

UCLH bed needs modelling

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1 Model input

- Forecasted COVID19 hospital admissions, taking Pietro/Richard forecasts for 0% (base) / 20% / 40% / 50% / 60% / 73% reduction in contact rates (Figure 1)
- Patient pathways
 - 1) intubated (mechanical ventilation) – mean LoS assumption: 14 days in ICU (with 50% mortality), 7 days HDU, 14 days ward bed, then discharge
 - 2) not intubated (non-invasive ventilation/CPAP) – mean LoS assumption: 7 days HDU (with 20% mortality), 10 days ward, then discharge
- Proportion of admissions going in each pathway:
 - 1) 18%
 - 2) 8%
- Note: 74% of COVID19 admissions are not critical care, and go on another pathway straight to ward beds. This is not yet accounted for in the model.
- Mortality:
 - 1) 50% in ICU, for those admitted straight to ICU. Otherwise they survive to discharge at end of pathway
 - 2) 20% in HDU, for those admitted straight to HDU. Otherwise they survive to discharge at end of pathway

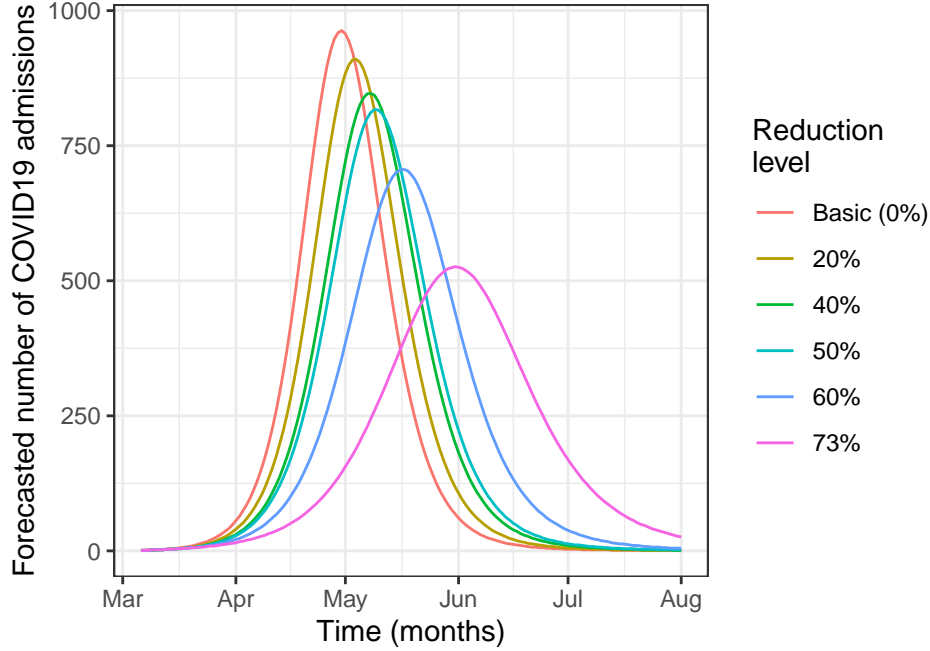


Figure 1: Forecasted daily COVID19 hospital admissions. Scenarios are: basic, 20% reduction in contact rate, and 60% reduction in contact rates.

2 Model principle

This model simulates the next few weeks of the epidemic. Every day, we assume a fixed 26% (18% + 8%) of forecasted COVID19 admissions require critical care. For each admission, we randomly draw the pathway based on the proportions provided as input. The model then simulates the length of stay for each step in the pathway for each patient.

For example, if a patient is admitted on day 1 and goes through pathway 1, we first randomly draw the length of stay in ICU from a Poisson distribution with mean 14 days. We then establish whether that patient dies, based on the mortality in ICU (here, 50%). If the patient dies, we then sample the date of death based on a Uniform distribution from 0 to the sampled length of stay above, reduce the new length of stay accordingly, and record that a death has occurred at that time. If the patient does not die, he/she moves on to the next step of the pathway.

We repeat the process to draw a length of stay for each remaining step (type of bed occupancy) in turn on the pathway, systematically recording the time interval when a bed will be needed. This allows us to account for the fact that beds are only needed for a limited period of time, and will eventually become available again for other patients.

3 Model output

The model outputs the number of beds that would be needed each day to accommodate all of the admitted critical care COVID19 patients. The model can be run multiple times to provide us a mean and error range for these outputs. The uncertainty presented arises from the stochastic model sampling from distributions in length of stays in each bed type, and from proportions to assign the pathways to each patient.

Results from 500 model runs for each of the 6 scenarios (base, 20%/40%/50%/60%/73% reduction) are presented below in summary Figures 2, 3 and 4, and summary Table 1. More details for each scenario are given in Figures 5, 6, 7, 8, 9 and 10, and Tables 2, 3, 4, 5, 6 and 7.

3.1 Summary

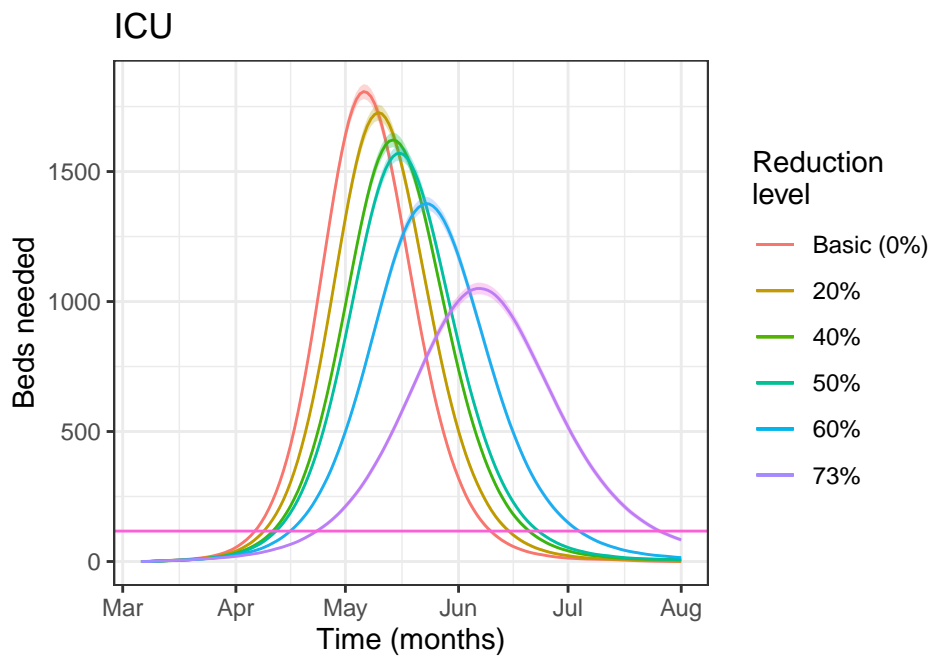


Figure 2: Output ICU bed demand from 500 model runs for the 20%, 40%, 50%, 60% and 73% reduction in contact rates. The horizontal lines represent the current maximum bed capacity. Lines are average daily requirements, shaded area represents average \pm standard deviation.

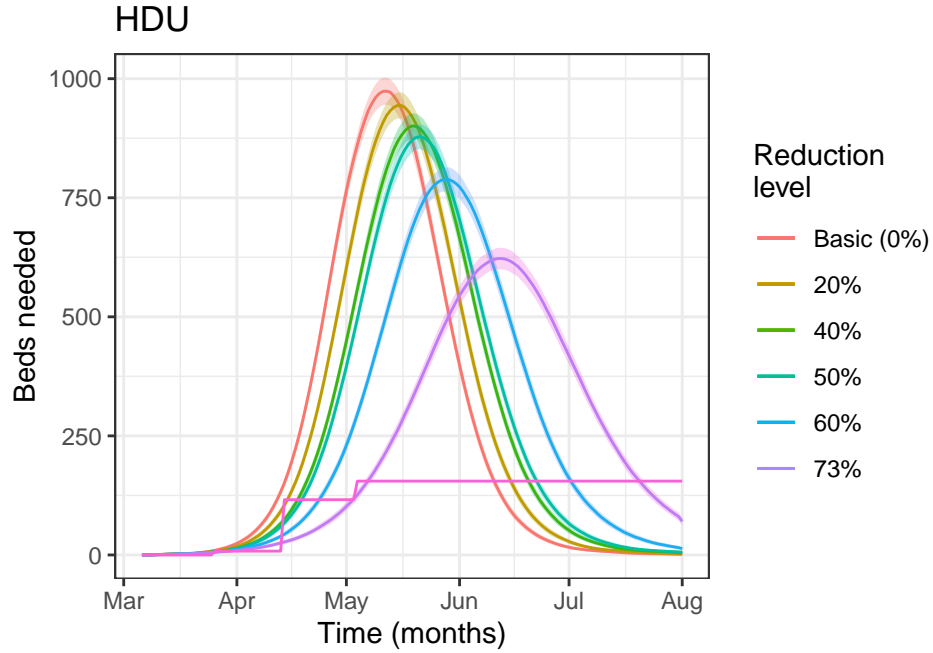


Figure 3: Output HDU bed demand from 500 model runs for the 20%, 40%, 50%, 60% and 73% reduction in contact rates. The horizontal lines represent the current maximum bed capacity. Lines are average requirements, shaded area represents average \pm standard deviation.

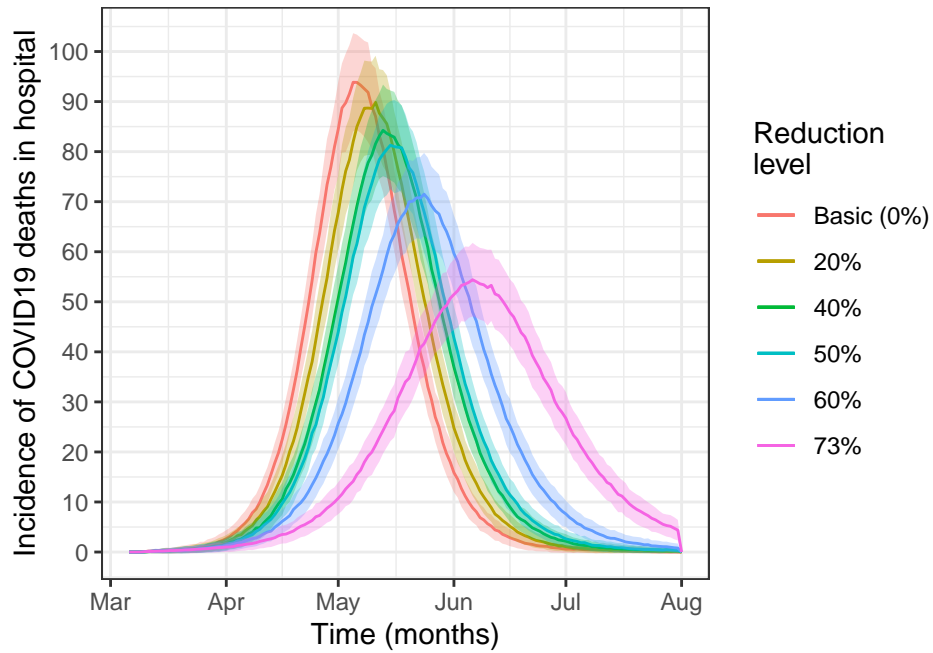


Figure 4: Estimated incidence of mortality in COVID19 hospitalised patients from 500 model runs. Scenarios are: 0% reduction in contact rate (base), 20%, 40%, 50%, 60% and 73% reduction in contact rates. Lines are average daily incidence, shaded area represents average \pm standard deviation.

Table 1: Summary model output from 500 model runs for all scenarios. Scenarios are: 0% reduction in contact rate (base), 20%, 40%, 50%, 60% and 73% reduction in contact rates SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions.

Scenario	ICU peak bed needs			HDU peak bed needs			Ward peak bed needs			Cumulative deaths	
	Peak time	Mean beds	SD	Peak time	Mean beds	SD	Peak time	Mean beds	SD	Mean deaths	SD
Base (0%)	2020-05-06	1808	29	2020-05-12	974	29	2020-05-24	1437	32	3015	477
20% reduction	2020-05-10	1727	31	2020-05-15	944	27	2020-05-27	1394	34	3012	485
40% reduction	2020-05-14	1621	28	2020-05-19	901	27	2020-05-31	1336	32	2996	492
50% reduction	2020-05-16	1570	29	2020-05-21	878	25	2020-06-02	1304	33	2990	501
60% reduction	2020-05-23	1377	26	2020-05-28	788	25	2020-06-09	1183	30	2953	520
73% reduction	2020-06-07	1050	23	2020-06-12	623	23	2020-06-24	947	27	2799	534

3.2 Model Limitations

- Uncertainty in inputs: using a Poisson distribution for length of stay based on single mean values
- Simple pathways: patients can only follow one of two pathways with fixed length of stay
- Mortality is assumed to be randomly assigned and to occur at the end of the length of stay (may overestimate beds needed?)
- Unlimited bed capacity: this is a prediction of bed need and does not include any competition for beds
- Uncertainty presented reflects only uncertainty in length of stay
- The population is split only by the two pathways - age / co-morbidities are not included
- Simple ward beds are only included for critical care patients, NOT for total COVID19 admissions, since we do not have an estimate of length of stay for patients admitted straight to ward beds

3.3 Individual scenario plots and tables

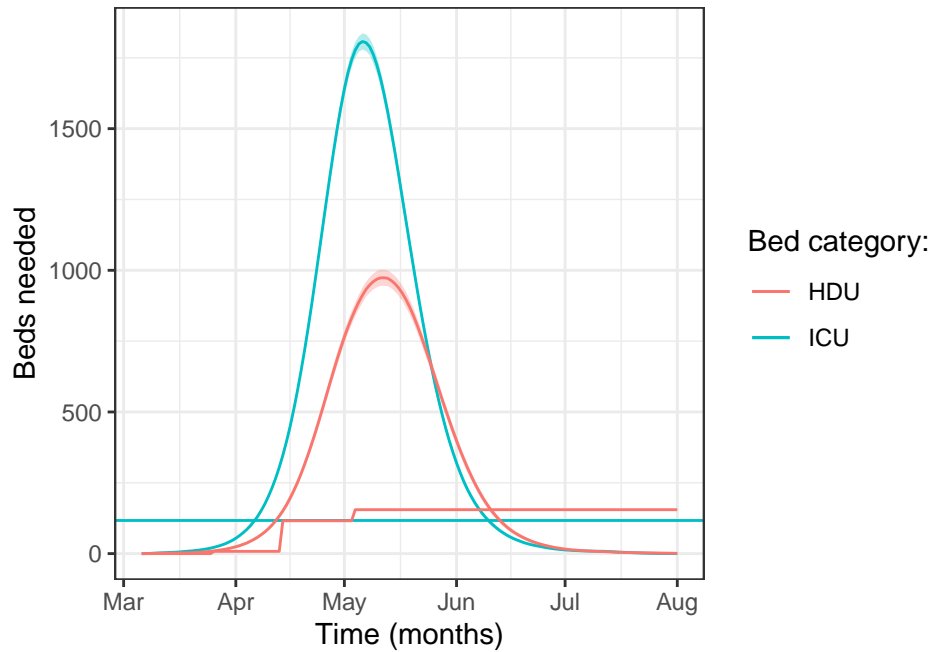


Figure 5: Output from 500 model runs for the base scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average \pm standard deviation.

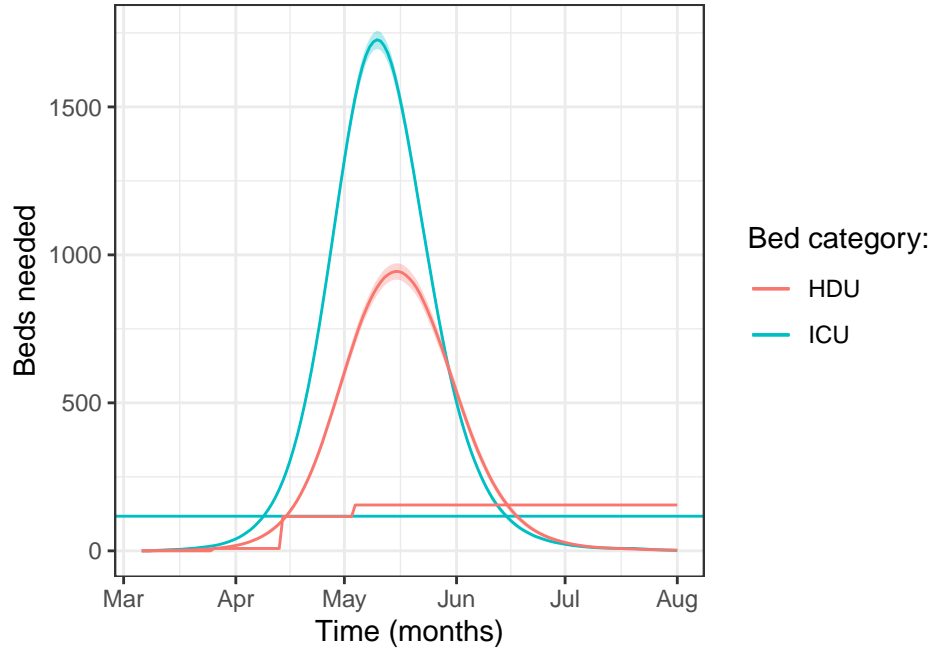


Figure 6: Output from 500 model runs for the 20% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average \pm standard deviation.

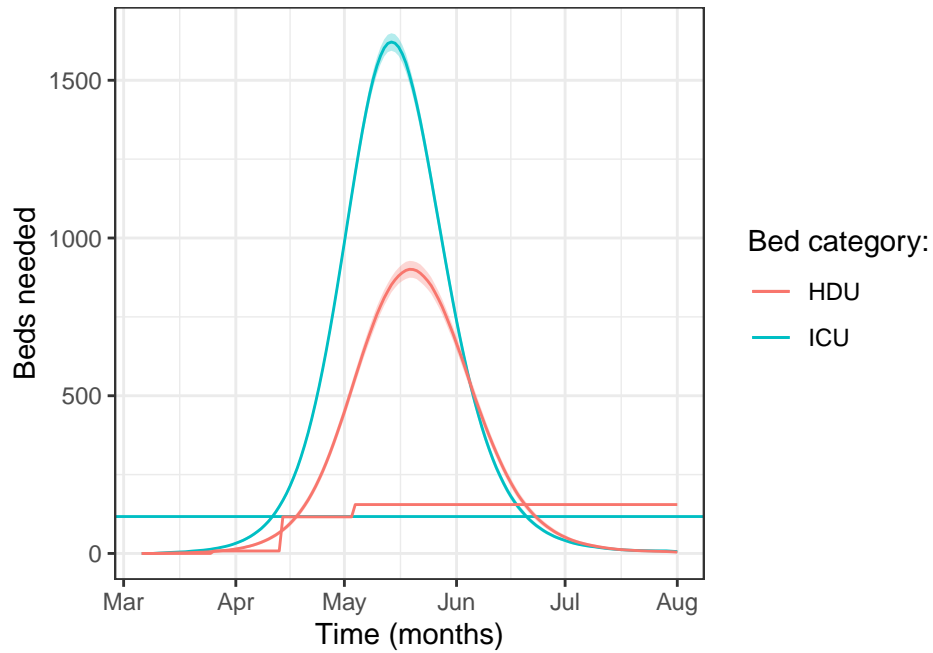


Figure 7: Output from 500 model runs for the 40% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average \pm standard deviation.

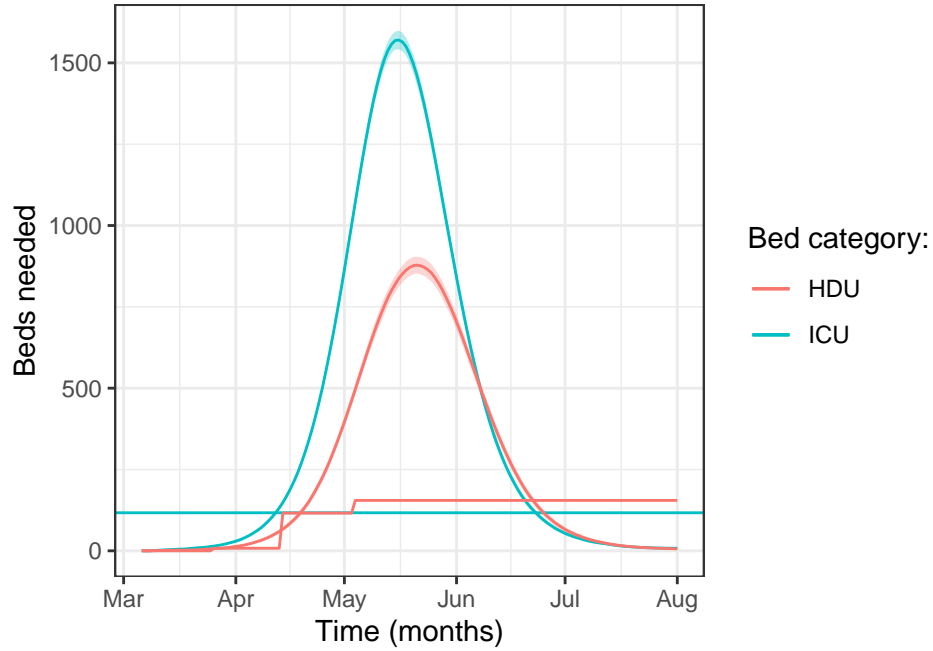


Figure 8: Output from 500 model runs for the 50% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average \pm standard deviation.

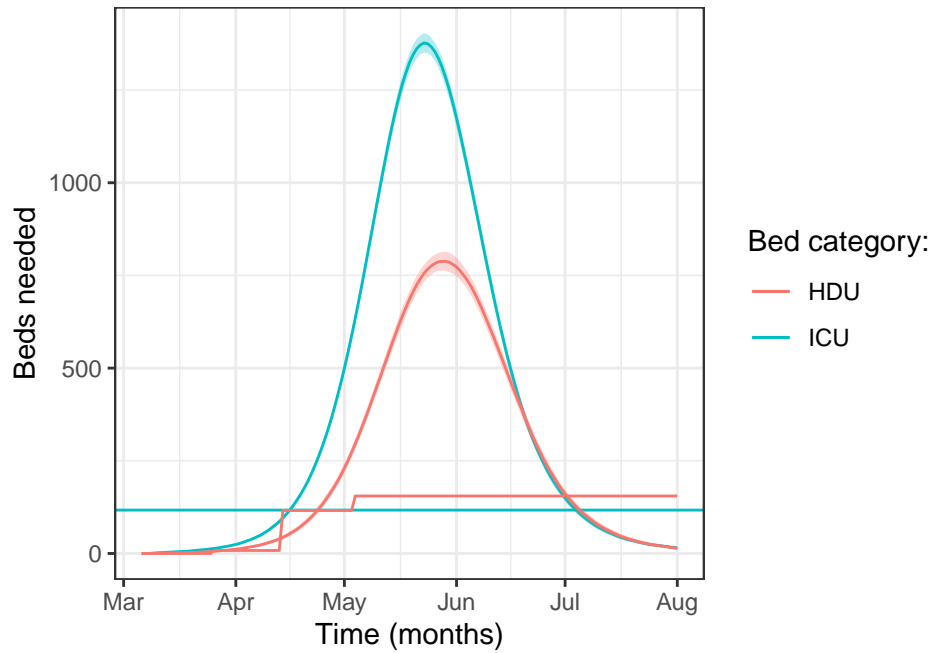


Figure 9: Output from 500 model runs for the 60% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average \pm standard deviation.

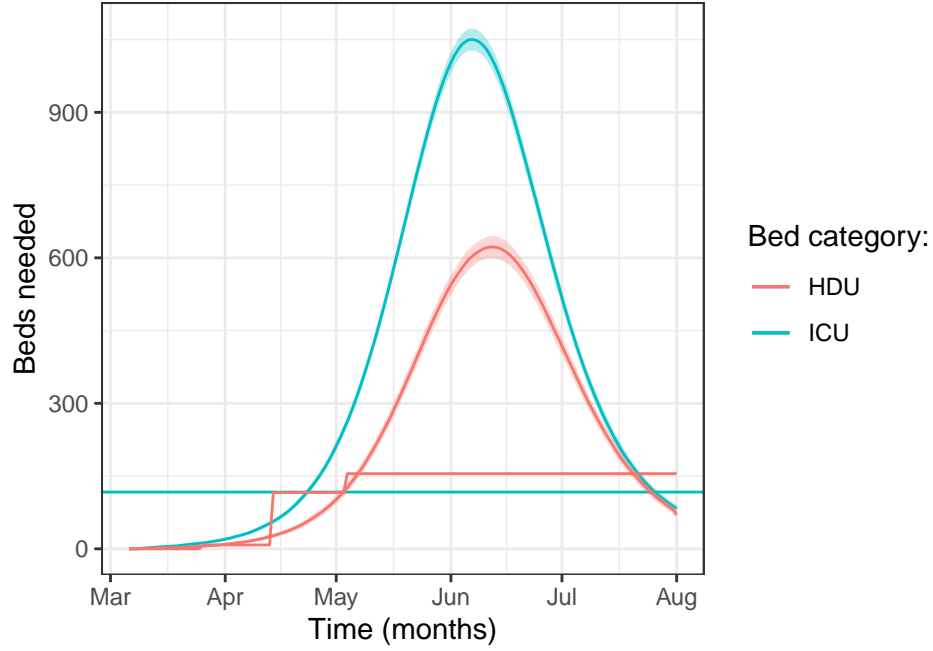


Figure 10: Output from 500 model runs for the 73% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average \pm standard deviation.

Table 2: Model output from 500 model runs for the base scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions.

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-06	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0
2020-03-08	1	0	0	0	0	0	0	0
2020-03-09	1	1	1	1	0	0	0	0
2020-03-10	2	1	1	1	0	0	0	0
2020-03-11	3	1	1	1	0	0	0	0
2020-03-12	3	1	1	1	0	0	0	0
2020-03-13	4	1	2	1	0	0	0	0
2020-03-14	4	1	2	1	0	0	0	0
2020-03-15	5	1	2	1	0	1	0	1
2020-03-16	5	1	2	1	1	1	0	1
2020-03-17	7	2	2	1	1	1	0	1
2020-03-18	8	2	3	1	1	1	0	1
2020-03-19	9	2	3	2	1	1	0	1
2020-03-20	10	2	4	2	2	1	1	1
2020-03-21	11	2	4	2	2	1	1	1
2020-03-22	13	2	5	2	2	1	1	1

Table 2: Model output from 500 model runs for the base scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. *(continued)*

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-23	15	3	6	2	2	1	1	1
2020-03-24	17	3	7	2	3	2	1	1
2020-03-25	19	3	8	2	3	2	1	1
2020-03-26	22	3	10	3	4	2	1	1
2020-03-27	26	3	12	3	4	2	1	1
2020-03-28	30	4	13	3	5	2	2	1
2020-03-29	34	4	15	3	6	2	2	1
2020-03-30	40	4	18	4	7	2	2	1
2020-03-31	46	4	21	4	8	3	2	2
2020-04-01	54	5	24	4	9	3	3	2
2020-04-02	63	5	28	5	11	3	3	2
2020-04-03	74	6	33	5	13	3	4	2
2020-04-04	85	6	37	5	15	3	4	2
2020-04-05	98	6	43	6	17	4	5	2
2020-04-06	114	7	50	6	20	4	6	2
2020-04-07	131	7	58	6	23	5	7	3
2020-04-08	152	8	67	7	27	5	8	3
2020-04-09	175	8	76	7	32	5	9	3
2020-04-10	202	9	88	8	36	6	10	3
2020-04-11	232	10	101	8	42	6	12	3
2020-04-12	266	10	116	9	48	6	13	4
2020-04-13	304	11	132	10	56	7	16	4
2020-04-14	347	12	151	11	65	7	18	4
2020-04-15	395	13	172	12	75	7	20	4
2020-04-16	448	14	196	12	85	8	23	5
2020-04-17	508	15	222	13	98	8	26	5
2020-04-18	573	16	250	13	113	9	29	5
2020-04-19	643	16	281	14	129	10	32	6
2020-04-20	718	17	315	15	148	11	36	6
2020-04-21	798	18	351	16	168	11	41	6
2020-04-22	882	19	389	17	192	12	45	7
2020-04-23	971	20	428	18	218	13	49	7
2020-04-24	1061	21	470	19	247	14	54	7
2020-04-25	1152	22	513	20	278	15	60	8
2020-04-26	1243	23	557	21	313	15	64	8
2020-04-27	1332	24	601	21	351	17	68	9
2020-04-28	1418	26	644	22	391	17	73	9
2020-04-29	1499	26	686	23	435	18	77	9
2020-04-30	1574	27	726	23	481	20	81	9
2020-05-01	1640	26	765	23	530	20	84	10
2020-05-02	1698	27	799	23	582	22	89	9
2020-05-03	1743	28	832	24	635	22	90	10
2020-05-04	1777	28	861	24	689	23	92	10

Table 2: Model output from 500 model runs for the base scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. *(continued)*

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-05	1799	27	889	26	744	23	94	10
2020-05-06	1808	29	912	27	799	25	94	10
2020-05-07	1803	30	933	26	856	25	93	10
2020-05-08	1789	29	948	28	911	26	93	10
2020-05-09	1762	31	960	28	966	27	92	10
2020-05-10	1724	29	969	29	1019	27	89	8
2020-05-11	1677	29	973	29	1071	28	87	10
2020-05-12	1621	29	974	29	1120	28	83	9
2020-05-13	1558	29	972	28	1168	28	81	9
2020-05-14	1487	28	964	27	1213	29	77	9
2020-05-15	1414	28	952	28	1254	30	73	9
2020-05-16	1337	27	938	27	1291	32	68	8
2020-05-17	1257	27	919	27	1324	33	64	8
2020-05-18	1177	26	897	28	1354	33	59	8
2020-05-19	1097	24	872	27	1379	32	56	7
2020-05-20	1019	23	843	26	1401	33	52	7
2020-05-21	941	22	810	26	1417	33	48	7
2020-05-22	866	21	776	25	1429	33	44	7
2020-05-23	795	20	739	25	1435	33	40	6
2020-05-24	728	20	701	24	1437	32	37	6
2020-05-25	662	19	663	23	1433	31	33	6
2020-05-26	601	18	624	23	1423	33	30	5
2020-05-27	544	18	584	22	1408	33	27	5
2020-05-28	491	17	545	20	1387	32	25	5
2020-05-29	443	15	507	20	1361	32	22	5
2020-05-30	398	14	470	19	1331	31	20	4
2020-05-31	357	14	433	18	1295	31	18	4
2020-06-01	320	13	399	18	1256	31	16	4
2020-06-02	286	13	365	17	1212	30	15	4
2020-06-03	255	12	333	16	1166	29	13	4
2020-06-04	227	12	303	16	1116	28	11	3
2020-06-05	203	11	276	15	1066	28	10	3
2020-06-06	181	10	249	14	1012	28	9	3
2020-06-07	161	10	225	13	957	27	8	3
2020-06-08	144	9	202	13	901	25	7	3
2020-06-09	128	8	182	12	846	25	6	2
2020-06-10	114	8	163	12	791	24	6	2
2020-06-11	102	8	146	11	738	23	5	2
2020-06-12	91	7	131	10	685	22	4	2
2020-06-13	81	7	117	10	634	21	4	2
2020-06-14	72	6	104	9	584	21	4	2
2020-06-15	64	6	93	9	537	20	3	2
2020-06-16	58	6	83	8	492	19	3	2

Table 2: Model output from 500 model runs for the base scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. *(continued)*

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-06-17	52	6	74	8	448	18	3	2
2020-06-18	47	5	67	8	409	18	2	2
2020-06-19	42	5	59	7	371	17	2	1
2020-06-20	37	5	53	6	337	16	2	1
2020-06-21	34	5	48	6	304	15	2	1
2020-06-22	30	4	42	6	275	14	2	1
2020-06-23	28	4	38	5	248	14	1	1
2020-06-24	26	4	34	5	223	13	1	1
2020-06-25	23	4	31	5	200	12	1	1
2020-06-26	21	4	27	5	179	12	1	1
2020-06-27	19	3	25	4	161	11	1	1
2020-06-28	17	3	22	4	144	11	1	1
2020-06-29	15	3	20	4	129	10	1	1
2020-06-30	14	3	18	4	116	10	1	1
2020-07-01	13	3	16	4	103	9	1	1
2020-07-02	12	3	14	4	92	8	1	1
2020-07-03	11	3	13	3	83	8	1	1
2020-07-04	11	2	12	3	74	8	1	1
2020-07-05	10	2	11	3	66	7	1	1
2020-07-06	10	2	10	3	59	7	0	1
2020-07-07	9	2	10	3	53	6	0	1
2020-07-08	9	2	9	3	48	6	0	1
2020-07-09	9	2	8	3	43	6	0	1
2020-07-10	8	2	8	2	38	6	0	1
2020-07-11	8	2	7	2	34	5	0	1
2020-07-12	8	2	7	2	31	5	0	1
2020-07-13	7	2	6	2	28	5	0	1
2020-07-14	7	2	6	2	25	4	0	1
2020-07-15	6	2	5	2	23	4	0	1
2020-07-16	5	2	4	2	21	4	0	0
2020-07-17	5	2	4	2	20	4	0	0
2020-07-18	4	2	4	2	18	4	0	0
2020-07-19	4	2	4	2	16	4	0	0
2020-07-20	3	1	3	2	15	3	0	0
2020-07-21	3	1	3	2	13	3	0	0
2020-07-22	2	1	3	2	12	3	0	0
2020-07-23	2	1	3	1	11	3	0	0
2020-07-24	1	1	3	1	10	3	0	0
2020-07-25	1	1	3	1	10	3	0	0
2020-07-26	1	1	2	1	9	3	0	0
2020-07-27	1	1	2	1	8	3	0	0
2020-07-28	0	1	2	1	8	2	0	0
2020-07-29	0	0	2	1	7	2	0	0

Table 2: Model output from 500 model runs for the base scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. *(continued)*

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-07-30	0	0	1	1	7	2	0	0
2020-07-31	0	0	1	1	6	2	0	0
2020-08-01	0	0	1	1	5	2	0	0

Table 3: Model output from 500 model runs for the 20% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions.

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-06	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0
2020-03-08	0	0	0	0	0	0	0	0
2020-03-09	1	0	0	0	0	0	0	0
2020-03-10	1	1	1	1	0	0	0	0
2020-03-11	2	1	1	1	0	0	0	0
2020-03-12	3	1	1	1	0	0	0	0
2020-03-13	3	1	1	1	0	0	0	0
2020-03-14	4	1	2	1	0	0	0	0
2020-03-15	4	1	2	1	0	1	0	0
2020-03-16	5	1	2	1	0	1	0	1
2020-03-17	5	2	2	1	1	1	0	1
2020-03-18	6	2	3	1	1	1	0	1
2020-03-19	8	2	3	1	1	1	0	1
2020-03-20	9	2	3	2	1	1	0	1
2020-03-21	9	2	4	2	1	1	0	1
2020-03-22	11	2	5	2	2	1	1	1
2020-03-23	13	2	5	2	2	1	1	1
2020-03-24	14	2	6	2	2	1	1	1
2020-03-25	16	3	7	2	3	1	1	1
2020-03-26	18	3	8	2	3	1	1	1
2020-03-27	20	3	9	3	4	2	1	1
2020-03-28	23	3	10	3	4	2	1	1
2020-03-29	27	4	12	3	5	2	1	1
2020-03-30	31	4	14	3	6	2	2	1
2020-03-31	35	4	16	4	7	2	2	1
2020-04-01	40	4	18	4	8	3	2	1
2020-04-02	46	4	21	4	9	3	2	2
2020-04-03	54	5	24	4	10	3	3	2
2020-04-04	62	5	27	4	12	3	3	2

Table 3: Model output from 500 model runs for the 20% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-04-05	71	5	31	5	13	3	3	2
2020-04-06	81	6	36	5	16	4	4	2
2020-04-07	93	7	41	6	18	4	5	2
2020-04-08	107	7	47	6	21	4	5	2
2020-04-09	123	7	54	6	24	4	6	3
2020-04-10	140	8	62	7	27	5	7	3
2020-04-11	160	8	71	7	31	5	8	3
2020-04-12	182	9	81	8	36	5	9	3
2020-04-13	208	10	91	8	41	6	11	3
2020-04-14	236	10	104	9	47	6	12	3
2020-04-15	269	11	118	9	53	6	14	4
2020-04-16	305	11	134	9	61	7	15	4
2020-04-17	346	11	152	10	70	8	18	4
2020-04-18	391	12	171	11	79	8	20	4
2020-04-19	440	13	193	12	91	9	22	5
2020-04-20	494	14	217	12	103	9	25	5
2020-04-21	552	15	243	13	117	9	28	5
2020-04-22	616	16	272	14	133	10	32	5
2020-04-23	684	17	302	15	151	11	35	6
2020-04-24	756	18	335	16	170	12	38	6
2020-04-25	833	20	370	17	192	12	42	7
2020-04-26	912	20	408	17	217	13	47	7
2020-04-27	993	21	445	18	244	13	51	7
2020-04-28	1076	22	484	19	274	14	55	7
2020-04-29	1159	23	523	20	306	15	60	8
2020-04-30	1241	24	563	21	341	16	64	8
2020-05-01	1321	26	603	22	379	18	68	8
2020-05-02	1397	26	642	22	419	19	72	9
2020-05-03	1468	27	680	23	462	20	76	9
2020-05-04	1533	28	718	24	506	20	78	9
2020-05-05	1589	28	754	24	554	21	82	9
2020-05-06	1637	29	787	24	603	22	85	9
2020-05-07	1675	29	816	25	653	22	87	9
2020-05-08	1703	29	844	25	705	23	89	10
2020-05-09	1720	30	868	27	757	23	89	9
2020-05-10	1727	31	890	27	809	24	89	9
2020-05-11	1723	31	908	27	862	25	90	9
2020-05-12	1707	30	923	27	914	26	88	9
2020-05-13	1681	31	933	27	965	27	87	10
2020-05-14	1646	29	940	27	1015	27	86	10
2020-05-15	1602	28	944	27	1064	28	83	9
2020-05-16	1549	27	944	28	1110	29	80	8
2020-05-17	1490	28	940	28	1154	29	77	8

Table 3: Model output from 500 model runs for the 20% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-18	1427	27	931	28	1195	30	73	8
2020-05-19	1360	27	920	28	1232	30	70	8
2020-05-20	1290	26	906	27	1267	30	66	8
2020-05-21	1217	24	888	27	1298	31	62	8
2020-05-22	1144	25	866	27	1325	32	58	8
2020-05-23	1071	24	840	27	1349	32	54	7
2020-05-24	999	25	812	27	1368	32	51	7
2020-05-25	927	25	782	27	1381	33	47	7
2020-05-26	857	24	751	26	1390	33	43	6
2020-05-27	789	22	717	26	1394	34	40	6
2020-05-28	725	21	683	24	1394	35	37	6
2020-05-29	664	21	647	23	1389	35	33	6
2020-05-30	606	20	610	22	1378	34	31	6
2020-05-31	552	18	573	23	1362	34	28	5
2020-06-01	501	17	537	22	1342	33	25	5
2020-06-02	455	16	501	21	1316	33	23	5
2020-06-03	412	15	465	21	1287	33	21	4
2020-06-04	373	14	430	20	1252	33	18	4
2020-06-05	336	13	397	19	1215	31	17	4
2020-06-06	304	13	365	19	1174	30	15	4
2020-06-07	273	12	334	18	1129	31	14	4
2020-06-08	246	12	307	17	1083	30	12	3
2020-06-09	220	11	280	16	1035	29	11	3
2020-06-10	197	11	254	15	984	27	10	3
2020-06-11	176	10	231	14	933	26	9	3
2020-06-12	158	10	210	14	882	26	8	3
2020-06-13	142	9	190	13	830	25	7	3
2020-06-14	127	9	172	12	778	23	6	3
2020-06-15	114	8	155	12	727	23	6	2
2020-06-16	102	8	140	11	678	23	5	2
2020-06-17	91	8	126	11	629	23	5	2
2020-06-18	82	7	113	10	583	22	4	2
2020-06-19	73	7	102	9	538	21	4	2
2020-06-20	66	7	91	9	495	21	3	2
2020-06-21	59	6	82	8	454	20	3	2
2020-06-22	53	6	73	8	416	19	3	2
2020-06-23	48	6	66	7	380	18	2	2
2020-06-24	44	5	59	7	346	17	2	1
2020-06-25	39	5	53	7	315	16	2	1
2020-06-26	35	5	47	7	286	16	2	1
2020-06-27	32	4	43	6	259	15	2	1
2020-06-28	29	4	39	6	235	14	1	1
2020-06-29	27	4	35	5	212	13	1	1

Table 3: Model output from 500 model runs for the 20% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-06-30	25	4	32	5	192	12	1	1
2020-07-01	22	4	28	5	173	12	1	1
2020-07-02	20	4	25	5	156	11	1	1
2020-07-03	18	3	23	4	140	10	1	1
2020-07-04	17	3	21	4	126	10	1	1
2020-07-05	15	3	19	4	114	10	1	1
2020-07-06	14	3	17	4	102	9	1	1
2020-07-07	13	3	15	4	92	9	1	1
2020-07-08	12	3	14	4	82	8	1	1
2020-07-09	11	3	13	3	74	8	1	1
2020-07-10	11	3	12	3	67	7	1	1
2020-07-11	10	3	11	3	60	7	0	1
2020-07-12	10	2	10	3	54	7	0	1
2020-07-13	9	2	10	3	49	6	0	1
2020-07-14	9	2	9	3	44	6	0	1
2020-07-15	9	2	8	3	39	6	0	1
2020-07-16	8	2	8	3	36	6	0	1
2020-07-17	8	2	7	3	32	5	0	1
2020-07-18	8	2	7	2	29	5	0	1
2020-07-19	8	2	7	2	27	5	0	1
2020-07-20	8	2	6	2	25	5	0	1
2020-07-21	7	2	6	2	22	4	0	1
2020-07-22	7	2	5	2	21	4	0	1
2020-07-23	6	2	5	2	19	4	0	1
2020-07-24	5	2	4	2	17	4	0	1
2020-07-25	5	2	4	2	16	4	0	0
2020-07-26	4	2	4	2	15	4	0	0
2020-07-27	4	2	3	2	14	3	0	0
2020-07-28	3	1	3	2	13	3	0	0
2020-07-29	3	1	3	2	12	3	0	0
2020-07-30	2	1	3	2	11	3	0	0
2020-07-31	2	1	3	2	10	3	0	0
2020-08-01	1	1	2	1	9	3	0	0

Table 4: Model output from 500 model runs for the 40% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions.

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-06	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0
2020-03-08	0	0	0	0	0	0	0	0
2020-03-09	0	0	0	0	0	0	0	0
2020-03-10	1	0	0	0	0	0	0	0
2020-03-11	1	1	1	1	0	0	0	0
2020-03-12	2	1	1	1	0	0	0	0
2020-03-13	3	1	1	1	0	0	0	0
2020-03-14	3	1	1	1	0	0	0	0
2020-03-15	4	1	2	1	0	0	0	0
2020-03-16	4	1	2	1	0	0	0	0
2020-03-17	5	1	2	1	0	1	0	1
2020-03-18	5	1	2	1	1	1	0	1
2020-03-19	6	2	3	1	1	1	0	1
2020-03-20	8	2	3	1	1	1	0	1
2020-03-21	8	2	3	2	1	1	0	1
2020-03-22	9	2	4	2	1	1	0	1
2020-03-23	10	2	4	2	2	1	1	1
2020-03-24	12	2	5	2	2	1	1	1
2020-03-25	13	2	6	2	2	1	1	1
2020-03-26	15	2	6	2	3	1	1	1
2020-03-27	17	3	7	2	3	1	1	1
2020-03-28	20	3	9	2	4	2	1	1
2020-03-29	22	3	10	3	4	2	1	1
2020-03-30	25	3	11	3	5	2	1	1
2020-03-31	28	3	13	3	5	2	1	1
2020-04-01	32	4	14	3	6	2	2	1
2020-04-02	37	4	16	3	7	2	2	1
2020-04-03	42	4	18	4	8	3	2	1
2020-04-04	47	4	21	4	9	3	2	2
2020-04-05	54	5	24	5	11	3	3	2
2020-04-06	61	5	27	5	12	3	3	2
2020-04-07	70	5	31	5	14	3	4	2
2020-04-08	79	6	35	5	16	4	4	2
2020-04-09	89	6	40	6	18	4	5	2
2020-04-10	101	6	45	6	21	4	5	2
2020-04-11	115	7	52	6	24	4	6	2
2020-04-12	131	7	58	7	27	5	7	3
2020-04-13	149	8	66	7	31	5	7	3
2020-04-14	168	8	75	7	35	6	9	3
2020-04-15	190	9	84	8	40	6	10	3
2020-04-16	214	9	95	9	46	6	11	3
2020-04-17	242	10	107	9	52	7	13	3

Table 4: Model output from 500 model runs for the 40% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-04-18	271	10	120	10	59	7	14	4
2020-04-19	305	11	136	10	66	7	15	4
2020-04-20	342	11	152	11	75	8	17	4
2020-04-21	383	12	170	11	85	9	20	4
2020-04-22	427	13	190	12	96	9	22	5
2020-04-23	476	14	211	13	108	10	24	5
2020-04-24	528	15	235	14	122	10	27	5
2020-04-25	584	16	261	14	137	10	30	6
2020-04-26	644	16	288	14	154	11	33	5
2020-04-27	707	17	317	15	173	12	36	6
2020-04-28	773	18	349	16	193	12	40	6
2020-04-29	842	18	381	17	216	13	43	7
2020-04-30	914	19	415	17	241	14	47	7
2020-05-01	986	20	449	18	268	15	51	7
2020-05-02	1060	21	485	20	298	16	54	7
2020-05-03	1133	21	521	19	329	17	58	7
2020-05-04	1205	22	558	20	364	17	62	8
2020-05-05	1275	23	594	21	400	18	66	8
2020-05-06	1340	23	630	22	439	18	69	8
2020-05-07	1401	24	664	22	480	19	72	9
2020-05-08	1457	25	696	24	523	19	75	8
2020-05-09	1505	26	727	24	567	21	78	8
2020-05-10	1546	27	758	25	614	22	79	9
2020-05-11	1578	27	785	25	661	23	82	9
2020-05-12	1602	27	810	25	708	23	83	9
2020-05-13	1617	28	831	25	757	24	84	9
2020-05-14	1621	28	852	24	805	24	84	9
2020-05-15	1618	28	867	25	853	25	83	9
2020-05-16	1605	28	880	26	900	26	83	9
2020-05-17	1584	28	890	26	946	27	81	9
2020-05-18	1555	28	897	27	991	27	80	9
2020-05-19	1517	28	901	27	1035	29	78	9
2020-05-20	1473	27	900	27	1078	28	76	9
2020-05-21	1424	26	896	27	1118	29	73	8
2020-05-22	1370	26	888	28	1156	29	71	8
2020-05-23	1311	26	877	27	1191	29	67	8
2020-05-24	1249	25	864	27	1222	30	64	8
2020-05-25	1185	25	849	26	1250	31	61	7
2020-05-26	1119	25	828	26	1274	31	57	7
2020-05-27	1055	24	807	25	1295	31	54	7
2020-05-28	989	24	783	24	1312	32	50	7
2020-05-29	924	23	755	24	1325	31	47	7
2020-05-30	860	22	727	24	1333	31	44	6

Table 4: Model output from 500 model runs for the 40% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-31	798	22	697	22	1336	32	40	6
2020-06-01	738	20	665	22	1335	32	37	6
2020-06-02	682	20	634	22	1329	32	34	6
2020-06-03	627	19	600	22	1320	31	32	6
2020-06-04	575	18	566	20	1305	31	29	5
2020-06-05	527	17	531	21	1287	31	26	5
2020-06-06	482	17	497	21	1264	31	24	5
2020-06-07	441	16	465	20	1236	30	22	4
2020-06-08	401	15	434	19	1206	29	20	4
2020-06-09	364	15	403	18	1172	28	18	4
2020-06-10	331	14	374	17	1134	28	17	4
2020-06-11	300	13	346	17	1093	28	15	4
2020-06-12	271	13	319	16	1051	28	14	4
2020-06-13	246	12	293	15	1007	28	12	3
2020-06-14	222	12	269	15	962	27	11	3
2020-06-15	201	11	246	14	915	26	10	3
2020-06-16	181	10	224	14	868	26	9	3
2020-06-17	164	10	204	13	821	25	8	3
2020-06-18	148	9	186	13	774	24	7	3
2020-06-19	134	9	169	12	726	24	7	2
2020-06-20	121	8	154	11	680	23	6	3
2020-06-21	109	8	140	11	636	23	5	2
2020-06-22	99	7	127	10	592	21	5	2
2020-06-23	89	7	115	10	550	20	4	2
2020-06-24	81	7	104	9	509	19	4	2
2020-06-25	73	6	95	9	471	19	4	2
2020-06-26	66	6	85	8	434	18	3	2
2020-06-27	60	5	77	8	399	18	3	2
2020-06-28	54	5	70	8	366	17	3	2
2020-06-29	49	5	63	7	335	17	2	2
2020-06-30	45	5	57	7	306	16	2	1
2020-07-01	41	5	52	6	280	15	2	1
2020-07-02	37	5	46	6	256	14	2	1
2020-07-03	34	5	42	5	233	14	2	1
2020-07-04	31	4	38	5	212	13	2	1
2020-07-05	28	4	35	5	192	12	1	1
2020-07-06	26	4	32	5	175	11	1	1
2020-07-07	24	4	29	5	159	11	1	1
2020-07-08	23	4	26	5	144	10	1	1
2020-07-09	21	3	24	4	130	10	1	1
2020-07-10	20	3	22	4	118	9	1	1
2020-07-11	18	3	20	4	107	9	1	1
2020-07-12	16	3	18	4	97	9	1	1

Table 4: Model output from 500 model runs for the 40% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-07-13	15	3	17	4	88	8	1	1
2020-07-14	14	3	15	4	80	8	1	1
2020-07-15	13	3	14	3	72	7	1	1
2020-07-16	12	3	13	3	65	7	1	1
2020-07-17	12	3	12	3	59	7	1	1
2020-07-18	11	3	11	3	54	6	1	1
2020-07-19	10	3	10	3	49	6	1	1
2020-07-20	10	2	10	3	44	6	0	1
2020-07-21	9	2	9	3	40	6	1	1
2020-07-22	9	2	8	3	37	5	0	1
2020-07-23	9	2	8	3	33	5	0	1
2020-07-24	9	2	8	2	30	5	0	1
2020-07-25	8	2	7	3	28	5	0	1
2020-07-26	8	2	7	2	26	5	0	1
2020-07-27	8	2	7	2	23	4	0	1
2020-07-28	8	2	6	2	22	4	0	1
2020-07-29	8	2	6	2	20	4	0	1
2020-07-30	7	2	6	2	19	4	0	1
2020-07-31	7	2	5	2	17	4	0	1
2020-08-01	6	2	4	2	15	4	0	0

Table 5: Model output from 500 model runs for the 50% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions.

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-06	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0
2020-03-08	0	0	0	0	0	0	0	0
2020-03-09	1	0	0	0	0	0	0	0
2020-03-10	1	1	1	1	0	0	0	0
2020-03-11	2	1	1	1	0	0	0	0
2020-03-12	3	1	1	1	0	0	0	0
2020-03-13	3	1	1	1	0	0	0	0
2020-03-14	4	1	2	1	0	0	0	0
2020-03-15	4	1	2	1	0	0	0	0
2020-03-16	5	1	2	1	0	1	0	0
2020-03-17	5	1	2	1	1	1	0	1
2020-03-18	6	2	2	1	1	1	0	1

Table 5: Model output from 500 model runs for the 50% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-19	7	2	3	1	1	1	0	1
2020-03-20	8	2	3	2	1	1	0	1
2020-03-21	9	2	3	2	1	1	0	1
2020-03-22	10	2	4	2	2	1	0	1
2020-03-23	10	2	4	2	2	1	1	1
2020-03-24	12	2	5	2	2	1	1	1
2020-03-25	13	2	6	2	3	2	1	1
2020-03-26	15	2	7	2	3	2	1	1
2020-03-27	16	3	7	2	3	2	1	1
2020-03-28	18	3	8	3	4	2	1	1
2020-03-29	21	3	9	3	4	2	1	1
2020-03-30	24	3	10	3	5	2	1	1
2020-03-31	26	3	12	3	6	2	1	1
2020-04-01	30	3	13	3	7	2	1	1
2020-04-02	34	4	15	3	7	2	2	1
2020-04-03	38	4	17	4	8	3	2	1
2020-04-04	43	4	19	4	9	3	2	1
2020-04-05	49	5	22	4	11	3	2	2
2020-04-06	56	5	25	5	12	3	3	2
2020-04-07	63	5	29	5	14	3	3	2
2020-04-08	71	6	32	5	15	4	3	2
2020-04-09	81	6	37	5	17	4	4	2
2020-04-10	92	6	41	6	20	4	5	2
2020-04-11	104	7	47	6	22	4	5	2
2020-04-12	117	7	53	7	26	5	6	2
2020-04-13	132	7	59	7	29	5	7	3
2020-04-14	149	8	67	7	33	5	7	3
2020-04-15	168	9	75	8	37	6	9	3
2020-04-16	189	9	85	8	42	6	10	3
2020-04-17	212	10	95	8	47	6	11	3
2020-04-18	238	10	106	9	54	7	12	4
2020-04-19	266	11	119	9	60	7	13	4
2020-04-20	298	11	133	10	68	8	15	4
2020-04-21	333	12	148	10	76	8	17	4
2020-04-22	371	13	166	11	86	8	19	4
2020-04-23	412	13	185	12	96	9	21	5
2020-04-24	457	13	206	13	108	9	24	4
2020-04-25	505	14	227	13	121	10	25	5
2020-04-26	558	15	251	14	136	10	28	5
2020-04-27	613	16	277	15	152	11	31	5
2020-04-28	672	17	306	15	169	11	35	6
2020-04-29	733	18	334	15	190	12	38	6
2020-04-30	798	18	365	16	212	13	41	6

Table 5: Model output from 500 model runs for the 50% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-01	864	20	396	17	235	14	44	6
2020-05-02	933	20	429	17	261	15	48	7
2020-05-03	1001	21	462	18	289	16	51	7
2020-05-04	1070	21	496	18	319	16	55	7
2020-05-05	1139	22	531	19	351	17	59	8
2020-05-06	1204	23	564	20	386	17	62	8
2020-05-07	1268	24	599	20	422	18	65	8
2020-05-08	1327	24	633	21	460	18	69	8
2020-05-09	1382	24	665	22	500	19	71	9
2020-05-10	1430	25	695	24	542	20	74	9
2020-05-11	1474	26	725	25	585	21	76	9
2020-05-12	1509	27	752	26	630	21	78	9
2020-05-13	1537	28	778	25	675	22	79	9
2020-05-14	1557	28	800	26	721	23	80	9
2020-05-15	1568	28	819	26	768	23	81	9
2020-05-16	1570	29	837	26	814	24	81	9
2020-05-17	1565	28	851	26	860	25	81	9
2020-05-18	1551	28	862	26	906	27	81	8
2020-05-19	1528	28	871	26	950	28	79	9
2020-05-20	1498	28	876	26	993	29	77	8
2020-05-21	1463	28	878	25	1034	29	76	8
2020-05-22	1421	28	876	27	1073	30	73	9
2020-05-23	1375	26	872	26	1110	30	70	8
2020-05-24	1322	26	865	27	1144	31	68	8
2020-05-25	1267	25	855	27	1176	31	65	8
2020-05-26	1208	25	840	27	1206	30	62	8
2020-05-27	1147	25	824	26	1231	29	59	7
2020-05-28	1085	24	804	26	1254	30	55	8
2020-05-29	1023	24	781	26	1273	31	52	7
2020-05-30	961	23	757	25	1287	30	49	7
2020-05-31	901	22	731	24	1297	31	46	7
2020-06-01	841	22	704	24	1302	32	43	6
2020-06-02	783	21	675	23	1304	33	40	6
2020-06-03	726	20	645	23	1303	33	37	6
2020-06-04	671	19	613	23	1295	33	34	6
2020-06-05	621	19	582	22	1284	34	31	6
2020-06-06	572	19	550	22	1269	34	29	5
2020-06-07	525	18	518	21	1250	34	26	5
2020-06-08	481	17	487	20	1227	34	24	5
2020-06-09	441	16	457	20	1200	32	22	5
2020-06-10	402	15	426	19	1170	32	21	4
2020-06-11	367	15	397	18	1137	32	18	4
2020-06-12	334	14	369	18	1100	31	17	4

Table 5: Model output from 500 model runs for the 50% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-06-13	304	14	343	17	1062	30	15	4
2020-06-14	276	13	316	16	1020	29	14	4
2020-06-15	251	12	292	16	978	28	12	4
2020-06-16	228	11	268	16	935	27	11	3
2020-06-17	207	11	246	14	891	26	11	3
2020-06-18	187	10	226	14	847	25	10	3
2020-06-19	170	10	206	13	801	24	8	3
2020-06-20	154	10	188	12	756	23	8	3
2020-06-21	140	9	172	12	711	22	7	3
2020-06-22	127	9	157	11	668	22	6	2
2020-06-23	116	8	143	11	625	22	6	2
2020-06-24	105	8	130	11	583	21	5	2
2020-06-25	95	7	118	10	542	20	5	2
2020-06-26	86	7	107	10	503	19	4	2
2020-06-27	79	6	97	9	466	19	4	2
2020-06-28	71	6	88	9	431	18	4	2
2020-06-29	65	6	80	8	398	18	3	2
2020-06-30	59	6	73	8	366	17	3	2
2020-07-01	54	6	66	7	336	16	3	2
2020-07-02	49	5	60	7	308	15	2	2
2020-07-03	45	5	55	7	282	15	2	2
2020-07-04	41	5	50	7	258	14	2	2
2020-07-05	38	5	45	6	236	13	2	1
2020-07-06	35	4	41	6	216	13	2	1
2020-07-07	32	4	37	6	196	12	2	1
2020-07-08	29	4	34	5	179	12	1	1
2020-07-09	27	4	31	5	163	11	1	1
2020-07-10	25	4	29	5	148	11	1	1
2020-07-11	23	4	26	5	135	10	1	1
2020-07-12	22	3	24	4	123	10	1	1
2020-07-13	20	3	22	4	112	9	1	1
2020-07-14	18	3	20	4	101	9	1	1
2020-07-15	17	3	18	4	92	9	1	1
2020-07-16	16	3	17	4	84	8	1	1
2020-07-17	14	3	15	4	76	8	1	1
2020-07-18	13	3	14	3	69	8	1	1
2020-07-19	12	3	13	3	63	7	1	1
2020-07-20	12	2	12	3	57	7	1	1
2020-07-21	11	2	11	3	52	7	1	1
2020-07-22	10	2	11	3	48	6	0	1
2020-07-23	10	2	10	3	43	6	1	1
2020-07-24	9	2	9	3	39	6	0	1
2020-07-25	9	2	9	3	36	5	0	1

Table 5: Model output from 500 model runs for the 50% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-07-26	9	2	8	3	33	5	0	1
2020-07-27	9	2	8	2	30	5	0	1
2020-07-28	8	2	7	2	28	5	0	1
2020-07-29	8	2	7	2	26	5	0	1
2020-07-30	8	2	7	2	24	4	0	1
2020-07-31	8	2	6	2	22	4	0	1
2020-08-01	8	2	6	2	20	4	0	0

Table 6: Model output from 500 model runs for the 60% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions.

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-06	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0
2020-03-08	0	0	0	0	0	0	0	0
2020-03-09	1	0	0	0	0	0	0	0
2020-03-10	1	1	1	1	0	0	0	0
2020-03-11	2	1	1	1	0	0	0	0
2020-03-12	3	1	1	1	0	0	0	0
2020-03-13	3	1	1	1	0	0	0	0
2020-03-14	4	1	2	1	0	0	0	0
2020-03-15	4	1	2	1	0	1	0	0
2020-03-16	5	1	2	1	0	1	0	1
2020-03-17	5	1	2	1	1	1	0	1
2020-03-18	6	2	2	1	1	1	0	1
2020-03-19	6	2	2	1	1	1	0	1
2020-03-20	7	2	3	1	1	1	0	1
2020-03-21	8	2	3	2	1	1	0	1
2020-03-22	9	2	4	2	2	1	0	1
2020-03-23	10	2	4	2	2	1	0	1
2020-03-24	11	2	5	2	2	1	0	1
2020-03-25	12	2	5	2	2	1	1	1
2020-03-26	14	2	6	2	3	2	1	1
2020-03-27	15	2	7	2	3	2	1	1
2020-03-28	17	3	8	2	4	2	1	1
2020-03-29	18	3	9	2	4	2	1	1
2020-03-30	20	3	9	3	5	2	1	1
2020-03-31	22	3	10	3	5	2	1	1

Table 6: Model output from 500 model runs for the 60% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-04-01	24	3	11	3	6	2	1	1
2020-04-02	27	3	13	3	7	2	1	1
2020-04-03	30	3	14	3	7	2	2	1
2020-04-04	34	4	16	3	8	3	2	1
2020-04-05	37	4	18	4	9	3	2	1
2020-04-06	41	4	19	4	11	3	2	1
2020-04-07	45	4	21	4	12	3	2	2
2020-04-08	50	5	23	4	13	3	3	2
2020-04-09	56	5	26	4	15	3	3	2
2020-04-10	63	5	29	4	16	4	3	2
2020-04-11	70	5	32	5	18	4	4	2
2020-04-12	77	6	35	5	20	4	4	2
2020-04-13	86	6	39	5	22	4	4	2
2020-04-14	96	6	43	6	25	4	5	2
2020-04-15	107	7	48	6	27	5	5	2
2020-04-16	118	7	54	7	30	5	6	2
2020-04-17	131	7	60	7	34	5	7	2
2020-04-18	145	8	66	7	37	6	7	3
2020-04-19	161	8	73	7	41	6	8	3
2020-04-20	178	8	81	8	46	6	9	3
2020-04-21	197	9	90	8	51	6	10	3
2020-04-22	217	9	100	9	57	6	11	3
2020-04-23	240	10	110	9	63	7	12	3
2020-04-24	265	10	121	10	70	7	13	4
2020-04-25	292	11	134	10	77	8	15	4
2020-04-26	320	12	147	11	86	8	16	4
2020-04-27	351	13	161	12	95	9	18	4
2020-04-28	385	14	177	12	105	9	20	4
2020-04-29	421	14	193	12	117	10	21	5
2020-04-30	459	15	211	13	129	11	23	5
2020-05-01	500	16	230	13	142	11	26	5
2020-05-02	542	15	250	13	156	12	28	5
2020-05-03	587	16	273	14	172	12	30	5
2020-05-04	634	17	296	15	189	12	32	6
2020-05-05	683	18	319	16	208	13	35	6
2020-05-06	733	18	344	16	227	14	38	6
2020-05-07	786	19	370	17	249	14	40	6
2020-05-08	838	19	397	17	272	15	43	6
2020-05-09	891	20	424	17	296	16	46	7
2020-05-10	944	21	451	18	323	16	49	7
2020-05-11	996	22	478	18	351	16	51	7
2020-05-12	1047	22	506	19	380	17	54	7
2020-05-13	1097	23	534	20	411	18	56	7

Table 6: Model output from 500 model runs for the 60% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-14	1145	23	562	21	443	18	59	8
2020-05-15	1189	24	588	22	477	19	62	8
2020-05-16	1229	25	615	23	512	19	63	8
2020-05-17	1266	25	640	23	549	20	66	8
2020-05-18	1297	26	664	23	585	20	67	8
2020-05-19	1324	26	686	23	623	21	68	8
2020-05-20	1346	27	706	24	661	22	70	8
2020-05-21	1362	26	725	24	700	23	70	8
2020-05-22	1372	25	741	24	738	23	71	8
2020-05-23	1377	26	756	23	778	24	71	8
2020-05-24	1375	25	767	23	816	24	72	8
2020-05-25	1367	24	776	24	854	25	71	8
2020-05-26	1354	24	782	24	891	26	69	8
2020-05-27	1335	25	787	24	928	26	68	8
2020-05-28	1312	26	788	25	962	26	68	8
2020-05-29	1283	26	788	26	993	28	65	7
2020-05-30	1250	25	785	26	1024	27	64	8
2020-05-31	1214	25	780	26	1051	28	62	8
2020-06-01	1174	25	773	25	1078	28	60	8
2020-06-02	1131	24	763	25	1101	29	58	7
2020-06-03	1086	24	750	24	1122	29	55	7
2020-06-04	1040	24	737	24	1140	29	53	7
2020-06-05	993	24	720	24	1155	30	51	7
2020-06-06	944	23	702	24	1167	30	48	7
2020-06-07	896	23	682	24	1176	31	46	7
2020-06-08	847	22	660	23	1181	30	43	7
2020-06-09	798	22	637	23	1183	30	40	6
2020-06-10	751	22	613	23	1182	30	38	6
2020-06-11	704	20	589	22	1177	30	36	6
2020-06-12	659	20	565	22	1169	30	33	6
2020-06-13	615	18	539	22	1158	30	31	5
2020-06-14	573	18	514	22	1143	29	29	5
2020-06-15	533	18	488	21	1126	29	27	5
2020-06-16	496	16	462	20	1106	29	25	5
2020-06-17	460	15	437	20	1082	29	23	5
2020-06-18	426	15	412	19	1057	29	22	4
2020-06-19	394	14	389	19	1030	28	20	4
2020-06-20	364	14	364	18	1000	28	18	4
2020-06-21	336	13	340	18	967	28	17	4
2020-06-22	311	12	318	17	934	27	15	4
2020-06-23	287	12	296	16	899	26	14	4
2020-06-24	265	12	275	15	863	26	13	4
2020-06-25	244	11	256	15	827	25	12	3

Table 6: Model output from 500 model runs for the 60% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-06-26	225	11	237	14	789	24	11	3
2020-06-27	207	11	220	14	752	24	10	3
2020-06-28	191	10	204	13	715	23	10	3
2020-06-29	176	10	189	13	678	23	9	3
2020-06-30	163	9	174	12	641	23	8	3
2020-07-01	150	9	161	11	604	22	8	3
2020-07-02	138	9	149	11	568	22	7	3
2020-07-03	127	8	138	11	534	21	6	2
2020-07-04	117	8	127	11	501	21	6	2
2020-07-05	108	8	117	10	469	20	5	2
2020-07-06	100	8	108	10	437	19	5	2
2020-07-07	92	7	100	9	408	18	5	2
2020-07-08	85	7	93	9	380	18	4	2
2020-07-09	78	7	85	8	354	17	4	2
2020-07-10	72	7	78	8	328	16	4	2
2020-07-11	67	6	73	8	305	16	3	2
2020-07-12	61	6	67	7	282	15	3	2
2020-07-13	57	6	62	7	262	14	3	2
2020-07-14	53	5	57	7	242	14	3	2
2020-07-15	48	5	53	6	224	14	3	1
2020-07-16	45	5	48	6	207	13	2	1
2020-07-17	41	5	45	6	191	12	2	1
2020-07-18	38	5	41	6	177	12	2	1
2020-07-19	36	5	38	6	163	11	2	1
2020-07-20	34	4	35	5	151	11	2	1
2020-07-21	31	4	33	5	139	10	2	1
2020-07-22	29	4	30	5	129	9	1	1
2020-07-23	27	4	28	5	119	9	1	1
2020-07-24	25	4	26	5	110	9	1	1
2020-07-25	24	4	24	5	101	9	1	1
2020-07-26	22	4	22	5	93	9	1	1
2020-07-27	21	4	21	4	86	9	1	1
2020-07-28	20	3	19	4	80	8	1	1
2020-07-29	19	3	18	4	73	8	1	1
2020-07-30	17	3	17	4	68	8	1	1
2020-07-31	16	3	15	4	63	7	1	1
2020-08-01	15	3	13	3	56	7	0	0

Table 7: Model output from 500 model runs for the 73% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions.

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-06	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0
2020-03-08	0	0	0	0	0	0	0	0
2020-03-09	1	0	0	0	0	0	0	0
2020-03-10	1	1	1	1	0	0	0	0
2020-03-11	2	1	1	1	0	0	0	0
2020-03-12	3	1	1	1	0	0	0	0
2020-03-13	3	1	1	1	0	0	0	0
2020-03-14	4	1	2	1	0	0	0	0
2020-03-15	4	1	2	1	0	0	0	0
2020-03-16	5	1	2	1	0	1	0	0
2020-03-17	5	1	2	1	1	1	0	1
2020-03-18	6	2	2	1	1	1	0	1
2020-03-19	6	2	3	1	1	1	0	1
2020-03-20	7	2	3	1	1	1	0	1
2020-03-21	8	2	3	2	1	1	0	1
2020-03-22	9	2	4	2	2	1	0	1
2020-03-23	10	2	4	2	2	1	0	1
2020-03-24	11	2	5	2	2	1	1	1
2020-03-25	11	2	5	2	3	1	1	1
2020-03-26	12	2	5	2	3	2	1	1
2020-03-27	13	2	6	2	3	2	1	1
2020-03-28	14	2	7	2	4	2	1	1
2020-03-29	16	3	7	2	4	2	1	1
2020-03-30	17	3	8	2	5	2	1	1
2020-03-31	18	3	9	3	5	2	1	1
2020-04-01	20	3	9	3	6	2	1	1
2020-04-02	21	3	10	3	6	2	1	1
2020-04-03	24	3	11	3	7	2	1	1
2020-04-04	26	3	12	3	8	2	1	1
2020-04-05	27	3	13	3	8	3	1	1
2020-04-06	30	4	14	3	9	3	2	1
2020-04-07	32	4	15	3	10	3	2	1
2020-04-08	35	4	17	4	11	3	2	1
2020-04-09	38	4	18	4	12	3	2	1
2020-04-10	41	4	20	4	13	3	2	1
2020-04-11	45	4	21	4	15	3	2	2
2020-04-12	49	5	23	4	16	3	2	2
2020-04-13	52	5	25	4	17	4	3	2
2020-04-14	56	5	27	5	19	4	3	2
2020-04-15	61	5	29	5	20	4	3	2
2020-04-16	66	5	32	5	22	4	4	2
2020-04-17	71	5	34	5	24	4	4	2

Table 7: Model output from 500 model runs for the 73% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-04-18	77	5	37	5	26	4	4	2
2020-04-19	84	6	40	5	28	5	4	2
2020-04-20	91	6	43	6	31	5	5	2
2020-04-21	99	6	47	6	33	5	5	2
2020-04-22	107	7	51	6	36	5	5	2
2020-04-23	116	7	55	6	39	5	6	2
2020-04-24	125	7	60	7	42	6	6	2
2020-04-25	135	8	65	7	45	6	7	3
2020-04-26	145	8	70	7	49	6	7	3
2020-04-27	157	9	75	8	53	6	8	3
2020-04-28	169	9	81	8	57	7	9	3
2020-04-29	182	9	87	9	62	7	9	3
2020-04-30	197	10	94	9	67	7	10	3
2020-05-01	212	10	102	9	73	8	11	3
2020-05-02	228	11	109	9	79	8	12	3
2020-05-03	245	11	117	10	85	8	13	3
2020-05-04	263	11	126	10	92	9	13	4
2020-05-05	282	12	136	10	99	9	14	4
2020-05-06	302	12	146	10	107	10	15	4
2020-05-07	323	13	157	11	115	10	16	4
2020-05-08	346	13	167	11	124	11	18	4
2020-05-09	370	13	179	12	134	11	19	4
2020-05-10	394	14	192	12	144	11	20	5
2020-05-11	420	14	205	13	155	12	21	5
2020-05-12	447	15	218	13	166	12	23	5
2020-05-13	474	15	233	14	179	12	24	5
2020-05-14	503	16	247	14	192	12	26	5
2020-05-15	532	16	261	14	206	13	27	5
2020-05-16	563	16	278	15	221	13	28	5
2020-05-17	593	16	295	15	237	14	31	5
2020-05-18	624	17	311	15	254	14	32	6
2020-05-19	655	17	328	16	271	14	34	6
2020-05-20	687	17	345	16	289	15	35	6
2020-05-21	718	17	362	17	308	16	37	6
2020-05-22	750	18	380	17	328	16	39	6
2020-05-23	780	19	398	18	349	16	41	6
2020-05-24	810	19	415	18	370	17	42	7
2020-05-25	839	19	434	19	393	18	43	6
2020-05-26	868	20	451	19	415	18	45	6
2020-05-27	894	20	468	20	439	19	46	6
2020-05-28	920	20	485	20	463	19	47	7
2020-05-29	944	21	501	21	488	19	49	7
2020-05-30	965	22	516	21	512	20	49	7

Table 7: Model output from 500 model runs for the 73% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-31	985	22	531	20	537	20	51	7
2020-06-01	1002	22	545	20	563	21	51	7
2020-06-02	1018	21	557	20	589	22	52	7
2020-06-03	1030	21	568	20	615	23	53	7
2020-06-04	1041	22	579	21	641	23	54	8
2020-06-05	1046	22	589	22	666	24	54	7
2020-06-06	1050	23	598	21	691	24	54	7
2020-06-07	1050	23	605	21	715	24	54	7
2020-06-08	1048	22	610	21	739	25	54	7
2020-06-09	1043	22	616	21	762	25	53	7
2020-06-10	1036	22	619	22	784	25	53	8
2020-06-11	1025	22	622	22	805	25	53	7
2020-06-12	1012	23	623	23	826	26	52	7
2020-06-13	996	22	622	23	844	25	51	7
2020-06-14	977	23	620	23	862	26	50	7
2020-06-15	957	22	616	23	877	26	49	7
2020-06-16	935	22	612	22	892	26	48	7
2020-06-17	912	21	606	22	906	26	47	7
2020-06-18	886	21	598	22	917	26	45	7
2020-06-19	859	21	589	21	927	26	44	6
2020-06-20	832	20	578	21	934	26	43	6
2020-06-21	803	21	568	21	940	26	41	7
2020-06-22	775	20	555	21	944	27	39	6
2020-06-23	746	19	542	21	947	26	38	6
2020-06-24	717	19	528	20	947	27	37	6
2020-06-25	688	19	513	20	945	26	35	6
2020-06-26	659	19	499	20	942	26	34	6
2020-06-27	630	19	483	20	936	26	32	6
2020-06-28	600	18	466	20	929	26	30	5
2020-06-29	572	18	450	19	919	26	29	5
2020-06-30	545	18	434	19	907	25	28	5
2020-07-01	518	17	418	18	894	25	27	5
2020-07-02	491	16	402	18	879	25	25	5
2020-07-03	465	16	385	18	862	25	23	5
2020-07-04	441	15	369	18	845	25	22	5
2020-07-05	417	15	352	17	827	25	21	5
2020-07-06	394	15	336	16	807	24	20	4
2020-07-07	372	14	320	15	785	25	19	4
2020-07-08	352	14	305	15	763	25	18	4
2020-07-09	332	14	290	14	740	25	17	4
2020-07-10	313	14	276	14	716	25	16	4
2020-07-11	295	13	262	14	693	24	15	4
2020-07-12	278	13	248	14	668	23	14	4

Table 7: Model output from 500 model runs for the 73% reduction scenario. SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total COVID19 admissions. (*continued*)

Date	ICU		HDU		Ward		Deaths	
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-07-13	261	13	235	13	644	23	14	4
2020-07-14	246	12	223	12	620	23	12	4
2020-07-15	231	12	210	12	596	22	12	4
2020-07-16	218	12	198	13	571	21	11	3
2020-07-17	204	11	187	13	547	21	10	3
2020-07-18	192	11	176	13	522	20	10	3
2020-07-19	181	10	167	11	499	20	9	3
2020-07-20	170	10	158	11	476	19	9	3
2020-07-21	160	9	149	11	454	18	8	3
2020-07-22	151	9	140	11	432	18	8	3
2020-07-23	141	9	132	10	410	18	7	3
2020-07-24	133	9	124	10	390	17	7	3
2020-07-25	125	8	117	10	369	17	6	2
2020-07-26	118	8	110	9	350	17	6	2
2020-07-27	111	8	103	9	331	17	6	2
2020-07-28	105	8	98	9	313	16	5	2
2020-07-29	99	8	91	8	296	16	5	2
2020-07-30	93	8	86	8	280	15	5	2
2020-07-31	88	7	81	8	264	15	4	2
2020-08-01	83	7	71	8	238	14	0	0