Additional analyses

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Individual-based simulation framework

- All staff are assigned a work schedule that determines time frames when they are working. $\mathbf{I}(w_{it})$ is an indicator function for whether staff member i is working at the facility on day t.
- In addition to their work schedule, all staff are assigned a testing schedule, encoded by function $\mathbf{T}(w_{it})$.
- All staff are subject to two sources of infection: community and workplace, represented by force of infection parameters λ_c and λ_w, respectively. In addition, we introduce a partitioning parameter, α, representing the relative probability of acquiring infection in the workplace versus in the community, therefore $\lambda_w = \lambda_c\alpha$ and $\Lambda_{it} = \lambda_c\alpha\mathbf{I}(w_{it}) + \lambda_c(1 - \mathbf{I}(w_{it}))$. New cases at each time step are then generated by subjecting all susceptible staff to a Bernoulli trial where $p = \Lambda_{it}$
- Whenever a new staff infection is generated, parameters for the individual are drawn to determine the latent period (t_{latent}), the incubation period ($t_{incubation}$), the total infectious period ($t_{infectious}$), and whether the case will be asymptomatic or symptomatic (p_{symp}) to generate an infectiousness profile (β_{it}). Assuming constant $\mathcal{R}$ across all individuals, the expected number of workplace cases produced on day t by individual i is $r_{it} = \mathcal{R}\beta_{it}\mathbf{I}(w_{it})$
- Main outcome is expected number of cases transmitted by staff over the simulation timeframe: $\mathbf{E}[cases] = \sum_{t=1}^{t_{sim}}\sum_{i=1}^{n}\mathbf{I}(w_{it})r_{it}$

Individual based model simulations

Goal 1: Determine impact of different testing interventions on expected number of imported cases

Basically interested in three variables: pcr vs antigen testing (which basically comes down to turnaround time if we assume antigen tests are equal to pcr in their ability to detect active infection), random vs systematic day of testing, and frequency of testing. We propose the following scenarios encompassing combinations of these variables to explore:

- **S1)** No testing
- **S2)** Random PCR testing once per work week with test report on second day following test
- **S3)** Random antigen testing once per work week with immediate test report
- **S4)** PCR testing on first day of work week with test report on second day following test
- **S5)** Antigen testing on first day of work week with immediate test report
- **S6)** Random PCR testing twice per work week with test report on second day following test

- **S7)** Random antigen testing twice per work week with immediate test report
- **S8)** PCR testing on first and third day of work week with test report on second day following test
- **S9)** Antigen testing on first and third day of work week with immediate test report
- **S10)** PCR testing on all days of work week with test report on second day following test
- **S11)** Antigen testing on all days of work week with immediate test report

No workplace transmission ($\alpha = 0$) scenarios

Table 1: Expected cases imported into facility across different testing scenarios indicated by test frequency, f, test delay, d, and systematic vs random testing day.

delay	testday	testfreq	Expected Cases
0	None	0	149 (144 - 162)
2	rand	1	95 (92 - 107)
2	1	1	72 (69 - 80)
2	rand	2	67 (64 - 75)
0	rand	1	63 (61 - 74)
2	13	2	51 (48 - 56)
2	1234	4	37 (36 - 42)
0	1	1	36 (34 - 45)
0	rand	2	28 (26 - 34)
0	13	2	9 (9 - 12)
0	1234	4	0 (0 - 0)

Sensitivity analyses

- Incorporate self isolation at symptom onset and proportion of symptomatic cases that adhere to self-isolation, proportion of cases symptomatic
- Antigen test sensitivity
- PCR turnaround time