

Emerging Infections Program

Tracking of SARS-CoV-2 Infections among Healthcare Personnel

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**Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention,
and the Emerging Infections Program**

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INTRODUCTION

Since the World Health Organization was first notified of a cluster of respiratory infections in Wuhan City, China on December 31, 2019 [1], the novel coronavirus, SARS-CoV-2, has caused more than 820,000 infections and 45,000 deaths in the United States and more than 2,500,000 infections and 177,000 deaths worldwide as of April 21, 2020. Overall, 20–30% of cases in the United States have required hospitalization[2], resulting in a huge burden on healthcare personnel (HCP) and U.S. healthcare systems.

Healthcare personnel (HCP) are at risk of contracting SARS-CoV-2 during their interactions with patients with suspected or confirmed infection with SARS-CoV-2 (COVID-19) or patients with unrecognized infection[3]. A recent contact investigation conducted by a hospital, local and state health departments, and the Centers for Disease Control and Prevention (CDC), identified 121 HCP with high, medium, or low risk exposures (classified according to CDC guidance for HCP with potential exposure to patients with COVID-19) to a single COVID-19 hospitalized patient (the first individual infected based on community transmission of SARS-CoV-2) in Solano County, California. Of these exposed HCP, 43 developed symptoms consistent with COVID-19 and three tested positive for SARS-CoV-2. Similar events have occurred in many other jurisdictions across the United States.

Given the novel nature of this virus, little is known about specific risk factors for SARS-CoV-2 transmission, particularly among HCP exposed in healthcare facilities. Furthermore, as community transmission has become widespread and hospitals and other healthcare facilities are caring for rapidly increasing numbers of infected patients, the burden of COVID-19 among HCP in U.S. healthcare facilities remains unclear. Additional information about characteristics of exposed and infected HCPs and associated risk and protective factors is urgently needed to inform guidance for healthcare facilities domestically and abroad to protect the healthcare workforce—a critical asset during this pandemic.

Objectives

- 1) Determine the incidence of COVID-19 among healthcare personnel (HCP) working in participating healthcare facilities;
- 2) Describe characteristics of HCP exposed to or infected with SARS-CoV-2, including clinical activities and personal protective equipment (PPE) use;
- 3) Compare exposures and other characteristics of HCP cases and exposed HCP that do not become cases to identify potential risk factors or protective factors for COVID-19.

This project will be implemented in up to 10 Emerging Infections Program (EIP) sites (California, Colorado, Connecticut, Georgia, Maryland, Minnesota, New Mexico, New York, Oregon, and Tennessee). EIP site participation is dependent upon available resources during the pandemic. EIP sites that are able to participate may choose to implement one or both project options below:

- Option 1: Tracking of SARS-CoV-2 infections among HCP
- Option 2: Assessing risk factors for infections among HCP exposed to patients with COVID-19 in healthcare facilities (HCFs)

METHODS

Surveillance personnel

Personnel for the proposed project include staff and contractors in the CDC's Division of Healthcare Quality Promotion (DHQP), state or local health department personnel, and/or affiliated EIP academic partners. CDC investigators will be responsible for project oversight, analyses, and interpretation of collected data. Investigators from the EIP sites will be responsible for case identification, data collection, data entry, analyses, and interpretation of data at their own site.

Participating healthcare facilities

For option 1: EIP project staff can track HCP cases that are residents of their catchment areas, as reported to local or state health departments, or they can track HCP cases in a convenience sample of healthcare facilities that agree to participate. EIP sites should prioritize engagement of hospitals and nursing homes, although other types of healthcare facilities can be included. The number of healthcare facilities recruited to participate will vary by EIP site; sites should aim to engage at least three facilities, where possible. Participation is voluntary. Healthcare facilities recruited to participate should be those within EIP catchment areas that have a system to track HCP with COVID-19, or facilities for whom HCP cases can be reliably identified through required reporting to local or state health departments. Ideally, these facilities should also have a system in place to identify HCP exposed to COVID-19 patients during work in the facilities.

For option 2: As above. Healthcare facilities recruited to participate should also have a system to track HCP who tested negative for SARS-CoV-2.

Case definitions

Healthcare personnel (HCP):

HCP refers to all paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or infectious materials, including:

- body substances
- contaminated medical supplies, devices, and equipment
- contaminated environmental surfaces
- contaminated air

For example, this includes any employee or contractor of a healthcare facility such as physicians, nurses, students, respiratory therapists, phlebotomists, laboratory staff, as well as transport, food service, housekeeping, volunteers, and maintenance personnel.

HCP cases and non-cases:

For option 1: A HCP case is defined as a HCP with ≥ 1 positive SARS-CoV-2 test result during the project period, with or without known exposures in healthcare or community settings.

For option 2: A HCP case is defined as that of option 1. To implement option 2, HCP non-cases in the same healthcare facility must also be identified for comparison. A HCP non-case is defined as a symptomatic or asymptomatic HCP who tested negative for SARS-CoV-2 with or without known exposures in healthcare or community settings.

Note that HCP with possible COVID-19 reinfection may be included in option 1 and/or option 2. The definition of reinfection is subject to change. One example of a reinfection definition that may be employed in this project is as follows: a HCP case who has collection of a positive SARS-CoV-2 PCR test at least 60 days after the symptom onset date or (if asymptomatic) the first positive SARS-CoV-2 PCR test collection date of the prior infection during the project period [4-7].

Case finding

For option 1: Case finding may vary by site. EIP project staff will ideally obtain line lists of HCP cases and contact information from local or state health department partners (see Appendix 1 for an example of variables to be included in the line list). EIP project staff in some cases may also work directly with a healthcare facility's occupational health department or infection control program to obtain names and contact information for HCP cases. Project staff will seek to minimize the burden on healthcare facility staff.

For option 2: Case finding may vary by site. Because this option requires identification and data collection from HCP non-cases (HCP who tested negative for SARS-CoV-2), EIP project staff may need to work directly with a healthcare facility's occupational health department or infection control program to

obtain HCP names and contact information. Project staff will seek to minimize the burden on healthcare facility staff to the extent possible.

Data collection

Once EIP project staff receive HCP line lists, additional data collection should begin as soon as possible through telephone interviews with HCP cases and/or non-cases using a standardized case report form (CRF) (see Appendix 2) or through self-reporting by HCP cases and/or non-cases using a secure, electronic CRF (e.g., REDCap survey). Each HCP case or non-case will be contacted a maximum of five times for the interview. Interviews will be conducted by EIP site staff. Interviewers will introduce themselves and the project using a standard, introductory script (see Appendix 3). Sites that choose to administer an electronic questionnaire will include standard, introductory language via email to HCP (see Appendix 4). HCP will be informed that their participation is voluntary.

Variable categories in the CRF include case status, demographics, underlying medical conditions, roles in healthcare facilities, locations of work in the healthcare facility, locations of exposures (including community exposures), activities during exposures, PPE used during COVID-19 patient care, source control in patients, and duration of exposures.

To determine the burden of SARS-CoV-2 infections among HCPs in participating facilities, EIP project staff will also attempt to collect the following denominator data from participating facilities approximately monthly or on a schedule to be agreed upon by the facility and EIP site staff (see Appendix 5):

- Total number of HCPs in the facility (stratified by characteristics such as shift, job category, or location of work in the healthcare facility, where possible);
- Total number of COVID-19 hospitalized patients or nursing home residents in the facility (stratified by location, such as critical care vs. non-critical care, where possible).

- For EIP sites that choose to track HCPs that are residents of the catchment area, the denominator will be the population of the catchment area, and ideally the population of HCP residing in the catchment area if possible (to be determined).

CDC's project staff will seek to minimize burden on healthcare facility and EIP site staff by using existing denominator data reported to CDC's National Healthcare Safety Network's (NHSN) COVID-19 Module by participating healthcare facilities where appropriate.

Sample size (for Option 2 only)

We estimated the sample size necessary for a case-non-case analysis based on the hypothesis that HCP cases would be more likely than non-cases to have had unprotected exposures during aerosol-generating procedures performed on a COVID-19 patient. We estimated that 15% of HCP cases would have unprotected exposures, compared to 5% of non-cases and 50% of HCP cases and non-cases would have known exposures in the facility. With an unmatched design and twice as many non-cases as cases, approximately 600 HCP in total (200 cases and 400 non-cases) would be required to detect an odds ratio of 2 as statistically significant with 80% power. This is the minimum target sample size. We will attempt to engage additional HCP cases and non-cases as resources allow.

Data management

Copies of completed paper CRF and HCP line lists will be maintained in each participating EIP site's offices in secure locations according to applicable local or state regulations. The EIP project staff will enter data from the CRF into a secure, CDC-provided, web-based data system, such as REDCap. For sites where electronic CRF is used, data will be first reported to EIP sites and have patient identifiable

information removed before submitting to CDC. Sites may also submit their data to CDC using a secure data upload function through CDC's Secure Access Management System.

Healthcare personnel privacy and confidentiality

EIP sites are responsible for ensuring that site-initiated electronic communications with HCP comply with applicable information security and privacy standards. The CDC data system will also comply with applicable information security and privacy standards. Direct personal identifiers such as HCP name or contact information (e.g., phone number or email address) will not be transmitted to CDC.

Primary outcomes

Option 1:

- Characteristics of HCP with COVID-19 from a large sample size
- Incidence of COVID-19 infection among HCP

Option 2:

- Identification of characteristics, patient care activities or PPE use significantly associated with COVID-19 among HCP

Statistical analysis

Descriptive analyses will be performed. Data will be aggregated across participating EIP sites and healthcare facilities for analyses using OpenEpi and SAS version 9.4 or the most current version (SAS Institute, Cary, NC). Incidence of COVID-19 among HCP is defined as the number of HCP who develop COVID-19 over the number of HCP working in the healthcare facilities during the reporting month.

Incidence may be reported based on factors such as job category. Characteristics of HCP cases and non-cases will be compared using chi-square tests or Fisher's exact tests (for categorical variables) or median or Wilcoxon rank-sum tests (for continuous variables). Bivariable or multivariable logistic regression

modeling may also be performed to identify factors associated with COVID-19 in HCP. Other analytical methods may be applied to the data as appropriate, in consultation with division statisticians.

PROJECT TIMELINE (preliminary and subject to change)

- April 1–14, 2020: Protocol finalized and submitted to CDC’s National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) human subjects advisor
- April 6–13, 2020: Recruitment of healthcare facilities and review by state or local health departments
- April 13–20, 2020: Local IRB approvals obtained
- April 27, 2020: Project training
- April 27–December 31, 2020 (or longer): Data collection
- May 4–August 7, 2020 (or longer): Data collection for option 2

HUMAN SUBJECTS RESEARCH REVIEW

This project is a public health practice and emergency response activity. CDC human subjects advisors previously determined that a related project was not human subjects research. Where necessary, EIP sites and hospitals will obtain IRB approval. In some instances, EIP sites may need to add additional language to this protocol to address state- and/or facility-specific IRB considerations, such as those pertaining to HIPAA waivers or waivers of informed consent. EIP personnel will ensure that any site-specific additions to the protocol will not affect the project objectives or data collection content or methods. Data generated by this project may be used to inform guidance to healthcare facilities and help protect HCP from COVID-19. Data collection will have no impact on the clinical care or work activities of participating HCP.

REPORTING AND PUBLICATION

CDC and EIP investigators may communicate the results of this project at scientific meetings or in publications. Given the urgent nature of the data collection, CDC and/or participating EIP sites will provide interim data updates to public health partners or healthcare facilities as deemed appropriate. Data may be reported in aggregate, across all participating EIP sites, or at the level of individual EIP sites. Data may also be reported by healthcare facility type, depending on the numbers of participating facilities. Data may be used in EIP site, state health department, or CDC reports.

NOT FOR DISTRIBUTION

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APPENDICES

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Appendix 2: Assessment of Healthcare Personnel Exposed to or Infected with SARS-CoV-2 Form and Assessment of Healthcare Personnel Exposed to or Infected with SARS-CoV-2: Possible Reinfection Form (see attachments)

Appendix 3: Introductory script for COVID-19 healthcare personnel telephone interview

INSTRUCTIONS: THIS SCRIPT HAS MULTIPLE SECTIONS. USE THE SECTION APPROPRIATE FOR THE CALL YOU ARE MAKING.

BEFORE CALLING: Complete the information on the call log sheet. List the county of residence, State ID, HCP name, and telephone number(s).

Section A: Answering Machine

TO THE ANSWERING MACHINE: Hello, my name is _____. I'm calling from the [STATE HEALTH DEPT]. I am calling to talk with you about an important public health project. Please call me at _____. If I am unable to answer the phone when you call, please leave a message with your name, phone number, and a time I may call you back. Thank you.

Section B: HCP COVID-19 Cases

- Q1 **TO THE PERSON WHO ANSWERS THE PHONE, IF ADULT; OTHERWISE, ASK TO SPEAK TO AN ADULT:** Hello, my name is _____. I'm calling from the [STATE HEALTH DEPT]. We are conducting a public health project about COVID-19. May I please speak to [HCP CASE]?
- ___ YES: PERSON WHO ANSWERED IS HCP CASE; GO TO Q4.
 - ___ YES: COMING TO THE PHONE; GO TO Q3.
 - ___ NO: PERSON IS NOT AVAILABLE NOW; GO TO Q1.1.
 - ___ NO: PERSON IS DECEASED: I'm sorry. I was not aware of your loss. I would like to offer my condolences to you and your family. Thank you very much for your time. =STOP=
 - ___ NO: PERSON IS INCAPACITATED; I'm sorry to hear that. GO TO Q1.2
 - ___ NO: REACHED WRONG NUMBER; ASK IF YOU HAVE DIALED THE NUMBER NOTED ON CALL LOG.
Sorry, I must have the wrong number. Good-bye. =STOP=
 - ___ DOES NOT SPEAK ENGLISH; RECORD LANGUAGE IN COMMENT SECTION OF CALL LOG. We will try to call back with someone who speaks Spanish. IF CASE SPEAKS A LANGUAGE OTHER THAN ENGLISH OR SPANISH, HE/SHE IS NOT ELIGIBLE. =STOP=
- Q1.1 When would be a good time to reach him/her or is there another phone number to reach him/her? RECORD PERSON'S NAME TO ASK FOR, AND DAY/TIME TO CALL AND ALTERNATIVE NUMBER ON CALL LOG. Thank you very much for your time. Good-bye. =STOP=
- Q1.2 Can I call back in 7 days to see if [HCP CASE] will get better and be able to talk?
- ___ YES; RECORD ON CALL LOG TO CALL AGAIN IN 7 DAYS. Thank you very much for your time. I wish [HCP CASE] a quick recovery. GO TO Q1 WHEN CALL IN 7 DAYS; IF [HCP CASE] IS STILL INCAPACITATED ON DAY 7 AFTER INITIAL CALL, GO TO Q1.2
 - ___ NO; Thank you very much for your time. I wish [HCP CASE] a quick recovery. [RECORD DAY/ TIME ON CALL LOG]. =STOP=
- Q2 May I speak with him/her?
- ___ Yes; COMING TO THE PHONE; GO TO Q3.
 - ___ No; BUT NOT HOME; GO TO Q2.1.

Q2.1 Is there another phone number at which I could reach him/her?

___Yes; RECORD ALTERNATE PHONE NUMBER ON CALL LOG. Thank you very much for your time. =STOP=

___No; When would be a good time to call back to reach him/her? [RECORD DAY/ TIME ON CALL LOG]. Thank you very much for your time. =STOP=

Q3 Hello, my name is _____. I'm calling from the [STATE HEALTH DEPT]. We are conducting a public health project on COVID-19. Are you [HCP CASE]?

___Yes; GO TO Q4. ___No; GO TO Q2.

Q4 I am helping to investigate the outbreak of coronavirus infection (known as COVID-19) in [xx County]. The state health department is notified whenever there is a person with COVID-19. Public health officials are trying to better understand how we can prevent the virus that causes COVID-19 from spreading, including in healthcare facilities.

You have been identified as a healthcare worker who developed COVID-19. Would you be willing to answer some questions to help us describe the types of exposures that healthcare workers have had to COVID-19, and to better understand how we can help protect healthcare personnel?

If you decide to answer the survey, it should take about 30 minutes. You can stop at any time, and you do not have to answer any question if you do not want to.

Information that you provide to me will be shared with the Centers for Disease Control and Prevention, but your name will not be shared. This information will be used to inform the response to COVID-19 and may be reported [AT SITES' DISCRETION, INSERT: "to participating healthcare facilities or"] in publications or presentations, but we will not include information in a way that would identify you.

Do you wish to participate?

___Yes; GO TO Q5. ___No; GO TO Q4.1

If you have a calendar or planner, it may be helpful to get those items to help you remember certain events.

Q4.1 Your participation in this project is very important. May I schedule a time to talk that would be better for you?

___Yes; RECORD DAY/TIME ON CALL LOG. Thank you very much for your time. =STOP=

___No; Sorry to have disturbed you. Good-bye. =STOP=

Q5 Thank you for agreeing to participate. If you have a calendar or planner, it may be helpful to get it to help you remember certain events. Do you need a few minutes to get your calendar?

___Yes; Okay, why don't you go get your calendar now, and when you return to the phone we can begin. [ONCE HCP CASE RETURNS TO PHONE, GO TO CRF]

___No; Okay, let's get started. [GO TO CRF]

Section C: Exposed HCP Non-Cases

BEFORE CALLING: Complete the information on the call log sheet. List the county of residence, State ID, HCP name, and telephone number(s).

- Q1E TO THE PERSON WHO ANSWERS THE PHONE, IF ADULT; OTHERWISE, ASK TO SPEAK TO AN ADULT: Hello, my name is _____. I'm calling from the [STATE HEALTH DEPT]. We are conducting a public health project about COVID-19. May I please speak to [HCP]?
- ___ YES: PERSON WHO ANSWERED IS HCP; GO TO Q4E.
 - ___ YES: COMING TO THE PHONE; GO TO Q3E.
 - ___ NO: PERSON IS NOT AVAILABLE NOW; GO TO Q1E.1.
 - ___ NO: PERSON IS DECEASED: I'm sorry. I was not aware of your loss. I would like to offer my condolences to you and your family. Thank you very much for your time. =STOP=
 - ___ NO: PERSON IS INCAPACITATED; I'm sorry to hear that. GO TO Q1E.2
 - ___ NO: REACHED WRONG NUMBER; ASK IF YOU HAVE DIALED THE NUMBER NOTED ON CALL LOG.
Sorry, I must have the wrong number. Good-bye. =STOP=
 - ___ DOES NOT SPEAK ENGLISH; RECORD LANGUAGE IN COMMENT SECTION OF CALL LOG. We will try to call back with someone who speaks Spanish. IF CASE SPEAKS A LANGUAGE OTHER THAN ENGLISH OR SPANISH, HE/SHE IS NOT ELIGIBLE. =STOP=
- Q1E.1 When would be a good time to reach him/her or is there another phone number to reach him/her? RECORD PERSON'S NAME TO ASK FOR, AND DAY/TIME TO CALL AND ALTERNATIVE NUMBER ON CALL LOG. Thank you very much for your time. Good-bye. =STOP=
- Q1E.2 Can I call back in 7 days to see if [HCP CASE] will get better and be able to talk?
- ___ YES; RECORD ON CALL LOG TO CALL AGAIN IN 7 DAYS. Thank you very much for your time. I wish [HCP CASE] a quick recovery. GO TO Q1 WHEN CALL IN 7 DAYS; IF [HCP] IS STILL INCAPACITATED ON DAY 7 AFTER INITIAL CALL, GO TO Q1.2
 - ___ NO; Thank you very much for your time. I wish [HCP] a quick recovery. [RECORD DAY/ TIME ON CALL LOG]. =STOP=
- Q2E May I speak with him/her?
- ___ Yes; COMING TO THE PHONE; GO TO Q3.
 - ___ No; BUT NOT HOME; GO TO Q2.1.
- Q2E.1 Is there another phone number at which I could reach him/her?
- ___ Yes; RECORD ALTERNATE PHONE NUMBER ON CALL LOG. Thank you very much for your time. =STOP=
 - ___ No; When would be a good time to call back to reach him/her? [RECORD DAY/ TIME ON CALL LOG]. Thank you very much for your time. =STOP=
- Q3E Hello, my name is _____. I'm calling from the [STATE HEALTH DEPT]. We are conducting a public health project on COVID-19. Are you [HCP]?
- ___ Yes; GO TO Q4E.
 - ___ No; GO TO Q2E.

Q4E I am helping to investigate the outbreak of coronavirus infection (known as COVID-19) in [xx County]. Public health officials are trying to better understand how we can prevent the virus that causes COVID-19 from spreading, including in healthcare facilities.

You have been identified as a healthcare worker who was exposed to COVID-19 in a healthcare facility. Would you be willing to answer some questions to help us describe the types of exposures that healthcare workers have had to COVID-19, and to better understand how we can help protect healthcare workers?

If you decide to answer the survey, it should take about 30 minutes. You can stop at any time, and you do not have to answer any question if you do not want to.

Information that you provide to me will be shared with the Centers for Disease Control and Prevention, but your name will not be shared. This information will be used to inform the response to COVID-19 and may be reported [AT SITES' DISCRETION, INSERT: "to participating healthcare facilities or"] in publications or presentations, but we will not include information in a way that would identify you.

Do you wish to participate?

Yes; GO TO Q5E. No; GO TO Q4E.1

If you have a calendar or planner, it may be helpful to get those items to help you remember certain events.

Q4E.1 Your participation in this project is very important. May I schedule a time to talk that would be better for you?

Yes; RECORD DAY/TIME ON CALL LOG. Thank you very much for your time. =STOP=

No, Sorry to have disturbed you. Good-bye. =STOP=

Q5E Thank you for agreeing to participate. If you have a calendar or planner, it may be helpful to get it to help you remember certain events. Do you need a few minutes to get your calendar?

Yes; Okay, why don't you go get your calendar now, and when you return to the phone we can begin. [ONCE HCP RETURNS TO PHONE, GO TO CRF]

No; Okay, let's get started. [GO TO CRF]

Section D: HCP Cases with Possible Reinfection

BEFORE CALLING: Complete the information on the call log sheet. List the county of residence, State ID, HCP name, and telephone number(s).

Q1R TO THE PERSON WHO ANSWERS THE PHONE, IF ADULT; OTHERWISE, ASK TO SPEAK TO AN ADULT: Hello, my name is _____. I'm calling from the [STATE HEALTH DEPT]. We are conducting a public health project about COVID-19. May I please speak to [HCP CASE]?

___ YES: PERSON WHO ANSWERED IS HCP CASE; GO TO Q4R.

___ YES: COMING TO THE PHONE; GO TO Q3R.

___ NO: PERSON IS NOT AVAILABLE NOW; GO TO Q1R.1.

___ NO: PERSON IS DECEASED: I'm sorry. I was not aware of your loss. I would like to offer my condolences to you and your family. Thank you very much for your time. =STOP=

___ NO: PERSON IS INCAPACITATED; I'm sorry to hear that. GO TO Q1R.2

___ NO: REACHED WRONG NUMBER; ASK IF YOU HAVE DIALED THE NUMBER NOTED ON CALL LOG.

Sorry, I must have the wrong number. Good-bye. =STOP=

___ DOES NOT SPEAK ENGLISH; RECORD LANGUAGE IN COMMENT SECTION OF CALL LOG. We will try to call back with someone who speaks Spanish. IF CASE SPEAKS A LANGUAGE OTHER THAN ENGLISH OR SPANISH, HE/SHE IS NOT ELIGIBLE. =STOP=

Q1R.1 When would be a good time to reach him/her or is there another phone number to reach him/her? RECORD PERSON'S NAME TO ASK FOR, AND DAY/TIME TO CALL AND ALTERNATIVE NUMBER ON CALL LOG. Thank you very much for your time. Good-bye. =STOP=

Q1R.2 Can I call back in 7 days to see if [HCP CASE] will get better and be able to talk?

___ YES; RECORD ON CALL LOG TO CALL AGAIN IN 7 DAYS. Thank you very much for your time. I wish [HCP CASE] a quick recovery. GO TO QR1 WHEN CALL IN 7 DAYS; IF [HCP CASE] IS STILL INCAPACITATED ON DAY 7 AFTER INITIAL CALL, GO TO Q1R.2

___ NO; Thank you very much for your time. I wish [HCP CASE] a quick recovery. [RECORD DAY/ TIME ON CALL LOG]. =STOP=

Q2R May I speak with him/her?

___ Yes; COMING TO THE PHONE; GO TO Q3R.

___ No; BUT NOT HOME; GO TO Q2R.1.

Q2R.1 Is there another phone number at which I could reach him/her?

___ Yes; RECORD ALTERNATE PHONE NUMBER ON CALL LOG. Thank you very much for your time. =STOP=

___ No; When would be a good time to call back to reach him/her? [RECORD DAY/ TIME ON CALL LOG]. Thank you very much for your time. =STOP=

Q3R Hello, my name is _____. I'm calling from the [STATE HEALTH DEPT]. We are conducting a public health project on COVID-19. Are you [HCP CASE]?

___ Yes; GO TO Q4R. ___ No; GO TO Q2R.

Q4R I am helping to investigate the outbreak of coronavirus infection (known as COVID-19) in [xx County]. Public health officials are trying to better understand how we can prevent the virus that causes COVID-19 from spreading, including in healthcare facilities.

We contacted you previously when you were identified as a healthcare worker who tested positive for COVID-19. Thank you for talking with us, and for the information you provided. We received information that you have had another positive test for COVID-19, at least 2 months after your initial test or illness. Would you be willing to answer some additional questions? The information you provide will help us determine how common it is for healthcare workers to have multiple positive COVID-19 PCR tests over a prolonged time period and risk factors for this.

If you decide to answer the survey, it should take about 30 minutes. You can stop at any time, and you do not have to answer any question if you do not want to.

Information that you provide to me will be shared with the Centers for Disease Control and Prevention, but your name will not be shared. This information will be used to inform the response to COVID-19 and may be reported [AT SITES' DISCRETION, INSERT: "to participating healthcare facilities or"] in publications or presentations, but we will not include information in a way that would identify you.

Do you wish to participate?

Yes; GO TO Q5R. No; GO TO Q4R.1

If you have a calendar or planner, it may be helpful to get those items to help you remember certain events.

Q4R.1 Your participation in this project is very important. May I schedule a time to talk that would be better for you?

Yes; RECORD DAY/TIME ON CALL LOG. Thank you very much for your time. =STOP=

No; Sorry to have disturbed you. Good-bye. =STOP=

Q5R Thank you for agreeing to participate. If you have a calendar or planner, it may be helpful to get it to help you remember certain events. Do you need a few minutes to get your calendar?

Yes; Okay, why don't you go get your calendar now, and when you return to the phone we can begin. [ONCE HCP CASE RETURNS TO PHONE, GO TO CRF]

No; Okay, let's get started. [GO TO CRF]

Tracking of SARS-CoV-2 Infections among Healthcare Personnel Call Log

HEALTHCARE PERSONNEL NAME: _____ EIP HCP ID: _____

PHONE NUMBER: _____

STATUS OF PHONE NUMBER: _____

PHONE TYPE: Home Office Cell

STATUS CODES: 1=correct, 0=not correct, 9=couldn't determine

| ATTEMPT NUMBER | DATE | TIME-OF-DAY CODE | OUTCOME CODE | COMMENTS |
|----------------|------|------------------|--------------|----------|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |

TIME-OF-DAY CODES

- 1 = Weekday, 10AM – 11:59AM
- 2 = Weekday, Noon – 4:59PM
- 3 = Weekday, 5PM - 8PM
- 4 = Saturday only, 10AM-11:59AM
- 5 = Weekend, Noon – 4:59PM
- 6 = Weekend, 5PM – 8PM

OUTCOME CODES

- 1 = Enrolled
- 2 = Not home, left message
- 3 = Not home, no message left
- 4 = Refused to participate
- 5 = Unable to answer questions
- 6 = Unable to enroll (after 5 attempts)
- 7 = Need to call back
- 8 = Other, specify in notes

[GUIDELINES: A MINIMUM OF 5 ATTEMPTS ON AT LEAST 3 DIFFERENT DATES USING A VALID PHONE NUMBER SHOULD BE MADE BEFORE GIVING UP ON A POTENTIAL HCP CASE OR HCP NON-CASE. AT LEAST ONE ATTEMPT SHOULD BE MADE BETWEEN 5-8PM; AND ONE WEEKEND DAY]

Appendix 4: COVID-19 Healthcare Personnel SAMPLE EMAIL TEXT

Section A: HCP COVID-19 Cases.

Dear [Name of HCP Case],

We are emailing you to ask for your help with the public health response to the pandemic of novel coronavirus infections, known as COVID-19, in [County, State]. The [State] Health Department and the healthcare facility where you work have agreed to participate in an effort led by the U.S. Centers for Disease Control and Prevention. Public health officials are collecting information from healthcare workers who have developed COVID-19 to better understand how we can prevent the virus from spreading, and how we can better help to protect healthcare workers from infection. The [State] Health Department is notified of all persons in the state that have a positive test for COVID-19. You have been identified as a [State] healthcare worker who has been diagnosed with COVID-19.

If you are willing to help, we would like to ask you to complete a survey. The survey contains questions about your health, your activities as a healthcare worker, and exposures to COVID-19 in the community and in the workplace. If you decide to answer the survey, it should take about 30 minutes. You can stop at any time, and you do not have to answer any question if you do not want to. Your responses will be kept confidential.

Information that you provide will be shared with the Centers for Disease Control and Prevention, but your name and contact information will not be shared. This information will be used to inform the public health response to COVID-19 and may be reported [AT SITES' DISCRETION, INSERT: "to participating healthcare facilities or"] in publications or presentations, but we will not include information in a way that would identify you.

If you have questions or concerns about the survey, please contact [State EIP point of contact name] at [phone] or [email address].

If you agree to participate, please click here to access the survey:

If you do not wish to participate, please click here:

If we do not receive a reply from you within three business days of this message, we may reach out to you again by email or by telephone.

Thank you for all that you do as a healthcare worker.

Sincerely yours,

[State Health Department Official, Title, Address, etc.]

SECTION B: Exposed HCP Non-Cases

Dear [Name of HCP Non-Case],

We are emailing you to ask for your help with the public health response to the pandemic of novel coronavirus infections, known as COVID-19, in [County, State]. The [State] Health Department and the healthcare facility where you work have agreed to participate in an effort led by the U.S. Centers for Disease Control and Prevention. Public health officials are collecting information from healthcare workers who have cared for or been exposed to patients with COVID-19 to better understand how we can prevent the virus from spreading, and how we can better help to protect healthcare workers from infection. You have been identified as a [State] healthcare worker who has cared for or been exposed to a patient with COVID-19 in the workplace.

If you are willing to help, we would like to ask you to complete a survey. The survey contains questions about your health, your activities as a healthcare worker, and exposures to COVID-19 in the community and in the workplace. If you decide to answer the survey, it should take about 30 minutes. You can stop at any time, and you do not have to answer any question if you do not want to. Your responses will be kept confidential.

Information that you provide will be shared with the Centers for Disease Control and Prevention, but your name and contact information will not be shared. This information will be used to inform the public health response to COVID-19 and may be reported [AT SITES' DISCRETION, INSERT: "to participating healthcare facilities or"] in publications or presentations, but we will not include information in a way that would identify you.

If you have questions or concerns about the survey, please contact [State EIP point of contact name] at [phone] or [email address].

If you agree to participate, please click here to access the survey:

If you do not wish to participate, please click here:

If we do not receive a reply from you within three business days of this message, we may reach out to you again by email or by telephone.

Thank you for all that you do as a healthcare worker.

Sincerely yours,

[State Health Department Official, Title, Address, etc.]

Section C: HCP Cases with Possible Reinfection.

Dear [Name of HCP Case],

We are emailing you to ask for your help with the public health response to the pandemic of novel coronavirus infections, known as COVID-19, in [County, State]. The [State] Health Department and the healthcare facility where you work have agreed to participate in an effort led by the U.S. Centers for Disease Control and Prevention. Public health officials are collecting information from healthcare workers who have developed COVID-19 to better understand how we can prevent the virus from spreading, and how we can better help to protect healthcare workers from infection.

We contacted you previously when you were identified as a healthcare worker who tested positive for COVID-19. Thank you for talking with us, and for the information you provided. We received information that you have had another positive test for COVID-19, at least 2 months after your initial test or illness. We would like to ask you some additional questions. The information you provide will help us determine how common it is for healthcare workers to have multiple positive COVID-19 PCR tests over a prolonged time period and risk factors for this.

If you are willing to help, we would like to ask you to complete a survey. The survey contains questions about your health, your activities as a healthcare worker, and exposures to COVID-19 in the community and in the workplace. If you decide to answer the survey, it should take about 30 minutes. You can stop at any time, and you do not have to answer any question if you do not want to. Your responses will be kept confidential.

Information that you provide will be shared with the Centers for Disease Control and Prevention, but your name and contact information will not be shared. This information will be used to inform the public health response to COVID-19 and may be reported [AT SITES' DISCRETION, INSERT: "to participating healthcare facilities or"] in publications or presentations, but we will not include information in a way that would identify you.

If you have questions or concerns about the survey, please contact [State EIP point of contact name] at [phone] or [email address].

If you agree to participate, please click here to access the survey:

If you do not wish to participate, please click here:

If we do not receive a reply from you within three business days of this message, we may reach out to you again by email or by telephone.

Thank you for all that you do as a healthcare worker.

Sincerely yours,

[State Health Department Official, Title, Address, etc.]

Appendix 5: Denominator form (see attachment)