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REDACS: Regional Emergency Driven Adaptive Cluster Sampling or Effective COVID-19 Prevalence

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ABSTRACT

As COVID-19 is spreading, national agencies need to monitor and track several metrics. Since we do not have perfect testing programs on the hand, one needs to develop an advanced sampling strategy for prevalence study. The recent importance of COVID-19 mitigation strategies motivates necessity of scalable, interpretable and precise methodology, which has materialized as REDACS. In this talk we will discuss its feasibility of REDACS implementations. We introduce REDACS: " Regional emergency driven adaptive cluster sampling" for effective COVID-19 prevalence and justify its usage as COVID-19 mitigation strategy. We show its advantages over classical massive individual testing sampling plans. We also point out how regional and spatial heterogeneity underlines proper sampling. Fundamental importance of adaptive control parameters from emergency health stations and medical frontline is outlined. Since the Northern hemisphere entered Autumn and Winter season, practical illustration from spatial heterogeneity of Chile (Southern hemisphere, which already experienced COVID-19 winter outbreak peak) is underlying the importance of proper regional heterogeneity of sampling plan. We explain the regional heterogeneity by microbiological backgrounds and link it to behavior of Lyapunov exponents. We also discuss screening by antigen test from the perspective of "on the fly" biomarker validation, i.e., during the screening.

Keywords: COVID-19, REDACS, Spatial heterogeneity, Biomarker

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