to PPE, are critical for protecting workers in quarantine facilities, as in other workplace settings.¹³

The transport and isolation of people suspected to have COVID-19 at a local hospital resulted in many close contacts both on the military base and while hospitalized. Isolation of medically stable people at their current residence would reduce the number of close contacts.¹⁷ Given the limited

information available about COVID-19 at that time during the pandemic, definitions of close contacts were more conservative than later in the outbreak.¹⁸ Current definitions of a close contact would provide for a smaller number of close contacts.

Our investigation had several limitations. First, testing was limited to evacuees and quarantine facility responders who had fever, cough, or difficulty breathing. The paucity of information about the spectrum and spread of COVID-19 illness at the time of quarantine led to a more limited set of symptoms used for test eligibility and more conservative definition of close contact compared with later guidance. Because only approximately 70% of people with symptomatic COVID-19 report fever, cough, or difficulty breathing, this limited testing may have resulted in decreased sensitivity of case finding, with the missed identification of evacuees with asymptomatic infection, mild illness, or atypical presentation, as well as secondary transmission from these people.¹⁹⁻²¹ Second, screening of asymptomatic people for COVID-19 has been recommended for populations in a natural cohort, such as people in institutions of higher education, nursing homes, and correctional and detention facilities.²²⁻²⁴ Although screening of asymptomatic evacuees would have been an increased operational effort, it would have remained in line with the objective of federal quarantine to reduce the risk of a novel pathogen spreading to the public.

Third, conducting contact tracing from the point of symptom onset, as was recommended at this time during the pandemic, may have missed transmission that occurred before symptom onset. Current research suggests that people with COVID-19 are most infectious in the few days before and after symptom onset, with an estimated 44% of secondary cases infected while presymptomatic.²⁵ These limitations highlight an important challenge of any public health response to a novel pathogen; mitigation strategies should evolve as knowledge of the pathogen evolves.

Conclusion

Our investigation highlights unique public health considerations during the federal quarantine of a large group of people potentially exposed to a novel pathogen. Daily monitoring of evacuees resulted in rapid identification and immediate isolation of suspected cases. Case investigations and implementation of aggressive mitigation measures are essential strategies to contain the spread of novel communicable diseases. These measures, in addition to engineering and administrative controls, reduced the potential for transmission, simplified case investigations by limiting the number of people exposed, and maintained the safety of evacuees and responders. Because of the rapid nature in which transmission of SARS-CoV-2 was established in the United States after travel from affected countries, and the success of the quarantine mission, public health officials may consider

similar strategies to slow the transmission of future novel respiratory diseases.

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Disclaimer

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