Parallel Session 3: Preparedness for the Next Pandemic

T3d - Community Based Sero-epidemiological Study of COVID19 to Provide Data in Real Time on Age-stratified Infection Attack Rates, Disease Severity and Population-immunity, for Guiding Intervention Policy

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Introduction and Project Objectives: During an epidemic, diagnosed cases represent a tip-of-the-iceberg of infection taking place in the community. Sero-epidemiological studies provide an effective means to assess true infection attack rates in a community to inform control strategies. The aim of the study was to define infection attack rates, development and duration of population immunity to SARS-CoV-2 through population based serial cross sectional and longitudinal sero-epidemiology studies.

Methods: Venous blood samples were collected from volunteers from four study cohorts chosen to provide different levels of exposure risk and one of RT-PCR confirmed cases. These were Cohort A) Community-based longitudinal cohort; Cohort B) Serial age-stratified cross-sectional sampling of blood donors; Cohort C) Individuals working in occupations associated with increased social contacts who are at increased risk of infection; Cohort D) Individuals discharged from quarantine. Cohort E: Cohort E) was a longitudinal follow up of a cohort of RT-PCR confirmed COVID-19 infections to define the duration of immunity following natural infection. Sera were tested by for SARS-CoV-2 specific antibody and a subset tested for T cell responses.

Results: Total numbers of sera collected from Cohorts A, B, C and D as of end of August 2021 was 4599, 13,968, 2,066 and 4,296 respectively. Virus neutralization confirmed sero-prevalence in the unvaccinated individuals in the four cohorts were 1.3% (95% CI 0.9-1.9), 0.12% (95% CI 0.06-0.19), C 0.16% (95% CI 0.02-0.57) and 9.92% (95% CI 8.92-10.9) respectively. Cohort A is the most representative cohort for estimating population sero-prevalence. From this data we estimate a total of 61,000 (95% CI 18,000 to 128,000) infections which is age-adjusted incidence of 0.8%. Thus, case detection captured 29 % of overall infections occurring in Hong Kong. Blood donors under-estimated population sero-prevalence, likely because blood-donors are a more "health conscious" subgroup of the population and because blood donation is deferred for 180 days for anyone with confirmed COVID-19, likely excluding most of those with known infection.

Follow up of RT-PCR confirmed SARS-CoV infections showed that neutralizing antibody will remain detectable for around 1,717 days after symptom onset and that levels conferring 50% protection will be maintained for around 990 days post-symptom onset, in symptomatic patients. PRNT titres wane faster in children.

Discussion and Conclusion: Population based infection attack rate in the community remains low and 29% of infections are detected. Symptomatic COVID-19 disease is followed by relatively long-lived protection from re-infection by antigenically similar viruses.

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