COST-EFFECTIVENESS OF WORKPLACE COVID-19 SELF-TESTING: A MATHEMATICAL MODELLING STUDY

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BACKGROUND

- The formally employed workforce is an ideal group for identifying individuals with COVID-19 as they are at risk of contracting COVID-19 at work and bringing it home to their family
- Minimizing the number of formally employed individuals who contract COVID-19 can reduce workplace absenteeism

We sought to determine the most cost-effective workplace testing strategies to reduce infections at either the community level and within individual workplaces

METHODS

- We used a two models to understand how SARS-CoV-2 AgRDTs could best be implemented within the workplace
- In our previously developed, community-level agent-based model, PATAT, we evaluated the impact of symptomatic testing and asymptomatic testing of 10, 20, 50, and 100% of the formally employed workforce at bi-weekly, weekly, and 2x weekly intervals within various epidemiological contexts (**Table 1**) on the broader community in Georgia, the Netherlands, and Brazil.
- An economic evaluation of the results was performed to determine the incremental cost-effectiveness ratio (ICER) of each self-testing strategy at workplaces with an assumed total cost of $2.50 USD per self-test (cost per community infection prevented)
- In our individual workplace model, we evaluated the impact of various testing strategies on workplace transmission events for different types of workplace schedules.

Table 1. Epidemic model parameters.

Parameter	Values
Effective reproductive number (*Rt*)	0.9, 1.2, 1.5, 2.0
Vaccination coverage	10%, 50%, 80%
Vaccination effectiveness	30/70% protective against infection/severe disease 70/90% protective against infection/severe disease

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Symptomatic self-testing of the formally employed workforce is the most cost-effective strategy to reduce the spread of SARS-CoV-2 within the workplace and within the broader community

RESULTS

- In larger, individual workplaces, more frequent asymptomatic testing was needed to significantly reduce the number of workplace transmission events (**Figure 1**)
- Shifting work modality so fewer workers were on site or reducing workers contacts helped improve the efficacy of testing interventions (**Figure 1**)

Figure 1. Workplace infections over a 30-day period where testing and work modality were the only interventions.

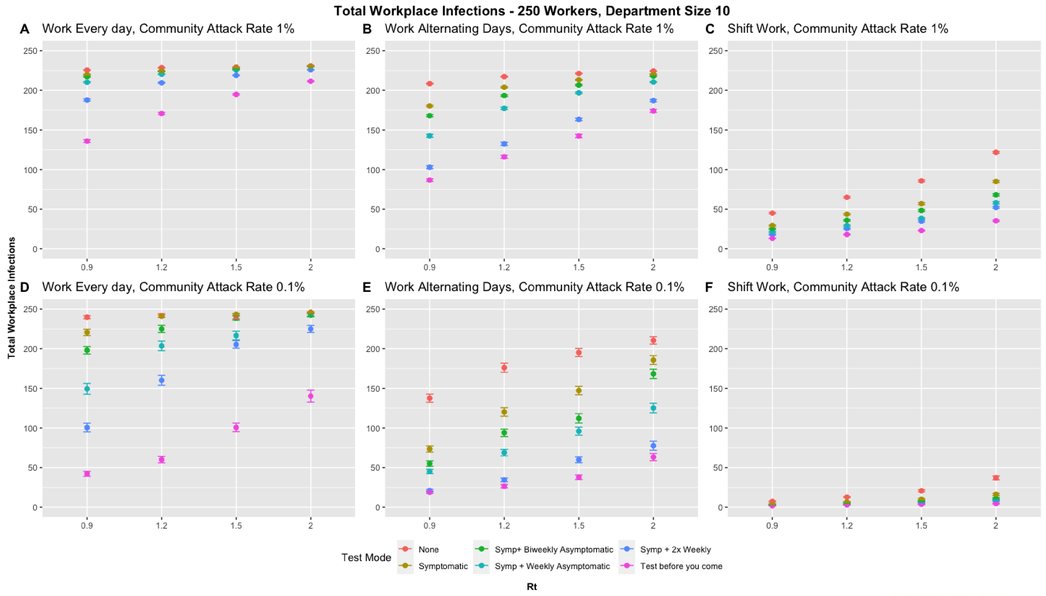
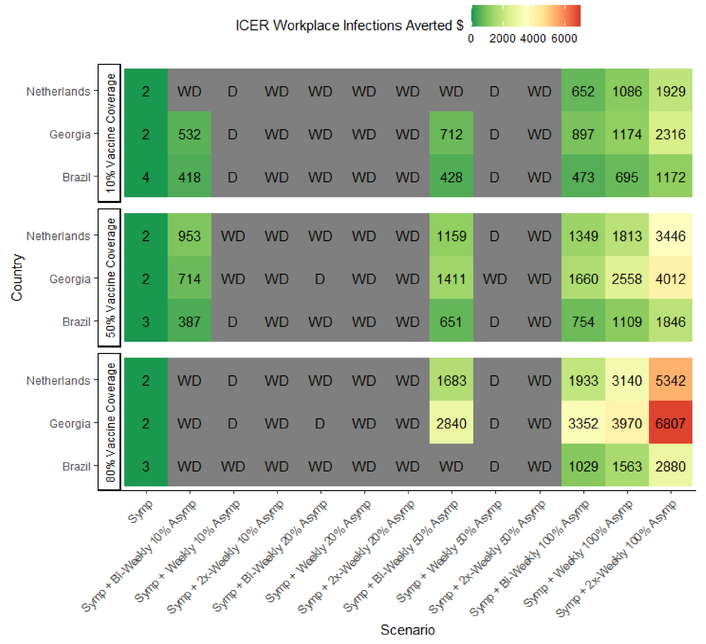


Figure 2. Incremental cost-effectiveness ratios (ICERs) of COVID-19 self-testing strategies in workplaces (additional cost/ community infection averted) by country and % vaccine coverage. Weakly dominated (WD) and Dominated (D) are scenarios not on the cost-effectiveness frontier



- Symptomatic testing only and symptomatic testing in combination with twice weekly asymptomatic testing were on the cost-effectiveness frontier in all 24 simulated scenarios in all three countries (**Figure 2**)
- Under all conditions symptomatic testing was able to avert up to 61%, 65%, and 59% of community infections and up to 611,200, 749,800, and 758,200 symptomatic days per 100,000 people in Brazil, Georgia, and the Netherlands respectively
- ICERS for symptomatic testing of workers ranged from USD $2–15, and USD $290–42,155 for 100% asymptomatic testing of workers across all countries and epidemic conditions

CONCLUSIONS

- Self-testing with AgRDTs for the formally employed workforce is cost-effective when targeting symptomatic individuals from both the community and the workplace perspective.
- In larger individual workplaces, reducing a worker's contacts may improve the efficacy of any implemented testing strategy