November 17, 2021

CDPH-UC COVID-19 Science Questions – Call for Proposal, November 2021

I. COVID-19 disease detection, burden, and impact

A. Use mathematical modeling to forecast COVID-19 trends and measure the impact of interventions across a range of populations

i. Model impact of COVID, influenza, and other respiratory viral pathogens on hospitalizations and deaths during 2021-2022 influenza season
ii. Incorporate waning immunity post-infection or post-vaccination in models
iii. Identify disease indicators or other indicators that can predict hot-spots, or surges of community-level infection
iv. Update models of contacts to incorporate airborne transmission

B. Assess and limit the impact of the COVID-19 response on public health disease elimination and control programs such as HIV, tuberculosis, and sexually transmitted infections.

II. Transmission of SARS-CoV-2

A. Refine understanding of SARS-CoV-2 transmission

i. Design and conduct epidemiologic studies to determine most important drivers of transmission for current and emerging variants of concern (VOCs) (e.g., duration of infectiousness, viral load, contact behaviors)
ii. Determine relative incidence of transmission by vaccinated vs previously infected vs unvaccinated individuals
iii. Design a field epidemiologic study to determine whether a future SARS-CoV-2 emerging VOC is more infectious, more virulent, and/or more likely to escape vaccine-induced or infection-induced immunity compared to the Delta (or other prevailing) variant given the challenges of limited or incomplete case investigations and contact tracing; and to measure the magnitude of such differences.

III. Natural history of SARS-CoV-2 infection

A. Characterize the immunity in vaccinated vs previously infected persons

i. Compare the magnitude and duration of immunity

ii. Evaluate if host factors (e.g., age, severity of disease, immunocompromising conditions) may be associated with differences in the immune response to natural infection and vaccines

B. Investigate whether environmental factors (e.g., chemical, and heavy metal exposures, air pollution, water quality, and the built environment) contribute to COVID-19 outcomes, particularly among populations disproportionately affected by COVID-19.

IV. Prevention, mitigation, and intervention strategies

A. Evaluate impact and effectiveness of changes in public health policies and interventions in defined settings (e.g., schools, healthcare facilities, adult residential care). Examples include:
   i. Modified contact tracing definitions, protocols, and strategies (e.g., backwards contact tracing/ source tracing)
   ii. Modified quarantine protocols
   iii. Vaccination mandates
   iv. Engineering controls (e.g., ventilation)

V. Social, behavioral, and communication science

A. Optimize uptake of recommended behaviors and actions using implementation science methods

   i. Identify social, economic, and behavioral factors that influence adoption of recommended personal protective behaviors and community mitigation measures in varying populations and settings
   ii. Identify socioeconomic and other barriers that can affect adoption of recommended prevention behaviors
   iii. Identify policies and practices that will increase implementation of, and compliance with strategies
   iv. Identify methods for measuring compliance with prevention strategies such as mask wearing
   v. Identify effective strategies to reduce barriers to the implementation of, and compliance with, prevention strategies – in groups with different beliefs (e.g., political and faith affiliations)
   vi. Identify optimal communication strategies and messages to promote prevention strategies for various populations and settings