## Supplementary information

Predictors of SARS-CoV-2 infection following high-risk exposure

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## **Text S1. Survey Questionnaire**

### SECTION 1: INTRODUCTION (~2 min)

- 1. Hello, my name is [\_\_\_\_] and I am calling on behalf of California Department of Public Health to ask some questions regarding [NAME]'s recent COVID-19 test on [INSERT DATE OF TEST].
- 2. Make sure you're on the phone with the correct person.

If case is a child under 18y, make sure you are speaking to a parent/ guardian:

2a. Am I speaking to [NAME]'s parent or guardian? [If yes, proceed to section 2] [If no, proceed to 2b]

2b. Can you please pass the phone to [NAME]'s parent or guardian?

[If yes, proceed to **section 2**] [If no, end call]

If case is someone older than 18y:

2c. Am I speaking to [NAME]? [If yes, proceed to section 2] [If no, proceed to 2d]

2d. Can you please pass the phone to [NAME]?

[If yes, proceed to **section 2**] [If no- end call]

## NOTE on proxy respondents:

If an individual is hospitalized or otherwise too sick to answer questions on their own behalf, a caretaker may serve as a proxy respondent, but verbal consent must first be obtained from the primary case both to participate in the study and to have the proxy respondent answer on their behalf.

A proxy respondent who speaks English or Spanish may answer if the individual is unable to easily complete the interview in one of these two languages, provided they are able to speak English or Spanish with sufficient proficiency to provide verbal consent for both participation and for communicating via the proxy respondent.

# SECTION 2: ASSENT (~1 min)

If you are speaking to a parent or correct person for the first time, add your name and affiliation before starting: Hello, my name is [\_\_\_\_] and I am calling on behalf of California Department of Public Health.

1. Hi! We are interested in asking you some questions about [YOUR or INSERT CHILD'S NAME] recent COVID-19 test. We are hoping to interview you to try to better understand the spread of COVID-19. Do you have some time to chat?

INTERVIEWER: pause and wait for person to confirm that they are still on the line, check YES if they say they are willing to chat

If they do not have time, select NO

2. So before we start, I want to make sure you understand that everything I ask you is confidential, protected by California's strict privacy laws, and is only being used to inform public health. Your answers will not be shared with any other federal, state, or local authorities, and you're welcome to decline to answer any question. We anticipate this will take about 20 minutes. I know that sounds like a long time, but we really appreciate your time and your answers will help us answer some extremely important questions about COVID-19.

Do you understand the information I have just shared with you? INTERVIEWER: check "yes" if the respondent answers yes and if you deem the respondent to be competent to proceed with consent and interviewing; check "no" and thank the respondent for their time if the respondent says no or if you deem the respondent is not competent to proceed with consent and interviewing.]

If it seems like the person needs a proxy respondent due to not speaking well enough English or being too sick,

you may ask "Is there anyone who can help you answer my questions?". If you get the proxy respondent on the phone, re-introduce yourself by starting at the top of Section 2 with "Hello, my name is..." and add at the end, "Can you help answer questions on [insert name of case/control's] behalf?"

NOTE that a proxy respondent must be over the age of 14.

Interviewers then seek consent from the participant, but the question asked will depend on the age of the desired case/control.

[If participant is answering on their own behalf AND they are older then 18]

Great, thank you! To confirm, are you willing to participate in this interview?

[If participant is a child older than 14, answering on their own behalf, first ask for consent from the parent for the child to answer the survey]

Great, thank you! I want to let you know that your child [INSERT CHILD'S NAME] may answer questions on their own behalf. Are you willing to allow [INSERT CHILD'S NAME] to participate in this interview? If not, you can answer questions on their behalf.

Interviewer: if the child older than 14 joins the call, make sure to reintroduce yourself and explain the purpose of the survey.

[If participant is a child younger than 14, and adult is answering on their behalf]

Great, thank you! Are you willing to answer questions about [INSERT CHILD'S NAME]'s recent exposures as part of this interview?

[If a proxy respondent will answer on behalf of the study participant]

If you are able, I would suggest putting the phone on speakerphone during this interview, so [insert name/relationship of proxy respondent] can help you.

[INSERT NAME OF CASE-CONTROL], are you willing to participate in this interview?

[INSERT NAME OF CASE-CONTROL], do you consent to allow [NAME OF PROXY RESPONDENT] to answer my questions during this interview. Please stay close by [NAME OF PROXY RESPONDENT] in case it is necessary to clarify any points that come up.

[If no or asks to be called back later, proceed to end of the survey]
[If consent is provided and case/control is 7-18 years old, proceed to 3]

Interviewer: select the following options based off of the consent pattern:

- Participant provided consent on their own behalf
- Parent provided consent for child <18 vrs</li>
- Participant provided consent for proxy respondent to answer on their own behalf
- No consent was provided
- 3. No problem. But before we hang up, do you mind quickly sharing why you are unable or unwilling to complete this call? Record the free response

[End call]

4. [INSERT CHILD'S NAME] is welcome to stand by or join the call to help answer questions.

[If child joins the call, proceed to 3b, otherwise skip to section 3]

3b. Hi [INSERT CHILD's NAME]. My name is [\_\_\_\_] and I work with the California Department of Public Health. I'm going to ask you some questions about activities in the past couple of weeks. Are you willing to answer these questions so that we can better understand the spread of COVID-19?

[Proceed to section 3]

# SECTION 3: LAST COVID TEST (~3 min)

1. Great, so to start, I want to ask whether you know your COVID-19 test result from [INSERT DATE OF TEST]?

Record whether they know or don't know their test result by selecting on of the options:

- Subject knows test result and is positive
- Subject knows test result and is negative

- Subject does NOT know test result and is positive
- Subject does NOT know test result and is negative

[If yes and they are positive, proceed to **section 4**] [If yes and they are negative, proceed to 3] [If no, and they are negative, proceed to 2]

[If no, and they are positive, proceed to 4]

2. Your COVID-19 test result from [INSERT DATE OF TEST] has come back negative.

Record one of the following options:

- Yes
- No
- Don't know
- Refuse

[Proceed to 3]

3. Have you ever received a *positive* COVID-19 test result or been told by a health care provider that you are positive for COVID-19?

[If no, proceed to section 4]

[If yes, end-call saying: Thanks for letting me know. Those are all the questions I have for you. Thank you for your time and I hope you have a nice day.

4. Your COVID-19 test result from [INSERT DATE OF TEST] has come back positive. This means you do have coronavirus disease or COVID-19. In my role with CDPH, I cannot provide you with medical advice. If you need any medical information, please call your healthcare provider. One thing I want to be sure of today is that we have a plan for you to follow up with your healthcare provider, so that they can check on any symptoms you may have and assess your risks. Even if you feel okay now, it is important to have someone you can call if you start feeling sick. If you do not have a healthcare provider, you can go to an urgent care facility or the emergency room if you are not getting better or you feel like you are getting worse.

[Proceed to section 4]

## [If the person brings up clinical questions or concerns about their positive test]

Thank you for sharing that concern. In my role with CDPH, I am not able to give you medical advice. I do want to be sure that you get the help you need. If you believe you are having a medical emergency, you should call 911. Some warning signs that you should go to the emergency room for are: trouble breathing, bluish lips or face, pain or pressure in the chest that does not go away, new confusion or trouble waking or staying awake, but there are other symptoms too. Otherwise, you should call your healthcare provider.

# SECTION 4: REASONS FOR TESTING (~3 min)

1. Next, I'm going to ask you some questions about your COVID-19 test. Can you describe to me why did you choose to get tested on [INSERT DATE OF TEST]?

Interviewers will select check boxes from the respondent based off of their response, without prompting them from the following list, and will use a write-in option for any additional reasons for seeking testing. After choosing the best answer from the list, confirm your choice the case/control (ex. "So you got tested for pre or post-travel screening?")

- I had contact with someone who tested positive
- I had contact with someone who had symptoms, but I do not know if they were confirmed to be positive
- I was told by a public health worker to get tested because I was exposed to a case
- I was concerned about symptoms I experienced
- Someone in my household had contact with someone who was positive
- A person in my household had contact with someone who had symptoms or suspected they had COVID, but we do not know if they are confirmed to be positive.
- Routine screening for my job
- Pre or post-travel screening
- Test required for a medical procedure
- I just wanted to see if I was infected
- Don't know
- Refuse
- Other [interviewer writes in response]

2. At the time you were tested on [DATE OF TEST] were you experiencing any COVID-19 symptoms? Record Yes/No/Not Sure/ Refuse

[If yes, ask <u>question 4</u>] [If no, proceed to <u>question 5</u>]

3. Can you please list the symptoms you were experiencing on or 14 days prior to your test on [DATE OF TEST]

Interviewers will select the symptoms the individuals indicated that they were experiencing. When the respondent is done listing symptoms, the interviewer may prompt, "Are you sure those were all the symptoms you experienced?" and proceed to confirm absence of the 6 most common symptoms (as applicable), in a conversational manner: "No fever, no chills, no muscle pain, no loss of appetite, no shortness of breath, no cough?"

Select from the following list of symptoms:

- Blocked nose
- Chills
- Cough
- Chest pain
- Diarrhea
- Muscle pain
- Fever
- Headache
- Hoarseness
- Loss of appetite
- Loss of taste
- Loss of smell
- Myalgia (muscle pain)

- Nausea
- Runny nose
- Shortness of breath
- Sneezing
- Sore throat
- Stomach pain
- Sinus pain
- Sweating
- Swollen glands
- Tickle in throat
- Watery eyes

- Don't know
- Refuse
- Other

4. I am now going to read a list of places you may have sought treatment or advice prior to your test on [DATE OF TEST]. After I read the following options, please answer "Yes" or "No".

Record Yes/No/ Not Sure/Refuse e for each of the options below

- Did you seek care at an in-person appointment with your usual physician or healthcare provider
- Did you seek care at a telehealth visit or phone appointment with your usual physician or healthcare provider
- Did you seek care at an in-person visit to an urgent care clinic
- Did you seek care at an in-person visit to a healthcare provider at a retail pharmacy
- Did you visit the emergency room?
- Were you admitted to the hospital?
- And just to follow-up, where there any other forms of healthcare from which you sought treatment advice at the time you had your test on [Insert date of test](specify):
- 5. In the 14 days prior to your test (between ADD DATE to ADD DATE) do you know whether you had known or suspected contact with one or more people who may have tested positive for COVID-19?

Select one of the following options

- Yes- contact with one person who was confirmed positive
- Yes- contact with more than one person who was confirmed positive
- Yes- contact with one person who I suspected was positive
- Yes- contact with more than one person who I suspected was positive
- No known or suspected contact with a positive case
- Not sure
- Refuse

[If case indicated they had KNOWN or SUSPECTED Contact, proceed to <u>section 5, part A</u>], [If the case did not have known or suspected contact, proceed to <u>section 6</u>]

[If case indicated they had KNOWN or SUSPECTED Contact, proceed to A]
[If case indicated they did NOT have known or suspected contact, proceed to section 6]

- A. I'm going to now ask you some questions about the type of contact you had with the person (people) who may have had COVID-19. We are trying to understand sources of exposure and are hopeful that you are willing to answer the questions honestly, knowing that we aren't looking or expecting any sort of answer.
  - Was the known/ suspected contact someone who lives in your household?
     if plural (contact with >1 person): Were any of the known/ suspected contact people who lives in your household

Record Yes, No, Don't know, Refuse

2. Did the known/ suspected contact occur indoors, outdoors, or both indoors and outdoors?

if plural (contact with >1 person): Did the known/suspected contacts occur indoors, outdoors, or both indoors and outdoors?

Record Indoors, Outdoors, Both indoors and outdoors, Unknown, or Refuse

3. In the 14 days prior to your test (between [ADD 14 DAYS – TEST DATE HERE] to [ADD TEST DATE]), what are the locations where you may have had contact with this person?

if plural: In the 14 days prior to your test (between [ADD 14 DAYS – TEST DATE HERE] to [ADD TEST DATE]), what are the locations where you may have had contact with these people)

Record the free response answer

4. I am now going to ask you about different precautions you may or may not have been able to take when you came into contact with the known or suspected positive case. Please answer "Yes, No or Not Sure" after each question:

Record Y/ N/ Not sure for each of the options below:

- Did you come within 6 feet of this person, indoors?

  If plural: Did you come within 6 feet of any of these people, indoors?
- Did you come within 6 feet of this person, outdoors?
   If plural: Did you come within 6 feet of any of these people, outdoors?
- Did you have physical contact with this person, (ie. handshake, hug)?

  If plural: Did you have physical contact with any of these people (ie. handshake, hug)
- 5. Did you wear a mask the entire time, most of the time, some of the time, or none of the time that you interacted with this person?

If plural: Did you wear a mask the entire time, most of the time, some of the time, or none of the time that you interacted with these people?

Record which of the statements they agree with from below:

- I wore a mask the entire time I interacted with this (these) person(s)
- I wore a mask most of the time I interacted with this (these) person(s)
- I wore a mask some of the time I interacted with this (these) person(s)
- I did not wear a mask during this (these) interaction(s)
- Not sure
- Refuse
- 6. Did the person you had known or suspected contact with wear a mask the entire time, most of the time, some of the time, or none of the time when you interacted with them?

If plural: Did the people you had known or suspected contact with wear a mask all, most, some, or none of the time that you interacted with them

Record which of the statements they agree with from below:

- They wore a mask the entire time we interacted
- They wore a mask most of the time we interacted
- They wore a mask some of the time we interacted
- They did not wear a mask during this interaction
- Not sure
- Refuse

7. Did you spend more than 3 consecutive hours with this person in the 14 days prior to your test (between Date to Date).

If plural: Did you spend more than three consecutive hours with these people in the 14 days prior to your test (between Date to Date)

Record Yes/ No/ Don't know/ Refuse

# [proceed to section 6]

## SECTION 6: EXPOSURE WITH CONTACT KNOWN OR SUSPECTED CASE (~10 min)

Next, I want to learn about potential sources of exposure to COVID-19 in the 14 days before your last test: from [ADD 14 DAYS – TEST DATE HERE] to [ADD TEST DATE]. It may help you to pull up a calendar to remember what you were up to over the last two weeks. This chunk usually takes the longest, so thank you in advance for your time

Only read the following if they did not have known or suspected contact:

[We are trying to understand sources of exposure and are hopeful that you are willing to answer the questions honestly, knowing that we aren't looking or expecting any sort of answer.]

- 1. I am now going to ask you about a series of locations which you may have visited. After I announce each location, please tell me "Yes, No, or Not sure" to indicate whether you visited that location between [ADD 14 DAYS TEST DATE HERE] to [ADD TEST DATE].
  - First, did you attend a health appointment or health facility (other than where you got tested for COVID-19)
  - Did you go grocery shopping?
  - Now I am going to ask you about the times you went to restaurants. Did you go to any restaurants to pick up take-out or to eat at the restaurant? Record one of the following options: a) Dine-in (eat at restaurant) only, b) Take-out only, c) Both dining-in and take-out, d) Neither dine-in or take-out, e) Not sure, f) Refuse

If yes and take-out:

- How many times did you get take-out?
- Did you ever have to go inside the restaurant to either place or pick up your take-out order?

  Record one of the following options: a) Yes, I went inside the restaurant either to place or pick-up my order, b) No I did not go inside the restaurant either to place or pick-up my order, d) No I did not go inside the restaurant either to place or pick-up my order, but someone I went to the restaurant with had to go inside to place or pick-up the order, e) not sure, f) refuse

If yes and dine-in:

- How many times did you eat at an indoor restaurant?
- How many times did you eat at an <u>outdoor</u> restaurant?

[Skip the following question chunk about bars if respondent is under 21]

- Did you attend any bars, breweries, or wine bars?

  If yes, ask: Did you attend a bar, brewery or wine bar? Select all

  For each of the places they indicated that they visited:
- How many times did you attend a [bar/brewery/wine bar]?
- When you went to a (those) [bar(s)/brewery(ies)/wine bar(s)], did you spend most of your time indoors, outdoors, or both indoors and outdoors?
- Did you ever visit a coffee shop? If yes, ask:
- When you (typically) visited the coffee shop(s), did you have to go inside to place your order? Record one of the following options: a) I went inside to place the order, b) I typically placed the order outside or remotely (via. App, web portal, phone order), c) Don't know, d) refuse
- When you visited a coffee shop, did you (typically) consume your beverage inside the shop, outside the shop, or did you just pick-up the beverage for take-away. Record one of the following options a) consumed inside the shop, b) consumed outside the shop (ex. restaurant set up outdoor tables/ chairs and I drank/ate at those tables), c) Got beverage for take-away, d) Don't know, e) refuse

- Did you go retail shopping?
   If yes, ask: And did you go indoor or outdoor retail shopping?
- Did you exercise at gym?
   If yes, ask: And was this an indoor or an outdoor gym?
- Did you participate in a group recreational sport (tennis, soccer, basketball, swimming)
- Did you ever leave your house to go for a walk, run, hike or ride a bike outside?

  If yes ask: Did you hike, run, walk, or bike with anyone outside your household? Select one of the following options a) No, I always hiked, ran, walked, or biked by myself, b) No, but I sometimes/ always ran, walked, or biked with other people who live in my household, c) Yes I hiked ran, walked, or biked with someone who doesn't live in my household, d) Don't know, e) Refuse
- Did you ride public transit?
- Did you use a ride share (eg. Taxi, Uber, Lyft, or carpool with individuals who are not members of your household)?
- Did you fly on a plane?
- Did you attend a parade, rally, march, or protest?
- Did you receive services at a salon or barber?
- Did you attend an indoor movie theater?
- Did you attend a worship service?

If yes ask: And was this an indoor or an outdoor worship service?

- Did you visit or stay at a school, daycare or preschool?
   If yes, ask: Was the school or daycare public or private?
- Did you visit a jail, prison, or correctional facility?

If a participant answers yes to any of the questions in 1, follow-up with: How many times did you attend [INSERT LOCATION] between [ADD 14 DAYS – TEST DATE HERE] to [ADD TEST DATE].

I am now going to ask you (a couple more) some questions about face mask usage between date to date.

- 2. Between [ADD 14 DAYS TEST DATE HERE], at all of the <u>indoor</u> places we discussed earlier, did you wear a face mask all, most, some, or none of the time?
  - I wore a face mask all of the time
  - I wore a face mask most of the time
  - I wore a face mask some of the time
  - I never wore a face mask in indoor places
  - I did not go inside any indoor places other than my home
  - I was not in contact with anyone
- 3. Between [ADD 14 DAYS TEST DATE HERE], at all of the <u>indoor</u> places we discussed earlier, did people you came within 6 feet of wear a face mask all, most, some, or none of the time?
  - They wore a face mask all of the time
  - They wore a face mask most of the time
  - They wore a face mask some of the time
  - They never wore a face mask in indoor places
  - I did not go inside any indoor places other than my home
  - I was not in contact with any people outside my household in indoor places
- 4. Between [ADD 14 DAYS TEST DATE HERE], at all of the <u>outdoor</u> places we discussed earlier, did you wear a face mask all, most, some, or none of the time?
  - I wore a face mask all of the time
  - I wore a face mask most of the time
  - I wore a face mask some of the time
  - I never wore a face mask in indoor places
  - I did not go inside any outdoor places other than my home
- 5. Between [ADD 14 DAYS TEST DATE HERE], at all of the <u>outdoor</u> places we discussed earlier, did people you came within 6 feet of wear a face mask all, most, some, or none of the time?
  - They wore a face mask all of the time
  - They wore a face mask most of the time
  - They wore a face mask some of the time
  - They never wore a face mask in indoor places
  - I did not go inside any outdoor places other than my home
  - I was not in contact with any people outside my household in outdoor places

6. I am now going to ask you some questions about social gatherings. These include any informal gatherings with friends or family who are NOT members of your household). Did you attend any social gatherings between (14 days prior to test result to test result date)?

Interviewer: note that our definition of social gatherings is mixing with people who don't otherwise live in your household. If someone had a longer-term family together (ie. traveled to visit relatives, but stayed for multiple days, count this as ONE event).

If yes, ask: When you attended social gatherings, were they indoors, outdoors, or both indoors and outdoors?

An <u>outdoor only</u> gathering means the person spent the majority of their time outside
An <u>indoor only</u> gathering means the person spent the majority of their time
A gathering that was "<u>both indoors and outdoors</u>" means the participant was both inside and
outside during the social gathering (ex. Sandy had some friends over for dinner and they ate
outside on the patio, and then watched a movie in their living room together)

If they indicate they attended indoor social gatherings: How many indoor social gatherings did you attend between (14 days prior to test result to test result date)? About how many people attended these gatherings? Did you eat or drink during any of these (or this) gatherings? When you attended this (these) indoor gathering(s), did you wear a face mask all, most, some or none of the time?

Interviewer: note that this question about mask usage is distinct from the question earlier.

If they indicate they attended outdoor social gatherings: How many outdoor social gatherings did you attend between (14 days prior to test result to test result date)? About how many people attended these gatherings? Did you eat or drink during any of these (or this) gatherings? When you attended this (these) outdoor gathering(s), did you wear a face mask all, most, some or none of the time?

If they indicate they attended social gatherings that were both inside and outside: How many social gatherings did you attend between (14 days prior to test result to test result date) that were both indoor and outdoor? About how many people attended these gatherings? Did you eat or drink during any of these (or this) gatherings? When you attended this (these) outdoor gathering(s), did you wear a face mask all, most, some or none of the time?

• Did you attend any other kind of event where there are <u>5 or more</u> people who are not in your household in attendance? Interviewer: If necessary, prompt with options like a sporting event, concert, festival, etc. Specify the event:

[Proceed to section 7]

## **SECTION 7: OCCUPATION (~1 min)**

- 1. I am now going to ask you some questions about your occupation. Between [ADD 14 DAYS TEST DATE HERE] to [ADD TEST DATE] did you attend work, school, or volunteering commitments exclusively at home, both at home and in "in-person", or exclusively "in-person".
  - o I work, study, and/or volunteer at home
  - o I attend work, school, and/or volunteering "in-person"
  - o I attend work, school, and/or volunteering both "in-person" and at home
  - o I am not currently working, in school, or in a volunteer position.

[If respondent is a student, skip question and just record "student"]

2. Can you tell me what your job is? (Record open ended response)

[If they attend work, school, or volunteering commitments in person or both at home & in person, proceed to guestion 3, otherwise proceed to **Section 8**]

3a. Do you come into close contact (within 6 feet) of more than 10 people per day at work/school/volunteering?

Record: Yes or No

**3b.** Do you primarily attend work/school/volunteering indoors, outdoor, or both indoors and outdoors? *Record: indoors, outdoors, or both* 

[Proceed to section 8]

### SECTION 8: VACCINATION (~2 min)

I am now going to ask you some questions about the COVID-19 vaccine.

- 1. Do you have any conditions that might place you higher risk for COVID-19? Interviewers may prompt with examples such diabetes, high blood pressure, overweight, being immunocompromised if requested. Select options from list below
  - Lung conditions: COPD, lung cancer, cystic fibrosis, moderate to severe asthma, pulmonary fibrosis
  - Heart disease
  - High blood pressure
  - Obesity
  - Overweight
  - Diabetes
  - Weakened immune system: organ transplant, cancer treatment, bone marrow transplant, HIV/AIDS, sickle cell anemia, thalassemia
  - Chronic kidney disease
  - Chronic liver disease
  - Pregnant (first, second, or third trimester)
- 2. Have you received any doses of a COVID-19 vaccine?

Record: Yes, No

[If they have not received any doses, skip to 2b\_otherwise ask question 3]

2b. Do you plan to receive any doses of the COVID-19 vaccine?

Record: Yes, No, not sure, refuse

[If they are not planning to receive any doses or are not sure yet, ask 2c, otherwise, ask skip to section 9]

2c. Can you describe to me why you are not planning to receive the COVID-19 vaccine? Record reason in check box

3. How many doses of the COVID-19 vaccine have you received?

Record: 1, 2

4. Do you have a vaccine card on hand from when you got the COVID-19 vaccine?

If yes, ask them to get their vaccine card. If no, ask them to do their best remembering and try pulling up a calendar to help them remember.

5. What dates did you receive your dose(s)?

Record the date of each vaccine

6. Do you know what product COVID-19 vaccine you received?

Record the product of each dose

7. Do you have access to a COVID -19 vaccination clinic at your work or school?

Record: yes/ no/ not sure/ refuse

8. Where did you get your COVID-19 vaccine?

Record: mass vaccination site, hospital, nursing home, at my work, at my school, at a retail pharmacy, at a retail shop (eg. Walmart)

9. At the time you received the vaccine was it required to attend work or school?

Record: ves/ no/ not sure/ refuse

[Proceed to section 9]

### SECTION 9: DEMOGRAPHICS (~5 min)

I just have a few more questions. Again, anything you share with me is confidential and protected by California's strict privacy laws. The information we collect about you will assist the health department in their COVID-19 response.

- 1. First, I'm going to ask you some general questions about COVID-19. From the beginning of the pandemic to the time you were tested on [DATE OF TEST], how worried did you feel about getting COVID-19? Would you say you felt:
  - Very worried
  - Somewhat worried
  - Neutral
  - Not worried at all
- 2. Since the beginning of the pandemic, there have been a lot of recommendations on behaviors that can reduce the risk of COVID-19 including avoiding large crowds, travel, and maintaining 6 feet of distance in public places. Would you say that you strongly agree, agree, are neutral, disagree, or strongly disagree that these measures reduce the risk of COVID-19?

Record strongly agree, agree, neutral, disagree, strongly disagree

3. Another recommendation to reduce the spread of COVID-19 is wearing face masks. Would you say that you strongly agree, agree, are neutral, disagree, or strongly disagree that face masks reduce the risk of COVID-19?

Record strongly agree, agree, neutral, disagree, strongly disagree

Last, I want to capture some information about demographics.

- 1. So do you mind sharing how old you are?
  - Record free response
- 2. Next, please let me know which of the following race/ethnicities best describe yourself. You may select all that apply:
  - White
  - Black
  - Hispanic
  - Asian
  - Native American or Alaska Native
  - Native Hawaiian or other Pacific Islander
- 3. What is your sex/ gender?

Record Man, Woman, Non=-binary, Prefer to self-describe, Refuse, Don't know

4. What is your zip code of your home address?

Record address using encryption tool

5. What is your home address?

Record address using encryption tool after verifying it is an address using google maps

- 6. Which of the following best describes your living arrangement:
  - Private home
  - Apartment, or condominium
  - Skilled nursing facility
  - College or university student housing
  - Military quarters
  - Emergency or transitional shelter
  - Other (please describe)
- 7. How many people live in your household?
- 8. How many bedrooms do you have in your household?
- 9. Do you have any children under 18 at your home?
- 10. Are any of your children under 18 attending in-person instruction, school, or daycare?
- 11. Does anyone visit your home on a regular basis like a cleaning service or babysitter?

If you are talking to a child aged 14-17, at this point you can end the interview with the child and ask to speak with their parent/guardian. When you get back on the phone with the parent or guardian, you can say something like ["Hi again, thank you so much for letting me speak with your child, it was extremely helpful. We are wrapping up the survey with some demographic questions and my last question that I didn't want your child to have to answer was whether you are willing to share your total household income?"]

12. What is your total household income? Answer on behalf of everyone you share finances with.

[If you are speaking with POSITIVE case, proceed to 13] [If you are speaking with NEGATIVE control, proceed to 14]

- 13. Thank you for participating in this survey. You may be contacted by another staff member at the health department to check in on you. They will ask you questions about your health and well-being to make sure you're ok.
- 14. Thank you for participating in our survey. We appreciate your time.

Table S1: Counties included in each geographic region.

County Alameda County Alpine County Alpine County Amador County Butte County Calaveras County Colusa County Del Norte County Del Norte County Del Norte County Presno County Glenn County Humboldt County Imperial County Lassen County Lassen County Lassen County Marin County Merced County Merced County Monoc County Merced County Merced County Marin County Merced County Merced County Merced County Marin County Merced County Marin County Marin County Marin County Merced County Merced County Monoc County Merced County Merced County Merced County Marin County Marin County Merced County Merced County Monoc County Merced County Monoc County Monoc County Monoc County Monoc County Marin County Ma	Table S1: Counties inc	luded in each geographic region.
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Table S2: Demographic attributes of study population, stratified by high-risk contact.

	inographic attributes or s		M. III I		Igii-iisk co	
		Total		sk contact	High-risk	
			Case	Control	Case	Control
		n (%)	n (%)	n (%)	n (%)	n (%)
		N=2920	N=697	N=1177	N=751	N=255
Age						
9 -	0-6	93 (3.2)	9 (1.3)	45 (3.8)	35 (4.7)	2 (0.8)
	7-12	124 (4.2)		45 (3.8)	44 (5.9)	
			17 (2.4)	` '	` ,	17 (6.7)
	13-17	154 (5.3)	24 (3.4)	59 (5.0)	50 (6.7)	17 (6.7)
	18-29	887 (30.4)	220 (31.6)	361 (30.7)	223 (29.7)	76 (29.8)
	30-49	1033 (35.4)	263 (37.7)	402 (34.2)	245 (32.6)	107 (42.0)
	50-64	443 (15.2)	115 (16.5)	185 (15.7)	110 (14.6)	26 (10.2)
	65+	186 (6.4)	49 (7.0)	80 (6.8)	44 (5.9)	10 (3.9)
Sex		,	- ( - /	( ,	(/	( - ( - )
	Male	1406 (48.1)	350 (50.2)	576 (48.9)	343 (45.7)	117 (45.9)
	Female	1514 (51.8)	347 (49.8)	601 (51.1)	408 (54.3)	138 (54.1)
Llausahald	i emale	1314 (31.0)	347 (43.0)	001 (31.1)	400 (34.3)	130 (34.1)
Household						
income						
	Under \$50,000	722 (24.7)	209 (30.0)	255 (21.7)	187 (24.9)	58 (22.7)
	\$50,000 to \$100,000	632 (21.6)	147 (21.1)	243 (20.6)	185 (24.6)	47 (18.4)
	\$100,000 to \$150,000	364 (12.5)	62 (8.9)	170 (14.4)	79 (10.5)	48 (18.8)
	Over \$150,000	407 (13.9)	78 (11.2)	195 (16.6)	88 (11.7)	40 (15.7)
	Refuse	495 (17.0)	125 (17.9)	195 (16.6)	131 (17.4)	39 (15.3)
	Not sure	300 (10.3)	76 (10.9)	119 (10.1)	81 (10.8)	23 (9.0)
Race/ ethnicity						
	Non-Hispanic White	1244 (44.0)	282 (41.6)	502 (43.9)	331 (45.9)	110 (44.9)
	Non-Hispanic Black	134 (4.7)	47 (6.9)	41 (3.6)	37 (5.1)	8 (3.3)
	Hispanic (any race)	814 (28.8)	230 (33.9)	320 (28.0)	192 (26.6)	61 (24.9)
	,					
	Asian	283 (10.0)	64 (9.4)	133 (11.6)	62 (8.6)	21 (8.6)
	Native American	35 (1.2)	9 (1.3)	8 (0.7)	15 (2.1)	2 (0.8)
	Native Hawaiian	19 (0.7)	2 (0.3)	12 (1.0)	5 (0.7)	0 (0.0)
	More than 1 race	297 (10.5)	44 (6.5)	128 (11.2)	79 (11.0)	43 (17.6)
Region of						
residence1						
	Predominantly urban regions					
	San Francisco Bay Area	338 (11.6)	83 (11.9)	144 (12.2)	87 (11.6)	21 (8.2)
		` ,				
	Greater Los Angeles Area	316 (10.8)	85 (12.2)	131 (11.1)	76 (10.1)	22 (8.6)
	Greater Sacramento Area	327 (11.2)	61 (8.8)	131 (11.1)	99 (13.2)	29 (11.4)
	San Diego and southern Border	323 (11.1)	83 (11.9)	140 (11.9)	75 (10.0)	21 (8.2)
	Predominantly rural regions					
	Central Coast	359 (12.3)	92 (13.2)	135 (11.5)	89 (11.9)	38 (14.9)
	Northern Sacramento Valley	318 (10.9)	75 (10.8)	133 (11.3)	80 (10.7)	26 (10.2)
				128 (10.9)	78 (10.4)	33 (12.9)
	San Joaquin Valley	328 (11.2)	83 (11.9)			
	Northwestern California	311 (10.7)	78 (11.2)	115 (9.8)	79 (10.5)	37 (14.5)
	Sierras Region	300 (10.3)	57 (8.2)	120 (10.2)	88 (11.7)	28 (11.0)
Vaccination						
status <sup>2</sup>						
	Unvaccinated	1747 (64.3)	517 (76.8)	555 (52.6)	546 (75.3)	103 (46.0)
	Partially vaccinated	273 (10.1)	45 (6.7)	142 (13.4)	56 (7.7)	27 (12.1)
	•	, ,	, ,			, ,
Country	Fully vaccinated	695 (25.6)	111 (16.5)	359 (34.0)	123 (17.0)	94 (42.0)
County						
reopening tier <sup>3</sup>						
	Purple tier (most restrictive)	599 (20.5)	141 (20.2)	245 (20.8)	160 (21.3)	41 (16.1)
	Red tier `	652 (22.3)	164 (23.5)	270 (22.9)	166 (22.1)	40 (15.7)
	Orange tier	625 (21.4)	136 (19.5)	285 (24.2)	165 (22.0)	35 (13.7)
	Yellow tier (least restrictive)	75 (2.6)	20 (2.9)	32 (2.7)	17 (2.3)	6 (2.4)
	` /	` ,				
0	After June 15 <sup>th</sup>	969 (33.2)	236 (33.9)	345 (29.3)	243 (32.4)	133 (52.2)
Symptoms						
experienced						
	No symptoms	1510 (51.7)	122 (17.5)	965 (82.0)	206 (27.4)	200 (78.4)
	At least one symptom	1410 (48.3)	575 (82.5)	212 (18.0)	545 (72.6)	55 (21.6)
	✓ F	1/	\/	\/	\ -/	

Recent high-risk exposure is defined as reported contact with an individual known or suspected to have been infected with SARS-CoV-2 at any time within the 14 days before participants were tested.

<sup>&</sup>lt;sup>1</sup>We list counties grouped into each region in **Table S1**.

<sup>&</sup>lt;sup>2</sup>An individual was considered partially-vaccinated if their SARS-CoV-2 test date with less than 14 days before their second dose of a mRNA vaccine product (Pfizer/BioNTech [BNT-162b2] or Moderna [mRNA-1273]), or less than 14 days after their first dose of a single dose vaccine product (Jansen Pharmaceutical Companies [JNJ-78436735]). An individual was considered fully-vaccinated if their SARS-CoV-2 test date was more than 14 days after their second dose of a mRNA vaccine product (Pfizer/BioNTech [BNT-162b2] or Moderna [mRNA-1273]), or more than 14 days after their first dose of a single dose product (Jansen Pharmaceutical Companies [JNJ-78436735])

<sup>&</sup>lt;sup>3</sup>The State of California implemented a tiered system of reopening to reduce risk of SARS-CoV-2 transmission in community settings. On June 15, 2021, California discontinued the tiered system, relaxed facial requirements in certain indoor settings, and allowed businesses to reopen without physical distancing restrictions.

Table S3. Enrollment of characteristics reporting high risk exposure, by month, in 2021.

Month	Total	Cases	Controls
	n (%)	n (%)	n (%)
	N=1006	N=751	N=255
February	26 (2.6)	19 (2.5)	7 (2.7)
March	176 (17.5)	144 (19.2)	32 (12.5)
April	175 (17.4)	146 (19.4)	29 (11.4)
May	143 (14.2)	117 (15.6)	26 (10.2)
June	101 (10.0)	75 (10.0)	26 (10.2)
July	87 (8.6)	56 (7.5)	31 (12.2)
August	95 (9.4)	54 (7.2)	41 (16.1)
September	68 (6.8)	48 (6.4)	20 (7.8)
October	91 (9.0)	61 (8.1)	30 (11.8)
November (1-12 only)	44 (4.4)	31 (4.1)	13 (5.1)

Table S4: Location(s) of confirmed or suspected contact among interviewed participants.

Location of contact	Total participants	Confirmed contact	Suspected contact
	n (%)	n (%)	n (%)
	N=1007	N=833	N=174
Residencea	554 (55.0)	470 (56.4)	84 (48.3)
Same household	396 (71.5)	341 (72.6)	55 (65.5)
Outside of the household	96 (17.3)	78 (16.6)	18 (21.4)
Visits to multiple households	55 (9.9)	45 (9.6)	10 (11.9)
Unknown but related to a residence	7 (1.3)	6 (1.3)	1 (1.2)
Workplace	136 (13.5)	107 (12.8)	29 (16.7)
Public space or event <sup>b</sup>	122 (12.1)	101 (12.1)	21 (12.1)
In a vehicle, including public transportation	21 (2.1)	17 (2.0)	4 (2.3)
Multiple location types <sup>c</sup>	115 (11.4)	96 (11.5)	19 (10.9)
Unknownd	59 (5.9)	42 (5.0)	17 (9.8)

<sup>&</sup>lt;sup>a</sup> Includes individuals who reported having contact with known or suspected case(s) from the same household, outside of the household, and during visits to multiple households (e.g., participant had contact with known cases from two separate residences)

<sup>b</sup> Excludes individuals who reported working at a public space (e.g., bar, restaurant, hospital) at the time of contact

c Includes individuals who reported having contact at any combination of the above location types (e.g., participant had contact with suspected cases at their workplace and at a relative's residence)

d Includes individuals who declined to answer or did not report a specific location

Table S5: Reasons for testing among participants who reported high-risk interactions.

Reasons*	Controls		Cases	
	Unvaccinated	Vaccinated <sup>1</sup>	Unvaccinated	Vaccinated
	N=103	N=121	N=546	N=179
Contact with positive case	61 (59.2)	77 (63.6)	386 (70.7)	129 (72.1)
Contact with symptomatic individual, unknown whether confirmed positive	13 (12.6)	14 (11.6)	41 (7.5)	9 (5.0)
Told by public health worker to get tested	1 (1.0)	6 (5.0)	5 (0.9)	2 (1.1)
Routine screening	27 (26.2)	17 (14.0)	22 (4.0)	8 (4.5)
Test required for medical procedure or hospital admittance	2 (1.9)	0 (0.0)	6 (1.1)	0 (0.0)
Someone in household had contact with a positive case	3 (2.9)	2 (1.7)	30 (5.5)	9 (5.0)
I just wanted to see if I was infected	11 (10.7)	11 (9.1)	25 (4.6)	7 (3.9)
Concerned about symptoms	11 (10.7)	12 (9.9)	209 (38.3)	87 (48.6)
Pre or post-travel screening	1 (1.0)	5 (4.1)	4 (0.7)	5 (2.8)

<sup>\*</sup>Since interviewers indicated all reasons listed by participants, and some participants refused to respond to the question, reasons will not sum to the total sample size.

<sup>&</sup>lt;sup>1</sup>An individual is considered vaccinated if they have had at least one dose of any SARS-CoV-2 vaccine product.

Table S6: Regression parameter estimates.

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Covariate	aOR (95% CI)
Restaurant	0.55 (0.35, 0.87)
Bar/ brewery/ winery	0.87 (0.44, 1.73)
Coffee shop	0.99 (0.6, 1.63)
Retail shop	0.98 (0.62, 1.53)
Gym	0.96 (0.51, 1.83)
Ride share service	1.15 (0.57, 2.29)
Public transport	1.11 (0.39, 3.27)
Salon	0.68 (0.36, 1.29)
Worship service	2.54 (0.83, 7.61)
Social gathering	1.12 (0.73, 1.73)
Very worried about	0.63 (0.36, 1.09)
COVID-19 (ref. not	
worried)	

aOR: adjusted odds ratio, computed using conditional logistic regression models adjusting for vaccination status, community exposures (listed in the main text), vaccination status of the participant and mask-wearing by the participant and their contact (as listed in **Figure 2**), and participants' age, sex, and region of residence. Regression strata were defined for county reopening tiers and week of SARS-CoV-2 test.

Table S7: Predictors of infection following high-risk exposure among participants with confirmed

SARS-CoV-2 exposure.

Exposure and participant		Case	Control	aOR (95%CI)
vaccination status		n (%)	n (%)	, ,
Relationship to contact		•		
Fully vaccinated				
•	Non-household member (ref.)	54 (54.0)	64 (85.3)	
	Household member	46 (46.0)	11 (14.7)	3.07 (1.27,7.42)
Unvaccinated		, ,	` ′	, ,
	Non-household member (ref.)	219 (42.8)	78 (80.4)	
	Household member	293 (57.2)	19 (19.6)	3.50 (1.79, 6.67)
Nature of contact		, ,	` ,	, ,
Fully vaccinated				
•	Non-physical contact only (ref.)	25 (25.8)	30 (44.1)	
	Any physical contact	72 (74.2)	38 (55.9)	0.89 (0.39,2.04)
Unvaccinated	, ,	` ,	` ,	, , ,
	Non-physical contact only (ref.)	162 (32.7)	53 (57.6)	
	Any physical contact	334 (67.3)	39 (42.4)	1.43 (0.81,2.58)
Setting		, ,	` ,	, ,
Fully vaccinated				
•	No indoor exposure (ref.)	9 (9.2)	11 (15.7)	
	Any indoor exposure	89 (90.8)	59 (84.3)	0.67 (0.21,2.08)
Unvaccinated		, ,	` ′	, ,
	No indoor exposure (ref.)	25 (5.0)	21 (23.1)	
	Any indoor exposure	473 (95.0)	70 (76.9)	2.15 (0.96,4.83)
Duration		, ,	` ′	, ,
Fully vaccinated				
	<3 hours (ref.)	17 (17.0)	29 (40.8)	
	≥3 hours	83 (83.0)	42 (59.2)	1.7 (0.72,3.88)
Unvaccinated		. ,	, ,	, ,
	<3 hours (ref.)	87 (17.3)	47 (51.1)	
	≥3 hours	417 (82.7)	45 (48.9)	2.96 (1.6,5.45)

aOR: adjusted odds ratio, computed using conditional logistic regression models restricted to 833 individuals (635 cases/198 controls) who reported they had recent contact with an individual confirmed (rather than confirmed or suspected) to have been infected with SARS-CoV-2. Models interacted vaccination status with each contact attribute, and additionally adjusted for community exposures (listed in the main text), characteristics of high-risk contact (as listed in **Figure 1**), and participants' age, sex, and region of residence. Regression strata were defined for county reopening tiers and, for the period after June 15<sup>th</sup>, the month of SARS-CoV-2

Table S8: Protective effects of mask-wearing and vaccination in the context of high-risk exposure among participants with confirmed SARS-CoV-2 exposure.

Exposure and participant vaccinations status	<b>Case</b> n (%) N=635	Control n (%) N=198	aOR (95% CI)
Mask usage at interaction			
No mask usage at interaction	555 (87.5)	127 (64.1)	ref.
Mask usage by either party	79 (12.5)	71 (35.9)	0.48 (0.26, 0.89)
Mask usage by participant and contact			
Mask usage by both parties	49 (7.7)	40 (20.2)	0.6 (0.28, 1.27)
Mask usage by participant only	17 (2.7)	19 (9.6)	0.42 (0.14, 1.22)
Mask usage by contact only	13 (2.1)	12 (6.1)	0.23 (0.06, 0.97)
Vaccination status of respondent			
No vaccine doses	463 (75.4)	78 (45.3)	ref.
Incomplete vaccination series	50 (8.1)	19 (11.0)	0.47 (0.2, 1.1)
Full vaccination series <sup>1</sup>	101 (16.4)	75 (43.6)	0.22 (0.11, 0.42)

aOR: adjusted odds ratio, computed using conditional logistic regression models restricted to 833 individuals (635 cases/198 controls)) who reported they had confirmed recent contact with an individual confirmed (rather than confirmed or suspected) to have been infected with SARS-CoV-2 Models additionally adjusted for vaccination status, community exposures (listed in the main text), characteristics of high-risk contact (as listed in **Figure 1**), and participants' age, sex, and region of residence. Regression strata were defined for county reopening tiers and week of SARS-CoV-2 test.

Table S9: Presence of reported symptoms among cases by attributes of high-risk exposure.

Contact Attribute	Symptoms	No reported symptoms
	n (%)	n (%)
	N=545	N=206
Relationship to contact		
Non-household member (ref.)	271 (49.7)	85 (41.3)
Household member	271 (49.7)	121 (58.7)
Nature of contact		
Non-physical contact only (ref.)	180 (33.0)	67 (32.5)
Any physical contact	347 (63.7)	130 (63.1)
Setting		
No indoor exposure (ref.)	34 (6.2)	13 (6.3)
Any indoor exposure	500 (91.7)	186 (90.3)
Duration		
<3 hours (ref.)	108 (19.8)	39 (18.9)
≥3 hours	427 (78.4)	164 (79.6)

Among cases who reported a high-risk interaction, we tabulated whether any symptoms were present at the time for SARS-CoV-2 testing within strata of attributes of contact reported by the participant.

Table S10: Number of reported symptoms among cases by attributes of the high-risk exposure.

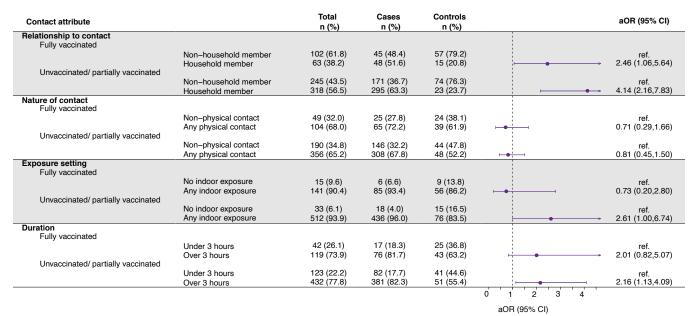
Mask usage	Mean number of reported symptoms (SD)
Mask usage at interaction	
No mask usage at interaction	2.37 (2.12)
Mask usage by either party	2.31 (2.22)
Mask usage by participant and contact	
Mask usage by both parties	2.43 (2.49)
Mask usage by participant only	2.64 (1.73)
Mask usage by contact only	1.79 (1.32)
Relationship to contact	
Non-household member (ref.)	2.58 (2.24)
Household member	2.07 (2.15)
Nature of contact	
Non-physical contact only (ref.)	2.25 (2.21)
Any physical contact	2.38 (2.23)
Setting	
No indoor exposure (ref.)	2.32 (2.19)
Any indoor exposure	2.33 (2.22)
Duration	
<3 hours (ref.)	2.46 (2.43)
<u>&gt;</u> 3 hours	2.28 (2.16)

Among cases who reported a high-risk interaction, we computed the mean number of reported symptoms within strata of reported mask usage by the participant and their contact during the interaction.

Table S11. Comparison of infection severity by symptoms experienced among cases with high-risk exposure.

	Symptoms experienced			Care-seeking			
	No symptoms, n (%)	Symptoms, n (%)	aOR (95% CI)	No care sought, n (%)	Care sought, n (%)	aOR (95% CI)	
	N=206	N=545		N=564	<i>N</i> =187	_	
Mask usage at interaction							
No mask usage at interaction	182 (88.8)	466 (85.0)		See Table 4	See Table 4	See Table 4	
Mask usage by either party	23 (11.2)	82 (15.0)	1.72 (0.91, 3.28)				
Mask usage by participant and contact							
Mask usage by both parties	15 (65.2)	39 (50.0)	1.38 (0.62, 3.03)	42 (52.5)	12 (57.1)	0.93 (0.41, 2.12)	
Mask usage by participant only	4 (17.4)	24 (30.8)	3.13 (0.82, 12.13)	22 (27.5)	6 (28.6)	0.59 (0.17, 2.02)	
Mask usage by contact only	4 (17.4)	15 (19.2)	1.81 (0.53, 6.17)	16 (20.0)	3 (14.3)	0.34 (0.07, 1.71)	

aOR: adjusted odds ratio, computed using conditional logistic regression models adjusting for vaccination status of respondent, community exposures (listed in main text), characteristics of the high-risk contact, level of COVID-19 anxiety prior to testing, and participants' age, sex, and region of residence.



**Figure S1.** Predictors of infection following high-risk exposure among 788 participants reporting testing due known exposure to SARS-CoV-2. aOR: adjusted odds ratio, computed using conditional logistic regression models interacting vaccination status with each contact attribute, and adjusting for community exposures (listed in the main text), vaccination status (defined as fully vaccinated or unvaccinated/incompletely vaccinated) of the participant and mask-wearing by the participant and their contact, level of anxiety about COVID-19 prior to testing, and participants' age, sex, and region of residence. Regression strata were defined for county reopening tiers and, for the period after June 15<sup>th</sup>, the month of SARS-CoV-2 test. Analyses were restricted to 578 cases and 188 controls who indicated they sought testing for one of the following reasons: contact with a positive case, contact with a symptomatic individual who was not confirmed to be positive, informed by public health worker that they should get tested, or household member had contact with someone who tested positive. Reasons for testing among cases and controls are outlined in **Table S4**.

	Total n (%)	Cases n (%)	Controls n (%)		aOR (95% CI)
Mask usage at interaction				1	
No mask usage at interaction	816 (81.2)	648 (86.5)	168 (65.9)		ref.
Mask usage by either party	188 (18.7)	101 (13.5)	87 (34.1)	<b>⊢•</b> ──	0.50 (0.29, 0.85)
Mask usage by participant and contact					
Mask usage by both parties	102 (54.2)	54 (53.4)	48 (55.1)	<b>⊢</b> •	0.50 (0.26, 0.96)
Mask usage by participant only	54 (28.7)	28 (27.8)	26 (29.9)	<b></b>	0.54 (0.24, 1.21)
Mask usage by contact only	32 (17.0)	19 (18.8)	13 (15.0)	<b>.</b>	0.43 (0.15, 1.31)
				0 0.5 1 1.5 aOR (95% CI)	

**Figure S2**. **Protective effects of mask wearing by participant and their contacts.** aOR: adjusted odds ratio, computed using conditional logistic regression models adjusting for vaccination status, community exposures (listed in the main text), characteristics of high-risk contact, level of anxiety about COVID-19 prior to testing, and participants' age, sex, and region of residence. Regression strata were defined for county reopening tiers and week of SARS-CoV-2 test.