

REPORT 4: IMPACT OF REDUCING WEEKLY TESTING OF STAFF

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1. Objectives:

Our objectives for this analysis have been:

- Examine the impact of reducing routine testing of staff for different vaccination coverages of care home residents and staff
- Determine the threshold of incidence rate in the community at which routine testing of staff can be reduced/lifted for each vaccination coverage scenario
- Investigate how transmission risk affects this threshold

2. Methods:

A detailed description of the model used for the analysis is available in Report 3. This section details the changes that have been made to the model for the analysis detailed in this report

Table 1: Vaccine efficacy against transmission over time in care home staff and residents¹

Timeline	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7 – 12
Day	1 – 7	8 – 14	15 – 21	22 – 28	29 – 35	36 – 42	43 – 90
	Dose 1			Dose 2			
Staff	0%		30%		46%	54%	
Resident	0%		19%			34%*	

*This value is calculated based on the assumption that the proportional increase in vaccine efficacy against transmission in residents one week after the 2nd dose would be similar to that in staff.

When reducing weekly staff testing, the RT-PCR test and/or Lateral Flow Device (LFD) testing were lifted on day 29 (one week after Dose 2). We consider that it is safe to lift a routine staff testing strategy when this does not lead to a statistically significant difference in the cumulative numbers of Covid-19 deaths after 90 days. The incidence rate in the community was kept constant for the simulated period. It was varied between five and 100 daily cases per 100,000 populations for different simulation scenarios. Each scenario was examined at the average per-contact transmission probability of 0.02 (low, most likely, $R_0 = 4.02$ in care homes) and 0.035 (high, $R_0 = 7.04$).²⁻⁴ The most likely per-contact transmission probability of 0.02 was based on the studies of transmission risk in different settings.^{2,3} This value corresponded to R_0 of 4.02 in care homes, in line with the base case R_0 of 4.04 used a study of Covid-19 spread in a long-term care facility in France.⁴ The higher probability represented different levels of adherence to hand hygiene, using Personal Protective Equipment, and social distancing, which may change as perceived risk reduces.

3. Results:

When transmission risk per contact was low (0.02) and at least 50% of residents and staff were vaccinated with two doses of the Covid-19 vaccine, reducing the routine testing of staff

had a small impact on the cumulative number of infected residents and Covid-19 deaths (Figure 1 & 2). With 50% vaccination coverage of residents and staff, the threshold of incidence rate in the community for the twice weekly LFD testing to be safely lifted was 55 daily cases (equivalent to 385 weekly cases) per 100,000 populations (Table A-1). This threshold was higher than the peak incidence rate of the second wave in Scotland (302 weekly cases per 100,000).⁵ This threshold increased as the vaccination coverages went up. When 90% of residents and staff received two doses of the vaccine, lifting the LFD testing was still safe even if the incident rate reached 95 daily case per 100,000 (just below the peak of second wave in England, approximately 100 daily case per 100,000).⁵

An increase in the risk of transmission significantly lowered the incidence rate threshold. At a high risk of transmission (0.035), the threshold for 70% coverage of residents and staff was five daily cases per 100,000. Lifting the LFD testing in lower coverage level scenarios had an impact on the outcomes, even at a low community incidence rate. It increased the cumulative number of infections by nine infections (95%CI: 7 – 11) and deaths by one (95%CI: 1 – 2) per 1,000 residents after 90 days in the scenario with 50% coverage and five new daily community cases per 100,000.

With at least 50% of residents and staff having received two vaccine doses and a low risk of transmission, the incidence rate threshold of 15 daily case per 100,000 allowed both weekly PCR and LFD testing to be safely halted. When transmission risk increased, the impact of removing both weekly PCR and LFD testing upon the outcomes increased (Figure 1 & 2).

In this analysis, we assumed a constant incidence rate in the community for the simulated time. If the incidence rate continues dropping, the identified threshold is cautious. However, if it rises, the threshold is optimistic. Our analysis is likely to overestimate the impact of lifting weekly testing of staff as the actual compliance of care home staff to the LFD testing is lower than our assumption that all staff comply to a full testing regime.

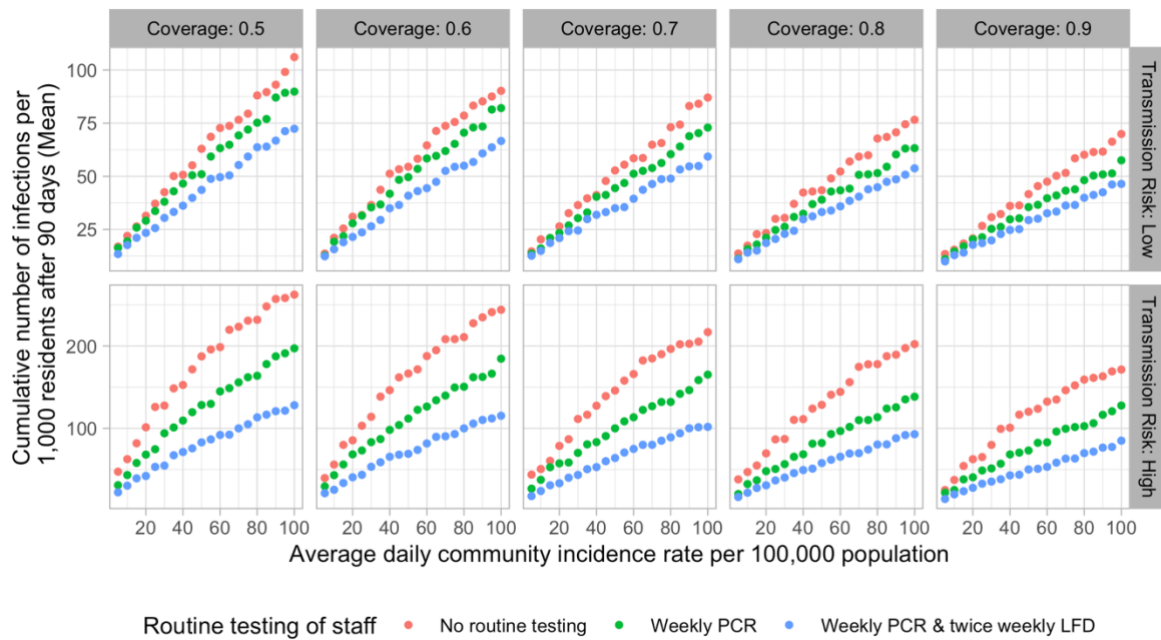


Figure 1: Impact of reducing routine testing of staff on the number of infected residents

The plot describes the impact of reducing weekly testing of staff in different scenarios of vaccination coverages, community incidence rates, and transmission risk on the cumulative number of infected residents after 90 days. Columns: Results with low (0.02) and high (0.035) risk of transmission per contact. Rows: Results under different vaccination coverages (two doses) in both care home residents and staff. Each scenario is run 1,000 times.

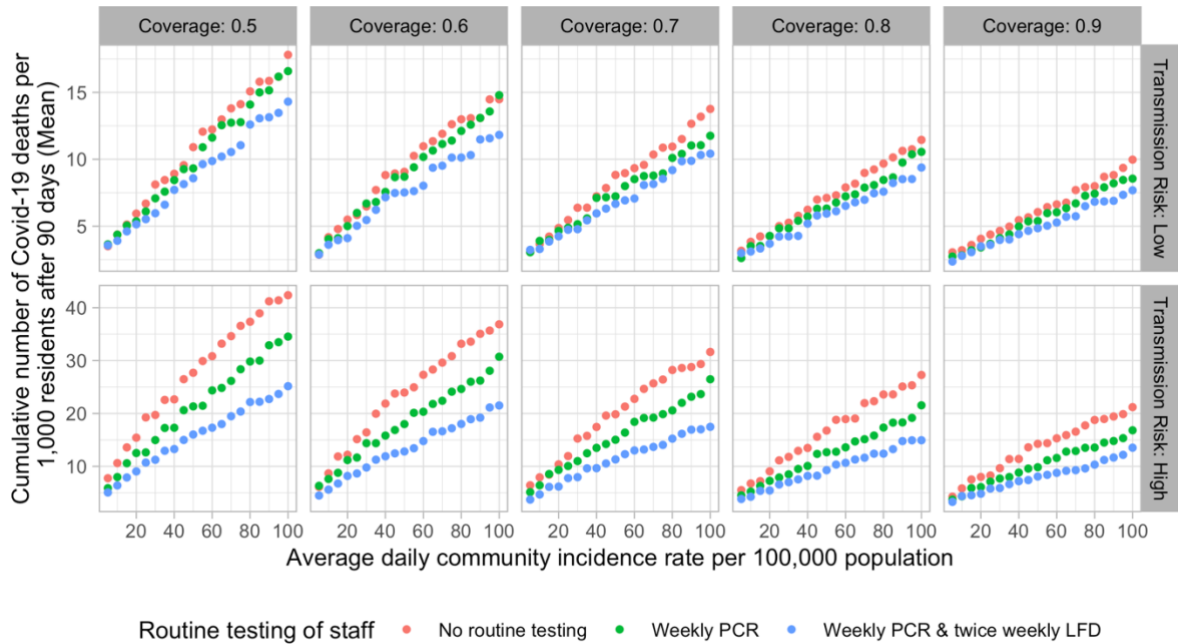


Figure 2: Impact of reducing routine testing of staff on Covid-19 deaths among residents

The plot describes the impact of reducing weekly testing of staff in different scenarios of vaccination coverages, community incidence rates, and transmission risk on the cumulative number of Covid-19 deaths among residents after 90 days.

Columns: Results with low (0.02) and high (0.035) risk of transmission per contact. Rows: Results under different vaccination coverages (two doses) in both care home residents and staff. Each scenario is run 1,000 times.

Appendix A

Table A-1: The impact of reducing weekly testing of staff on Covid-19 deaths among residents

Intervention	Coverage	Low Transmission		High Transmission	
		Threshold	Difference in mean Covid-19 deaths	Threshold	Difference in mean Covid-19 deaths
Lift the twice weekly LFD testing	50%	55	P > 0.2	5	1 (1 – 2)
	60%	60	P > 0.2	5	1 (1 – 2)
	70%	75	P > 0.2	5	P > 0.2
	80%	85	P > 0.5	5	P > 0.2
	90%	95	P > 0.5	10	P > 0.5
Lift both weekly PCR and LFD testing	50%	15	P > 0.2	5	3 (1 – 4)
	60%	15	P > 0.2	5	2 (0 – 3)
	70%	20	P > 0.2	5	2 (2 – 3)
	80%	20	P > 0.2	5	2 (1 – 3)
	90%	20	P > 0.2	5	1 (0 – 2)

(Threshold refers to the incidence rate in the community at which reducing/lifting routine testing of staff would not lead to a statistically significant increase in the cumulative number of Covid-19 deaths in residents. 'Coverage' column denotes the vaccination coverages in both residents and staff with two doses of the Covid-19 vaccine. Values in brackets are 95%CI of the difference. Green: the difference is not statistically significant – Orange: small difference – Red: Significant difference)

References

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