UCLH bed needs modelling

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Contents

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

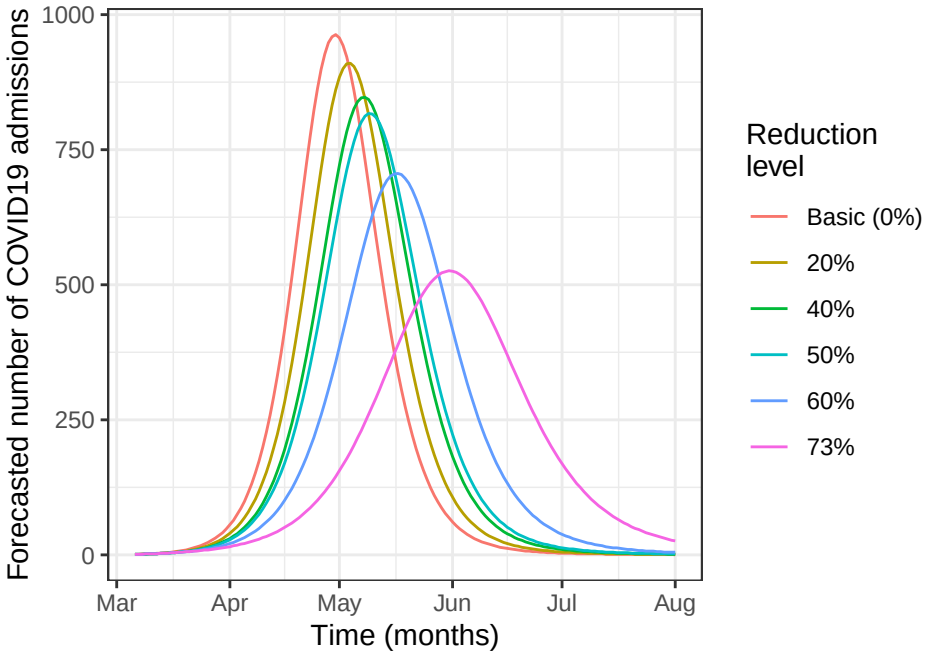

Figure 1: Forecasted daily COVID19 hospital admissions. Scenarios are: basic, 20% reduction in contact rate, and 60% reduction in contact rates.

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 occured at that time. If the patient does not dies, 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

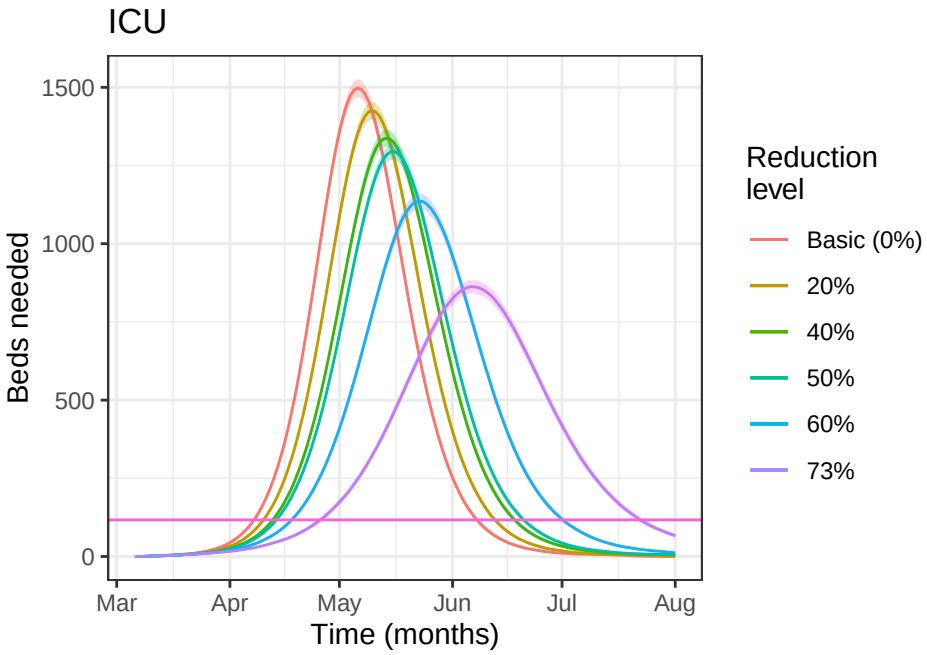

Figure 2: Output ICU bed demand from 500 model runs for the 20%, 40%, 50%, 60% and 73% reduction in contact rates. The horizontal lines represent the current maximum bed capacity. Lines are average daily requirements, shaded area represents average +/- standard deviation.

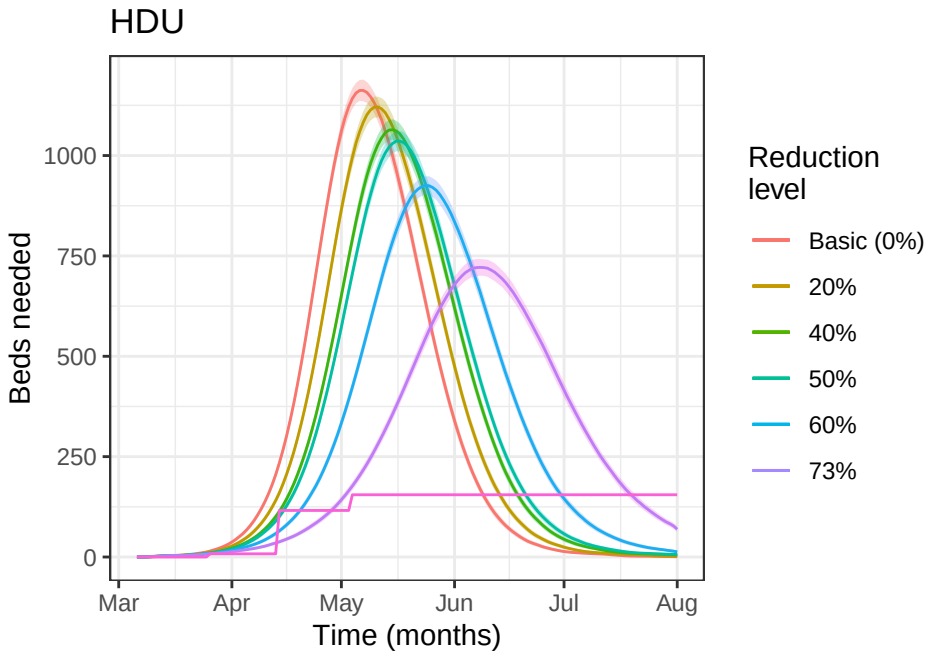

Figure 3: Output HDU bed demand from 500 model runs for the 20%, 40%, 50%, 60% and 73% reduction in contact rates. The horizontal lines represent the current maximum bed capacity. Lines are average requirements, shaded area represents average +/- standard deviation.

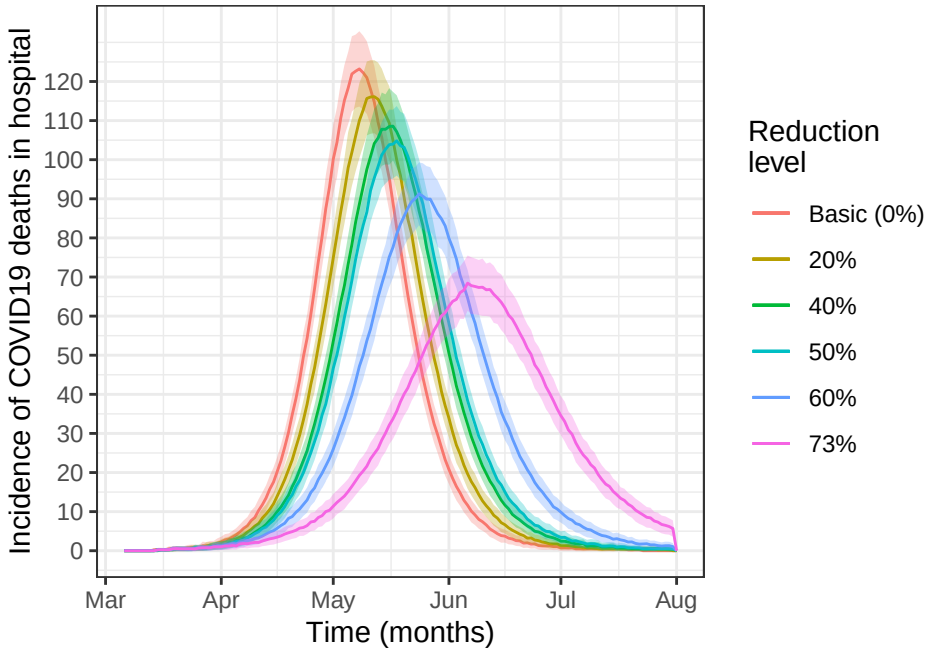

Figure 4: Estimated incidence of mortality in COVID19 hospitalised patients from 500 model runs. Scenarios are: 0% reduction in contact rate (base), 20%, 40%, 50%, 60% and 73% reduction in contact rates. Lines are average daily incidence, shaded area represents average +/- standard deviation.

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.

	ICU peak bed needs			HDU peak bed needs			Ward peak bed needs			Cumulative deaths	
Scenario	Peak time	Mean beds	SD	Peak time	Mean beds	SD	Peak time	Mean beds	SD	Mean deaths	SD
Base (0%)	2020-05-06	1498	29	2020-05-07	1162	27	2020-05-22	1166	31	3696	449
20% reduction	2020-05-10	1426	29	2020-05-11	1121	26	2020-05-25	1131	31	3693	465
40% reduction	2020-05-14	1338	27	2020-05-15	1064	26	2020-05-29	1087	30	3680	477
50% reduction	2020-05-16	1295	26	2020-05-16	1036	25	2020-05-31	1064	29	3668	475
60% reduction	2020-05-23	1136	25	2020-05-24	925	23	2020-06-07	967	29	3622	500
73% reduction	2020-06-06	863	21	2020-06-08	721	21	2020-06-22	778	24	3426	516

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

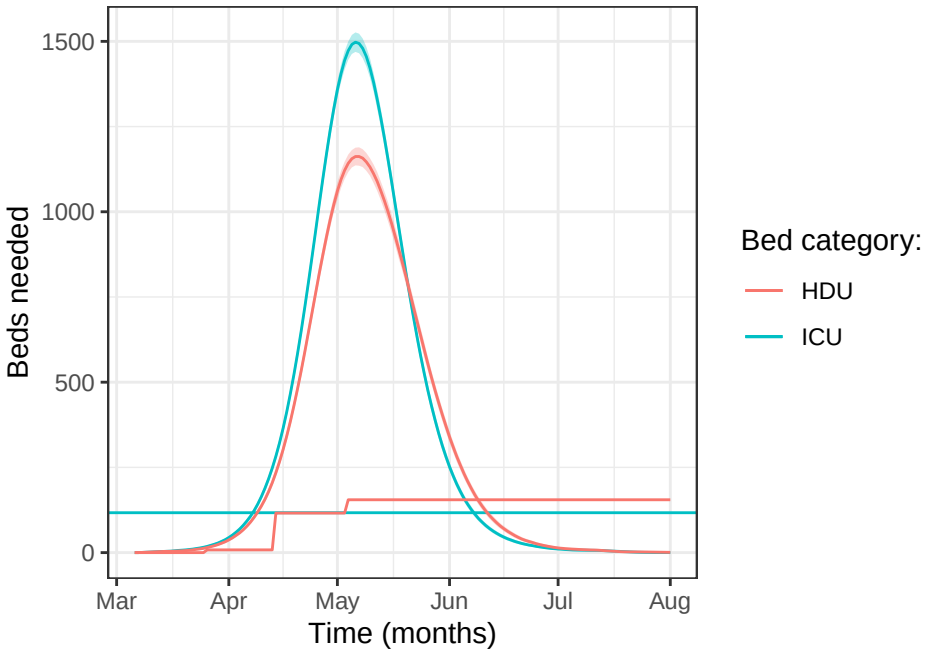

Figure 5: Output from 500 model runs for the base scenario. The horizontal lines represent the current maximum bed capacity for the different units.Lines are average daily incidence, shaded area represents average +/- standard deviation.

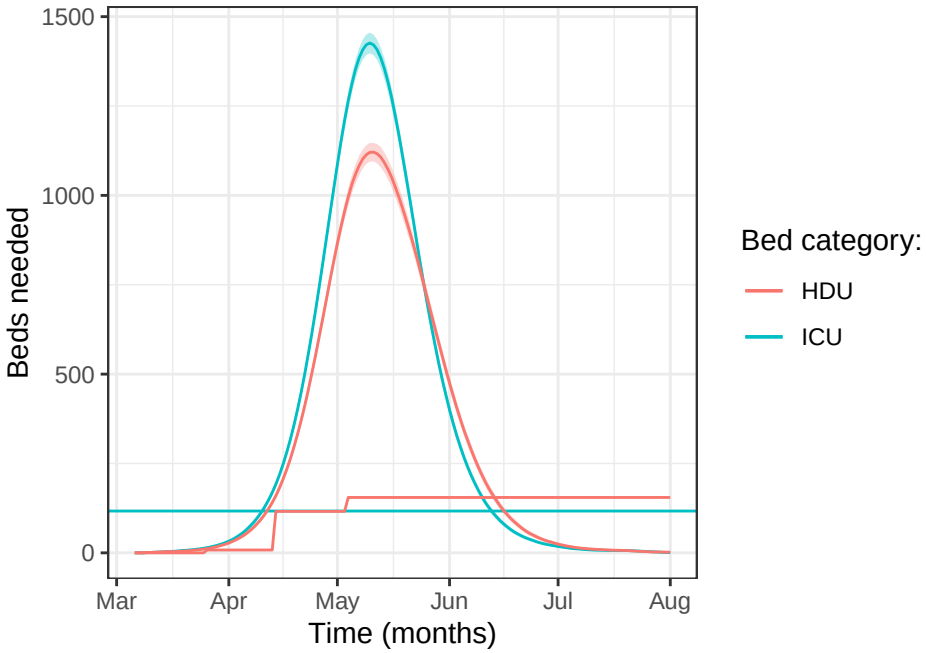

Figure 6: Output from 500 model runs for the 20% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

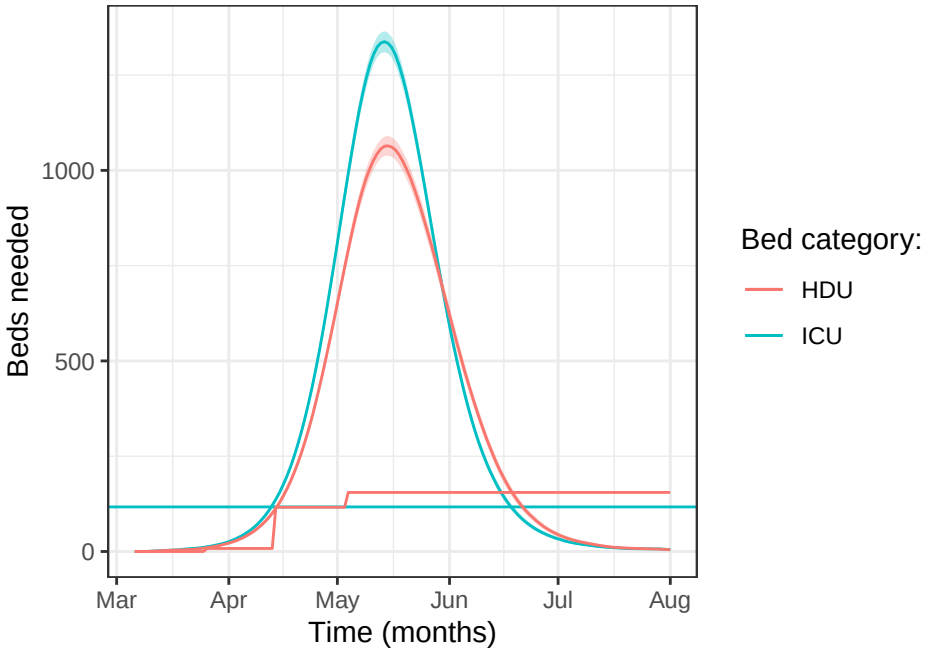

Figure 7: Output from 500 model runs for the 40% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

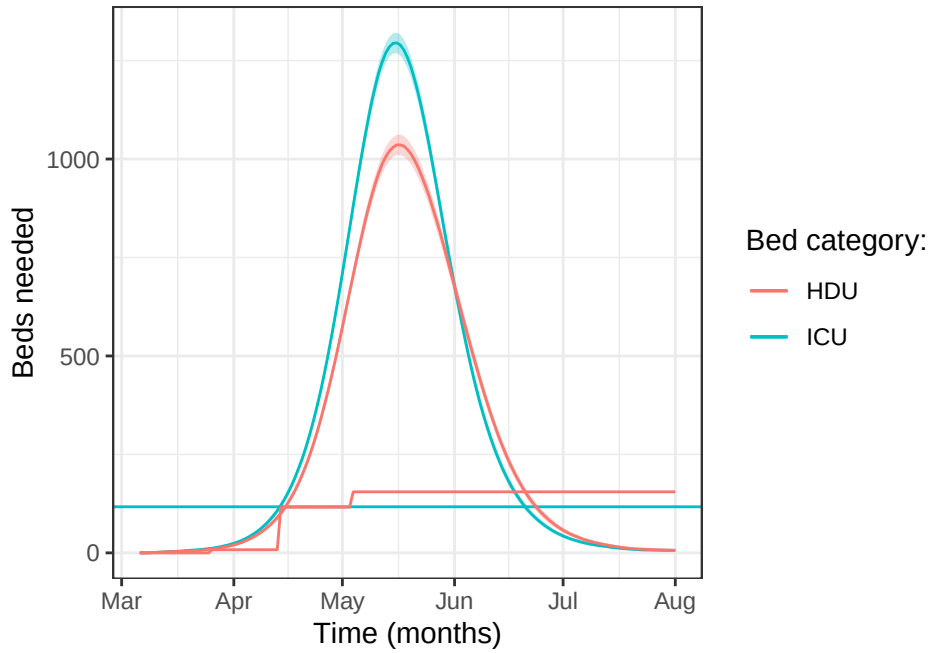

Figure 8: Output from 500 model runs for the 50% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

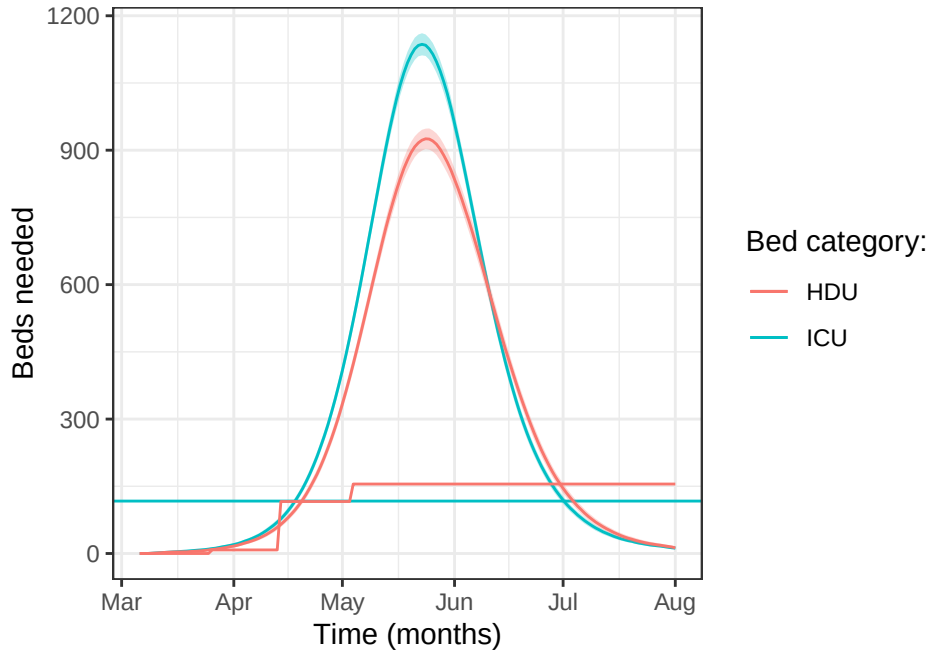

Figure 9: Output from 500 model runs for the 60% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

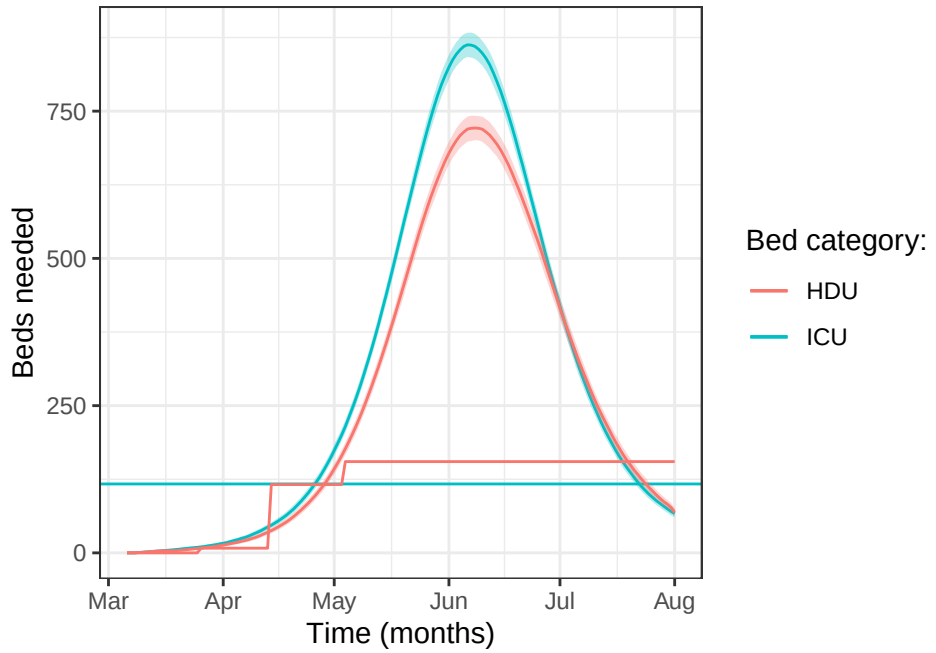

Figure 10: Output from 500 model runs for the 73% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

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.

	ICU		HDU		Ward		Deaths	
Date	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	1	0	1	0	0	0	0
2020-03-09	1	1	1	1	0	0	0	0
2020-03-10	1	1	2	1	0	0	0	0
2020-03-11	2	1	2	1	0	0	0	0
2020-03-12	2	1	3	1	0	0	0	0
2020-03-13	3	1	3	1	0	0	0	0
2020-03-14	3	1	3	1	0	0	0	0
2020-03-15	4	1	4	1	0	1	0	0
2020-03-16	4	1	4	1	1	1	0	0
2020-03-17	5	2	4	2	1	1	0	0
2020-03-18	6	2	5	2	1	1	0	1
2020-03-19	7	2	5	2	1	1	1	1
2020-03-20	8	2	6	2	2	1	0	1
2020-03-21	9	2	7	2	2	1	0	1
2020-03-22	10	2	8	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-23	12	2	9	2	2	1	1	1
2020-03-24	14	3	11	2	3	2	1	1
2020-03-25	16	3	12	3	3	2	1	1
2020-03-26	18	3	15	3	4	2	1	1
2020-03-27	21	3	17	3	4	2	1	1
2020-03-28	24	3	20	3	5	2	1	1
2020-03-29	28	4	24	4	5	2	1	1
2020-03-30	33	4	27	4	6	2	1	1
2020-03-31	38	4	32	4	7	3	2	1
2020-04-01	44	5	37	4	9	3	2	1
2020-04-02	51	5	43	5	10	3	3	1
2020-04-03	60	5	50	5	12	3	3	1
2020-04-04	69	6	58	6	14	4	3	2
2020-04-05	80	6	67	6	16	4	4	2
2020-04-06	93	7	78	6	19	4	5	2
2020-04-07	107	7	90	7	22	4	6	2
2020-04-08	123	8	104	7	26	4	6	2
2020-04-09	142	8	119	8	30	5	8	3
2020-04-10	164	9	137	8	35	5	9	3
2020-04-11	189	9	157	9	40	5	10	3
2020-04-12	217	10	179	10	46	6	12	3
2020-04-13	248	11	205	11	53	6	13	3
2020-04-14	283	12	234	12	62	7	16	3
2020-04-15	321	13	267	13	72	7	18	4
2020-04-16	364	14	302	14	82	8	20	4
2020-04-17	413	14	342	14	95	9	23	4
2020-04-18	466	15	385	15	109	9	26	4
2020-04-19	523	17	431	15	125	10	30	5
2020-04-20	584	18	481	16	142	11	35	5
2020-04-21	650	19	534	18	162	11	39	5
2020-04-22	720	20	589	18	184	13	44	6
2020-04-23	793	20	647	19	209	13	50	6
2020-04-24	868	21	704	19	236	14	54	6
2020-04-25	945	22	762	20	266	15	60	7
2020-04-26	1022	23	820	21	299	16	67	7
2020-04-27	1098	23	874	22	334	17	74	8
2020-04-28	1170	24	927	23	373	17	80	8
2020-04-29	1239	24	976	23	412	18	87	9
2020-04-30	1302	24	1021	23	455	19	93	9
2020-05-01	1358	25	1060	25	499	20	100	9
2020-05-02	1405	26	1094	25	545	20	104	9
2020-05-03	1444	27	1121	25	592	21	111	9
2020-05-04	1473	27	1142	26	640	22	115	9

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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-05	1491	28	1156	25	689	23	118	9
2020-05-06	1498	29	1162	26	736	24	122	10
2020-05-07	1494	29	1162	27	784	24	123	9
2020-05-08	1479	29	1157	26	829	26	123	10
2020-05-09	1456	29	1146	26	873	27	122	9
2020-05-10	1422	28	1131	26	915	28	121	9
2020-05-11	1380	27	1112	27	955	28	118	9
2020-05-12	1330	28	1089	28	990	28	115	9
2020-05-13	1276	27	1062	27	1023	28	110	9
2020-05-14	1216	26	1032	28	1054	28	106	9
2020-05-15	1153	26	1000	28	1080	29	100	8
2020-05-16	1088	25	965	27	1105	29	95	8
2020-05-17	1020	25	927	27	1126	29	89	8
2020-05-18	952	24	888	27	1141	29	83	8
2020-05-19	885	23	849	24	1153	29	77	7
2020-05-20	818	22	808	23	1161	30	71	7
2020-05-21	754	21	765	24	1166	31	65	7
2020-05-22	693	21	722	24	1166	31	60	7
2020-05-23	634	20	680	23	1164	31	54	6
2020-05-24	578	19	637	22	1156	31	49	6
2020-05-25	526	18	595	23	1145	31	44	6
2020-05-26	476	18	554	20	1129	31	40	5
2020-05-27	431	17	514	20	1111	31	36	5
2020-05-28	389	16	476	19	1088	30	32	5
2020-05-29	350	15	440	19	1062	30	30	5
2020-05-30	314	15	405	18	1032	29	26	4
2020-05-31	282	14	371	18	1001	29	23	4
2020-06-01	252	13	339	16	965	28	21	4
2020-06-02	225	12	310	16	928	27	18	4
2020-06-03	201	11	282	15	889	26	16	4
2020-06-04	179	11	256	14	848	26	15	3
2020-06-05	159	10	231	14	806	25	13	3
2020-06-06	142	10	209	12	763	25	12	3
2020-06-07	127	9	188	12	721	24	10	3
2020-06-08	113	8	169	12	678	24	9	3
2020-06-09	100	8	152	11	636	23	8	2
2020-06-10	89	7	136	11	593	22	7	2
2020-06-11	80	7	122	10	552	22	7	2
2020-06-12	71	7	109	10	511	21	6	2
2020-06-13	63	6	98	9	473	21	5	2
2020-06-14	57	6	88	9	435	19	4	2
2020-06-15	51	6	78	8	400	19	4	2
2020-06-16	45	5	70	7	366	17	4	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-06-17	41	5	63	7	334	16	3	2
2020-06-18	37	5	56	7	305	16	3	1
2020-06-19	33	5	50	7	277	14	3	1
2020-06-20	30	5	45	6	252	14	3	1
2020-06-21	27	4	40	6	228	14	2	1
2020-06-22	24	4	36	5	206	13	2	1
2020-06-23	22	4	32	5	186	13	2	1
2020-06-24	20	4	29	5	167	12	2	1
2020-06-25	18	4	26	5	150	11	1	1
2020-06-26	17	4	23	4	135	11	1	1
2020-06-27	15	3	21	4	120	10	1	1
2020-06-28	14	3	19	4	108	10	1	1
2020-06-29	12	3	17	4	96	9	1	1
2020-06-30	11	3	15	3	86	9	1	1
2020-07-01	11	2	14	3	77	8	1	1
2020-07-02	10	2	13	3	69	8	1	1
2020-07-03	9	2	12	3	61	8	1	1
2020-07-04	8	2	11	3	55	7	1	1
2020-07-05	8	2	10	3	49	7	1	1
2020-07-06	7	2	10	3	44	7	1	1
2020-07-07	7	2	9	3	40	6	0	1
2020-07-08	7	2	9	3	35	6	1	1
2020-07-09	7	2	8	2	32	5	1	1
2020-07-10	7	2	8	2	29	5	1	1
2020-07-11	7	2	8	2	26	5	1	1
2020-07-12	6	2	7	2	23	5	0	1
2020-07-13	6	2	6	2	21	4	0	1
2020-07-14	5	2	6	2	19	4	0	1
2020-07-15	5	2	5	2	18	4	0	1
2020-07-16	4	2	4	2	16	4	1	1
2020-07-17	4	2	4	2	15	4	1	1
2020-07-18	4	1	3	2	14	3	1	1
2020-07-19	3	1	2	2	13	3	0	0
2020-07-20	3	1	2	1	12	3	0	0
2020-07-21	2	1	2	1	11	3	0	0
2020-07-22	2	1	2	1	10	3	0	0
2020-07-23	1	1	2	1	9	3	0	0
2020-07-24	1	1	2	1	8	3	0	0
2020-07-25	1	1	2	1	7	2	0	0
2020-07-26	1	1	2	1	7	2	0	0
2020-07-27	0	1	2	1	6	2	0	0
2020-07-28	0	1	1	1	6	2	0	0
2020-07-29	0	0	1	1	5	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-07-30	0	0	1	1	5	2	0	0
2020-07-31	0	0	1	1	4	2	0	0
2020-08-01	0	0	1	1	4	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.

	ICU		HDU		Ward		Deaths	
Date	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	1	0	0	0	0	0
2020-03-10	1	1	1	1	0	0	0	0
2020-03-11	1	1	2	1	0	0	0	0
2020-03-12	2	1	2	1	0	0	0	0
2020-03-13	2	1	3	1	0	0	0	0
2020-03-14	3	1	3	1	0	0	0	0
2020-03-15	3	1	3	1	0	1	0	0
2020-03-16	4	1	4	1	0	1	0	0
2020-03-17	4	1	4	1	1	1	0	0
2020-03-18	5	2	4	1	1	1	0	0
2020-03-19	6	2	5	2	1	1	0	1
2020-03-20	7	2	5	2	1	1	1	1
2020-03-21	8	2	6	2	2	1	1	1
2020-03-22	9	2	7	2	2	1	0	1
2020-03-23	10	2	8	2	2	1	1	1
2020-03-24	11	2	9	2	2	1	1	1
2020-03-25	13	3	10	3	3	1	1	1
2020-03-26	14	3	12	3	3	2	1	1
2020-03-27	17	3	13	3	4	2	1	1
2020-03-28	19	3	16	3	4	2	1	1
2020-03-29	22	3	18	3	5	2	1	1
2020-03-30	25	4	21	3	5	2	1	1
2020-03-31	29	4	24	3	6	2	1	1
2020-04-01	33	4	27	4	7	2	2	1
2020-04-02	37	4	32	4	8	3	2	1
2020-04-03	43	4	37	5	10	3	2	1
2020-04-04	50	5	42	5	11	3	3	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-04-05	57	5	48	5	13	3	3	2
2020-04-06	66	6	55	6	15	3	3	2
2020-04-07	76	7	63	6	17	4	4	2
2020-04-08	87	7	73	7	19	4	5	2
2020-04-09	100	7	83	7	22	4	5	2
2020-04-10	114	8	95	7	26	4	6	2
2020-04-11	130	8	109	8	30	5	7	2
2020-04-12	148	9	124	8	34	5	8	2
2020-04-13	169	9	141	9	39	6	9	2
2020-04-14	192	10	160	9	45	6	11	3
2020-04-15	218	11	182	10	51	6	12	3
2020-04-16	248	11	206	11	58	7	14	3
2020-04-17	281	12	233	11	67	7	16	4
2020-04-18	317	13	263	12	76	8	18	4
2020-04-19	357	14	296	13	87	8	21	4
2020-04-20	401	14	332	13	99	9	23	4
2020-04-21	449	15	371	15	112	9	26	5
2020-04-22	501	16	412	16	127	10	30	5
2020-04-23	558	17	457	16	144	11	33	5
2020-04-24	617	18	505	17	162	11	37	5
2020-04-25	680	19	554	19	183	12	43	5
2020-04-26	745	20	606	19	206	12	47	6
2020-04-27	813	21	658	19	232	13	52	6
2020-04-28	882	22	711	19	259	14	58	7
2020-04-29	951	22	764	19	289	15	63	7
2020-04-30	1019	23	816	21	322	16	69	7
2020-05-01	1086	23	866	21	357	16	75	7
2020-05-02	1150	24	912	23	394	17	81	8
2020-05-03	1210	24	956	24	433	19	87	8
2020-05-04	1265	25	995	25	474	20	92	8
2020-05-05	1312	26	1031	26	517	20	98	9
2020-05-06	1352	27	1059	27	561	22	102	9
2020-05-07	1384	28	1083	27	606	23	106	9
2020-05-08	1407	28	1102	27	651	24	110	10
2020-05-09	1421	29	1114	26	696	25	113	9
2020-05-10	1426	29	1121	26	740	25	116	9
2020-05-11	1421	29	1121	26	784	25	116	9
2020-05-12	1407	28	1116	27	827	25	116	9
2020-05-13	1385	29	1107	29	869	27	115	9
2020-05-14	1354	29	1091	28	907	27	114	10
2020-05-15	1317	29	1073	29	944	27	111	9
2020-05-16	1273	28	1050	28	978	27	109	9
2020-05-17	1223	27	1024	28	1009	28	105	9

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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-18	1169	26	995	28	1036	28	100	8
2020-05-19	1111	27	965	28	1060	28	96	9
2020-05-20	1051	26	932	27	1080	29	90	8
2020-05-21	990	25	898	25	1099	29	85	8
2020-05-22	929	24	862	25	1113	30	81	8
2020-05-23	866	22	825	24	1123	31	75	8
2020-05-24	804	22	786	24	1129	31	69	7
2020-05-25	745	21	746	24	1131	31	64	7
2020-05-26	688	21	707	23	1130	31	59	7
2020-05-27	633	20	667	22	1126	32	54	7
2020-05-28	581	19	627	22	1118	31	49	6
2020-05-29	531	19	588	21	1107	31	45	6
2020-05-30	484	18	550	20	1093	30	41	5
2020-05-31	441	17	512	19	1075	29	37	5
2020-06-01	400	16	475	18	1053	29	34	5
2020-06-02	363	15	440	18	1029	29	30	5
2020-06-03	327	14	405	17	1001	29	27	5
2020-06-04	296	13	374	16	971	29	25	4
2020-06-05	267	13	343	15	937	28	22	4
2020-06-06	241	12	315	16	902	27	20	4
2020-06-07	216	11	288	15	865	27	18	4
2020-06-08	195	10	262	15	827	26	16	4
2020-06-09	174	9	239	14	788	25	14	3
2020-06-10	156	9	217	13	748	25	13	3
2020-06-11	139	9	196	13	708	24	12	3
2020-06-12	125	8	178	12	666	23	10	3
2020-06-13	112	8	161	12	626	22	9	3
2020-06-14	100	8	146	11	586	21	8	3
2020-06-15	90	7	131	10	546	21	7	2
2020-06-16	81	7	118	9	508	21	7	2
2020-06-17	72	6	106	9	471	20	6	2
2020-06-18	64	6	95	9	436	19	5	2
2020-06-19	58	6	86	8	402	19	5	2
2020-06-20	52	5	77	8	370	17	4	2
2020-06-21	47	5	69	7	339	17	4	2
2020-06-22	42	5	61	7	310	17	3	2
2020-06-23	38	5	55	7	283	16	3	1
2020-06-24	35	4	50	6	258	15	3	1
2020-06-25	31	4	45	6	235	14	3	1
2020-06-26	28	4	41	6	214	13	2	1
2020-06-27	26	4	36	5	193	13	2	1
2020-06-28	23	4	33	5	175	12	2	1
2020-06-29	21	3	30	5	158	12	2	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-06-30	20	3	27	5	142	11	2	1
2020-07-01	18	3	24	4	129	10	1	1
2020-07-02	16	3	22	4	116	10	1	1
2020-07-03	15	3	20	4	105	10	1	1
2020-07-04	13	3	18	4	94	9	1	1
2020-07-05	12	3	16	3	84	9	1	1
2020-07-06	11	3	15	3	76	8	1	1
2020-07-07	10	3	14	3	68	7	1	1
2020-07-08	10	2	12	3	61	7	1	1
2020-07-09	9	2	12	3	55	6	1	1
2020-07-10	8	2	11	3	49	6	1	1
2020-07-11	8	2	10	3	44	6	1	1
2020-07-12	7	2	10	3	40	6	0	1
2020-07-13	7	2	9	2	36	6	1	1
2020-07-14	7	2	9	2	33	5	1	1
2020-07-15	7	2	8	2	30	5	0	1
2020-07-16	7	2	8	2	27	5	1	1
2020-07-17	7	2	7	2	24	4	0	1
2020-07-18	7	2	7	2	22	4	0	1
2020-07-19	7	2	7	2	20	4	1	1
2020-07-20	7	2	7	2	18	4	0	1
2020-07-21	6	2	6	2	17	4	0	1
2020-07-22	6	2	5	2	16	4	1	1
2020-07-23	5	2	5	2	14	3	1	1
2020-07-24	5	2	4	2	13	3	0	1
2020-07-25	4	1	4	2	12	3	0	1
2020-07-26	4	1	3	1	11	3	1	1
2020-07-27	3	1	3	1	11	3	0	0
2020-07-28	3	1	2	1	10	3	0	0
2020-07-29	2	1	2	1	9	3	0	0
2020-07-30	1	1	2	1	8	3	0	0
2020-07-31	1	1	2	1	8	3	0	0
2020-08-01	1	1	2	1	7	2	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.

	ICU		HDU		Ward		Deaths	
Date	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	2	1	2	1	0	0	0	0
2020-03-14	2	1	2	1	0	0	0	0
2020-03-15	3	1	3	1	0	0	0	0
2020-03-16	4	1	3	1	0	0	0	0
2020-03-17	4	1	4	1	0	1	0	0
2020-03-18	4	1	4	1	1	1	0	0
2020-03-19	5	2	4	2	1	1	0	0
2020-03-20	6	2	5	2	1	1	1	1
2020-03-21	7	2	5	2	1	1	0	1
2020-03-22	8	2	6	2	2	1	0	1
2020-03-23	9	2	6	2	2	1	0	1
2020-03-24	10	2	8	2	2	1	0	1
2020-03-25	11	2	9	2	2	1	1	1
2020-03-26	12	3	10	2	3	1	1	1
2020-03-27	14	3	11	2	3	2	1	1
2020-03-28	16	3	13	3	4	2	1	1
2020-03-29	18	3	15	3	4	2	1	1
2020-03-30	20	3	17	3	5	2	1	1
2020-03-31	23	4	19	3	5	2	1	1
2020-04-01	26	4	22	4	6	2	2	1
2020-04-02	30	4	25	4	7	2	1	1
2020-04-03	34	4	28	4	8	2	2	1
2020-04-04	38	4	32	4	9	3	2	1
2020-04-05	44	5	37	4	10	3	3	1
2020-04-06	49	5	42	5	12	3	3	1
2020-04-07	56	5	47	5	13	3	3	2
2020-04-08	64	5	54	5	15	3	3	2
2020-04-09	73	6	61	6	18	4	4	2
2020-04-10	83	6	69	6	20	4	5	2
2020-04-11	94	7	78	7	23	5	5	2
2020-04-12	106	7	89	7	26	5	6	2
2020-04-13	121	8	100	7	29	5	7	2
2020-04-14	137	9	113	8	34	5	8	3
2020-04-15	154	9	128	9	38	6	9	3
2020-04-16	174	10	145	9	43	6	10	3
2020-04-17	196	10	163	9	49	6	11	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-04-18	221	11	183	10	55	6	13	3
2020-04-19	248	11	206	11	63	7	14	3
2020-04-20	279	12	230	12	71	8	16	4
2020-04-21	312	13	257	12	81	8	18	4
2020-04-22	348	13	287	13	91	9	21	4
2020-04-23	388	14	319	14	103	9	23	4
2020-04-24	430	14	353	14	116	10	26	4
2020-04-25	476	16	390	15	131	11	29	5
2020-04-26	525	17	430	16	147	11	32	5
2020-04-27	578	17	471	16	164	12	36	5
2020-04-28	633	18	514	17	183	12	40	6
2020-04-29	691	19	558	17	205	13	44	6
2020-04-30	750	20	604	19	228	13	49	6
2020-05-01	810	20	651	19	253	14	54	6
2020-05-02	871	21	698	19	280	15	58	7
2020-05-03	932	22	745	20	309	16	64	7
2020-05-04	992	23	791	21	341	16	68	7
2020-05-05	1049	24	836	22	373	17	73	7
2020-05-06	1104	25	877	23	408	18	78	8
2020-05-07	1156	25	916	24	444	18	84	8
2020-05-08	1202	26	950	24	482	19	89	8
2020-05-09	1243	26	980	25	521	19	93	9
2020-05-10	1277	27	1005	25	561	20	97	9
2020-05-11	1304	27	1027	25	602	21	101	9
2020-05-12	1324	27	1044	24	643	22	104	9
2020-05-13	1334	27	1056	25	685	23	105	9
2020-05-14	1338	27	1063	25	725	24	108	9
2020-05-15	1334	27	1064	26	764	24	108	9
2020-05-16	1323	27	1061	25	803	25	108	10
2020-05-17	1304	27	1054	26	841	26	109	9
2020-05-18	1278	26	1042	26	876	26	107	9
2020-05-19	1246	26	1025	26	909	26	105	9
2020-05-20	1209	25	1006	26	940	27	102	9
2020-05-21	1166	25	984	26	969	26	99	8
2020-05-22	1119	24	959	25	996	26	95	9
2020-05-23	1070	24	931	25	1019	28	91	9
2020-05-24	1018	23	901	26	1039	29	87	8
2020-05-25	964	24	869	25	1054	29	83	8
2020-05-26	909	23	837	24	1066	30	78	8
2020-05-27	854	23	803	24	1076	30	73	8
2020-05-28	799	22	768	24	1083	29	69	8
2020-05-29	745	21	731	23	1087	30	64	7
2020-05-30	693	20	694	22	1086	30	59	7

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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-31	641	19	658	22	1082	30	55	6
2020-06-01	592	19	621	22	1075	31	51	6
2020-06-02	546	18	584	22	1064	31	47	6
2020-06-03	502	18	548	20	1050	31	42	6
2020-06-04	461	18	513	20	1033	29	39	5
2020-06-05	420	17	479	19	1012	29	35	5
2020-06-06	384	16	447	18	990	29	32	5
2020-06-07	349	14	415	17	964	28	29	5
2020-06-08	317	14	385	17	936	28	27	4
2020-06-09	288	14	356	17	906	27	24	4
2020-06-10	262	13	329	15	874	26	22	4
2020-06-11	238	12	302	15	839	26	20	4
2020-06-12	215	11	277	14	805	25	18	4
2020-06-13	195	10	254	14	770	25	16	4
2020-06-14	176	10	231	14	733	24	15	3
2020-06-15	159	10	211	13	696	23	13	3
2020-06-16	144	9	192	13	659	24	12	3
2020-06-17	129	8	175	12	621	22	11	3
2020-06-18	117	8	159	11	585	21	9	2
2020-06-19	106	7	145	11	549	21	9	3
2020-06-20	95	7	131	10	513	20	8	2
2020-06-21	86	7	119	10	479	20	7	2
2020-06-22	78	7	108	9	446	19	6	2
2020-06-23	71	7	98	9	413	19	6	2
2020-06-24	64	6	89	8	382	18	5	2
2020-06-25	58	6	80	7	352	18	5	2
2020-06-26	53	6	73	7	324	17	4	2
2020-06-27	48	6	65	7	298	17	4	2
2020-06-28	44	5	59	6	273	16	4	2
2020-06-29	40	5	54	6	250	15	3	2
2020-06-30	36	5	49	6	229	14	3	1
2020-07-01	33	5	44	6	208	14	2	1
2020-07-02	30	4	40	6	190	13	2	1
2020-07-03	27	4	37	5	173	12	2	1
2020-07-04	25	4	33	6	157	11	2	1
2020-07-05	23	4	31	5	143	11	2	1
2020-07-06	21	4	28	5	129	10	2	1
2020-07-07	20	3	26	5	117	10	2	1
2020-07-08	18	3	24	4	106	9	1	1
2020-07-09	17	3	22	4	97	9	1	1
2020-07-10	16	3	20	4	88	8	1	1
2020-07-11	14	3	18	4	80	8	1	1
2020-07-12	13	3	17	4	72	8	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-07-13	12	3	15	4	65	8	1	1
2020-07-14	12	3	14	3	59	7	1	1
2020-07-15	11	3	13	3	54	7	1	1
2020-07-16	10	2	11	3	49	7	1	1
2020-07-17	9	2	11	3	45	7	1	1
2020-07-18	9	2	10	3	41	6	1	1
2020-07-19	8	2	9	3	37	6	1	1
2020-07-20	8	2	9	3	34	5	1	1
2020-07-21	8	2	9	3	31	5	1	1
2020-07-22	7	2	8	3	28	5	1	1
2020-07-23	7	2	8	2	25	5	0	1
2020-07-24	7	2	8	2	23	4	0	1
2020-07-25	7	2	7	2	21	4	1	1
2020-07-26	7	2	7	2	20	4	1	1
2020-07-27	7	2	7	2	18	4	1	1
2020-07-28	7	2	7	2	17	4	1	1
2020-07-29	7	2	6	2	15	4	1	1
2020-07-30	6	2	6	2	14	4	0	1
2020-07-31	6	2	5	2	13	3	0	1
2020-08-01	5	2	4	2	12	3	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.

	ICU		HDU		Ward		Deaths	
Date	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	1	1	1	0	0	0	0
2020-03-10	1	1	1	1	0	0	0	0
2020-03-11	1	1	2	1	0	0	0	0
2020-03-12	2	1	2	1	0	0	0	0
2020-03-13	2	1	2	1	0	0	0	0
2020-03-14	3	1	3	1	0	0	0	0
2020-03-15	3	1	3	1	0	0	0	0
2020-03-16	4	1	4	1	0	1	0	0
2020-03-17	4	1	4	1	1	1	0	0
2020-03-18	5	2	4	1	1	1	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. *(continued)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-03-19	6	2	4	2	1	1	1	1
2020-03-20	7	2	5	2	1	1	1	1
2020-03-21	7	2	5	2	2	1	0	1
2020-03-22	8	2	6	2	2	1	1	1
2020-03-23	9	2	7	2	2	1	0	1
2020-03-24	10	2	8	2	2	1	0	1
2020-03-25	11	2	9	2	3	1	1	1
2020-03-26	12	3	10	2	3	2	1	1
2020-03-27	13	3	11	2	3	2	1	1
2020-03-28	15	3	12	3	4	2	1	1
2020-03-29	17	3	14	3	4	2	1	1
2020-03-30	19	3	16	3	5	2	1	1
2020-03-31	21	3	18	3	5	2	1	1
2020-04-01	24	4	20	3	6	2	1	1
2020-04-02	27	4	23	4	7	2	2	1
2020-04-03	31	4	26	4	8	3	2	1
2020-04-04	35	4	30	4	9	3	2	1
2020-04-05	40	5	34	5	10	3	2	1
2020-04-06	45	5	38	5	12	3	2	1
2020-04-07	51	5	43	5	13	3	3	1
2020-04-08	58	6	49	6	15	3	3	2
2020-04-09	66	6	55	6	17	4	4	2
2020-04-10	74	6	63	6	19	4	4	2
2020-04-11	84	7	71	6	21	4	5	2
2020-04-12	95	7	80	7	24	5	6	2
2020-04-13	107	8	89	7	28	5	6	2
2020-04-14	121	8	101	8	31	5	7	2
2020-04-15	136	9	113	8	35	5	8	2
2020-04-16	153	9	128	9	40	6	9	3
2020-04-17	172	10	143	9	45	6	10	3
2020-04-18	193	10	160	10	51	6	11	3
2020-04-19	217	11	179	11	57	7	13	3
2020-04-20	242	12	200	11	64	7	14	3
2020-04-21	270	12	223	12	72	8	16	3
2020-04-22	301	13	249	13	81	8	18	4
2020-04-23	335	13	276	13	91	9	20	4
2020-04-24	372	14	306	13	102	10	23	4
2020-04-25	411	15	339	14	114	10	25	4
2020-04-26	454	15	374	14	128	11	28	5
2020-04-27	501	16	409	15	144	11	31	5
2020-04-28	550	17	448	16	160	12	35	5
2020-04-29	601	17	488	15	179	12	38	5
2020-04-30	654	17	530	16	199	13	42	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-01	710	18	573	17	221	14	47	6
2020-05-02	766	19	617	18	244	14	50	6
2020-05-03	823	20	662	19	269	15	55	6
2020-05-04	881	21	706	19	297	15	60	7
2020-05-05	938	21	749	20	327	16	64	7
2020-05-06	992	22	791	20	358	17	69	7
2020-05-07	1045	23	831	22	390	17	75	8
2020-05-08	1094	24	869	22	425	18	79	7
2020-05-09	1141	24	903	23	460	20	83	8
2020-05-10	1181	24	935	22	497	20	87	7
2020-05-11	1218	25	963	22	534	21	92	8
2020-05-12	1246	25	987	24	573	21	95	8
2020-05-13	1270	25	1006	25	613	22	98	9
2020-05-14	1285	25	1020	25	652	22	101	8
2020-05-15	1294	26	1030	25	691	23	103	9
2020-05-16	1295	26	1036	25	730	24	104	9
2020-05-17	1290	27	1036	26	768	25	104	9
2020-05-18	1277	27	1033	26	805	25	105	9
2020-05-19	1257	27	1024	26	841	26	104	9
2020-05-20	1232	26	1012	25	875	26	103	9
2020-05-21	1201	26	996	25	907	28	101	9
2020-05-22	1165	26	977	26	937	27	98	8
2020-05-23	1125	25	955	25	964	27	95	8
2020-05-24	1080	24	931	24	987	28	92	8
2020-05-25	1033	24	905	24	1008	28	89	8
2020-05-26	984	23	875	24	1025	30	84	8
2020-05-27	933	23	845	24	1040	30	80	8
2020-05-28	880	23	814	24	1051	30	75	8
2020-05-29	829	22	780	23	1059	29	71	7
2020-05-30	777	21	745	22	1063	29	67	7
2020-05-31	728	21	711	22	1064	29	62	7
2020-06-01	678	20	677	23	1061	30	58	6
2020-06-02	629	19	642	22	1056	29	54	7
2020-06-03	583	19	607	22	1048	29	49	6
2020-06-04	538	18	573	21	1036	30	46	6
2020-06-05	496	18	540	21	1022	29	42	6
2020-06-06	455	17	506	20	1004	28	38	5
2020-06-07	418	17	474	19	985	29	35	5
2020-06-08	382	16	441	19	962	29	32	5
2020-06-09	350	15	411	17	936	29	29	5
2020-06-10	319	14	382	17	909	28	27	5
2020-06-11	291	13	353	16	880	27	25	4
2020-06-12	265	13	326	15	850	27	23	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-06-13	241	12	300	15	818	27	20	4
2020-06-14	219	12	276	15	784	26	18	4
2020-06-15	200	11	254	14	750	26	17	4
2020-06-16	181	11	233	13	714	25	15	3
2020-06-17	164	10	213	13	678	25	13	3
2020-06-18	149	10	195	12	643	24	12	3
2020-06-19	136	10	178	11	608	23	11	3
2020-06-20	123	9	163	11	572	22	10	3
2020-06-21	111	8	148	11	538	21	9	2
2020-06-22	101	8	135	11	503	20	8	2
2020-06-23	92	7	123	10	471	19	7	2
2020-06-24	84	7	112	10	438	19	7	2
2020-06-25	76	7	102	10	408	18	6	2
2020-06-26	69	6	93	9	378	17	6	2
2020-06-27	63	6	84	9	350	17	5	2
2020-06-28	57	6	77	8	323	16	5	2
2020-06-29	52	5	70	8	298	16	4	2
2020-06-30	47	5	63	7	275	16	4	2
2020-07-01	43	5	58	7	252	15	3	2
2020-07-02	39	5	52	6	231	15	3	2
2020-07-03	36	5	48	6	211	15	3	1
2020-07-04	33	4	44	6	193	14	2	1
2020-07-05	30	4	40	5	177	13	3	1
2020-07-06	27	4	37	5	161	13	2	1
2020-07-07	25	4	33	5	147	12	2	1
2020-07-08	23	4	31	5	134	11	2	1
2020-07-09	21	4	28	5	122	11	2	1
2020-07-10	20	3	26	4	112	10	2	1
2020-07-11	18	3	24	4	101	9	2	1
2020-07-12	17	3	22	4	92	9	1	1
2020-07-13	16	3	20	4	84	8	1	1
2020-07-14	15	3	18	4	76	8	1	1
2020-07-15	13	3	17	4	70	7	1	1
2020-07-16	12	3	15	4	63	7	1	1
2020-07-17	11	3	14	3	58	6	1	1
2020-07-18	11	3	13	3	53	6	1	1
2020-07-19	10	2	12	3	48	6	1	1
2020-07-20	9	2	11	3	44	6	1	1
2020-07-21	9	2	10	3	40	6	1	1
2020-07-22	8	2	10	3	37	6	1	1
2020-07-23	8	2	9	3	33	5	1	1
2020-07-24	7	2	9	2	30	5	0	1
2020-07-25	7	2	8	2	28	5	1	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-07-26	7	2	8	2	25	5	0	1
2020-07-27	7	2	8	2	23	5	1	1
2020-07-28	7	2	8	2	22	4	0	1
2020-07-29	7	2	7	2	20	4	0	1
2020-07-30	7	2	7	2	18	4	0	1
2020-07-31	7	2	7	2	17	4	0	1
2020-08-01	7	2	6	2	15	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.

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

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-04-01	20	3	17	3	6	2	1	1
2020-04-02	22	4	18	3	6	2	1	1
2020-04-03	24	4	21	3	7	3	2	1
2020-04-04	27	4	23	4	8	3	2	1
2020-04-05	30	4	25	4	9	3	2	1
2020-04-06	33	4	28	4	10	3	2	1
2020-04-07	37	4	31	4	11	3	2	1
2020-04-08	41	5	34	5	12	3	3	1
2020-04-09	46	5	38	5	14	3	3	1
2020-04-10	51	5	42	5	15	4	3	2
2020-04-11	57	6	47	5	17	4	3	2
2020-04-12	63	6	53	6	19	4	4	2
2020-04-13	70	6	58	6	21	4	4	2
2020-04-14	77	7	65	6	23	4	5	2
2020-04-15	86	7	72	6	26	5	5	2
2020-04-16	96	7	80	7	28	5	6	2
2020-04-17	106	7	89	7	32	5	6	2
2020-04-18	118	8	98	7	35	6	7	2
2020-04-19	131	8	108	8	39	6	8	2
2020-04-20	145	8	120	8	43	6	9	3
2020-04-21	161	9	132	9	48	6	10	3
2020-04-22	177	10	146	9	53	7	11	3
2020-04-23	196	10	161	10	59	7	12	3
2020-04-24	216	11	177	11	65	7	13	3
2020-04-25	239	11	195	11	72	7	15	3
2020-04-26	262	12	214	11	80	8	16	4
2020-04-27	287	12	235	12	88	8	18	4
2020-04-28	315	12	257	12	97	9	20	4
2020-04-29	344	13	281	13	108	9	22	4
2020-04-30	376	14	306	13	119	10	24	4
2020-05-01	408	14	334	13	131	10	26	4
2020-05-02	444	15	362	14	145	11	29	5
2020-05-03	481	15	392	15	159	12	31	5
2020-05-04	520	16	423	16	175	12	34	5
2020-05-05	560	16	455	16	192	12	37	5
2020-05-06	601	17	488	17	210	13	40	5
2020-05-07	645	18	522	18	230	14	43	6
2020-05-08	689	18	557	18	250	14	47	6
2020-05-09	732	19	591	18	273	15	50	6
2020-05-10	776	19	626	18	296	16	54	6
2020-05-11	819	20	660	20	321	17	57	6
2020-05-12	863	21	693	20	347	17	61	7
2020-05-13	904	22	726	20	375	18	65	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-14	944	22	757	21	404	18	68	7
2020-05-15	981	22	785	22	434	19	71	7
2020-05-16	1015	23	812	22	464	20	75	8
2020-05-17	1046	24	836	23	495	20	78	8
2020-05-18	1073	24	859	23	527	20	81	8
2020-05-19	1095	25	878	24	559	21	84	8
2020-05-20	1113	25	895	24	591	22	86	8
2020-05-21	1126	25	908	23	624	23	88	8
2020-05-22	1134	24	916	23	656	23	89	9
2020-05-23	1136	25	922	23	688	23	90	8
2020-05-24	1134	24	925	23	718	23	91	8
2020-05-25	1126	24	925	24	748	24	91	8
2020-05-26	1114	25	921	24	778	25	90	8
2020-05-27	1097	25	913	24	805	25	90	8
2020-05-28	1077	24	903	25	831	25	88	8
2020-05-29	1053	24	889	25	856	25	86	8
2020-05-30	1026	24	873	25	879	26	85	8
2020-05-31	995	23	856	24	899	26	83	8
2020-06-01	960	23	835	24	917	27	80	8
2020-06-02	924	22	814	24	931	26	78	8
2020-06-03	886	21	791	24	945	26	75	7
2020-06-04	846	22	766	24	954	27	70	7
2020-06-05	807	21	742	24	962	28	68	7
2020-06-06	766	21	715	24	966	28	65	7
2020-06-07	726	21	687	23	967	29	61	7
2020-06-08	685	20	660	22	966	30	58	6
2020-06-09	645	20	631	22	963	30	54	6
2020-06-10	606	20	601	21	958	30	51	6
2020-06-11	568	19	571	21	950	28	48	6
2020-06-12	531	18	543	21	940	28	45	6
2020-06-13	495	17	514	19	927	28	42	5
2020-06-14	462	16	486	19	911	27	39	5
2020-06-15	429	16	458	19	894	26	36	5
2020-06-16	398	16	432	18	874	26	33	5
2020-06-17	369	15	406	17	852	26	31	5
2020-06-18	341	14	381	16	830	27	29	5
2020-06-19	315	14	356	16	805	25	26	4
2020-06-20	291	13	333	16	780	24	24	4
2020-06-21	269	13	311	15	752	25	22	4
2020-06-22	248	12	289	15	723	24	21	4
2020-06-23	229	12	269	15	695	23	19	4
2020-06-24	212	11	249	14	665	23	17	4
2020-06-25	195	11	231	14	635	22	16	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-06-26	180	10	214	13	606	21	15	3
2020-06-27	165	10	198	13	577	21	14	3
2020-06-28	152	10	183	12	547	20	13	3
2020-06-29	140	9	169	11	517	20	11	3
2020-06-30	130	9	157	11	488	20	11	3
2020-07-01	119	9	145	11	459	19	10	3
2020-07-02	109	8	135	10	431	18	9	2
2020-07-03	101	8	124	10	405	18	8	3
2020-07-04	93	7	115	10	380	17	8	2
2020-07-05	86	7	106	9	355	17	7	2
2020-07-06	79	7	98	9	332	16	7	2
2020-07-07	73	7	90	8	310	16	6	2
2020-07-08	67	7	83	8	288	16	5	2
2020-07-09	62	6	76	8	267	16	5	2
2020-07-10	57	6	70	7	248	14	5	2
2020-07-11	53	6	65	7	231	14	4	2
2020-07-12	49	6	60	7	214	14	4	2
2020-07-13	45	5	55	6	198	13	4	2
2020-07-14	42	5	51	6	183	13	3	2
2020-07-15	38	5	47	6	169	13	3	2
2020-07-16	36	5	43	6	157	12	3	2
2020-07-17	33	4	40	6	145	12	3	1
2020-07-18	31	4	37	5	134	11	3	1
2020-07-19	29	4	34	5	124	11	2	1
2020-07-20	27	4	32	5	114	10	2	1
2020-07-21	25	4	29	5	105	10	2	1
2020-07-22	23	4	27	5	97	9	2	1
2020-07-23	22	3	25	5	89	9	2	1
2020-07-24	20	4	24	4	82	9	2	1
2020-07-25	19	3	22	4	76	8	2	1
2020-07-26	18	3	21	4	70	8	2	1
2020-07-27	17	3	19	4	65	8	1	1
2020-07-28	16	3	18	4	60	7	1	1
2020-07-29	15	3	17	4	55	7	1	1
2020-07-30	14	3	16	4	51	7	1	1
2020-07-31	13	3	15	3	47	7	1	1
2020-08-01	12	3	13	3	42	6	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.

	ICU		HDU		Ward		Deaths	
Date	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	1	0	1	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	2	1	2	1	0	0	0	0
2020-03-13	3	1	2	1	0	0	0	0
2020-03-14	3	1	3	1	0	0	0	0
2020-03-15	3	1	3	1	0	0	0	0
2020-03-16	4	1	4	1	0	1	0	0
2020-03-17	4	2	4	1	1	1	0	0
2020-03-18	5	2	4	1	1	1	0	0
2020-03-19	5	2	4	1	1	1	1	1
2020-03-20	6	2	4	2	1	1	1	1
2020-03-21	7	2	5	2	1	1	0	1
2020-03-22	8	2	5	2	2	1	0	1
2020-03-23	8	2	6	2	2	1	1	1
2020-03-24	9	2	7	2	2	1	0	1
2020-03-25	9	2	7	2	2	1	0	1
2020-03-26	10	2	8	2	3	2	1	1
2020-03-27	11	2	9	2	3	2	1	1
2020-03-28	12	2	10	2	3	2	1	1
2020-03-29	13	3	10	2	4	2	1	1
2020-03-30	14	3	11	2	4	2	1	1
2020-03-31	15	3	12	3	5	2	1	1
2020-04-01	16	3	13	3	5	2	1	1
2020-04-02	17	3	14	3	6	2	1	1
2020-04-03	19	3	16	3	6	2	1	1
2020-04-04	21	3	17	3	7	2	1	1
2020-04-05	23	3	18	3	8	2	1	1
2020-04-06	25	3	20	3	8	3	2	1
2020-04-07	26	4	21	4	9	3	2	1
2020-04-08	29	4	23	4	10	3	2	1
2020-04-09	32	4	25	4	11	3	2	1
2020-04-10	34	4	27	4	12	3	2	1
2020-04-11	37	4	29	4	13	3	2	1
2020-04-12	40	4	32	4	14	3	2	1
2020-04-13	44	5	35	4	15	4	3	1
2020-04-14	47	5	38	5	17	4	3	2
2020-04-15	51	5	41	5	18	4	3	2
2020-04-16	55	5	45	5	20	4	3	2
2020-04-17	59	6	48	5	21	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-04-18	64	6	52	5	23	5	4	2
2020-04-19	69	6	57	6	25	5	5	2
2020-04-20	74	7	62	6	27	5	5	2
2020-04-21	81	7	67	7	30	5	5	2
2020-04-22	87	7	72	7	32	5	6	2
2020-04-23	95	7	78	7	35	5	6	2
2020-04-24	102	8	85	7	38	6	6	2
2020-04-25	110	8	91	7	41	6	7	2
2020-04-26	119	8	98	8	45	6	8	2
2020-04-27	128	8	106	8	49	6	8	2
2020-04-28	139	9	114	8	53	6	9	3
2020-04-29	150	9	122	9	57	7	10	3
2020-04-30	161	9	132	9	62	7	10	3
2020-05-01	174	10	143	9	66	7	11	3
2020-05-02	187	10	153	9	72	7	12	3
2020-05-03	200	10	165	10	77	7	13	3
2020-05-04	215	11	177	10	83	8	14	3
2020-05-05	231	11	189	11	90	8	15	3
2020-05-06	247	11	203	11	98	9	16	3
2020-05-07	265	12	217	12	105	9	18	4
2020-05-08	283	12	232	12	113	9	19	4
2020-05-09	303	13	247	12	122	10	20	4
2020-05-10	323	12	264	13	131	11	22	4
2020-05-11	344	13	281	13	141	11	24	4
2020-05-12	366	14	299	14	152	12	25	4
2020-05-13	389	14	317	14	163	12	26	4
2020-05-14	413	14	336	14	174	13	28	4
2020-05-15	437	15	355	15	187	13	30	5
2020-05-16	462	16	375	15	201	13	32	5
2020-05-17	487	16	395	15	214	13	34	5
2020-05-18	513	16	416	16	228	13	36	5
2020-05-19	539	17	438	17	243	14	38	5
2020-05-20	566	17	459	17	259	14	40	5
2020-05-21	591	17	480	18	276	15	42	6
2020-05-22	617	18	502	18	293	15	44	6
2020-05-23	642	19	523	18	310	16	46	6
2020-05-24	667	19	544	19	329	17	48	6
2020-05-25	691	20	564	19	348	18	50	6
2020-05-26	715	20	584	19	368	18	53	7
2020-05-27	737	20	602	19	388	19	54	6
2020-05-28	758	21	619	20	409	19	56	6
2020-05-29	778	21	636	20	430	19	58	6
2020-05-30	796	21	651	20	451	20	60	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-05-31	811	21	666	20	472	21	61	6
2020-06-01	825	21	679	19	493	21	62	7
2020-06-02	837	20	690	20	515	21	64	7
2020-06-03	847	21	700	21	536	22	64	7
2020-06-04	854	21	709	21	557	22	66	7
2020-06-05	860	21	714	21	577	22	67	7
2020-06-06	863	21	720	21	597	22	68	7
2020-06-07	862	21	721	21	618	22	68	7
2020-06-08	860	21	721	21	637	23	68	7
2020-06-09	855	21	721	21	655	23	67	7
2020-06-10	849	21	719	21	673	23	67	7
2020-06-11	840	21	715	22	689	23	67	7
2020-06-12	829	22	709	22	704	23	67	7
2020-06-13	815	22	702	22	718	24	66	7
2020-06-14	800	22	694	21	730	25	65	7
2020-06-15	783	21	684	21	741	25	64	7
2020-06-16	765	21	672	21	751	25	62	7
2020-06-17	745	21	660	21	759	25	60	7
2020-06-18	724	21	646	20	767	25	59	7
2020-06-19	702	21	630	20	772	24	58	7
2020-06-20	678	21	615	20	775	24	56	7
2020-06-21	656	20	598	20	777	24	54	6
2020-06-22	632	19	582	20	778	24	52	6
2020-06-23	607	18	564	20	775	24	50	6
2020-06-24	583	18	547	21	772	24	48	6
2020-06-25	559	17	530	21	768	24	46	6
2020-06-26	534	17	511	21	763	25	44	6
2020-06-27	509	17	492	21	756	25	42	6
2020-06-28	486	17	473	20	747	24	40	5
2020-06-29	463	16	454	20	737	24	38	6
2020-06-30	441	16	435	19	726	24	36	5
2020-07-01	419	16	416	19	714	24	35	5
2020-07-02	397	16	397	18	699	24	33	5
2020-07-03	376	16	379	18	685	24	31	5
2020-07-04	357	16	362	17	669	24	30	5
2020-07-05	337	15	345	17	653	24	28	5
2020-07-06	318	15	328	16	636	24	26	4
2020-07-07	300	14	312	16	618	24	24	4
2020-07-08	284	14	296	15	600	23	23	4
2020-07-09	268	13	280	14	581	24	22	4
2020-07-10	252	13	265	14	562	23	21	4
2020-07-11	238	12	251	13	542	22	19	4
2020-07-12	224	11	238	13	522	22	18	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)*

	ICU		HDU		Ward		Deaths	
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD
2020-07-13	210	12	225	12	503	21	17	4
2020-07-14	198	11	213	12	483	21	16	4
2020-07-15	186	10	200	12	464	20	15	3
2020-07-16	175	10	189	12	444	19	14	3
2020-07-17	164	10	178	13	425	19	13	3
2020-07-18	154	10	167	12	406	18	13	3
2020-07-19	146	10	158	11	386	18	12	3
2020-07-20	137	9	150	11	368	17	11	3
2020-07-21	129	9	141	11	350	17	10	3
2020-07-22	120	9	133	10	333	17	10	3
2020-07-23	113	8	125	10	317	16	9	3
2020-07-24	106	8	118	9	301	15	9	3
2020-07-25	100	8	111	9	285	15	8	3
2020-07-26	94	8	105	9	270	15	8	2
2020-07-27	89	7	99	8	256	15	7	2
2020-07-28	84	7	93	8	242	15	7	2
2020-07-29	80	7	87	8	229	14	6	2
2020-07-30	75	7	83	8	216	14	6	2
2020-07-31	70	7	77	7	204	14	6	2
2020-08-01	67	7	69	7	184	13	0	0