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Low yield of SARS-CoV-2 Asymptomatic Routine Screen Testing, Despite High Community Incidence

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Dear Editor,

Serial asymptomatic screen testing of staff with RT-PCR has been used in some jurisdictions as one strategy to help prevent SARS-CoV-2 outbreaks in high-risk settings.1 Results from other serially screened populations during periods of low community SARS-CoV-2 incidence demonstrated very low percent positivity (< 0.5%);2,3 the yield in high SARS-CoV-2 community incidence settings is less understood. We investigated the percent positivity of routine asymptomatic screen testing in nursing home staff during periods of both low and high SARS-CoV-2 incidence.

Methods

Beginning on July 1, 2020, all nursing home staff in Ontario, Canada were required to undergo serial asymptomatic screen testing for SARS-CoV-2 by nasopharyngeal RT-PCR twice per month,1 which then increased to once per week on November 22, 2020 in regions with weekly SARS-CoV-2 incidence of >25 per 100,000 population.4 Staff with a history of COVID-19 were exempt from testing. Data was collected centrally and included reporting from all 623 nursing homes in the province. Staff tested while symptomatic or homes experiencing COVID-19 outbreaks were excluded from the analyses. The study period was June 28, 2020 until March 13, 2021. Analysis and graphing was done using Microsoft Excel®. The study was approved by the University of Toronto Research Ethics Board.
Results

A total of 705,370 SARS-CoV-2 screen tests were collected during the study period, and of these 1,147 were positive (positivity rate 0.16%). During July and August 2020 when weekly SARS-CoV-2 incidence in Ontario was <10 cases per 100,000 individuals, the positivity rate in asymptomatic nursing home staff was <0.1%. During December 2020 - January 2021 when weekly SARS-CoV-2 incidence in Ontario was >100 cases per 100,000, asymptomatic screen testing positivity rates in nursing home staff peaked at 0.36%.

Discussion

Our study confirms previous work, showing that during times of low SARS-CoV-2 incidence, the yield of routine asymptomatic screen testing is very low. We further show that in times of high SARS-CoV-2 incidence, positivity rose only modestly to a peak of 0.36% in contrast to the rise in percent positivity observed in symptomatic individuals. This contrasts an earlier study showing 13.7% positivity in systematically screened pregnant women in New York in late March and early April of 2020. This may be explained by the fact that at the time, there was limited access to SARS-CoV-2 testing for the general public, and without reporting on previous COVID-19 compatible illness associated with this testing, positive cases may have in fact had recovered illness with prolonged viral RNA persistence. Our study overcame these limitations since staff in the study underwent serial symptomatic screening and screen testing and also had access to symptomatic testing. Although SARS-CoV-2 vaccination of nursing home staff began December 14, 2020, the roll out was slow, with only 55% of staff receiving their first dose by February 23, 2021; vaccination would not have impacted the results at peak in December 2020.
Our findings demonstrate that outside of an outbreak or high risk contact setting, the pre-test probability of routine asymptomatic SARS-CoV-2 screen testing remains low, even in high SARS-CoV-2 incidence settings. When pre-test probability is low, the rate of false positives increases, further increasing the opportunity costs of such testing strategies (e.g. unnecessary isolation of residents). While there are theoretical benefits of routine screen testing, the low yield seen in our study, even during high SARS-CoV-2 incidence, means that in sectors with limited resources, these costs must be weighed against the limited benefit of such testing. The yield in those fully vaccinated against SARS-CoV-2 will be even further reduced than suggesting there is unlikely to be any benefit from asymptomatic screen testing in fully vaccinated individuals, outside of high-risk exposures and outbreaks.
References


Figures

Figure 1. Ontario Nursing Home Staff Screen Testing SARS-CoV-2 Percent Positivity Compared to Provincial Percent Positivity, from June 28, 2020 to March 13, 2021

Line graph showing percent SARS-CoV-2 test positivity for routine asymptomatic nursing home staff screen testing compared to provincial test positivity between June 28, 2020 and March 13, 2021. During the low SARS-CoV-2 incidence summer months of 2020, test positivity rates were consistently <0.1%. There was a small increase in SARS-CoV-2 test positivity during the second wave (September 1, 2020–March 14, 2021) peaking at 0.36% in December 2020.