

COVID-19 Seroprevalence Among San Francisco Firefighters and Emergency Responders



Meet the Study Team



Dr. Robert Harrison



Dr. Dennis Shusterman



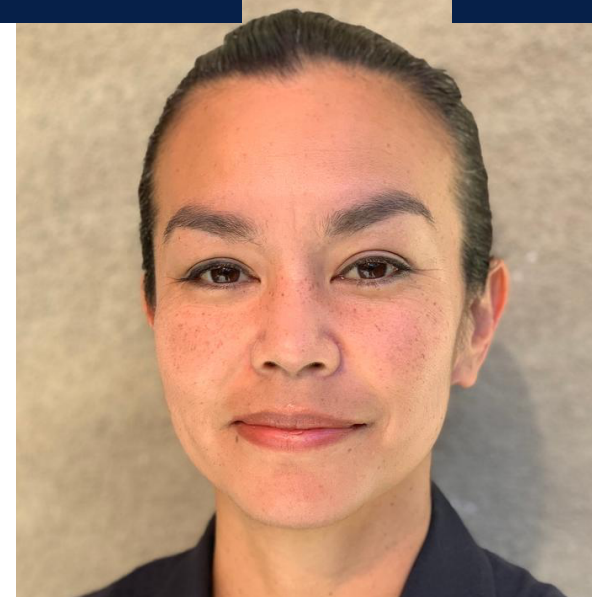
Dr. Ted Kurtz



Megan Grant, NP



Stephanie Phelps, NP



Firefighter Arlene Nunez



Dr. Jennifer Brokaw

Study Sponsors



University of California
San Francisco

**Thank you to the San Francisco Fire
Credit Union, SFFD leadership, Local 798,
and all members of the SFFD.**

Special thanks to:

Chief Jose Velo, SFFD

Chief Natasha Parks, SFFD

Chief Joel Sato, SFFD

Chief Sandy Tong, SFFD

Captain Craig Gordon, SFFD

Division of Training

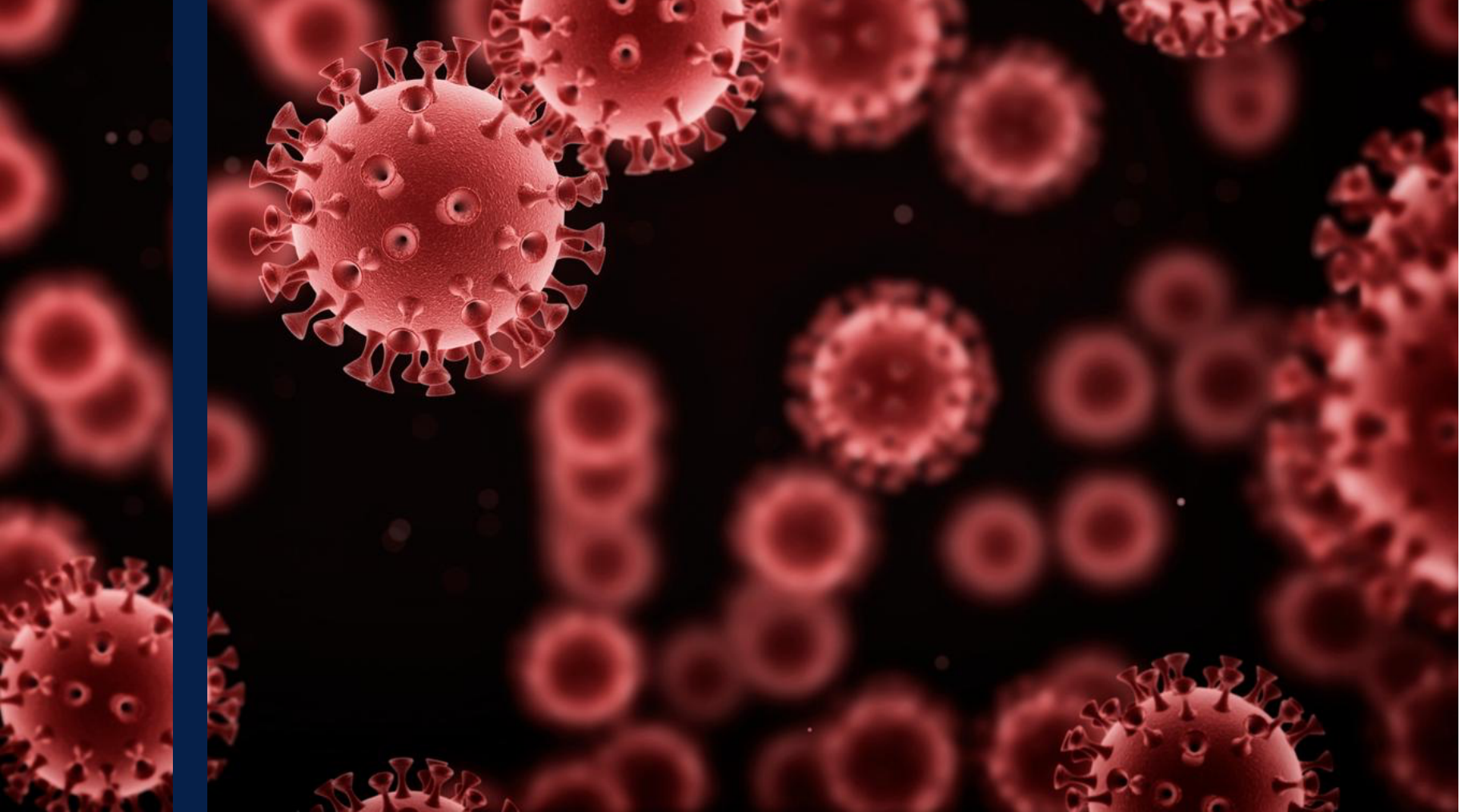
Station 7

Station 49

JoAnne Wong, UCSF Clinical Lab

Volunteers from UCSF School of Nursing

THANK YOU!



Why was this study done?

Had San Francisco Fire Department members been infected with COVID-19?

How well were health & safety precautions working to prevent COVID-19 infection?

There is very little data about COVID-19 infection & frontline workers such as firefighters, paramedics.

COVID-19 Background

Pathways of Exposure

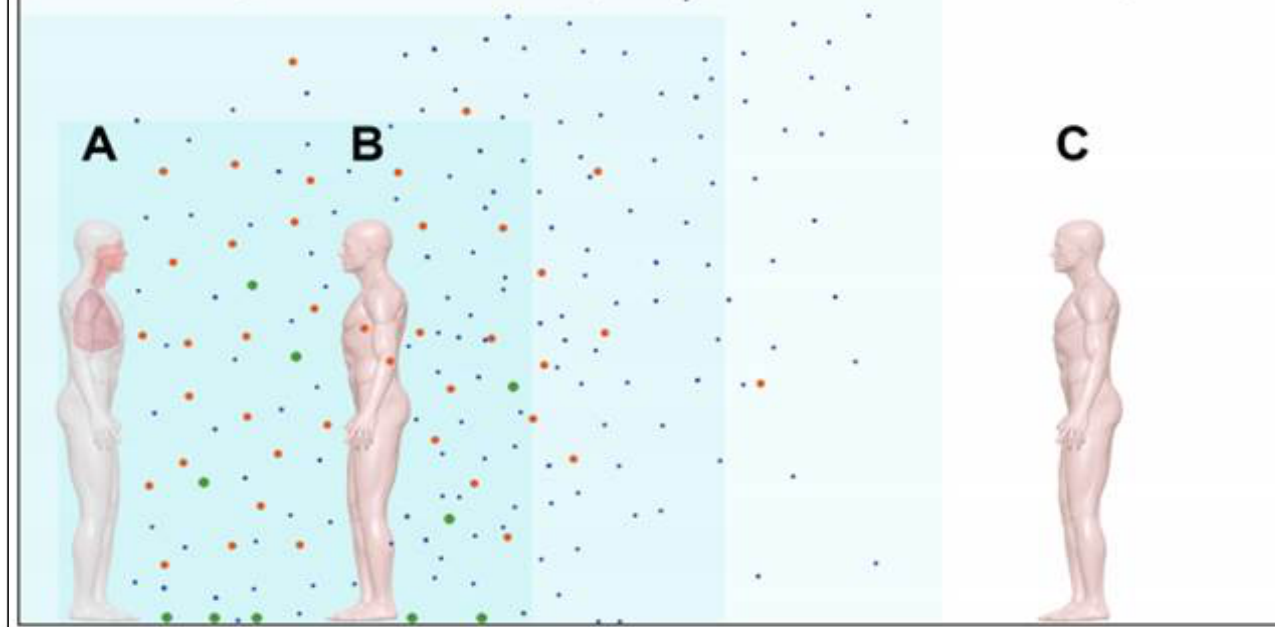
Aerosol > surfaces

Distribution of particle sizes

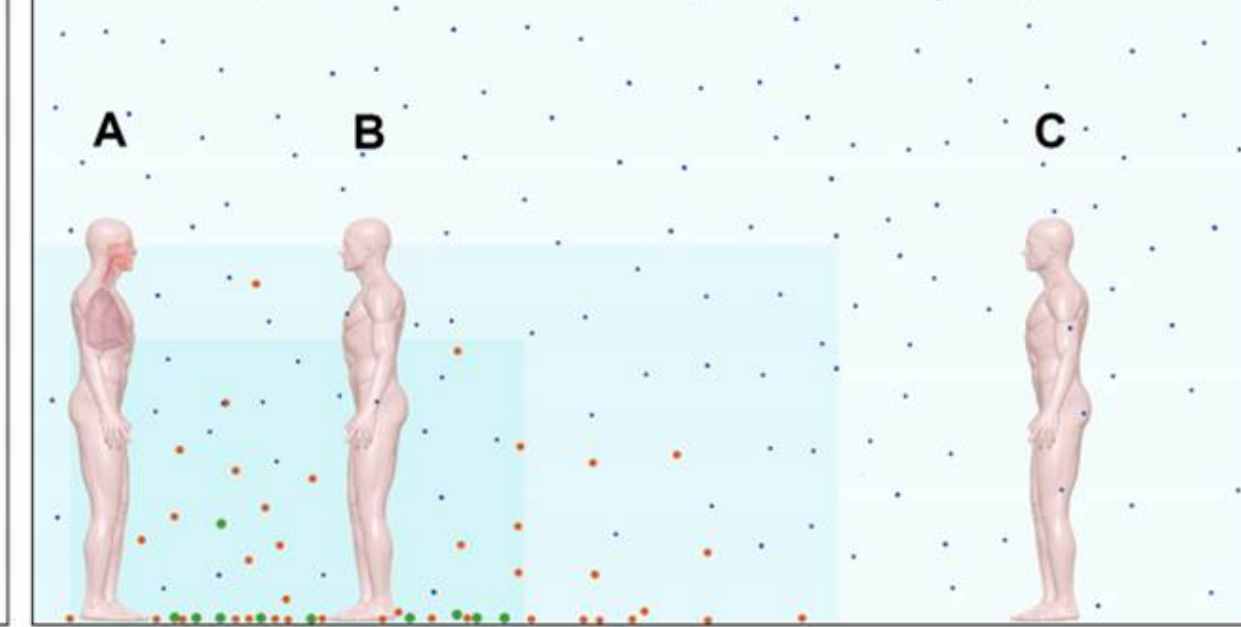
At time = 0, an aerosol is generated by person A.
Person B receives droplet spray and inhales particles.
Person C has no exposure.



At time = 1, the aerosol is dispersing, and many larger particles are settling. Person B inhales particles. Person C has no exposure.



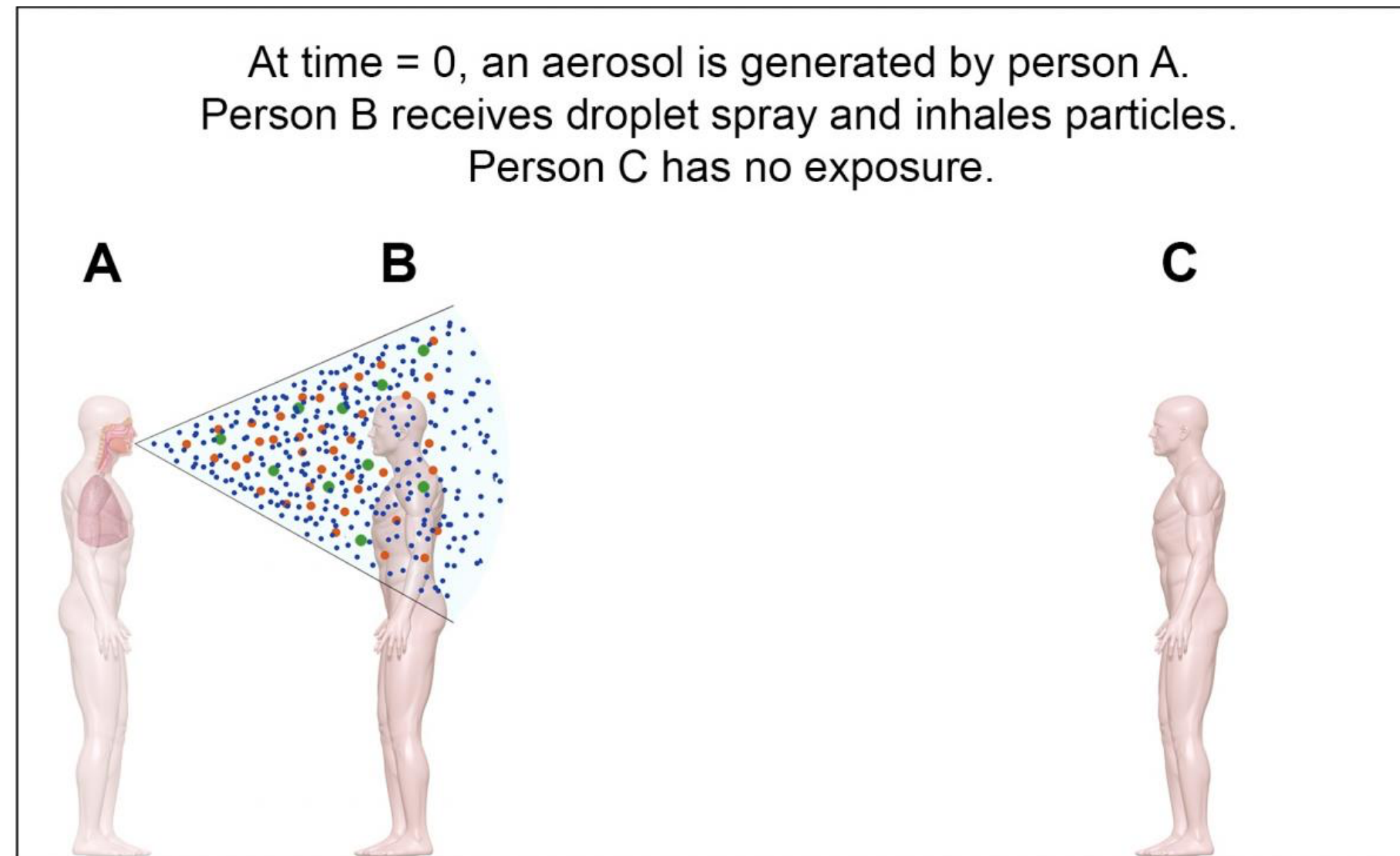
At time = 2, the aerosol is dispersed, and many larger particles have deposited on the floor. Persons B and C inhale particles.



Pathways of Exposure

Aerosol > surfaces

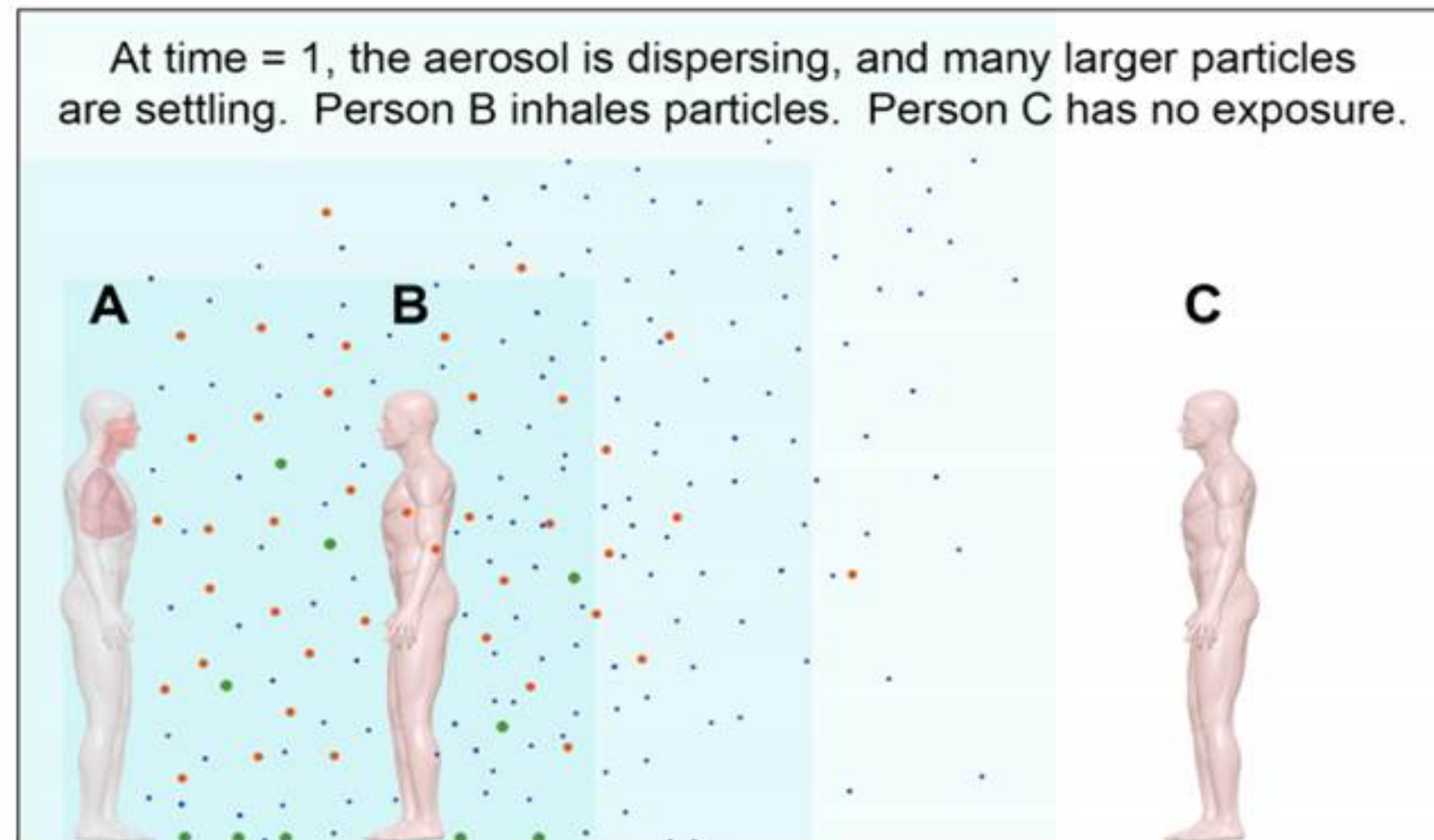
Distribution of particle sizes



Pathways of Exposure

Aerosol > surfaces

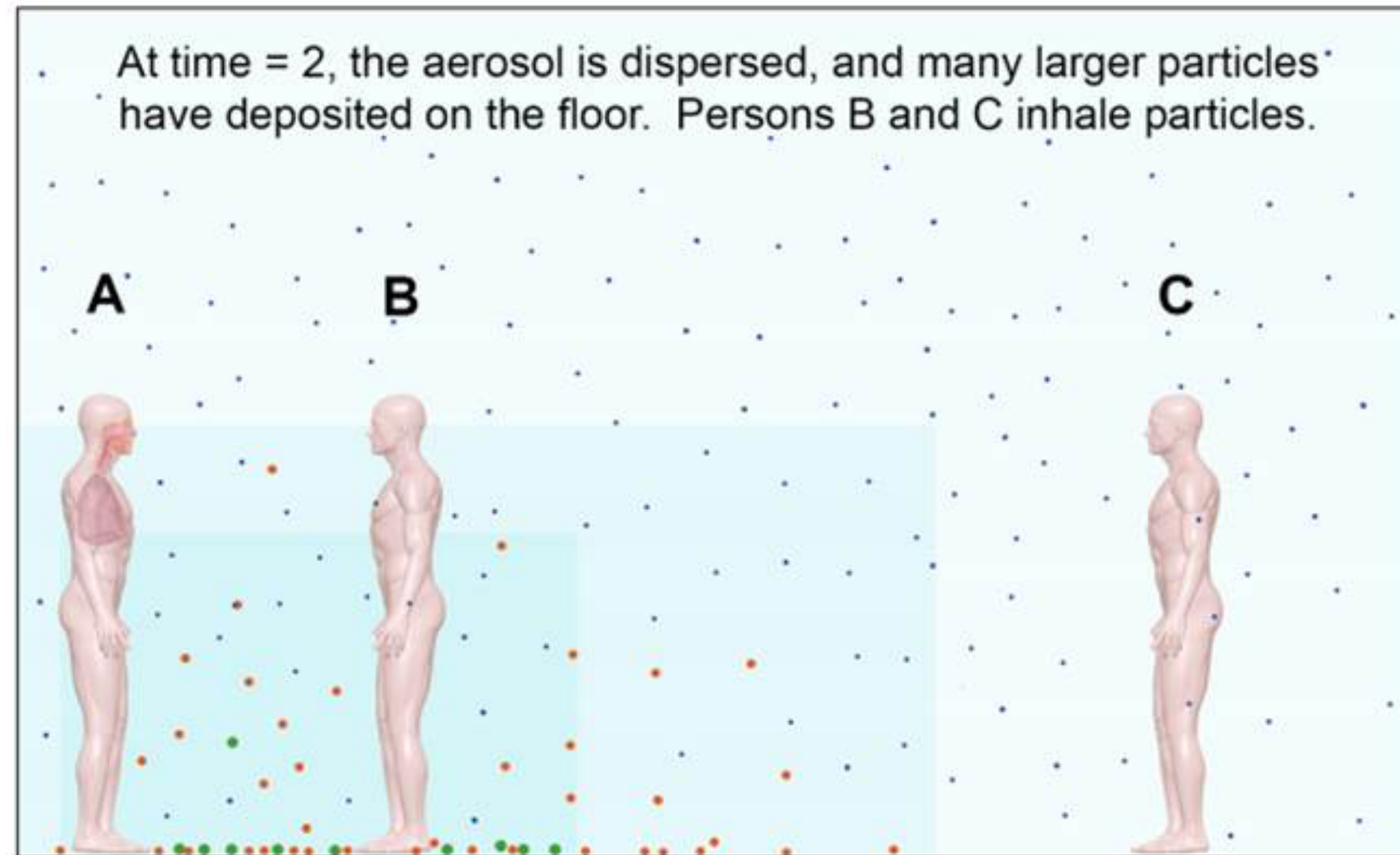
Distribution of particle sizes



Pathways of Exposure

Aerosol > surfaces

Distribution of particle sizes



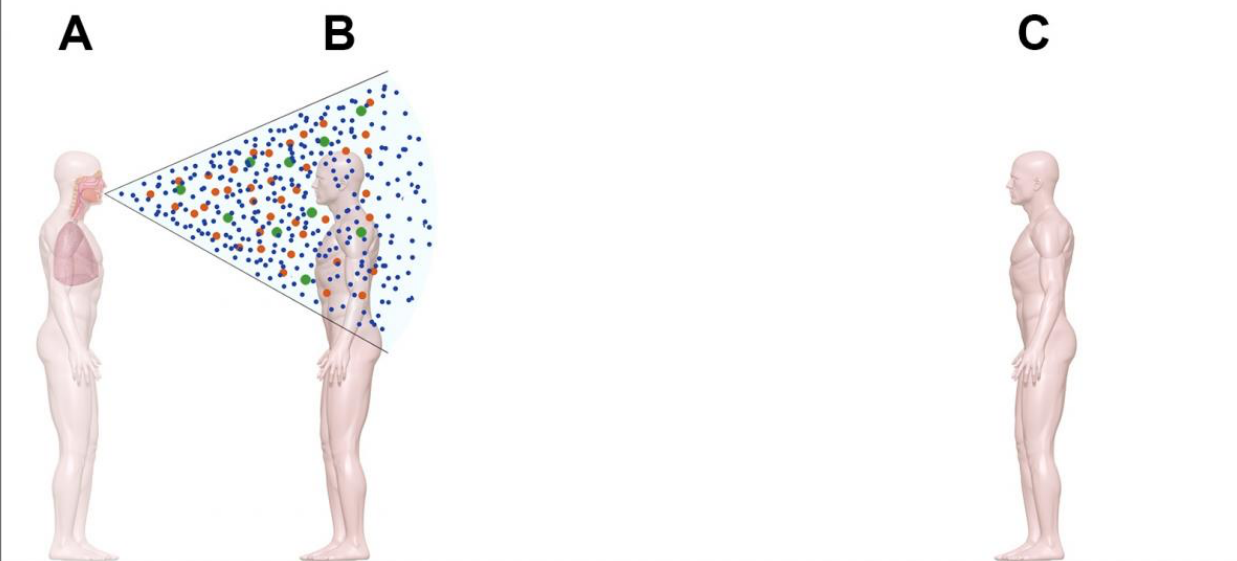
Pathways of Exposure

Aerosol > surfaces

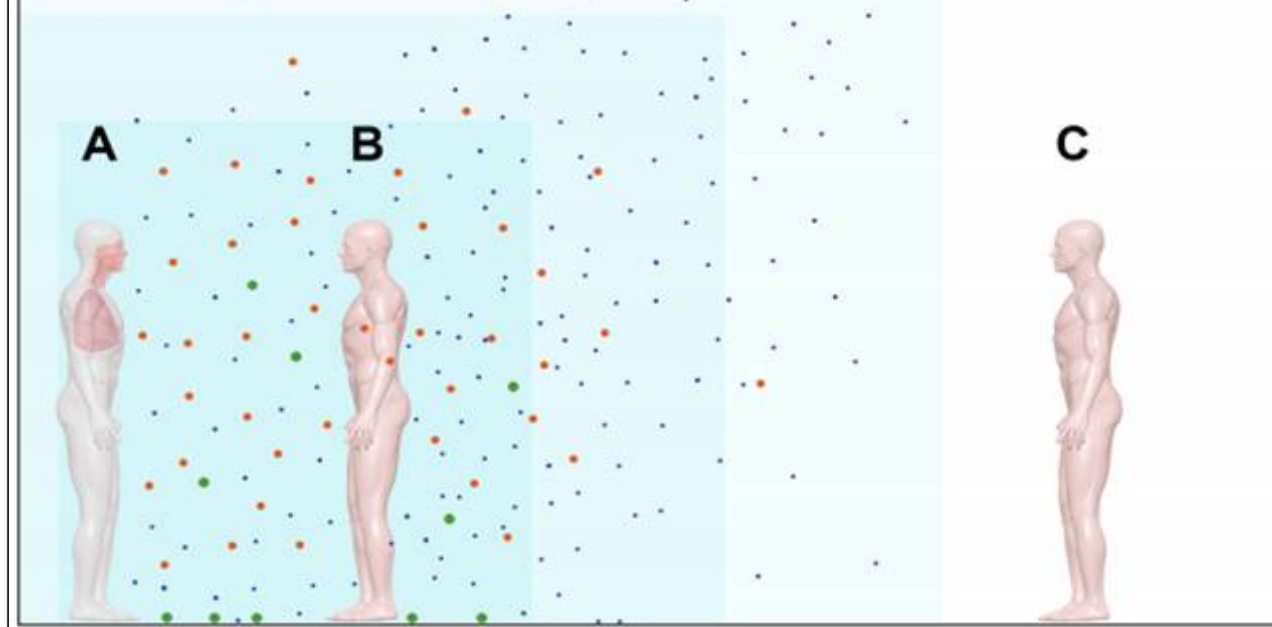
Distribution of particle sizes

The 6' x 15 Rule

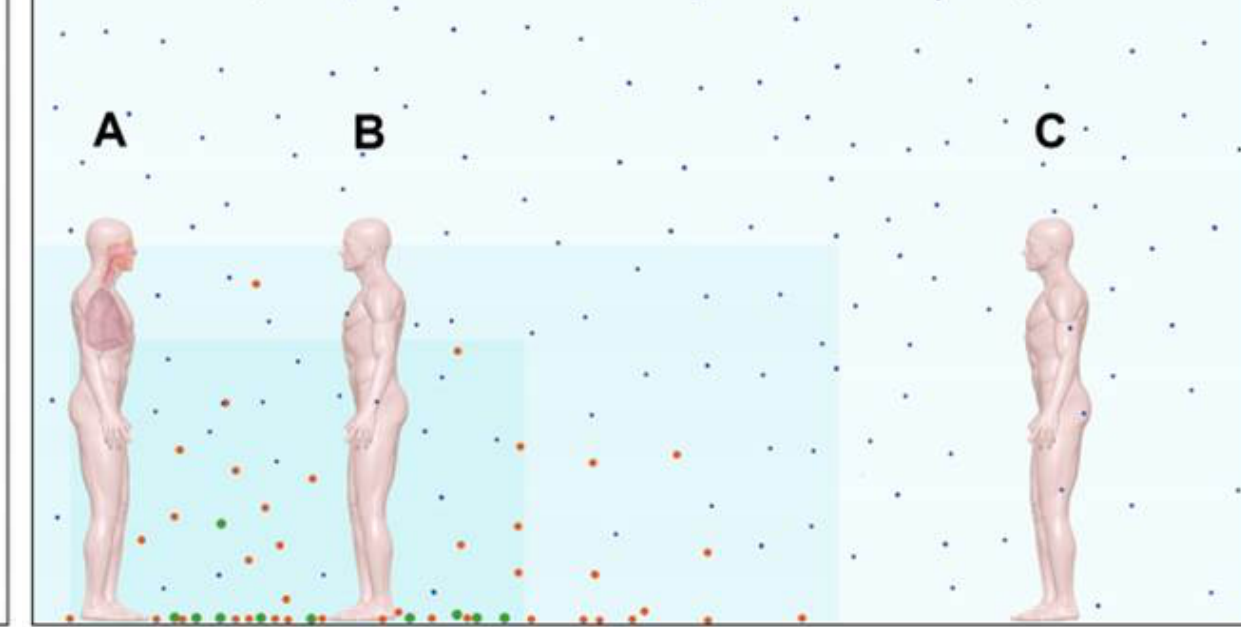
At time = 0, an aerosol is generated by person A.
Person B receives droplet spray and inhales particles.
Person C has no exposure.



At time = 1, the aerosol is dispersing, and many larger particles are settling. Person B inhales particles. Person C has no exposure.



At time = 2, the aerosol is dispersed, and many larger particles have deposited on the floor. Persons B and C inhale particles.



Signs and Symptoms

- Fever or chills (not always)
- Cough
- Shortness of breath or difficulty breathing
- Sore throat
- Feeling unusually fatigued
- Runny or congested nose
- Eye redness (Pink Eye)
- Diarrhea
- Nausea or vomiting
- Loss of smell or taste

Asymptomatic transmission

- 40-50% have no symptoms
 - Most infectious about 7 days after exposure
 - “Superspreaders”
-

Diagnosis of COVID-19

PCR-RT: diagnose
present infection

- Nasopharyngeal
- Midturbinate
- Anterior nares
- Oropharyngeal
- ?saliva

Blood test: diagnose
prior infection

- Different methods
- Varying accuracy
- Ongoing research
about immunity

How was this study done?

Recruitment through
SFFD groups, email, flyers

Active member =
worked at least 3 shifts
since January 1, 2020

How was this study done?

Recruitment through
SFFD groups, email, flyers

Online consent
all information and test
results are confidential

Active member =
worked at least 3 shifts
since January 1, 2020

Questionnaire
demographics
exposure to COVID-19
PPE use
prior testing

How was this study done?

Recruitment through
SFFD groups, email, flyers

Online consent
all information and test
results are confidential

Sample collection at
Division of Training &
Station 49

Active member =
worked at least 3 shifts
since January 1, 2020

Questionnaire
demographics
exposure to COVID-19
PPE use
prior testing

Laboratory testing at
UCSF Clinical Lab
any positive sample
confirmed with two
additional tests

WHO PARTICIPATED?

Total Participants

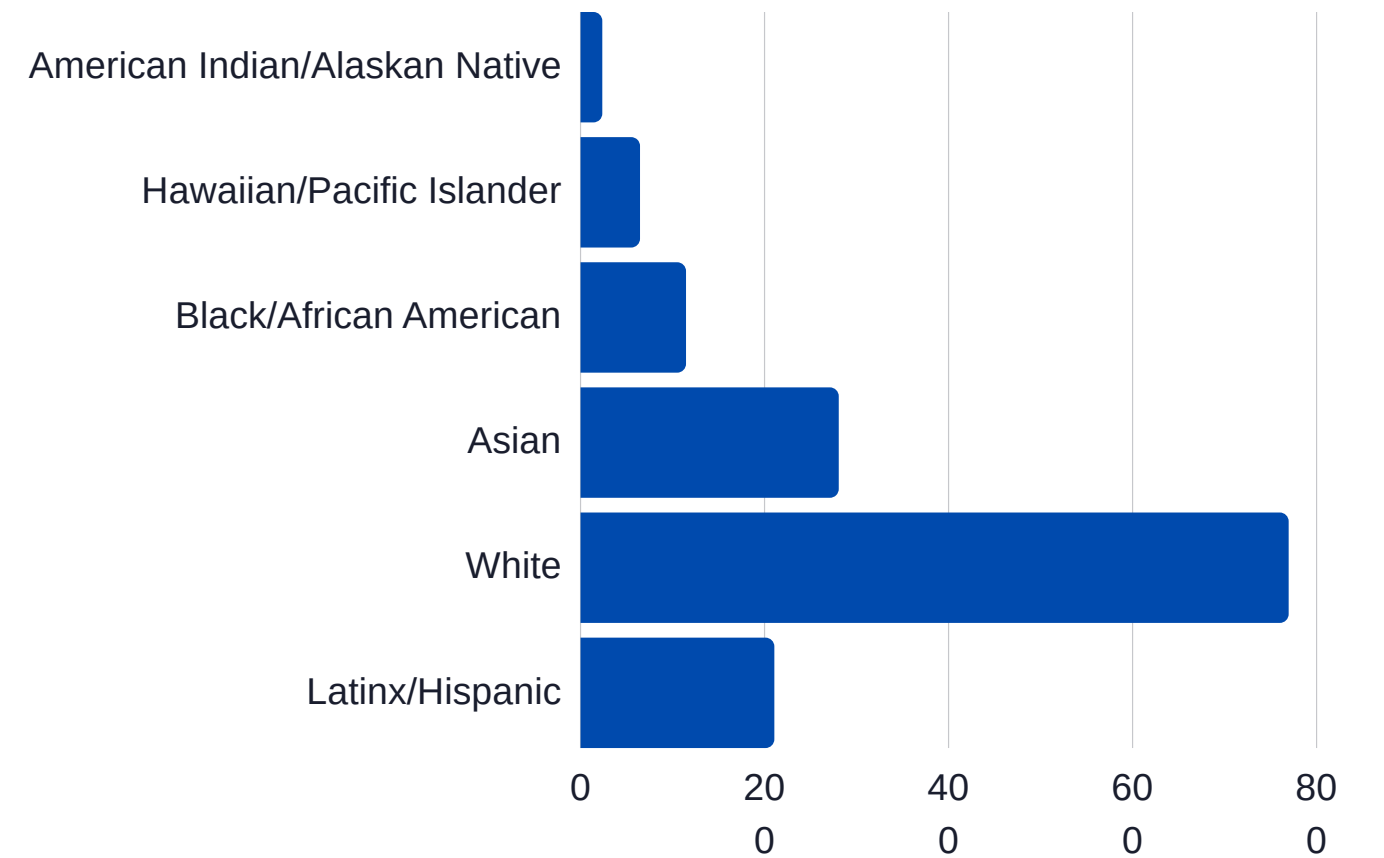
(blood sample & survey):

1,233 SFFD members

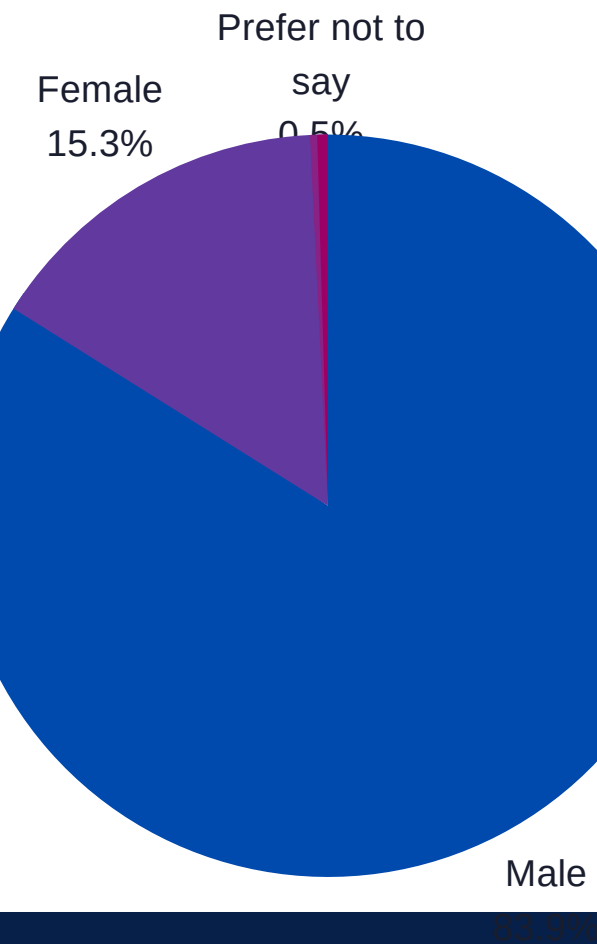
66% of total members

SFFD members from every job title
and 60 work locations participated!

Race & Ethnicity

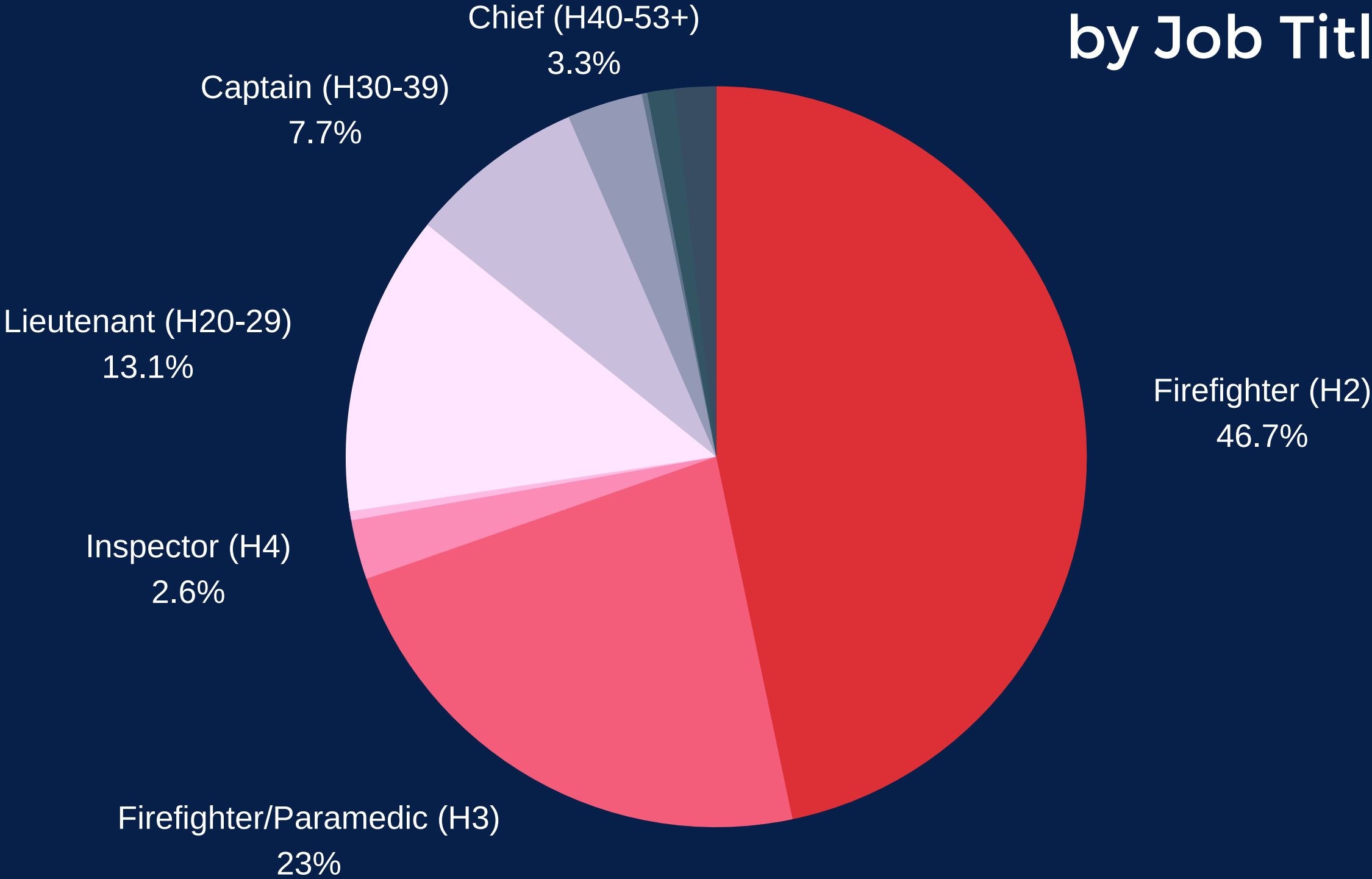


Gender



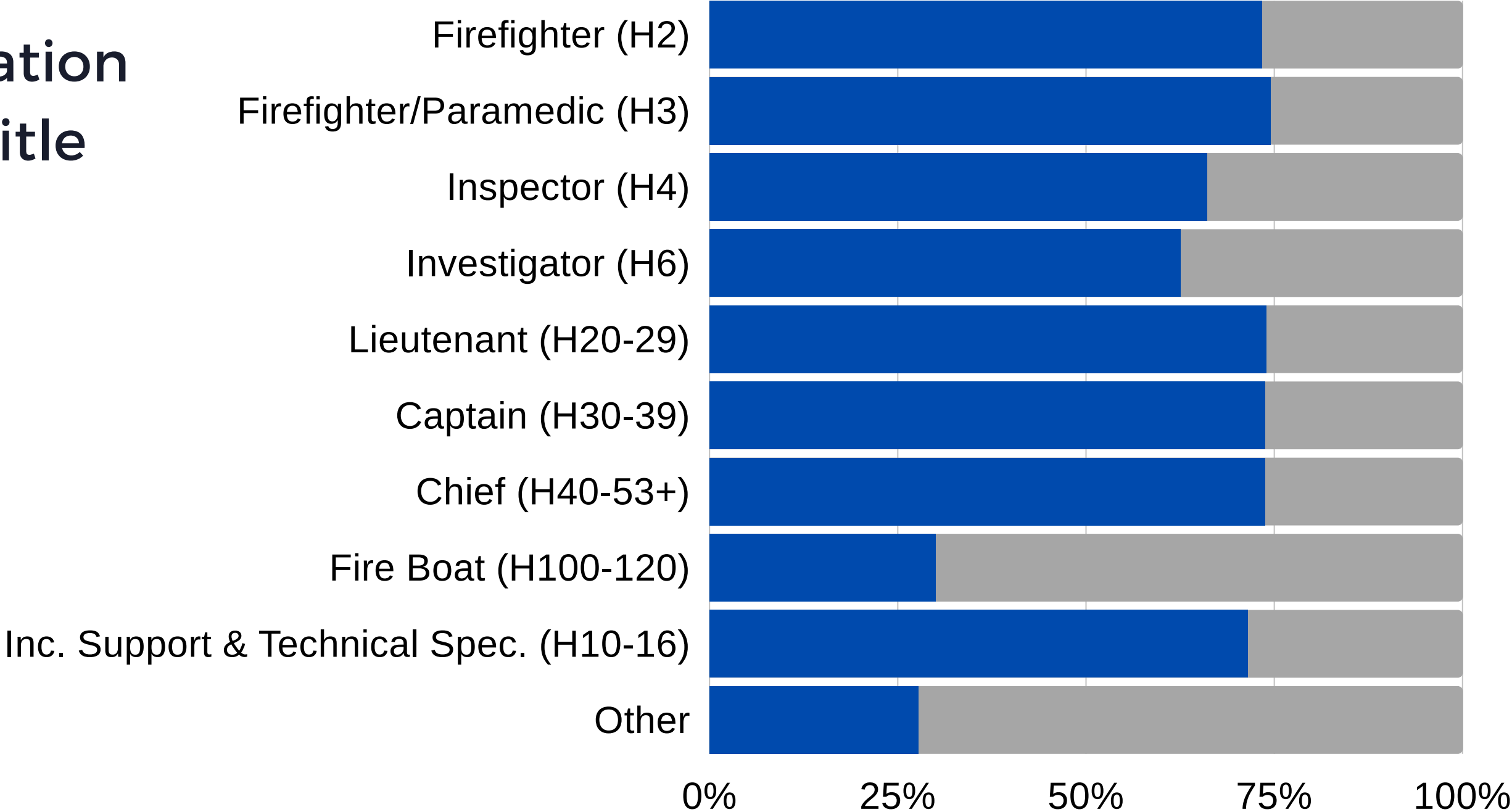
WHO PARTICIPATED?

Participation by Job Title



WHO PARTICIPATED?

Percent Participation by Job Title

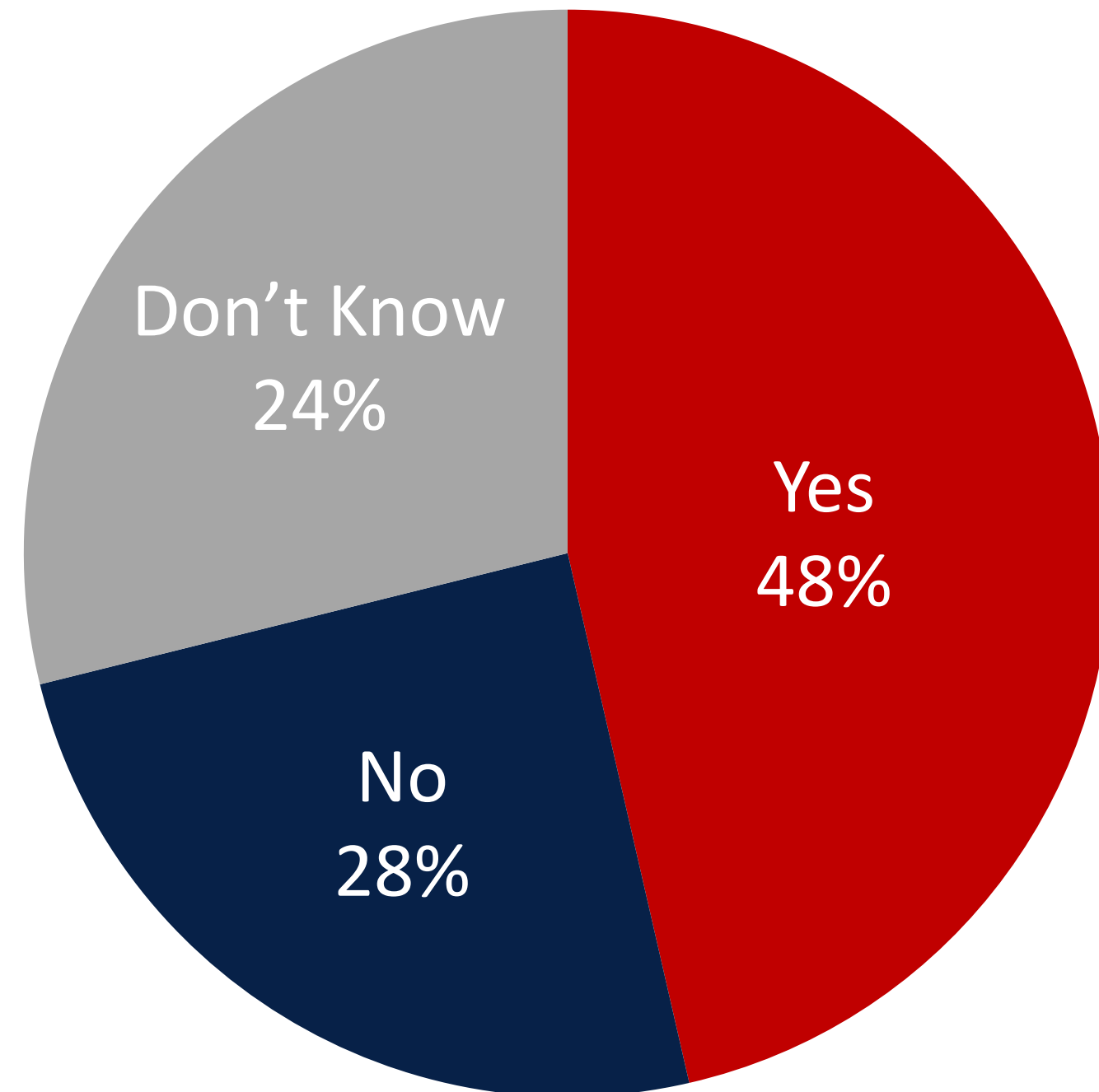


What did we learn?

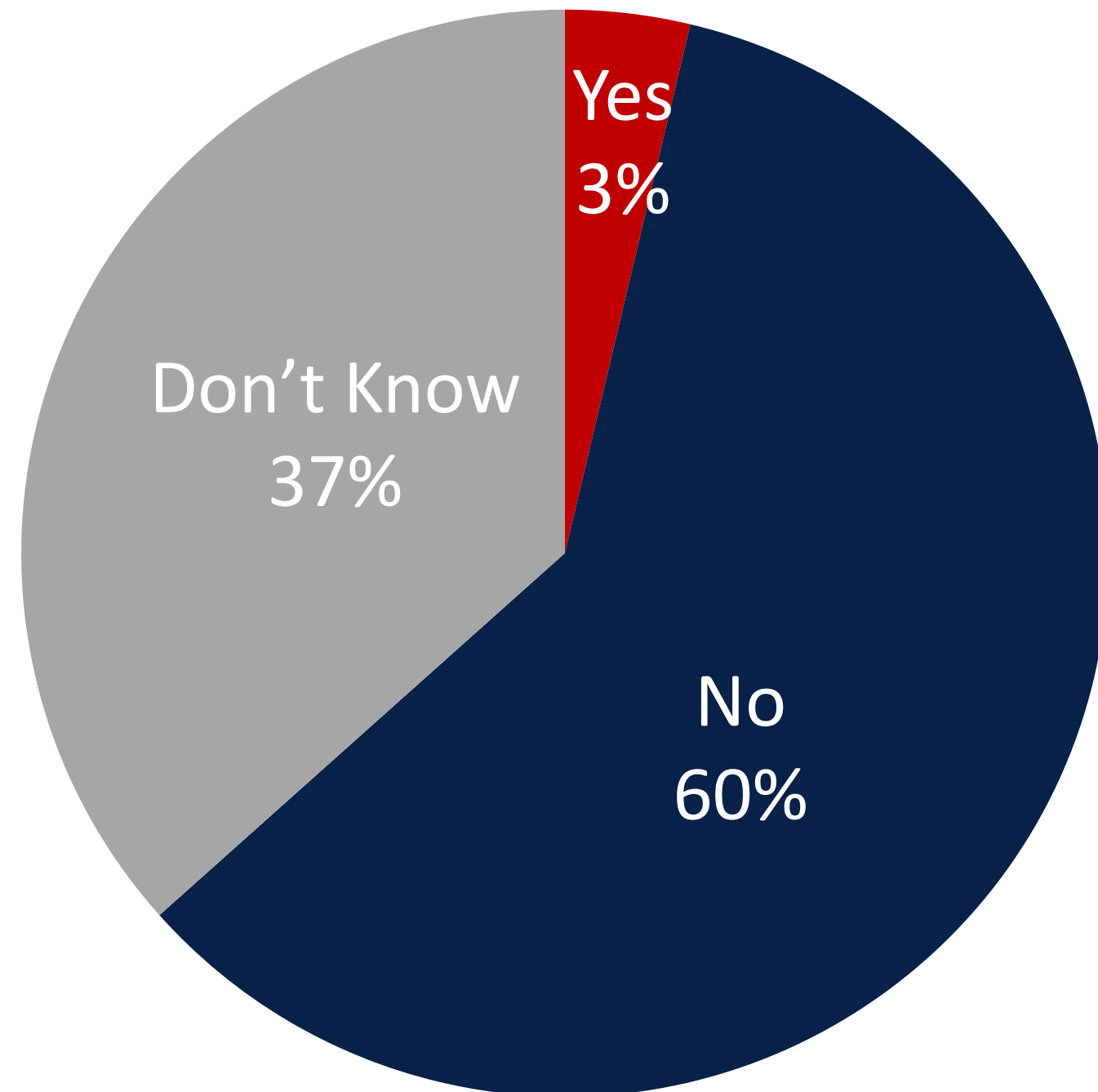
601 members (48% of those surveyed) reported likely or confirmed contact with patients with COVID-19.

Some of these members reported just one or two exposures, and some reported many exposures.

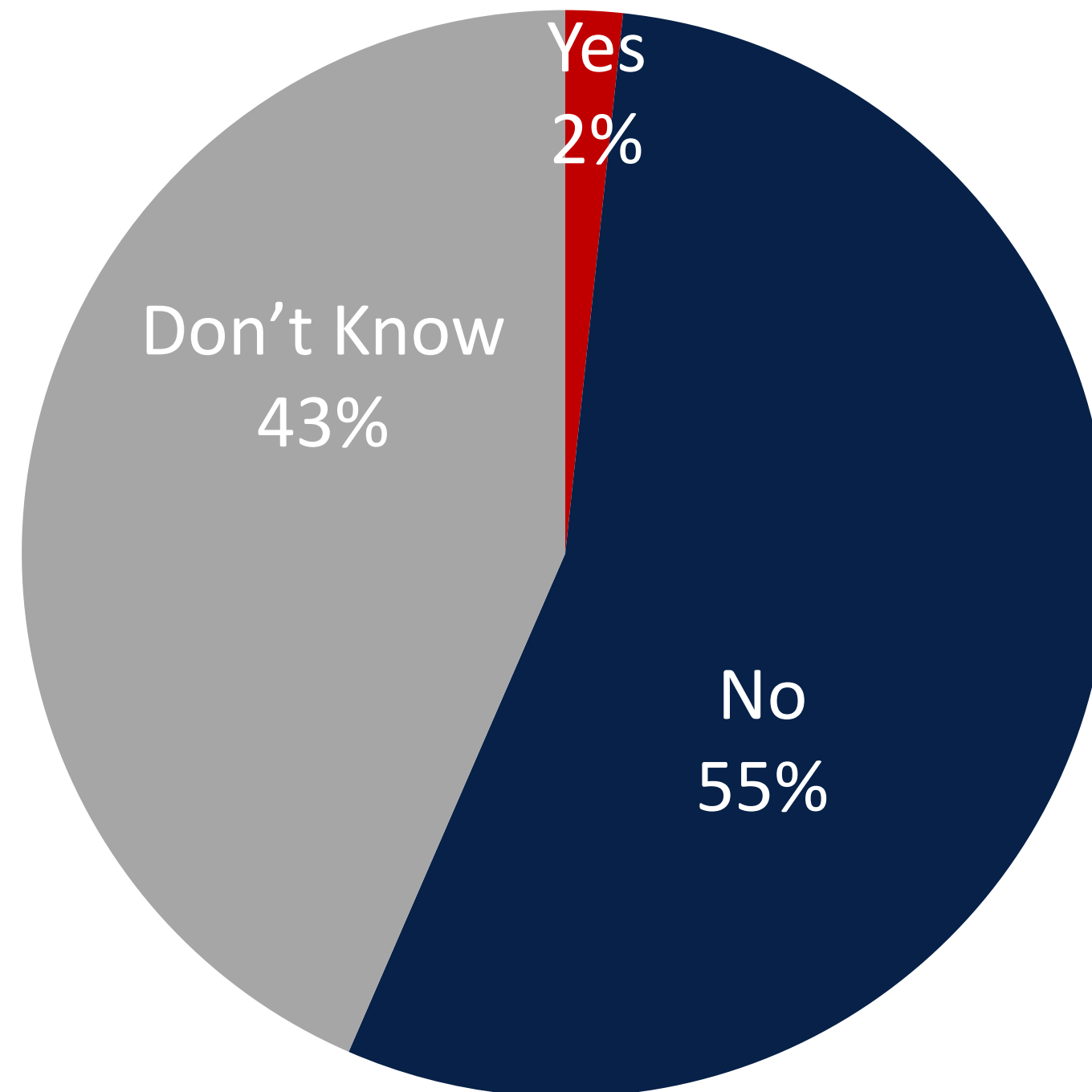
Exposure to a COVID-19 positive patient at work



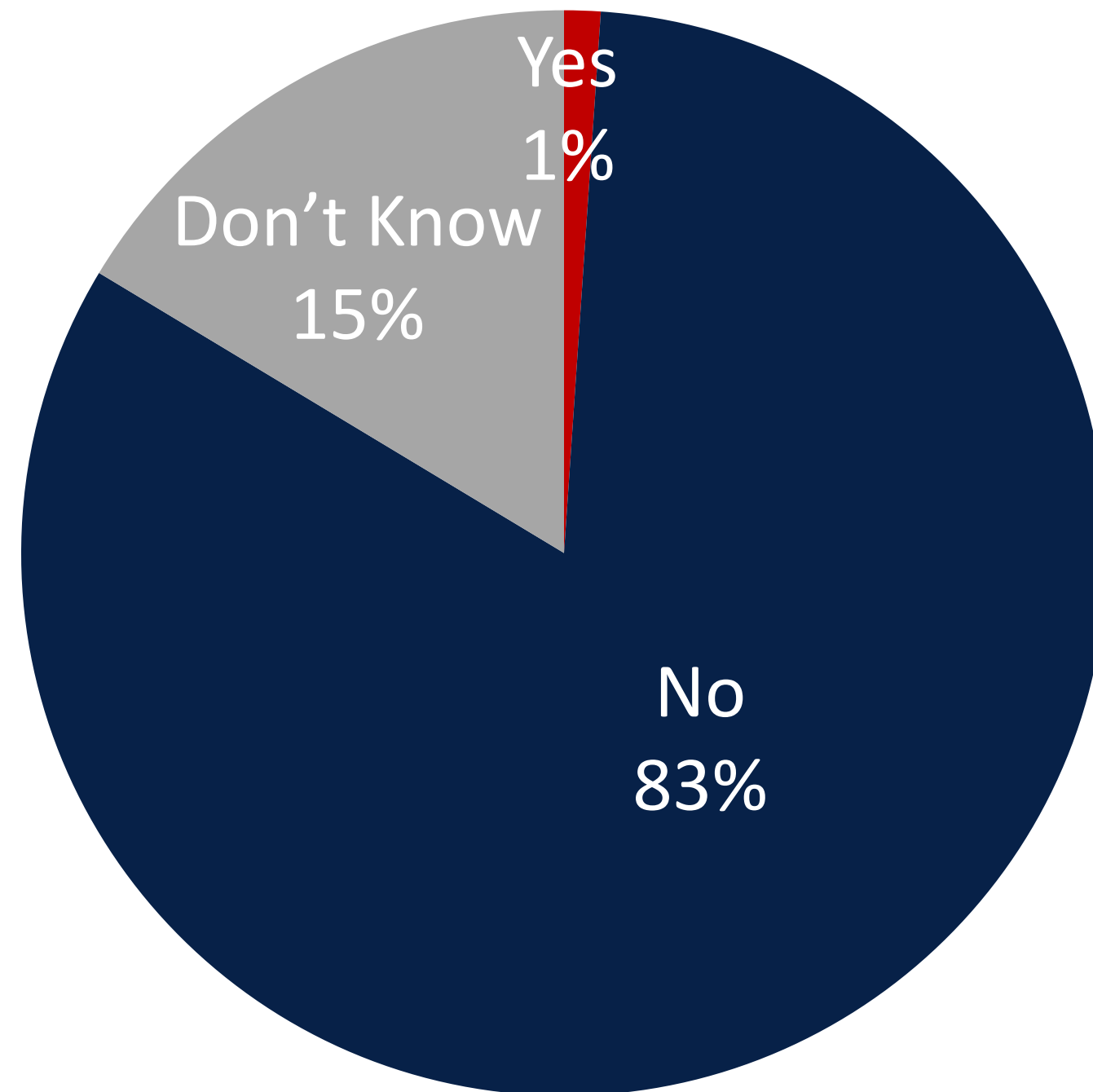
Exposure to a COVID-19 positive coworker



Exposure to a COVID-19 positive member of the public while off-duty



Exposure to a COVID-19 positive family member



What did we learn?

Very few members of SFFD have had previous COVID-19 infection.

Antibodies were confirmed in only 3 of the 1,233 samples tested.

What do the results mean?

MY RESULT WAS POSITIVE

You were exposed to the virus and recovered from the infection. You should still assume there is risk of future COVID-19 infection.

MY RESULT WAS NEGATIVE

You probably did not have a COVID-19 infection. There is still risk of future COVID-19 infection.

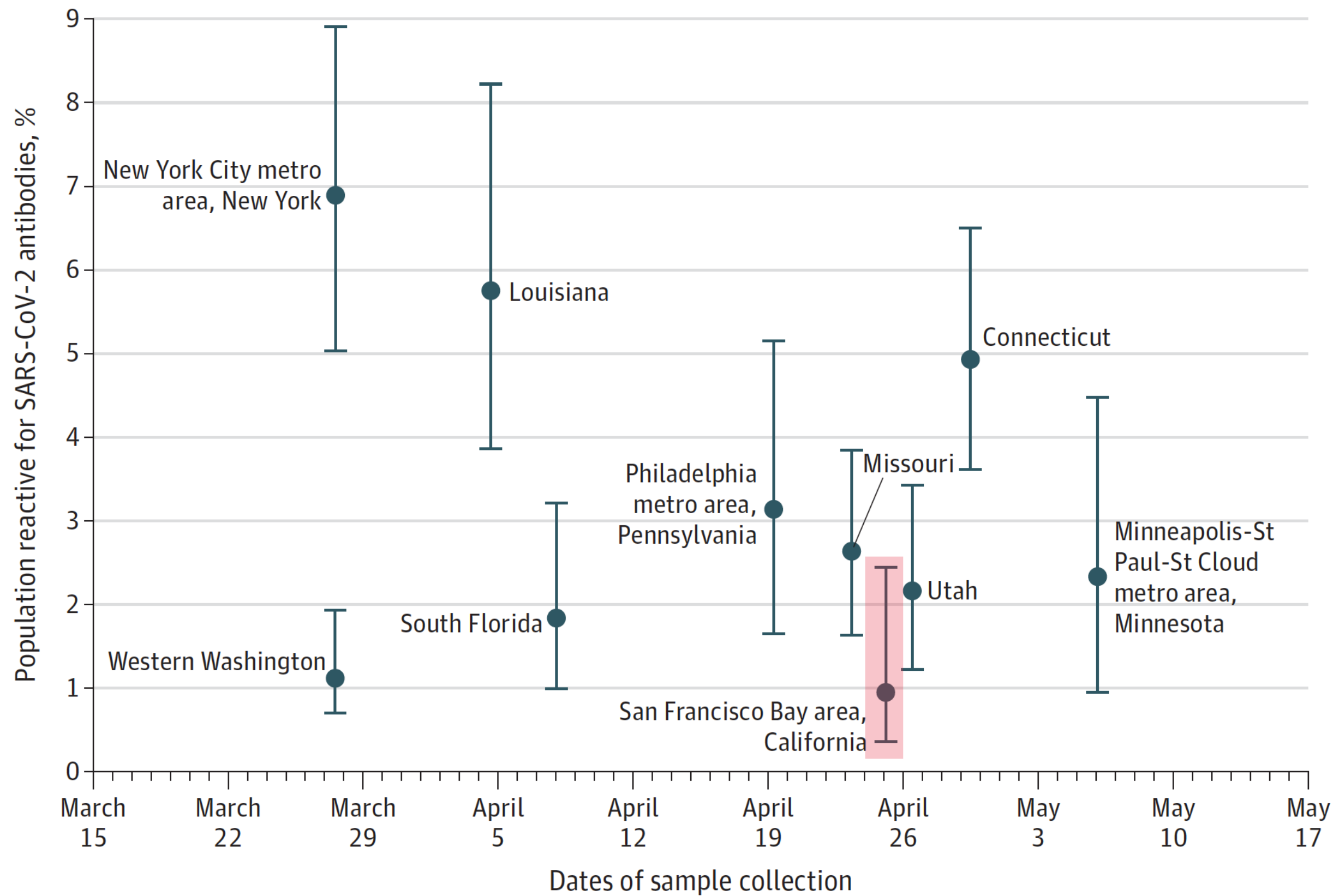
What do the results mean?

For SFFD:

We found lower rates of past COVID-19 infection in SFFD than healthcare workers.

May be due to lower prevalence of COVID-19 in San Francisco, protective work practices, or both.

A Estimates of seroprevalence



What did we learn?

PPE use changed after the
Shelter-in -Place Order:

Many more members routinely
wore respiratory protection after
March 18, 2020

Other changes in PPE were
apparent as well

Routine use of personal protective equipment (PPE)

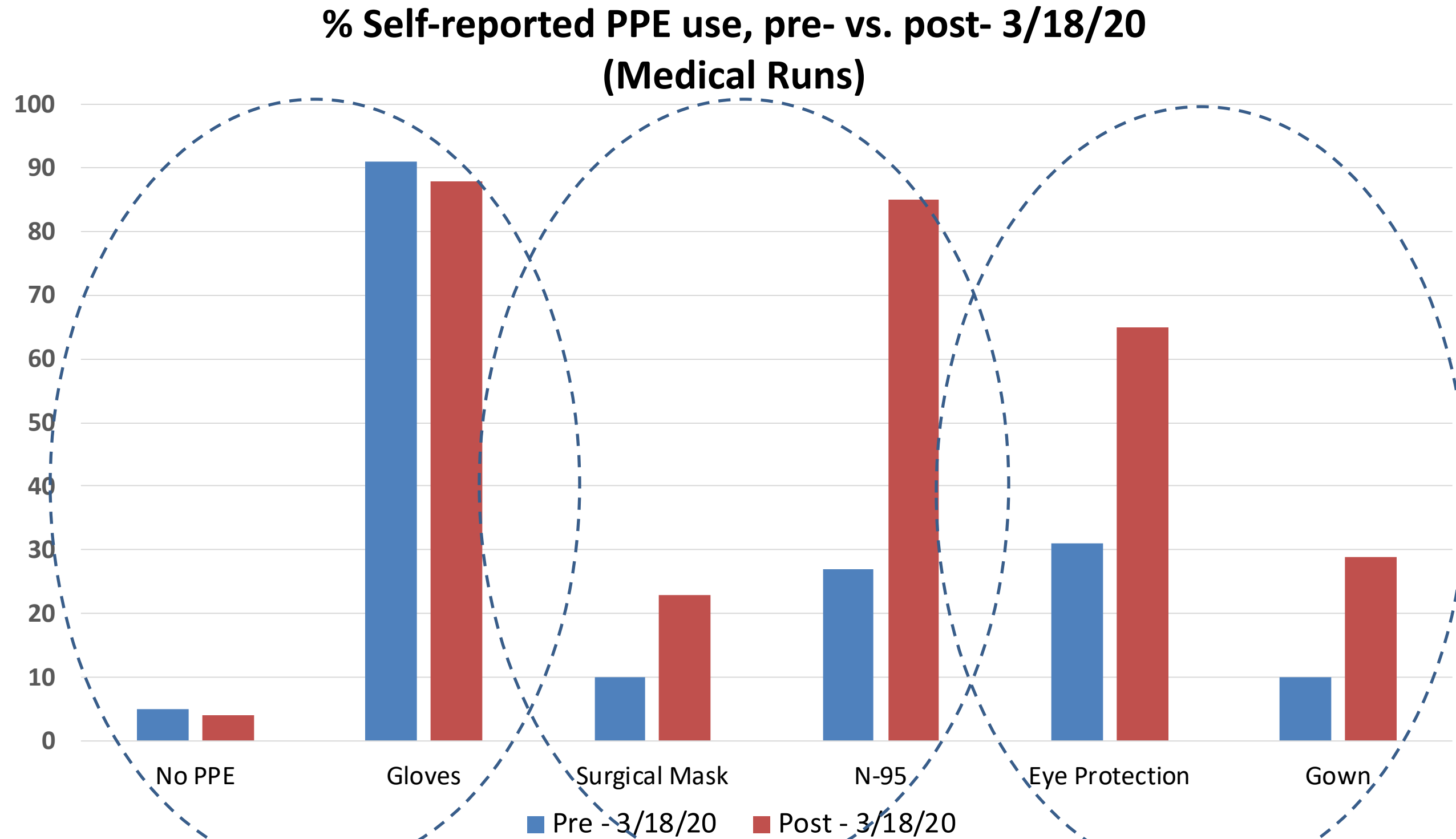
- **Gloves**
- **Surgical (or cough) mask**
- **N95 respirator**
- **Face shield or goggles**
- **Disposable gown**
- **No PPE**

During medical calls:

Personal Protective Equipment - Medical Calls

During medical calls, what type of PPE did you routinely wear when dealing with members of the public prior to March 18, 2020?

During medical calls:



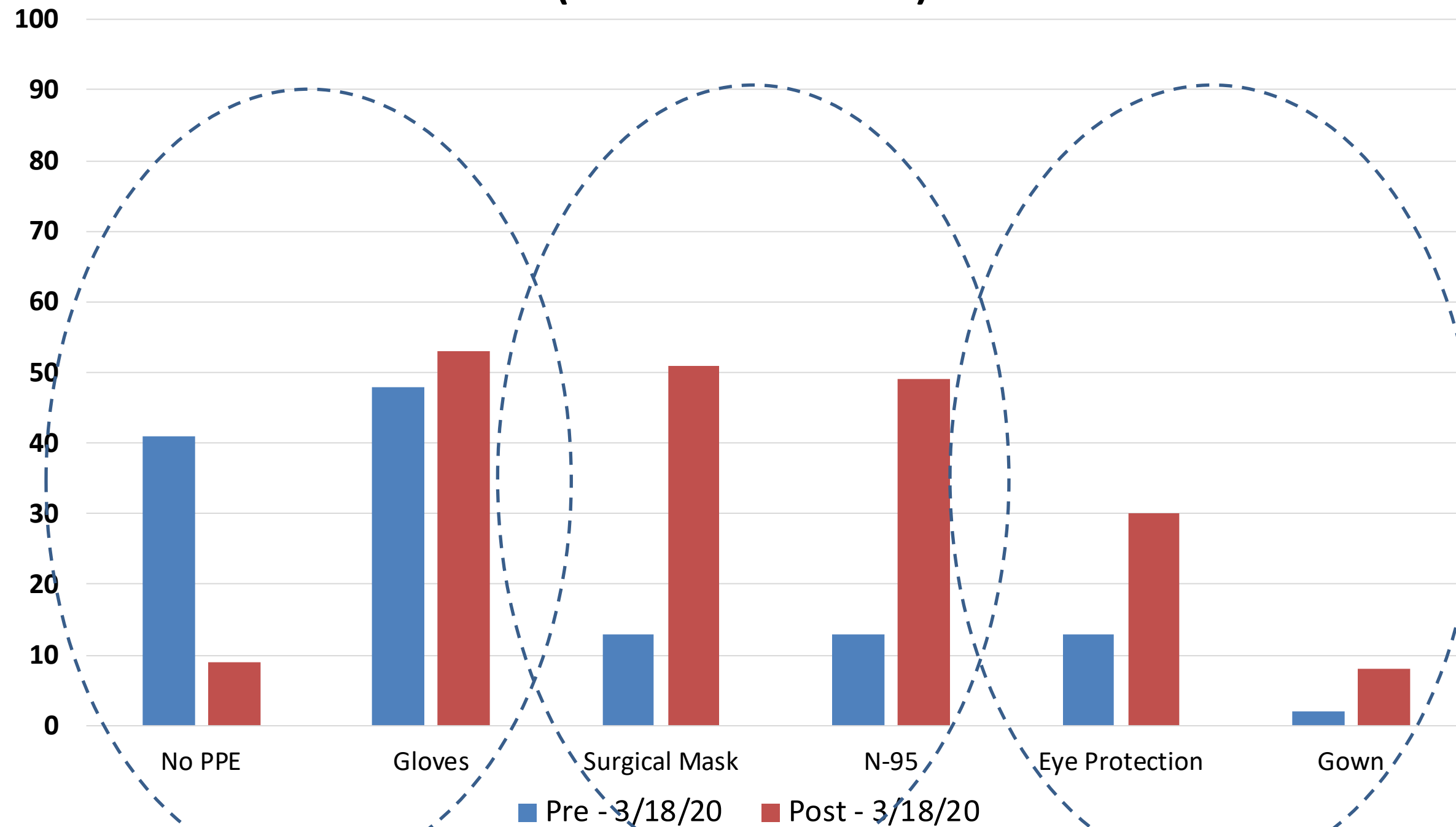
During non-medical calls:

Personal Protective Equipment - Non-medical Calls

When not performing active fire suppression (or overhaul) operations, what type of PPE did you routinely wear when dealing with members of the public prior to March 18, 2020?

During non-medical calls:

**% Self-reported PPE use, pre- vs. post- 3/18/20
(Non-medical Runs)**



Summary: Changes in PPE Use

Increase in use of routine *respiratory protection* on medical runs (N95 > surgical masks)

Increase in use of routine *respiratory protection* on non- medical runs (N95 ~ surgical masks)

More modest increase in use of *eye protection* and *disposable gowns* in both situations

What more would we like to know?

Antibody results of other Fire Departments

Studies are under way in San Jose, Ventura, New York City, Detroit, & Rhode Island

What more would we like to know?

Will SFFD's low rate last?

As COVID-19 numbers rise in SF and the Bay Area, there may be increased risk of exposure

What more would we like to know?

When are members most at risk of COVID-19 infection?

On a call? At the firehouse? In the community when off work?

What more would we like to know?

How can we best protect front line workers?

Recommendations

Keep up the good work

by continuing to take the following precautions:

- Wearing a face covering, surgical mask or N95 respirator depending upon the circumstances
- Wash your hands frequently
- Disinfect commonly touched surfaces
- Stay at least 6 feet from other people
- Wear PPE when possible during interactions with the public



Recommendations

Stay vigilant

If you experience any of the symptoms of COVID-19, contact the SFFD Physician's Office

Phone: 415-558-3255



Thank you!

Please type your
questions using the
Q&A button

Visit
sffd19.ucsf.edu
for more
information

Reach out:

Study Coordinator

Megan Grant

megan.grant@ucsf.edu

510-480-0006

Study Director

Dr. Robert Harrison

robert.harrison@ucsf.edu

415-717-1601

SFFD Physician's Office

415-558-3255