Real-time estimation of the effective reproduction number of COVID-19 from behavioral data

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Monitoring the effective reproduction number of a rapidly unfolding pandemic in real-time is key to successful mitigation and prevention strategies. However, existing methods based on case numbers, hospital admissions or fatalities suffer from multiple measurement biases and temporal lags due to high test positivity rates or delays in symptom development or administrative reporting. Alternative methods such as web search and social media tracking are less directly indicating epidemic prevalence over time. We instead record age-stratified anonymous contact matrices at a daily resolution using a longitudinal online-offline survey in Hungary during the first two waves of the COVID-19 pandemic. This approach is innovative, cheap, and provides information in near real-time for estimating at a daily resolution. Moreover, it allows to complement traditional surveillance systems by signaling periods when official monitoring infrastructures are unreliable due to observational biases.