PROTECT

A COVID-19 National Core Study

COVID-OUT: COVID-19 outbreak investigations to understand workplace SARS-CoV-2 transmission in the United Kingdom

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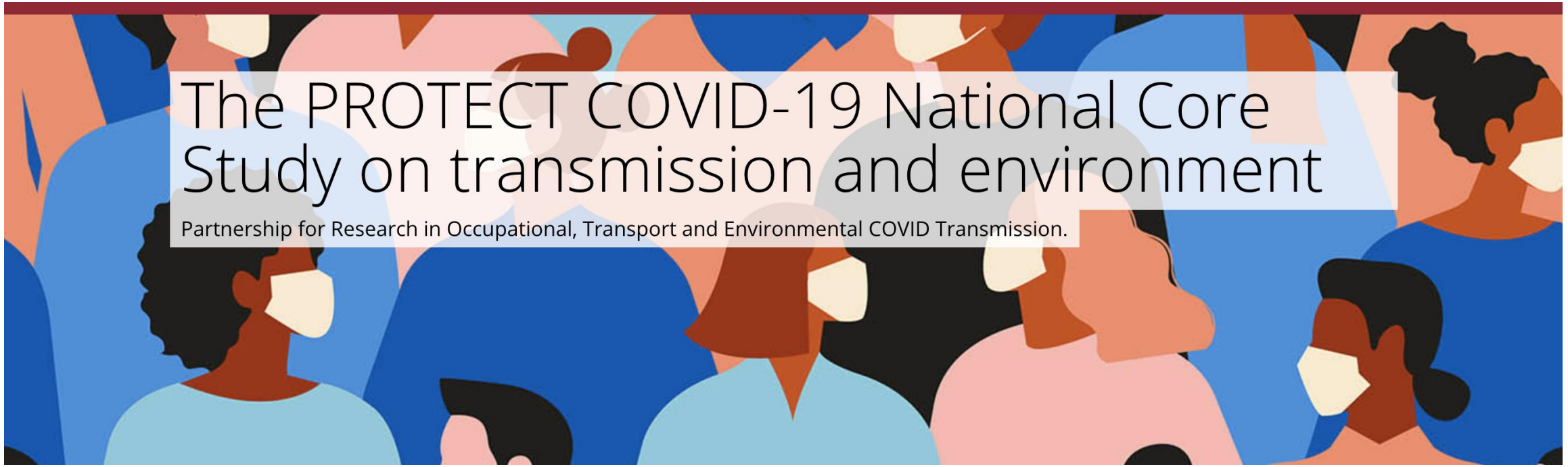

Established in October 2020, the PROTECT study aims to provide critical evidence to prevent or more effectively control SARS-CoV-2 (the virus that causes COVID-19) transmission in all potential exposure scenarios, including workplaces.

https://sites.manchester.ac.uk/covid19-national-project/

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Theme 1: Outbreak investigations

Theme 2: Transmission modelling

Theme 3: Sector specific studies

Theme 4: Tools and methods

Theme 5: Experimental infection

Theme 6: Knowledge synthesis

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COVID-OUT

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COVID-19 Outbreak Investigations to Understand Transmission

Overall Aim

To understand SARS-CoV-2 transmission routes and risk factors through investigation of outbreaks in a range of occupational settings

Objectives

1. To establish a multiagency rapid response team for workplace outbreak investigations.
2. To standardize and expand data collection in workplace outbreak investigations.
3. To identify risk factors for SARS-CoV-2 infection among workers, recognizing transmission may occur at or outside of work.

IDENTIFYING COVID-19 OUTBREAKS

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PHE & HSE partners undertake daily surveillance for outbreaks in workplaces.

We have prioritized investigation of outbreaks occurring:

- Between December 2020 and July 2021
- In large workplaces (i.e., with ≥100 workers)
- With attack rates of ≥5%

We have excluded outbreaks occurring:

- In care homes, hospitals, schools, prisons, and restaurants

OUTBREAKS UNDER INVESTIGATION

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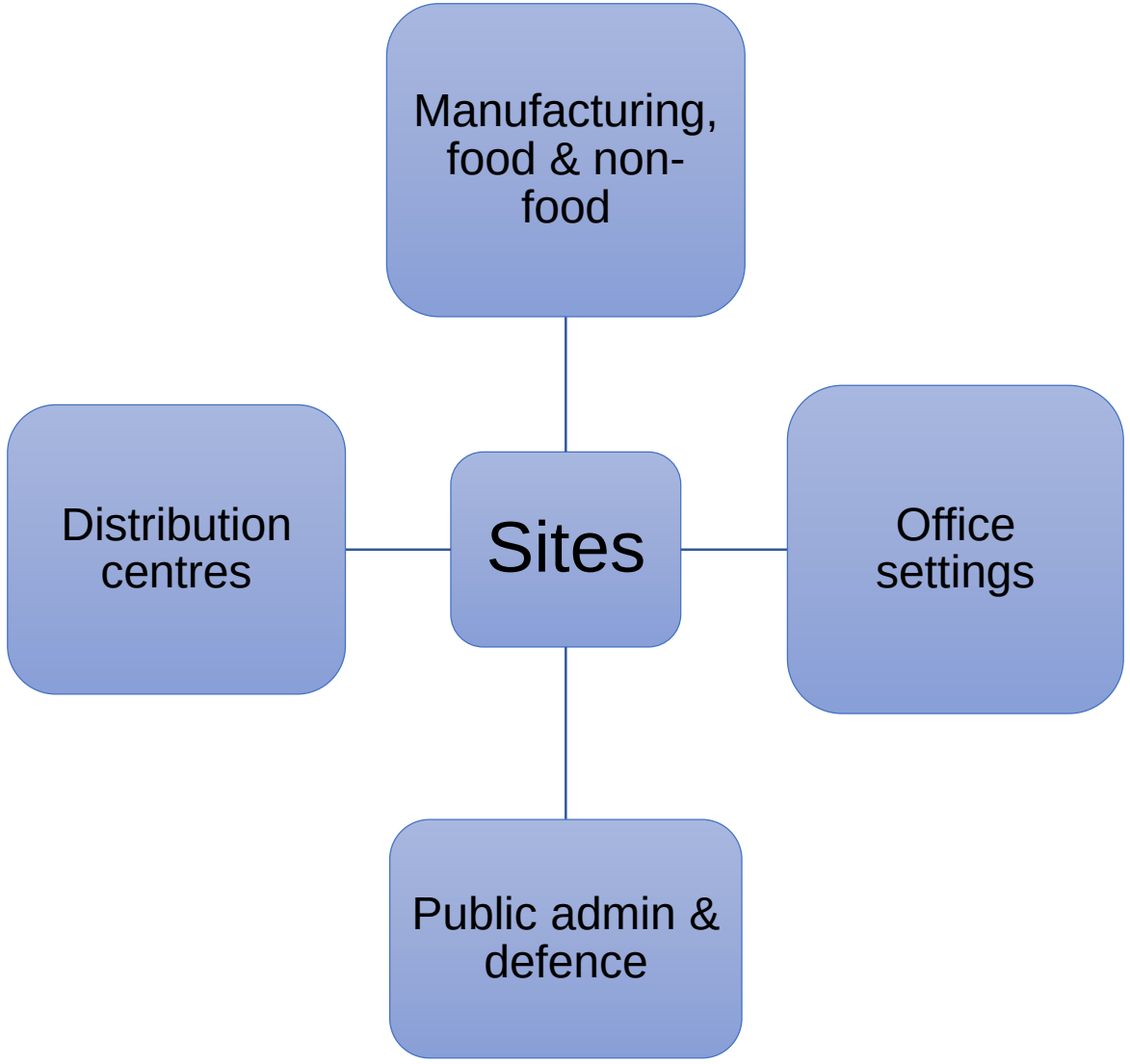

RECRUITMENT

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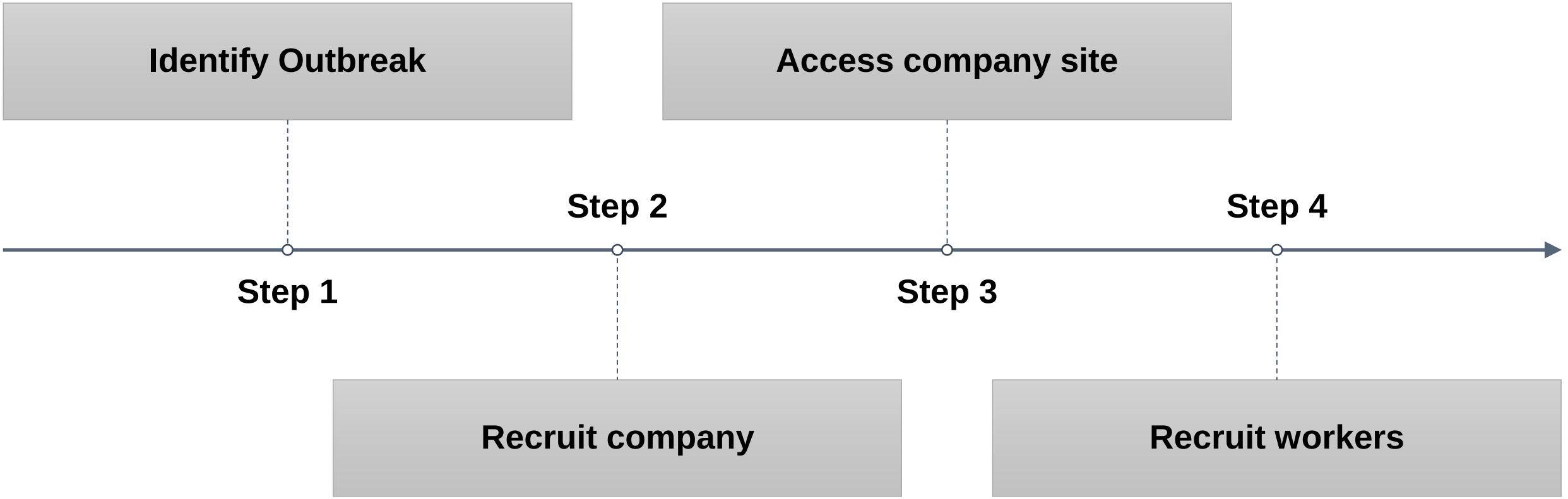

RAPID RESPONSE

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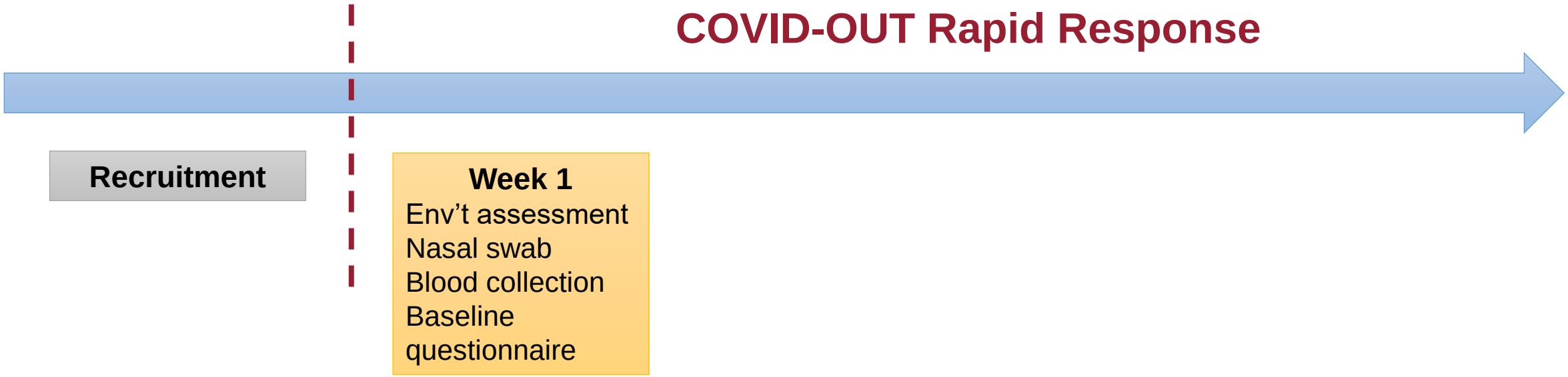
COVID-OUT Rapid Response



RAPID RESPONSE

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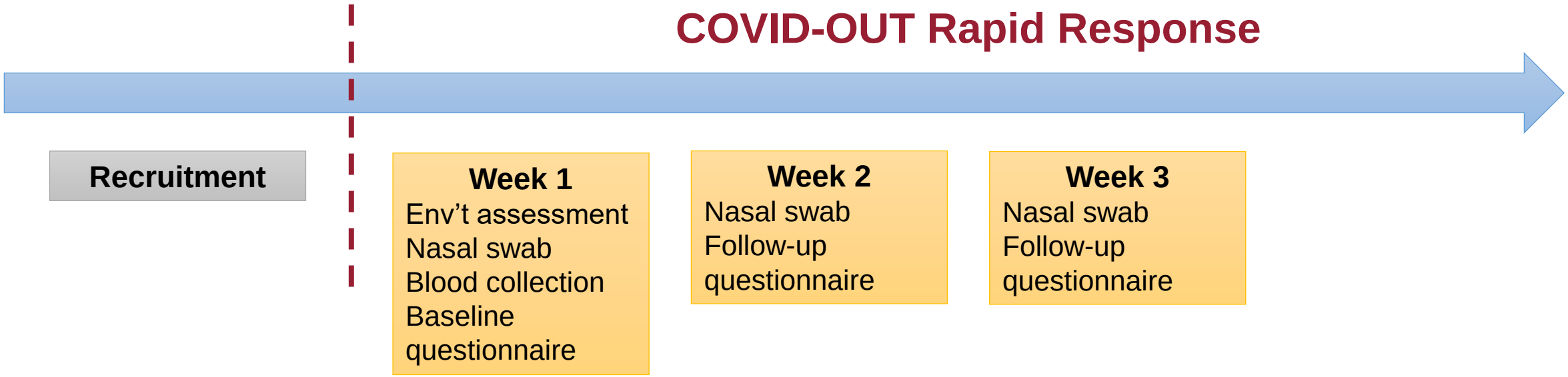
COVID-OUT Rapid Response



RAPID RESPONSE

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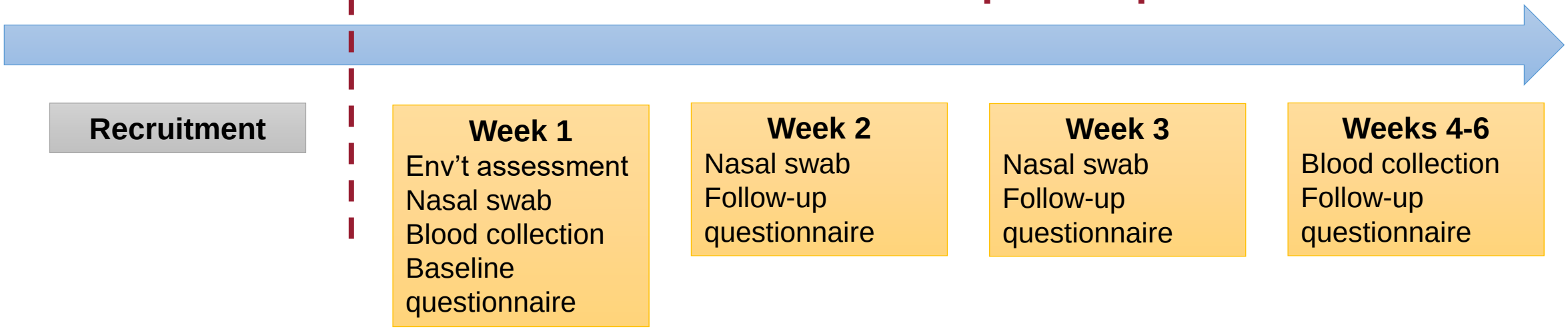
COVID-OUT Rapid Response



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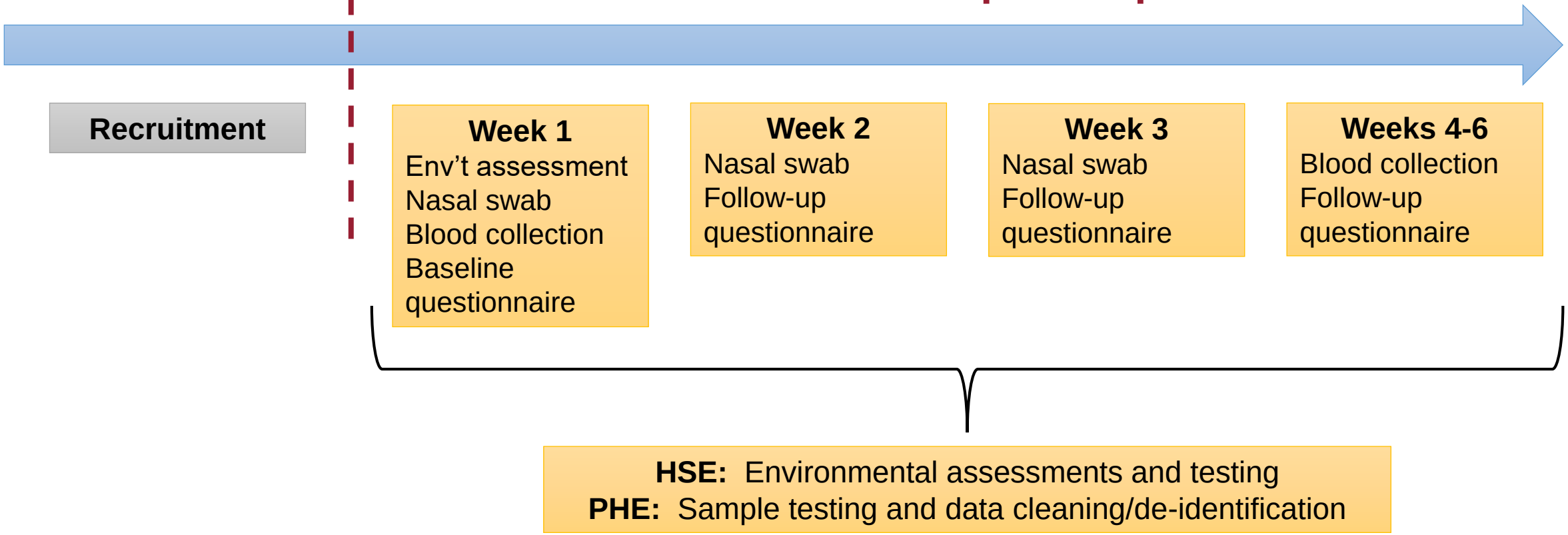
COVID-OUT Rapid Response



KEY RESEARCH QUESTIONS

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In workplace outbreaks:

What are environmental conditions associated with SARS-CoV-2 outbreaks?

What interventions and mitigation activities prevent SARS-CoV-2 transmission?

What are the risk factors for SARS-CoV-2 infection?

What are the potential transmission routes of SARS-CoV-2?

ENVIRONMENTAL ASSESSMENT

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What are environmental conditions associated with SARS-CoV-2 outbreaks?

Site information
- Size & no. of buildings
- Layout
- Temperature and humidity
- Worker density

Common areas
- Shared surfaces (e.g., hot desks)
- Canteens, toilets, locker rooms, & showers

Ventilation
- CO_2 levels
- Mechanical
- Natural

Publicly available on OSF: https://osf.io/suqx9/

ENVIRONMENTAL ASSESSMENT

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What interventions and mitigation activities prevent SARS-CoV-2 transmission?

Existing Control Measures

- Sick leave & pay
- Hand hygiene
- Workplace cleaning
- Social distancing
- Physical barriers
- PPE

Additional Control Measures

- Improved ventilation
- Enhanced cleaning/ handwashing
- Limited time on tasks
- Altered placements (e.g., back-to-back)
- ‘Bubbles’

Mitigations introduced since outbreak

Publicly available on OSF: https://osf.io/suqx9/

CASE-CONTROL INVESTIGATION

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Public Health England

COVID_OUT Follow-up Questionnaire

Vaccination

Q9 Since the last time you answered this questionnaire, have you been vaccinated against the virus that causes COVID-19?

- Yes
- No

Q10 If yes, when did you have the first dose?

Q11 If applicable, when did you have the second dose?

Symptoms

Q5 Since the last time you had answered this questionnaire, have you had

*Please tick **all** that apply*

- Fever (>=37.8C)
- New continuous cough - dry cough
- New continuous cough - productive cough
- Shortness of breath
- Loss of taste or smell
- Runny nose
- Fatigue
- Sore throat
- Muscle or body aches
- Headache
- Nausea or vomiting
- Diarrhoea

Inside of workplace

Outside of workplace

Publicly available on OSF: https://osf.io/w8zv5/

CASE-CONTROL INVESTIGATION

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What are the risk factors for SARS-CoV-2 infection?

About the worker
- Demographics
- Medical history
- Household
- Lifestyle (e.g., attend gym)
- Travel
- Contact patterns

About COVID-19
- Vaccines
- Test results
- Symptoms

About their job
- Job role
- Financial impact of self-isolation
- Work activities
- Work setting
- PPE

Publicly available on OSF: https://osf.io/w8zv5/

DEFINING CASES AND CONTROLS

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Prospective ascertainment

RNA (virus) testing

- 3 rounds of nose & throat swabs
- RT-PCR testing

Antibody testing

- 2 rounds of blood collection
- ELISA testing

Retrospective ascertainment

Self-reported testing & symptoms

Local health protection team records

INTEGRATED ANALYSES

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What are the potential transmission routes of SARS-CoV-2?

Compare workplaces and conduct pooled analyses to generate hypotheses on the routes of transmission and their relative importance.

- COVID-OUT standardized environmental and epidemiological data
- Local health protection teams' investigation reports
- Company testing data, as available

LESSONS LEARNED

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Outbreaks happen when production demands are high and workers cannot work from home.

- Protective measures should be applied proactively.
- Returning workers need to be carefully monitored and managed.
- Workers experience risks not only at work, but also on the journeys to and from work and in their home environments.
- Measures to identify new infections introduced to workplaces (e.g., testing) and rapidly control transmission (e.g., tracing, isolating, and sick leave policies) within workplaces are important for preventing and limiting the size of outbreaks.

LESSONS LEARNED

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Risks are not equal within a given workplace.

- Even workplaces with robust COVID-19 control measures can experience outbreaks.

- COVID-19 control measures are not applied systematically and their adherence may vary by person, place, and time.
  - Social distancing is a particular challenge.

- Attack rates (i.e., proportion of at-risk workers who become infected) can vary significantly between and within workplaces (e.g., 0% in warehouse, >35% of workers on a specific assembly line).

LESSONS LEARNED

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Groups with high risks can be difficult to engage in research.

- Agency or temporary workers
  - High risk of exposure (e.g., cleaning staff)
  - Difficult to reach (e.g., lack of email)
  - Pressures related to isolation (e.g., precarious contracts, loss of pay)

- Migrant workers
  - Language barriers
  - Increased infection risks (e.g., crowded housing conditions)
  - Differential access and uptake of healthcare and vaccines
  - Pressures related to immigration status

LESSONS LEARNED

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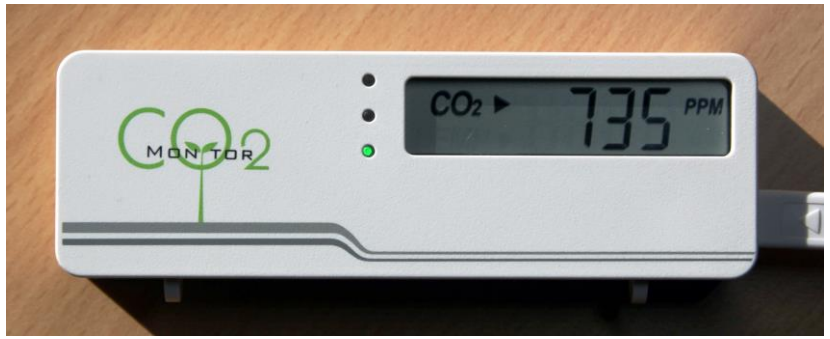
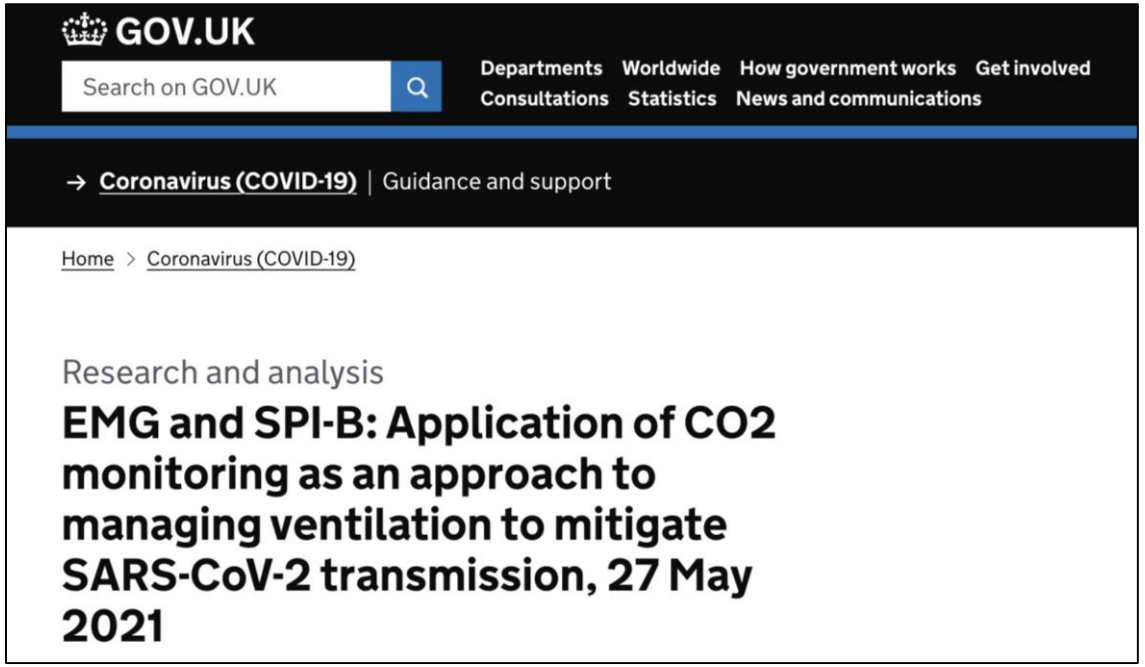
Ventilation should be a priority.

- Ventilation can reduce airborne transmission of the virus.
- Insufficient natural and mechanical ventilation is a common finding in COVID-OUT outbreaks.
- Ventilation is invisible, so is easily forgotten and poorly monitored.

Monitoring CO_2 can help identify spaces with poor ventilation and higher risks of transmission.

- CO_2 levels are a proxy for exhaled air.
- Monitors can be a cost-effective tool to identify areas that require action, but do not directly mitigate COVID-19 risks.

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Research and analysis

EMG and SPI-B: Application of CO2 monitoring as an approach to managing ventilation to mitigate SARS-CoV-2 transmission, 27 May 2021

PUBLIC ENGAGEMENT

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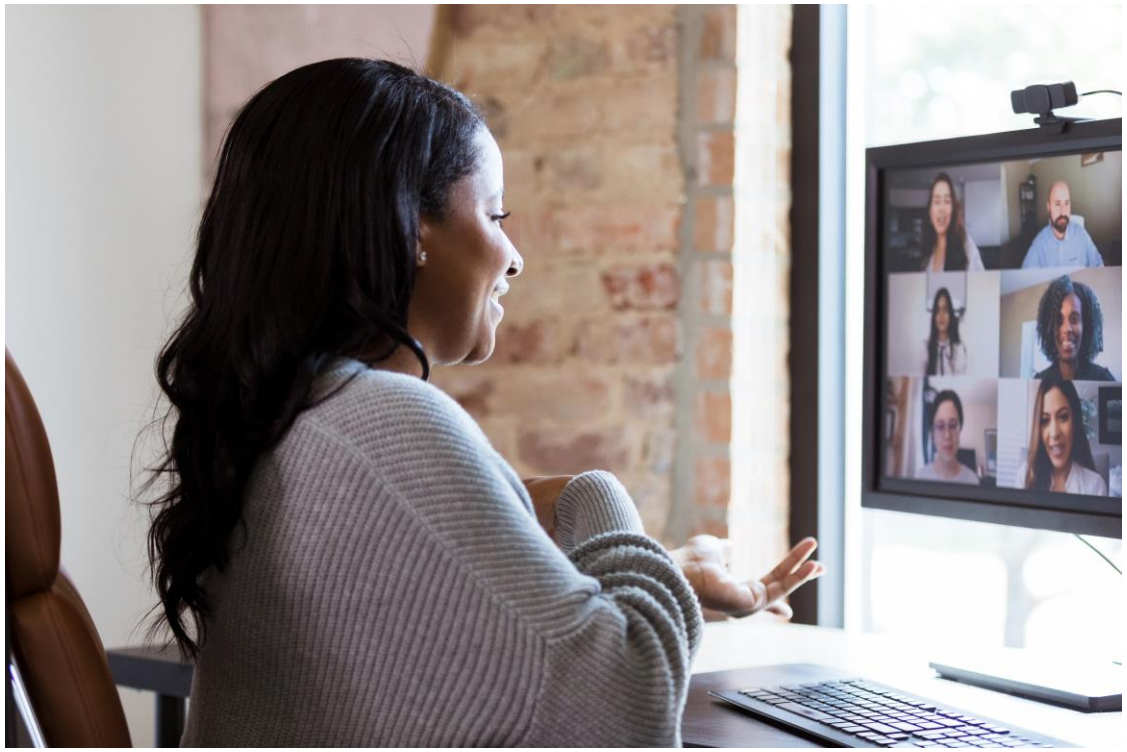
Two-way process of interaction and listening

Adapt research to reflect perspectives and concerns related to:

- Staying safe in workplaces
- Lifting of restrictions in Step 4
- Participating in research like COVID-OUT



CONCLUSIONS

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As a real-world observational study, COVID-OUT brings strengths and limitations:

- Provides critical evidence in the near-term to inform the national COVID-19 response
- Offers a unique breadth and depth of standardized data collection
- Faces challenges in:
  - Responding rapidly and achieving a high participation rate
  - Evolving epidemiological landscape
    - Vaccination rates
    - Variants of concern
  - Continually adapting to new outbreak settings and new policies

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Thank you

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