

Effects of isolation and shielding

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Fraction Dead

Summary Statistics

Isolation_capacity	Shielding_strategy	n	mean	sd
Isolation cap 0	No shielding	500	0.100	0.033
Isolation cap 0	Shield 10 conts/wk	500	0.098	0.032
Isolation cap 0	Shield 2 conts/wk	500	0.100	0.033
Isolation cap 10	No shielding	500	0.059	0.053
Isolation cap 10	Shield 10 conts/wk	500	0.059	0.052
Isolation cap 10	Shield 2 conts/wk	500	0.062	0.052
Isolation cap 25	No shielding	500	0.050	0.051
Isolation cap 25	Shield 10 conts/wk	500	0.048	0.049
Isolation cap 25	Shield 2 conts/wk	500	0.050	0.050

Effect of isolation capacity under each shielding strategy (pairwise t-tests)

Shielding_strategy	group1	group2	n1	n2	p	p.signif	p.adj	p.adj.signif
No shielding	Isolation cap 0	Isolation cap 10	500	500	0.0000	****	0.0000	****
No shielding	Isolation cap 0	Isolation cap 25	500	500	0.0000	****	0.0000	****
No shielding	Isolation cap 10	Isolation cap 25	500	500	0.0031	**	0.0092	**
Shield 10 conts/wk	Isolation cap 0	Isolation cap 10	500	500	0.0000	****	0.0000	****
Shield 10 conts/wk	Isolation cap 0	Isolation cap 25	500	500	0.0000	****	0.0000	****
Shield 10 conts/wk	Isolation cap 10	Isolation cap 25	500	500	0.0002	***	0.0006	***
Shield 2 conts/wk	Isolation cap 0	Isolation cap 10	500	500	0.0000	****	0.0000	****
Shield 2 conts/wk	Isolation cap 0	Isolation cap 25	500	500	0.0000	****	0.0000	****
Shield 2 conts/wk	Isolation cap 10	Isolation cap 25	500	500	0.0001	***	0.0004	***

Effect of shielding strategy in each isolation capacity scenario (pairwise t-tests)

Isolation_capacity	group1	group2	n1	n2	p	p.signif	p.adj	p.adj.signif
Isolation cap 0	No shielding	Shield 10 conts/wk	500	500	0.344	ns	1	ns
Isolation cap 0	No shielding	Shield 2 conts/wk	500	500	0.980	ns	1	ns
Isolation cap 0	Shield 10 conts/wk	Shield 2 conts/wk	500	500	0.356	ns	1	ns
Isolation cap 10	No shielding	Shield 10 conts/wk	500	500	0.957	ns	1	ns
Isolation cap 10	No shielding	Shield 2 conts/wk	500	500	0.429	ns	1	ns
Isolation cap 10	Shield 10 conts/wk	Shield 2 conts/wk	500	500	0.398	ns	1	ns
Isolation cap 25	No shielding	Shield 10 conts/wk	500	500	0.495	ns	1	ns
Isolation cap 25	No shielding	Shield 2 conts/wk	500	500	0.956	ns	1	ns
Isolation cap 25	Shield 10 conts/wk	Shield 2 conts/wk	500	500	0.461	ns	1	ns

Time to Peak Number of Infections

Summary Statistics

Isolation_capacity	Shielding_strategy	n	mean	sd
Isolation cap 0	No shielding	500	63.72	13.97
Isolation cap 0	Shield 10 conts/wk	500	95.03	24.84
Isolation cap 0	Shield 2 conts/wk	500	103.99	27.16
Isolation cap 10	No shielding	500	114.86	89.18
Isolation cap 10	Shield 10 conts/wk	500	131.28	85.15
Isolation cap 10	Shield 2 conts/wk	500	136.53	83.53
Isolation cap 25	No shielding	500	126.54	91.70
Isolation cap 25	Shield 10 conts/wk	500	141.15	86.63
Isolation cap 25	Shield 2 conts/wk	500	147.04	86.05

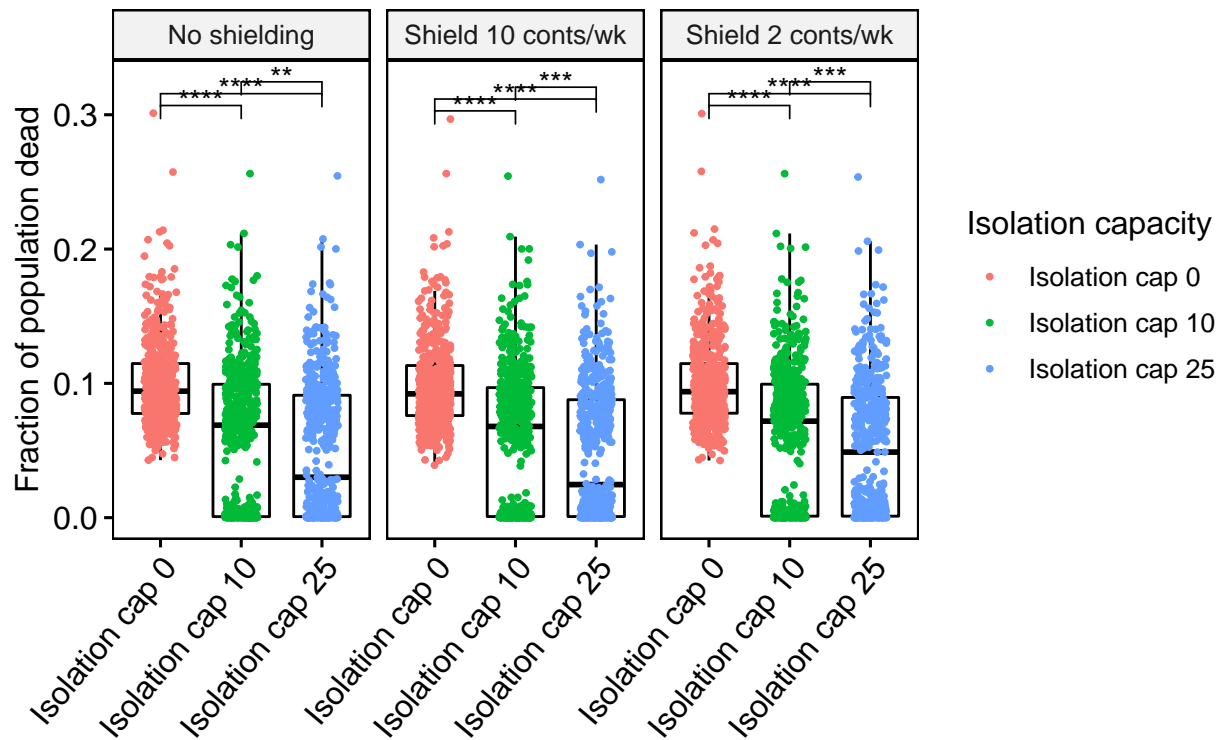
Effect of isolation capacity under each shielding strategy (pairwise t-tests)

Shielding_strategy	group1	group2	n1	n2	p	p.signif	p.adj	p.adj.signif
No shielding	Isolation cap 0	Isolation cap 10	500	500	0.0000	****	0.0000	****
No shielding	Isolation cap 0	Isolation cap 25	500	500	0.0000	****	0.0000	****
No shielding	Isolation cap 10	Isolation cap 25	500	500	0.0130	*	0.0390	*
Shield 10 conts/wk	Isolation cap 0	Isolation cap 10	500	500	0.0000	****	0.0000	****
Shield 10 conts/wk	Isolation cap 0	Isolation cap 25	500	500	0.0000	****	0.0000	****
Shield 10 conts/wk	Isolation cap 10	Isolation cap 25	500	500	0.0294	*	0.0882	ns
Shield 2 conts/wk	Isolation cap 0	Isolation cap 10	500	500	0.0000	****	0.0000	****
Shield 2 conts/wk	Isolation cap 0	Isolation cap 25	500	500	0.0000	****	0.0000	****
Shield 2 conts/wk	Isolation cap 10	Isolation cap 25	500	500	0.0194	*	0.0581	ns

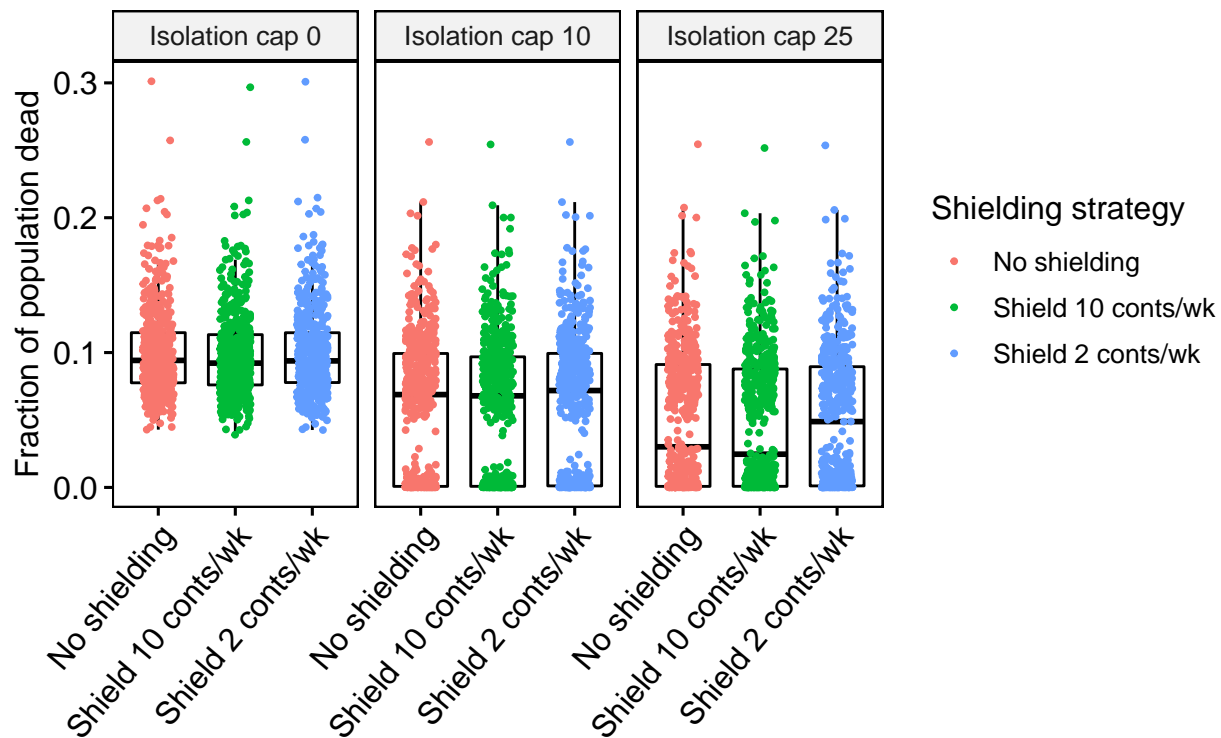
Effect of shielding strategy in each isolation capacity scenario (pairwise t-tests)

Isolation_capacity	group1	group2	n1	n2	p	p.signif	p.adj	p.adj.signif
Isolation cap 0	No shielding	Shield 10 conts/wk	500	500	0.0000	****	0.0000	****
Isolation cap 0	No shielding	Shield 2 conts/wk	500	500	0.0000	****	0.0000	****
Isolation cap 0	Shield 10 conts/wk	Shield 2 conts/wk	500	500	0.0000	****	0.0000	****
Isolation cap 10	No shielding	Shield 10 conts/wk	500	500	0.0026	**	0.0077	**
Isolation cap 10	No shielding	Shield 2 conts/wk	500	500	0.0001	****	0.0002	***
Isolation cap 10	Shield 10 conts/wk	Shield 2 conts/wk	500	500	0.3350	ns	1.0000	ns
Isolation cap 25	No shielding	Shield 10 conts/wk	500	500	0.0089	**	0.0266	*
Isolation cap 25	No shielding	Shield 2 conts/wk	500	500	0.0002	***	0.0007	***
Isolation cap 25	Shield 10 conts/wk	Shield 2 conts/wk	500	500	0.2910	ns	0.8740	ns

Effect of isolation capacity on deaths from an outbreak Under each shielding strategy, based on a camp of 2,000 people



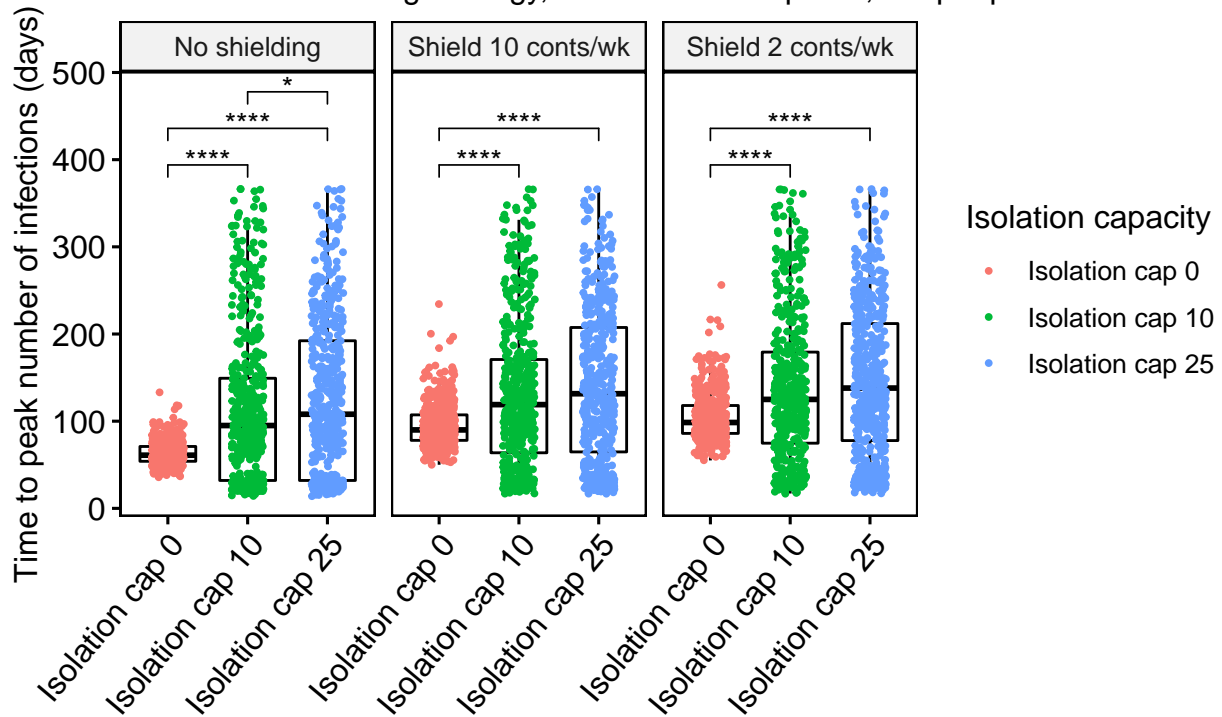
Effect of shielding strategy on deaths from an outbreak Under each isolation capacity scenario, based on a camp of 2,000 people



Effect of isolation capacity on time to peak number of infections

In population over 50 with comorbidities

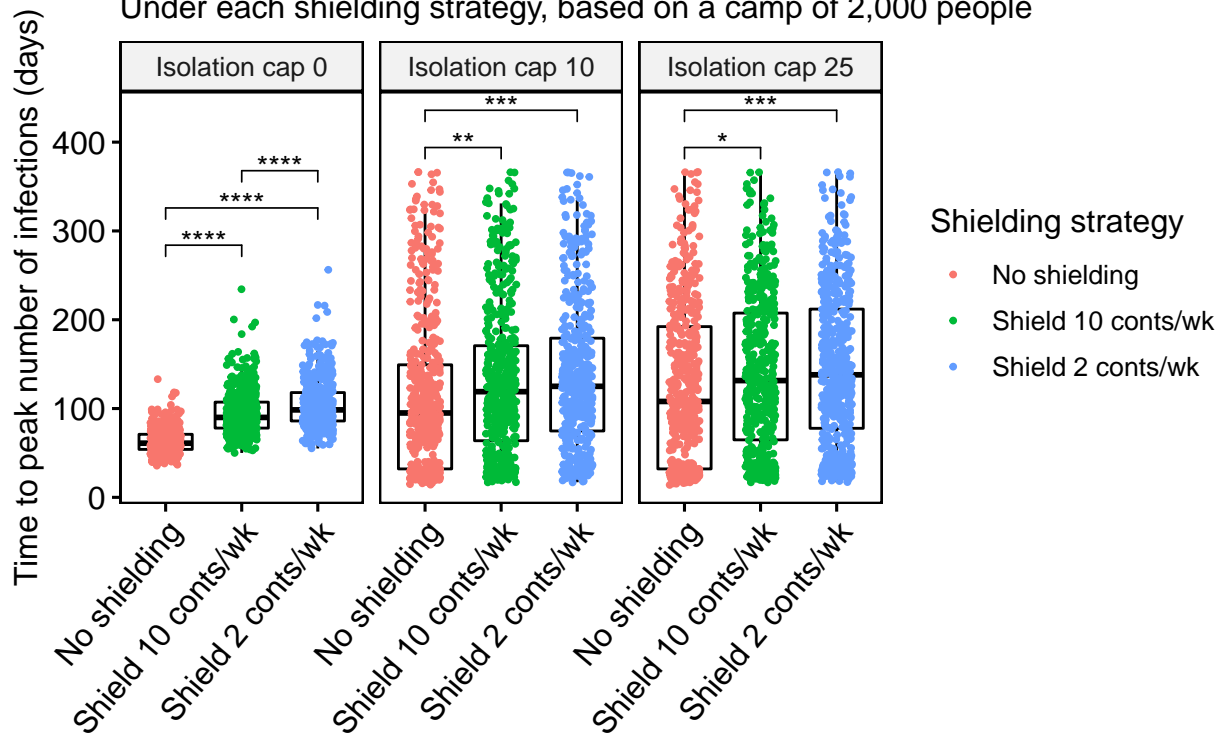
Under each shielding strategy, based on a camp of 2,000 people



Effect of shielding strategy on time to peak number of infections

In population over 50 with comorbidities

Under each shielding strategy, based on a camp of 2,000 people



Analysis/recommendations

Isolation of symptomatic cases is the single most effective intervention for preventing deaths. The fraction of a camp’s population that dies in our models is statistically significantly reduced each time the level of isolation capacity is increased; from 0 to 10 beds per camp of 2,000, and from 10 to 25 beds per camp of 2,000, regardless of the shielding strategy that is implemented. We also find that isolating symptomatic cases should slow down outbreaks. Case isolation significantly delays the date at which infections peak, most importantly in more vulnerable populations such as older individuals and those with comorbidities; any, even a small ammount of case isolation has this delaying effect.

We find that shielding vulnerable populations in designated “green zones” alone has no effect on the number of deaths, as long as there is even a small amount of contact between shielded and non-shielded populations. Shielding does however significantly slow down outbreaks, especially in the vulnerable populations who are being shielded. While any shielding strategy has this delaying effect compared to no shielding, the more close contact between shielded and non-shielded individuals is restricted, the greater this delaying effect is, especially at very low levels of isolation capacity.

Based on these findings, we recommend the following:

1. Preventing deaths by placing a significant focus on increasing isolation capacity as soon as possible, and promptly isolating any individuals with symptoms common to COVID-19 (fever, cough, loss of smell, etc) as soon as the capacity exists to do so.
2. Buying time to build up more capacity to manage an outbreak by shielding vulnerable people in “green zones”, as well as isolating symptomatic cases. This additional time obtained should be used to further increase isolation capacity, and to improve screening for common COVID-19 symptoms.