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) 7.5%
- Note: 74.5% 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

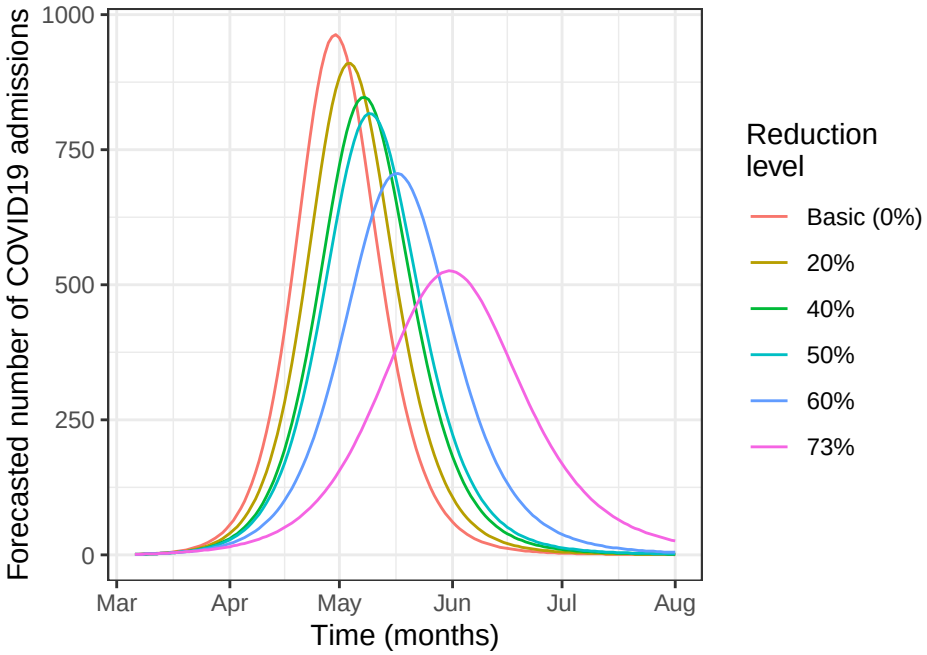

Figure 1: Forecasted daily COVID19 hospital admissions. Scenarios are: basic, 20% reduction in contact rate, and 60% reduction in contact rates.

2 Model principle

This model simulates the next few weeks of the epidemic. Every day, we assume a fixed 25.5% (18% + 7.5%) 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

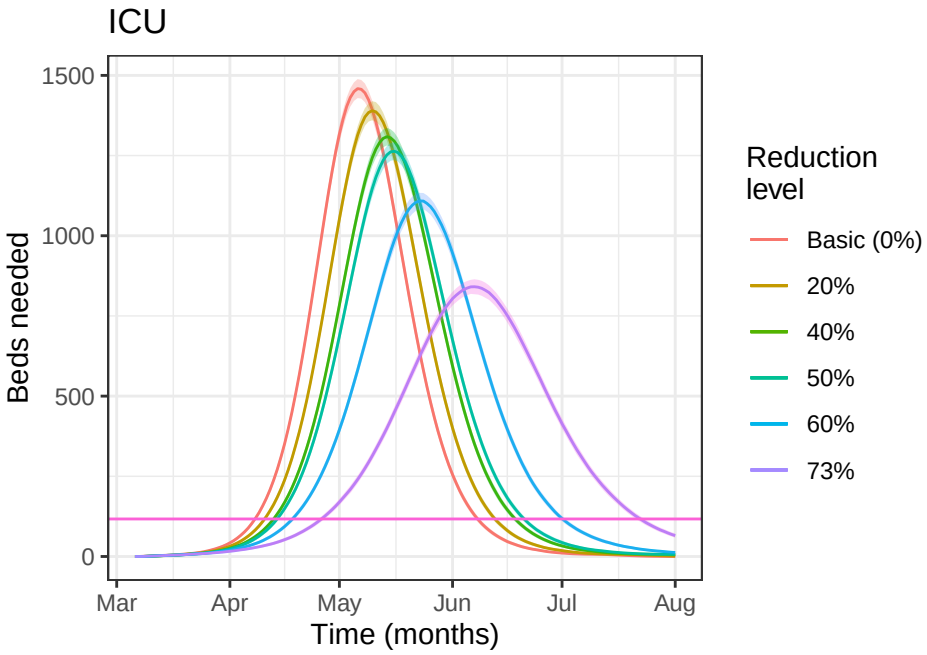

Figure 2: Output ICU bed demand from 500 model runs for the 20%, 40%, 50%, 60% and 73% reduction in contact rates. The horizontal lines represent the current maximum bed capacity. Lines are average daily requirements, shaded area represents average +/- standard deviation.

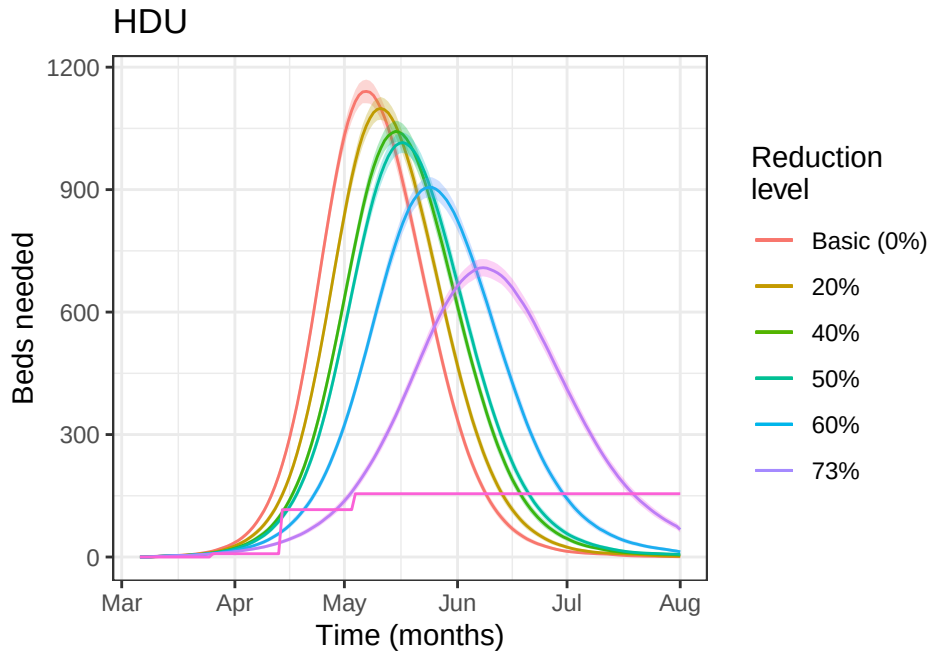

Figure 3: Output HDU bed demand from 500 model runs for the 20%, 40%, 50%, 60% and 73% reduction in contact rates. The horizontal lines represent the current maximum bed capacity. Lines are average requirements, shaded area represents average +/- standard deviation.

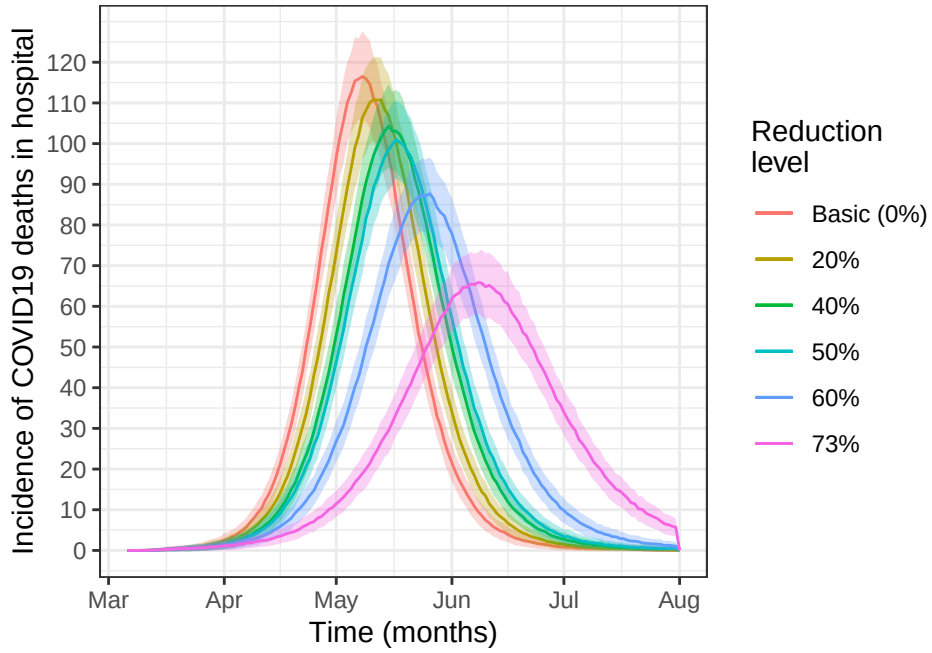

Figure 4: Estimated incidence of mortality in COVID19 hospitalised patients from 500 model runs. Scenarios are: 0% reduction in contact rate (base), 20%, 40%, 50%, 60% and 73% reduction in contact rates. Lines are average daily incidence, shaded area represents average +/- standard deviation.

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	1459	30	2020-05-07	1141	29	2020-05-22	1146	31	3630	509
20% reduction	2020-05-10	1390	30	2020-05-11	1099	28	2020-05-25	1111	29	3620	526
40% reduction	2020-05-14	1309	27	2020-05-15	1043	26	2020-05-30	1067	29	3611	535
50% reduction	2020-05-16	1264	28	2020-05-17	1015	25	2020-05-31	1041	29	3600	540
60% reduction	2020-05-23	1108	25	2020-05-25	906	25	2020-06-07	946	29	3555	563
73% reduction	2020-06-07	841	23	2020-06-08	709	21	2020-06-22	760	24	3365	578

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

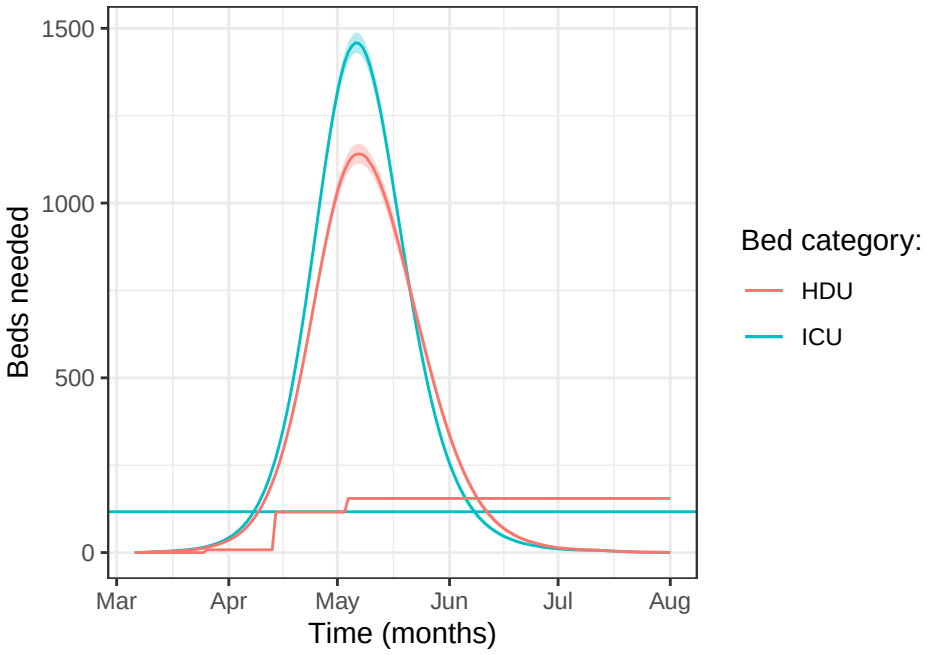

Figure 5: Output from 500 model runs for the base scenario. The horizontal lines represent the current maximum bed capacity for the different units.Lines are average daily incidence, shaded area represents average +/- standard deviation.

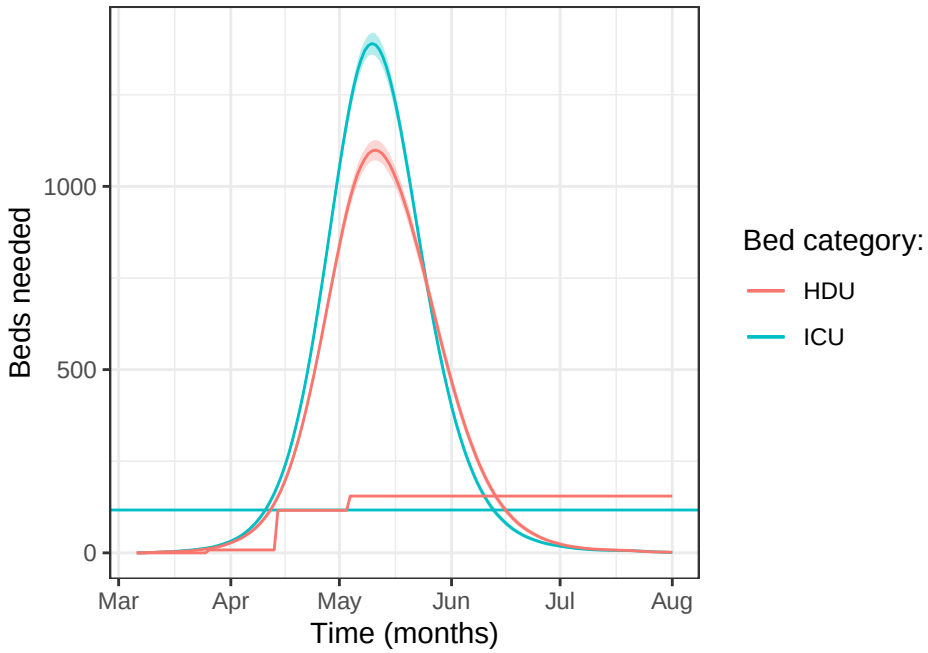

Figure 6: Output from 500 model runs for the 20% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

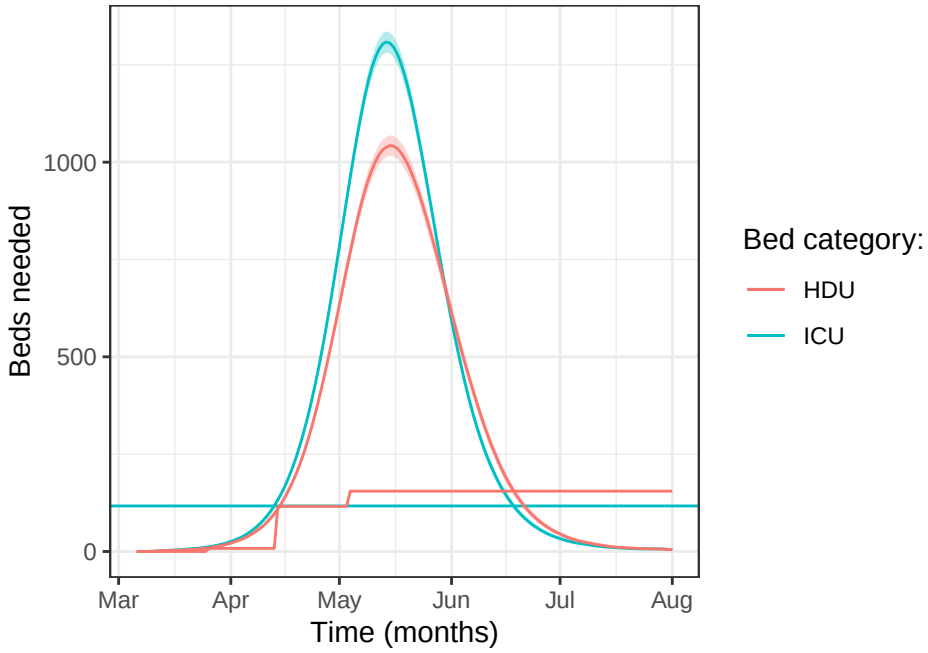

Figure 7: Output from 500 model runs for the 40% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

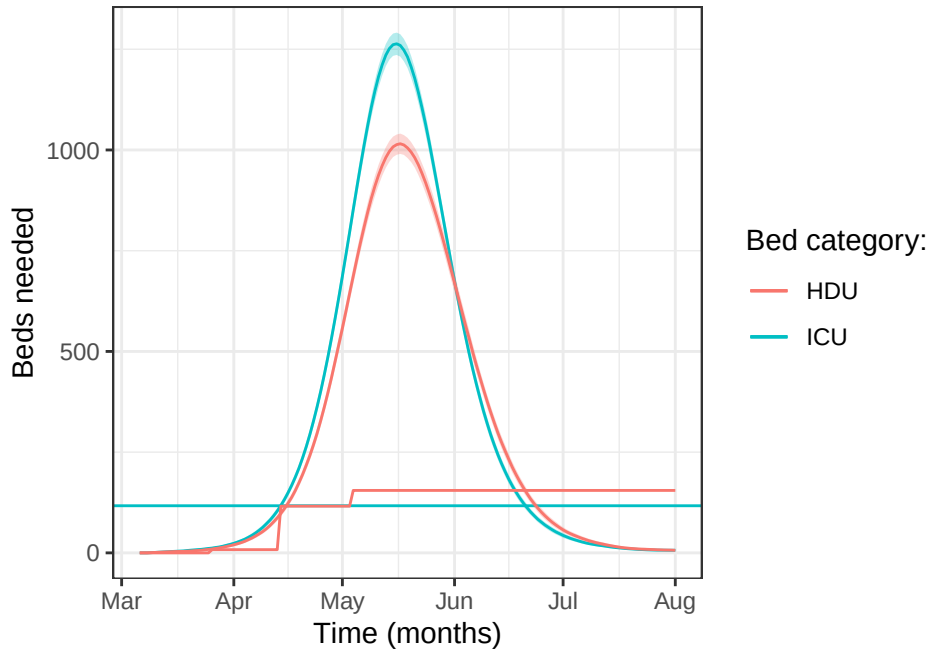

Figure 8: Output from 500 model runs for the 50% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

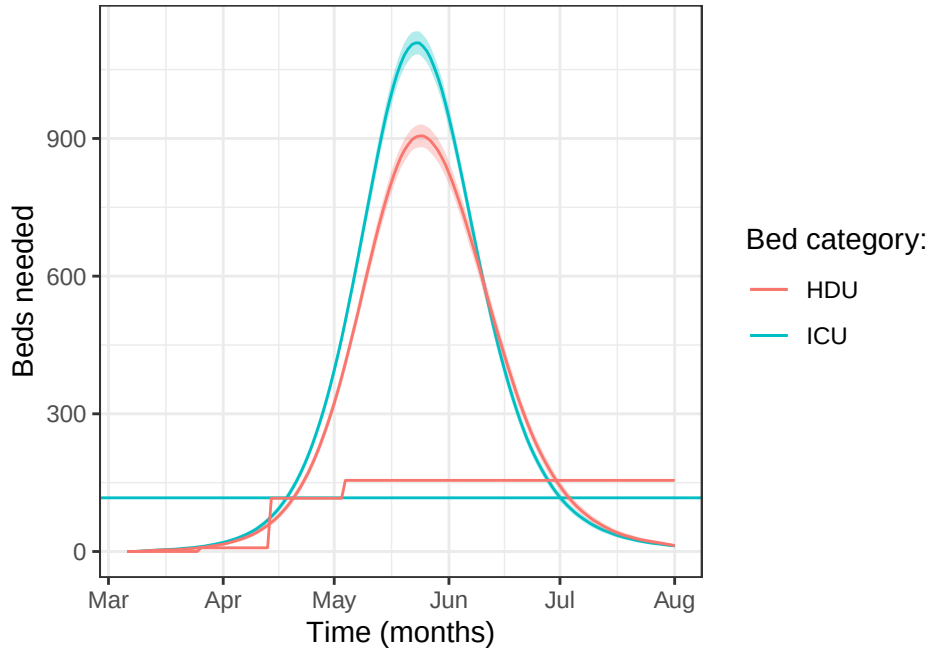

Figure 9: Output from 500 model runs for the 60% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

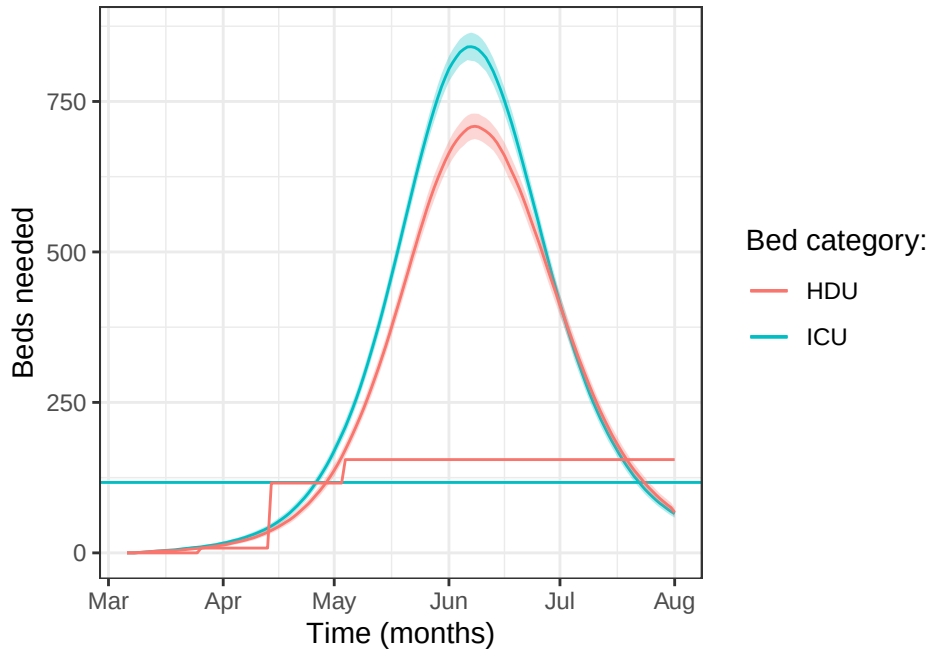

Figure 10: Output from 500 model runs for the 73% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average +/- standard deviation.

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	New patients (ICU+HDU)
2020-03-06	0	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0	0
2020-03-08	1	1	0	1	0	0	0	0	1
2020-03-09	1	1	1	1	0	0	0	0	1
2020-03-10	1	1	2	1	0	0	0	0	1
2020-03-11	2	1	2	1	0	0	0	0	1
2020-03-12	3	1	2	1	0	0	0	0	1
2020-03-13	3	1	3	1	0	0	0	0	1
2020-03-14	3	1	3	1	0	0	0	0	1
2020-03-15	4	1	3	1	0	1	0	0	1
2020-03-16	4	2	4	1	1	1	0	1	1
2020-03-17	5	2	4	2	1	1	0	1	2
2020-03-18	6	2	5	2	1	1	0	1	2
2020-03-19	7	2	5	2	1	1	0	1	2
2020-03-20	8	2	6	2	2	1	1	1	2
2020-03-21	9	2	7	2	2	1	1	1	3
2020-03-22	10	2	8	2	2	1	1	1	3

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	New patients (ICU+HDU)
2020-03-23	12	2	10	2	2	1	1	1	4
2020-03-24	13	3	11	2	3	2	1	1	4
2020-03-25	15	3	13	2	3	2	1	1	5
2020-03-26	18	3	15	3	4	2	1	1	6
2020-03-27	21	3	17	3	4	2	1	1	7
2020-03-28	24	4	20	3	5	2	1	1	8
2020-03-29	27	4	23	4	6	2	2	1	9
2020-03-30	32	4	27	4	6	2	2	1	10
2020-03-31	37	4	31	4	8	2	2	1	12
2020-04-01	42	5	36	4	9	3	3	2	14
2020-04-02	49	5	41	5	10	3	3	2	16
2020-04-03	57	5	47	5	12	3	3	2	19
2020-04-04	66	6	55	6	14	3	4	2	22
2020-04-05	77	6	63	6	16	4	4	2	25
2020-04-06	88	6	73	6	19	4	5	2	29
2020-04-07	103	7	85	7	21	4	6	2	34
2020-04-08	119	8	99	8	25	5	7	3	39
2020-04-09	137	8	114	8	29	5	8	3	44
2020-04-10	158	9	131	8	34	5	9	3	51
2020-04-11	181	9	151	9	39	6	10	3	58
2020-04-12	208	10	173	10	45	6	12	3	66
2020-04-13	238	11	199	11	52	6	14	4	75
2020-04-14	272	11	227	11	60	7	16	4	84
2020-04-15	310	12	258	12	69	7	18	4	95
2020-04-16	352	13	292	12	80	8	21	4	106
2020-04-17	399	14	331	13	92	9	25	5	119
2020-04-18	450	15	371	15	105	9	28	5	131
2020-04-19	506	16	416	16	121	10	31	5	145
2020-04-20	566	17	463	17	139	11	35	6	158
2020-04-21	630	18	514	18	158	11	40	6	172
2020-04-22	698	19	567	18	180	12	44	7	185
2020-04-23	769	20	623	19	204	13	50	6	198
2020-04-24	842	20	680	20	231	13	55	7	210
2020-04-25	915	22	737	21	260	14	61	8	220
2020-04-26	989	23	793	22	292	15	67	7	229
2020-04-27	1063	23	847	22	327	16	74	8	236
2020-04-28	1134	24	899	23	365	17	79	9	242
2020-04-29	1200	25	947	23	404	17	85	9	245
2020-04-30	1262	25	992	24	446	19	91	9	246
2020-05-01	1317	26	1033	26	489	20	97	10	244
2020-05-02	1364	27	1066	26	533	20	102	9	240
2020-05-03	1403	28	1094	27	580	21	106	10	235
2020-05-04	1431	29	1116	28	628	21	110	10	228

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	New patients (ICU+HDU)
2020-05-05	1449	29	1131	29	676	22	113	10	219
2020-05-06	1459	30	1139	28	723	23	115	11	209
2020-05-07	1457	29	1141	29	770	24	116	10	198
2020-05-08	1446	29	1139	28	815	25	117	11	187
2020-05-09	1424	29	1130	28	858	25	116	10	175
2020-05-10	1393	28	1116	27	900	26	115	11	162
2020-05-11	1354	28	1099	26	938	28	111	10	150
2020-05-12	1309	27	1077	27	974	27	109	10	139
2020-05-13	1258	27	1051	27	1007	28	105	10	127
2020-05-14	1202	27	1023	28	1036	29	101	10	116
2020-05-15	1141	25	992	29	1063	29	97	10	106
2020-05-16	1077	25	956	29	1086	29	93	9	96
2020-05-17	1012	25	918	27	1106	28	86	9	86
2020-05-18	948	24	880	27	1122	30	81	9	78
2020-05-19	883	23	840	26	1133	31	76	9	70
2020-05-20	818	22	799	24	1141	30	70	8	63
2020-05-21	755	22	756	24	1146	30	65	8	56
2020-05-22	694	22	714	24	1146	31	60	8	50
2020-05-23	636	21	672	24	1142	32	54	7	45
2020-05-24	581	19	631	23	1135	31	50	7	40
2020-05-25	529	18	590	22	1123	30	45	7	36
2020-05-26	480	17	550	21	1108	30	41	6	32
2020-05-27	434	17	511	20	1089	30	37	6	28
2020-05-28	391	16	473	19	1067	30	33	5	25
2020-05-29	353	15	436	18	1041	29	30	5	22
2020-05-30	317	14	401	17	1012	30	27	5	20
2020-05-31	285	13	367	16	981	29	24	5	18
2020-06-01	255	12	336	16	947	29	22	5	16
2020-06-02	229	12	306	15	911	28	19	4	14
2020-06-03	204	12	278	14	872	28	17	4	12
2020-06-04	182	11	252	13	832	28	16	4	11
2020-06-05	163	11	229	13	791	27	14	3	10
2020-06-06	145	10	207	12	749	26	12	4	9
2020-06-07	129	9	187	11	707	25	11	3	8
2020-06-08	115	9	168	11	665	24	10	3	7
2020-06-09	102	8	150	11	623	23	9	3	6
2020-06-10	91	8	135	10	582	22	7	3	6
2020-06-11	82	7	121	10	542	21	7	3	5
2020-06-12	73	7	108	9	502	19	6	2	5
2020-06-13	65	7	97	9	464	18	5	2	4
2020-06-14	58	6	87	9	427	18	5	2	4
2020-06-15	52	6	78	8	392	17	4	2	3
2020-06-16	47	6	69	7	359	16	4	2	3

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	New patients (ICU+HDU)
2020-06-17	42	5	62	7	328	16	3	2	3
2020-06-18	38	5	56	7	299	16	3	2	3
2020-06-19	34	5	50	6	272	15	3	2	2
2020-06-20	31	5	44	6	246	14	2	2	2
2020-06-21	28	4	40	6	223	14	2	1	2
2020-06-22	25	4	36	5	201	13	2	1	2
2020-06-23	23	4	32	5	181	12	2	1	2
2020-06-24	21	4	29	5	162	12	2	1	2
2020-06-25	19	4	26	5	146	11	2	1	1
2020-06-26	17	3	24	4	131	11	1	1	1
2020-06-27	15	3	21	4	118	10	1	1	1
2020-06-28	14	3	19	4	105	10	1	1	1
2020-06-29	13	3	17	3	94	9	1	1	1
2020-06-30	12	3	15	3	85	8	1	1	1
2020-07-01	11	3	14	3	76	8	1	1	1
2020-07-02	10	2	13	3	68	8	1	1	1
2020-07-03	9	2	12	3	61	8	1	1	1
2020-07-04	8	2	11	3	55	7	1	1	1
2020-07-05	8	2	10	3	49	7	1	1	1
2020-07-06	8	2	10	3	44	6	1	1	1
2020-07-07	7	2	9	3	40	6	1	1	1
2020-07-08	7	2	9	3	35	5	1	1	1
2020-07-09	7	2	8	3	32	5	1	1	1
2020-07-10	7	2	8	2	29	5	1	1	1
2020-07-11	7	2	7	2	26	5	0	1	1
2020-07-12	7	2	7	2	23	4	0	1	1
2020-07-13	6	2	6	2	21	4	0	1	0
2020-07-14	6	2	6	2	19	4	1	1	0
2020-07-15	5	2	5	2	18	4	0	1	0
2020-07-16	5	2	4	2	16	3	0	1	0
2020-07-17	4	2	4	2	15	3	0	1	0
2020-07-18	4	2	3	2	13	3	0	1	0
2020-07-19	3	1	3	2	12	3	0	1	0
2020-07-20	3	1	3	2	11	3	0	1	0
2020-07-21	2	1	2	1	10	3	0	0	0
2020-07-22	2	1	2	1	9	3	0	0	0
2020-07-23	1	1	2	1	9	3	0	0	0
2020-07-24	1	1	2	1	8	3	0	0	0
2020-07-25	1	1	2	1	7	2	0	0	0
2020-07-26	1	1	2	1	7	2	0	0	0
2020-07-27	0	1	1	1	6	2	0	0	0
2020-07-28	0	1	1	1	6	2	0	0	0
2020-07-29	0	0	1	1	5	2	0	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	New patients (ICU+HDU)
2020-07-30	0	0	1	1	5	2	0	0	0
2020-07-31	0	0	1	1	4	2	0	0	0
2020-08-01	0	0	1	1	4	2	0	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	New patients (ICU+HDU)
2020-03-06	0	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0	0
2020-03-08	0	0	0	0	0	0	0	0	0
2020-03-09	1	1	0	1	0	0	0	0	1
2020-03-10	1	1	1	1	0	0	0	0	1
2020-03-11	1	1	2	1	0	0	0	0	1
2020-03-12	2	1	2	1	0	0	0	0	1
2020-03-13	2	1	2	1	0	0	0	0	1
2020-03-14	3	1	3	1	0	0	0	0	1
2020-03-15	3	1	3	1	0	0	0	0	1
2020-03-16	4	1	3	1	0	1	0	0	1
2020-03-17	4	1	4	1	1	1	0	1	1
2020-03-18	5	2	4	1	1	1	0	1	2
2020-03-19	6	2	5	2	1	1	0	1	2
2020-03-20	7	2	5	2	1	1	0	1	2
2020-03-21	8	2	6	2	2	1	0	1	2
2020-03-22	9	2	7	2	2	1	1	1	3
2020-03-23	10	2	8	2	2	1	1	1	3
2020-03-24	11	2	9	2	2	1	1	1	3
2020-03-25	13	3	10	2	3	2	1	1	4
2020-03-26	14	3	12	2	3	2	1	1	4
2020-03-27	16	3	13	3	4	2	1	1	5
2020-03-28	19	3	15	3	4	2	1	1	6
2020-03-29	21	3	18	3	5	2	1	1	7
2020-03-30	25	4	21	4	5	2	1	1	8
2020-03-31	28	4	24	4	6	2	2	1	9
2020-04-01	32	4	27	4	7	2	2	1	10
2020-04-02	37	4	31	4	8	3	2	1	12
2020-04-03	42	5	36	4	9	3	3	2	13
2020-04-04	48	5	41	5	11	3	3	2	15

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	New patients (ICU+HDU)
2020-04-05	55	5	47	5	13	3	3	2	18
2020-04-06	63	6	53	6	15	3	4	2	20
2020-04-07	73	7	61	7	17	4	4	2	23
2020-04-08	83	7	69	7	19	4	5	2	26
2020-04-09	95	7	79	7	22	4	6	2	30
2020-04-10	109	8	90	8	26	5	6	2	34
2020-04-11	125	9	103	8	29	5	8	3	39
2020-04-12	143	9	117	9	33	5	8	3	44
2020-04-13	162	10	134	9	38	6	10	3	50
2020-04-14	185	10	153	10	44	6	11	3	57
2020-04-15	210	11	174	10	50	6	12	4	64
2020-04-16	239	11	197	11	57	7	14	4	72
2020-04-17	271	12	224	12	65	7	16	4	81
2020-04-18	306	13	253	12	74	8	18	4	91
2020-04-19	345	13	285	13	84	9	21	4	101
2020-04-20	388	14	320	14	96	9	24	5	111
2020-04-21	434	15	358	15	109	10	27	5	123
2020-04-22	484	15	399	16	123	11	30	6	135
2020-04-23	538	16	442	16	141	12	34	6	147
2020-04-24	597	17	487	17	159	12	38	6	159
2020-04-25	658	18	536	18	180	13	43	6	171
2020-04-26	721	19	585	18	202	13	47	7	182
2020-04-27	786	20	637	19	227	14	52	7	193
2020-04-28	853	21	688	20	255	15	57	7	203
2020-04-29	920	22	739	21	285	16	63	8	212
2020-04-30	987	23	789	21	316	17	68	8	220
2020-05-01	1052	24	838	23	351	17	73	8	225
2020-05-02	1114	24	885	23	387	18	79	8	230
2020-05-03	1172	25	929	24	426	19	84	9	232
2020-05-04	1226	26	968	25	466	20	89	9	232
2020-05-05	1273	25	1003	26	507	20	94	10	231
2020-05-06	1314	27	1033	26	551	21	99	10	227
2020-05-07	1346	28	1056	26	594	22	102	10	222
2020-05-08	1370	28	1075	26	637	22	106	10	215
2020-05-09	1384	28	1089	27	681	23	108	11	208
2020-05-10	1390	30	1097	27	724	25	110	10	199
2020-05-11	1386	30	1099	28	767	25	111	10	189
2020-05-12	1374	30	1096	28	808	25	111	11	179
2020-05-13	1354	30	1088	27	848	25	111	10	168
2020-05-14	1326	29	1074	28	886	27	108	10	157
2020-05-15	1291	29	1058	29	921	27	107	10	146
2020-05-16	1249	28	1037	27	955	27	104	10	136
2020-05-17	1203	27	1012	26	985	28	100	9	125

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	New patients (ICU+HDU)
2020-05-18	1152	27	986	26	1013	28	96	9	115
2020-05-19	1097	27	956	25	1036	29	92	10	105
2020-05-20	1040	26	925	26	1059	29	88	9	96
2020-05-21	980	26	889	26	1076	29	83	9	87
2020-05-22	920	25	853	26	1090	30	78	9	79
2020-05-23	860	23	817	25	1100	29	74	9	72
2020-05-24	801	23	779	25	1108	29	68	8	65
2020-05-25	742	22	739	25	1111	29	63	8	58
2020-05-26	686	20	701	24	1111	30	58	8	53
2020-05-27	631	20	660	23	1107	30	54	8	47
2020-05-28	580	20	620	22	1101	30	49	7	42
2020-05-29	531	19	580	21	1090	29	45	7	38
2020-05-30	485	17	542	21	1075	30	41	6	34
2020-05-31	441	17	505	21	1055	29	37	6	30
2020-06-01	400	16	469	20	1035	28	34	6	27
2020-06-02	363	16	433	19	1010	28	31	6	24
2020-06-03	329	15	400	18	982	29	27	5	22
2020-06-04	296	15	368	17	952	28	25	5	19
2020-06-05	267	14	338	17	918	27	23	5	17
2020-06-06	241	13	310	16	883	27	20	4	16
2020-06-07	216	12	283	16	847	27	18	4	14
2020-06-08	194	12	258	15	809	27	16	4	12
2020-06-09	174	11	235	14	771	26	14	4	11
2020-06-10	156	10	213	14	731	26	13	4	10
2020-06-11	140	10	193	13	692	24	11	3	9
2020-06-12	125	9	175	12	652	24	10	3	8
2020-06-13	112	9	158	12	612	23	9	3	7
2020-06-14	101	8	143	11	572	22	8	3	7
2020-06-15	91	8	129	11	534	21	8	3	6
2020-06-16	81	7	116	10	496	21	7	3	5
2020-06-17	72	7	105	9	460	20	6	3	5
2020-06-18	65	7	94	9	426	19	5	2	4
2020-06-19	58	6	84	8	393	19	5	2	4
2020-06-20	53	6	76	8	361	18	4	2	4
2020-06-21	47	6	68	7	331	17	4	2	3
2020-06-22	43	6	62	7	303	16	3	2	3
2020-06-23	38	5	56	7	277	16	3	2	3
2020-06-24	35	5	50	6	253	15	3	2	3
2020-06-25	31	5	45	6	230	15	3	2	2
2020-06-26	28	4	40	6	209	14	2	1	2
2020-06-27	26	4	36	6	189	13	2	1	2
2020-06-28	24	4	33	5	171	12	2	1	2
2020-06-29	22	4	29	5	154	11	2	1	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)*

	ICU		HDU		Ward		Deaths		
Date	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	New patients (ICU+HDU)
2020-06-30	20	4	27	5	139	11	2	1	2
2020-07-01	18	4	24	5	126	10	1	1	1
2020-07-02	17	4	22	4	113	9	1	1	1
2020-07-03	15	3	19	4	102	9	1	1	1
2020-07-04	14	3	18	4	92	9	1	1	1
2020-07-05	13	3	16	4	82	8	1	1	1
2020-07-06	12	3	15	3	74	8	1	1	1
2020-07-07	11	3	14	3	67	7	1	1	1
2020-07-08	10	3	12	3	60	7	1	1	1
2020-07-09	9	2	11	3	54	6	1	1	1
2020-07-10	9	2	11	3	49	6	1	1	1
2020-07-11	8	2	10	3	43	6	1	1	1
2020-07-12	8	2	10	3	39	6	1	1	1
2020-07-13	7	2	9	3	35	6	1	1	1
2020-07-14	7	2	9	3	32	5	1	1	1
2020-07-15	7	2	8	3	29	5	1	1	1
2020-07-16	7	2	8	2	26	5	1	1	1
2020-07-17	7	2	7	2	24	5	1	1	1
2020-07-18	7	2	7	2	21	4	1	1	1
2020-07-19	7	2	7	2	20	4	1	1	1
2020-07-20	6	2	7	2	18	4	1	1	1
2020-07-21	6	2	6	2	17	4	0	1	0
2020-07-22	5	2	5	2	15	4	1	1	0
2020-07-23	5	2	5	2	14	4	0	1	0
2020-07-24	4	2	4	2	13	3	0	1	0
2020-07-25	4	2	4	2	12	3	0	1	0
2020-07-26	4	2	3	2	11	3	0	1	0
2020-07-27	3	1	3	2	11	3	0	1	0
2020-07-28	3	1	2	1	10	3	0	0	0
2020-07-29	2	1	2	1	9	3	0	0	0
2020-07-30	2	1	2	1	8	3	0	0	0
2020-07-31	1	1	2	1	8	3	0	0	0
2020-08-01	1	1	2	1	7	2	0	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	New patients (ICU+HDU)
2020-03-06	0	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0	0
2020-03-08	0	0	0	0	0	0	0	0	0
2020-03-09	0	0	0	0	0	0	0	0	0
2020-03-10	1	1	0	1	0	0	0	0	1
2020-03-11	1	1	1	1	0	0	0	0	1
2020-03-12	2	1	1	1	0	0	0	0	1
2020-03-13	2	1	2	1	0	0	0	0	1
2020-03-14	3	1	2	1	0	0	0	0	1
2020-03-15	3	1	3	1	0	0	0	0	1
2020-03-16	4	1	3	1	0	0	0	0	1
2020-03-17	4	1	3	1	0	1	0	0	1
2020-03-18	4	1	4	1	0	1	0	1	1
2020-03-19	5	2	4	2	1	1	0	1	2
2020-03-20	6	2	5	2	1	1	0	1	2
2020-03-21	7	2	5	2	1	1	0	1	2
2020-03-22	8	2	6	2	1	1	0	1	2
2020-03-23	9	2	6	2	2	1	1	1	2
2020-03-24	10	2	7	2	2	1	1	1	3
2020-03-25	11	2	8	2	2	1	1	1	3
2020-03-26	12	3	10	2	3	1	1	1	4
2020-03-27	14	3	11	3	3	2	1	1	4
2020-03-28	16	3	13	3	4	2	1	1	5
2020-03-29	18	3	15	3	4	2	1	1	5
2020-03-30	20	3	17	3	5	2	1	1	6
2020-03-31	22	3	19	3	5	2	1	1	7
2020-04-01	26	4	22	4	6	2	2	1	8
2020-04-02	29	4	25	4	7	2	2	1	9
2020-04-03	33	4	28	4	8	3	2	1	10
2020-04-04	37	4	31	4	9	3	2	1	11
2020-04-05	42	5	36	5	10	3	3	2	13
2020-04-06	48	5	41	5	12	3	3	2	15
2020-04-07	55	5	46	5	13	3	3	2	17
2020-04-08	62	6	52	6	15	4	4	2	19
2020-04-09	71	6	59	6	18	4	4	2	21
2020-04-10	80	7	66	6	20	4	5	2	24
2020-04-11	91	7	75	7	23	4	5	2	28
2020-04-12	103	8	85	7	26	4	6	2	31
2020-04-13	117	8	97	7	29	5	7	3	35
2020-04-14	133	8	110	8	33	5	8	3	40
2020-04-15	150	9	124	8	37	6	9	3	44
2020-04-16	169	9	140	9	42	6	10	3	50
2020-04-17	190	10	158	9	48	7	12	3	56

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	New patients (ICU+HDU)
2020-04-18	214	10	177	10	54	7	13	3	62
2020-04-19	240	11	199	11	62	7	15	4	69
2020-04-20	270	12	222	11	70	8	17	4	77
2020-04-21	302	13	249	12	79	8	19	4	85
2020-04-22	336	14	277	13	89	9	21	5	94
2020-04-23	374	15	308	14	100	9	24	5	104
2020-04-24	415	16	342	15	113	10	26	5	113
2020-04-25	459	16	378	16	127	11	29	5	123
2020-04-26	507	17	417	16	143	12	33	6	134
2020-04-27	557	18	458	17	160	12	36	6	144
2020-04-28	611	19	500	18	179	13	40	6	155
2020-04-29	667	20	543	18	200	13	44	7	165
2020-04-30	725	20	588	19	223	13	48	7	175
2020-05-01	784	21	634	20	248	14	53	8	184
2020-05-02	843	22	679	21	275	14	57	7	192
2020-05-03	903	22	725	22	304	15	63	8	200
2020-05-04	961	23	769	22	334	17	67	8	206
2020-05-05	1018	23	812	22	366	18	72	8	211
2020-05-06	1072	23	853	22	401	19	77	9	214
2020-05-07	1122	24	891	23	436	19	82	9	216
2020-05-08	1168	25	925	24	473	20	86	10	216
2020-05-09	1208	26	955	25	512	21	91	9	215
2020-05-10	1243	26	981	25	551	22	94	9	212
2020-05-11	1270	27	1002	25	590	24	97	9	208
2020-05-12	1290	27	1020	26	631	25	99	10	203
2020-05-13	1304	28	1032	26	672	26	101	9	196
2020-05-14	1309	27	1039	26	711	27	103	10	189
2020-05-15	1306	27	1043	26	750	27	104	10	181
2020-05-16	1295	27	1041	26	789	27	103	10	172
2020-05-17	1279	27	1035	26	825	27	103	10	163
2020-05-18	1254	27	1025	27	860	28	102	10	153
2020-05-19	1225	27	1010	27	893	27	101	10	144
2020-05-20	1190	27	993	27	923	27	98	9	134
2020-05-21	1151	26	971	27	952	27	96	9	125
2020-05-22	1106	26	947	25	978	28	92	10	116
2020-05-23	1058	25	920	24	1001	28	88	9	107
2020-05-24	1008	24	890	24	1021	28	84	9	98
2020-05-25	957	24	859	24	1036	28	81	9	90
2020-05-26	904	24	826	25	1048	28	76	8	82
2020-05-27	850	23	793	25	1058	29	72	8	75
2020-05-28	797	22	759	25	1065	29	67	8	69
2020-05-29	743	22	723	24	1067	29	63	8	62
2020-05-30	693	21	687	24	1067	29	59	8	57

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	New patients (ICU+HDU)
2020-05-31	642	20	651	24	1063	29	54	8	51
2020-06-01	594	20	614	23	1056	29	50	7	46
2020-06-02	548	20	578	22	1046	30	46	7	42
2020-06-03	504	19	543	22	1032	29	43	6	38
2020-06-04	462	18	508	20	1016	29	39	6	34
2020-06-05	423	16	475	19	995	29	36	6	31
2020-06-06	386	16	443	18	973	28	32	6	28
2020-06-07	351	15	411	18	947	28	29	5	25
2020-06-08	320	14	382	18	919	28	27	5	23
2020-06-09	291	14	352	17	890	28	24	5	20
2020-06-10	264	13	324	16	858	27	22	4	18
2020-06-11	240	13	298	16	826	26	20	4	17
2020-06-12	217	13	274	16	791	26	18	4	15
2020-06-13	197	12	251	14	756	25	17	4	14
2020-06-14	178	11	229	14	720	24	15	4	12
2020-06-15	161	11	209	13	684	24	13	3	11
2020-06-16	146	10	190	13	647	23	12	4	10
2020-06-17	131	9	174	12	610	22	11	3	9
2020-06-18	119	9	158	11	574	22	10	3	8
2020-06-19	107	8	143	11	538	21	9	3	7
2020-06-20	97	8	130	11	503	21	8	3	7
2020-06-21	87	7	118	10	469	21	7	3	6
2020-06-22	79	7	107	9	436	20	7	2	6
2020-06-23	71	7	97	9	405	19	6	2	5
2020-06-24	65	7	88	9	374	18	5	2	5
2020-06-25	59	6	80	8	346	17	5	2	4
2020-06-26	53	6	72	8	318	17	5	2	4
2020-06-27	48	6	66	7	293	16	4	2	4
2020-06-28	44	5	60	7	268	16	4	2	3
2020-06-29	40	5	54	7	247	15	3	2	3
2020-06-30	36	5	49	6	225	14	3	2	3
2020-07-01	33	5	45	6	206	14	3	2	3
2020-07-02	30	5	41	6	188	13	2	2	2
2020-07-03	27	4	37	5	171	13	2	1	2
2020-07-04	25	4	33	5	155	12	2	1	2
2020-07-05	23	4	30	5	141	11	2	1	2
2020-07-06	21	4	28	5	128	11	2	1	2
2020-07-07	20	4	26	4	116	10	2	1	2
2020-07-08	18	3	24	4	105	10	2	1	2
2020-07-09	17	3	22	4	95	9	1	1	2
2020-07-10	16	3	20	4	86	9	1	1	1
2020-07-11	14	3	18	4	78	8	1	1	1
2020-07-12	13	3	17	4	71	8	1	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	New patients (ICU+HDU)
2020-07-13	12	3	15	4	65	7	1	1	1
2020-07-14	11	3	14	3	59	7	1	1	1
2020-07-15	11	3	13	3	53	7	1	1	1
2020-07-16	10	3	12	3	49	6	1	1	1
2020-07-17	9	2	11	3	44	6	1	1	1
2020-07-18	9	2	10	3	40	6	1	1	1
2020-07-19	8	2	10	3	37	6	1	1	1
2020-07-20	8	2	9	3	33	6	1	1	1
2020-07-21	7	2	9	2	30	5	1	1	1
2020-07-22	7	2	8	2	28	5	1	1	1
2020-07-23	7	2	8	2	25	5	1	1	1
2020-07-24	7	2	8	2	23	4	1	1	1
2020-07-25	7	2	7	2	21	4	0	1	1
2020-07-26	7	2	7	2	19	4	1	1	1
2020-07-27	7	2	7	2	18	4	0	1	1
2020-07-28	7	2	7	2	17	4	0	1	1
2020-07-29	7	2	6	2	15	4	1	1	1
2020-07-30	6	2	6	2	14	3	0	1	0
2020-07-31	6	2	5	2	13	3	1	1	0
2020-08-01	5	2	4	2	12	3	0	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	New patients (ICU+HDU)
2020-03-06	0	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0	0
2020-03-08	0	0	0	0	0	0	0	0	0
2020-03-09	1	1	0	1	0	0	0	0	1
2020-03-10	1	1	1	1	0	0	0	0	1
2020-03-11	2	1	1	1	0	0	0	0	1
2020-03-12	2	1	2	1	0	0	0	0	1
2020-03-13	2	1	2	1	0	0	0	0	1
2020-03-14	3	1	3	1	0	0	0	0	1
2020-03-15	4	1	3	1	0	0	0	0	1
2020-03-16	4	1	3	1	0	1	0	1	1
2020-03-17	4	1	4	1	1	1	0	0	1
2020-03-18	5	2	4	1	1	1	0	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	New patients (ICU+HDU)
2020-03-19	6	2	4	2	1	1	0	1	2
2020-03-20	7	2	5	2	1	1	0	1	2
2020-03-21	7	2	5	2	2	1	0	1	2
2020-03-22	8	2	6	2	2	1	1	1	2
2020-03-23	9	2	7	2	2	1	1	1	2
2020-03-24	10	2	8	2	2	1	1	1	3
2020-03-25	11	2	9	2	3	1	1	1	3
2020-03-26	12	3	10	2	3	1	1	1	3
2020-03-27	13	3	11	3	3	2	1	1	4
2020-03-28	15	3	12	3	4	2	1	1	4
2020-03-29	17	3	14	3	4	2	1	1	5
2020-03-30	19	3	16	3	5	2	1	1	6
2020-03-31	21	4	18	3	6	2	1	1	6
2020-04-01	24	4	20	3	6	2	1	1	7
2020-04-02	27	4	22	3	7	2	2	1	8
2020-04-03	30	4	25	4	8	3	2	1	9
2020-04-04	34	4	29	4	9	3	2	1	10
2020-04-05	38	5	33	4	10	3	2	2	12
2020-04-06	43	5	37	5	12	3	2	2	13
2020-04-07	49	6	42	5	13	3	3	2	15
2020-04-08	56	6	47	5	15	4	4	2	17
2020-04-09	63	6	53	6	17	4	4	2	19
2020-04-10	72	6	60	6	19	4	4	2	22
2020-04-11	81	7	68	6	21	4	5	2	24
2020-04-12	92	7	77	7	24	4	6	2	28
2020-04-13	104	8	87	7	27	5	6	3	31
2020-04-14	118	8	98	8	31	5	7	3	35
2020-04-15	133	8	110	8	35	5	8	3	39
2020-04-16	149	9	123	9	39	5	9	3	43
2020-04-17	168	9	138	9	44	6	10	3	48
2020-04-18	188	10	155	10	50	6	12	3	54
2020-04-19	210	10	174	10	56	7	13	3	60
2020-04-20	235	11	194	11	63	7	15	4	67
2020-04-21	263	12	217	11	71	8	17	4	74
2020-04-22	293	13	241	12	79	8	18	4	81
2020-04-23	326	14	268	13	89	9	21	5	90
2020-04-24	362	15	296	13	101	9	23	5	98
2020-04-25	401	15	328	14	113	10	26	5	107
2020-04-26	442	17	362	15	126	10	28	5	117
2020-04-27	486	18	398	16	141	11	31	5	126
2020-04-28	533	19	435	16	157	11	35	6	136
2020-04-29	582	19	476	17	175	12	38	6	146
2020-04-30	633	20	516	18	196	13	42	6	155

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	New patients (ICU+HDU)
2020-05-01	687	21	558	19	217	14	46	7	164
2020-05-02	741	21	600	20	241	14	50	7	173
2020-05-03	796	22	644	20	266	14	54	7	182
2020-05-04	852	22	687	21	293	15	60	7	189
2020-05-05	907	23	729	22	321	16	64	8	195
2020-05-06	960	24	770	22	352	17	68	8	200
2020-05-07	1012	24	809	23	385	17	72	8	204
2020-05-08	1061	25	846	24	418	18	76	8	207
2020-05-09	1106	26	880	24	454	18	82	9	208
2020-05-10	1147	26	910	25	491	19	85	9	208
2020-05-11	1182	27	938	26	528	20	89	9	207
2020-05-12	1211	27	961	25	566	21	91	9	204
2020-05-13	1235	27	981	26	603	22	94	9	200
2020-05-14	1252	27	997	26	641	23	97	10	195
2020-05-15	1261	28	1008	25	680	23	98	10	188
2020-05-16	1264	28	1013	25	717	24	100	10	181
2020-05-17	1260	28	1015	25	754	25	101	10	174
2020-05-18	1248	28	1012	25	790	25	100	10	165
2020-05-19	1231	27	1005	25	824	26	100	10	157
2020-05-20	1206	27	995	25	856	25	98	9	148
2020-05-21	1178	27	981	24	886	26	97	9	139
2020-05-22	1143	26	963	25	915	26	94	9	130
2020-05-23	1105	26	942	25	940	27	92	10	121
2020-05-24	1064	26	919	26	964	27	89	10	113
2020-05-25	1018	25	893	25	984	28	85	8	105
2020-05-26	971	25	865	25	1001	28	81	9	96
2020-05-27	922	24	836	25	1016	28	78	9	89
2020-05-28	873	22	804	25	1027	29	73	8	82
2020-05-29	823	22	772	25	1035	28	69	8	75
2020-05-30	773	22	739	24	1040	29	65	8	68
2020-05-31	723	22	704	24	1041	29	61	8	62
2020-06-01	675	21	670	23	1039	29	57	8	57
2020-06-02	627	20	636	22	1035	29	53	7	52
2020-06-03	582	19	601	22	1028	29	49	7	47
2020-06-04	538	18	566	22	1017	28	45	7	43
2020-06-05	497	18	533	21	1004	29	42	6	39
2020-06-06	457	17	499	20	987	29	39	6	35
2020-06-07	420	17	467	19	967	29	35	6	32
2020-06-08	385	16	436	18	945	29	33	6	29
2020-06-09	352	16	406	17	920	28	30	5	26
2020-06-10	322	15	376	17	892	28	27	5	24
2020-06-11	293	14	349	16	864	29	24	5	21
2020-06-12	267	13	322	15	834	28	23	5	19

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	New patients (ICU+HDU)
2020-06-13	243	13	297	15	802	27	21	5	18
2020-06-14	221	12	274	15	769	25	18	4	16
2020-06-15	201	12	253	15	735	24	17	4	15
2020-06-16	182	11	232	14	701	24	15	4	13
2020-06-17	166	11	212	13	666	23	14	4	12
2020-06-18	151	10	194	13	631	23	13	3	11
2020-06-19	137	10	177	12	595	23	11	3	10
2020-06-20	124	9	162	11	561	22	10	3	9
2020-06-21	112	8	148	10	527	22	10	3	8
2020-06-22	102	8	134	10	494	21	9	3	7
2020-06-23	92	7	122	9	462	20	8	3	7
2020-06-24	83	7	111	9	430	19	7	3	6
2020-06-25	76	7	101	9	400	18	6	3	6
2020-06-26	69	7	92	9	371	18	6	2	5
2020-06-27	63	7	84	8	344	17	5	2	5
2020-06-28	57	7	76	8	318	15	5	2	4
2020-06-29	52	6	69	8	293	15	4	2	4
2020-06-30	48	6	63	7	270	15	4	2	4
2020-07-01	43	6	57	7	248	14	3	2	3
2020-07-02	40	5	52	6	227	14	3	2	3
2020-07-03	36	5	48	6	208	13	3	2	3
2020-07-04	33	5	44	6	190	12	3	2	3
2020-07-05	30	4	40	6	174	12	2	2	3
2020-07-06	28	4	37	5	158	11	2	1	2
2020-07-07	25	4	34	5	145	11	2	1	2
2020-07-08	23	4	31	5	132	11	2	1	2
2020-07-09	22	4	28	5	120	10	2	1	2
2020-07-10	20	3	26	4	110	10	2	1	2
2020-07-11	19	3	24	4	100	9	2	1	2
2020-07-12	18	3	22	4	91	8	1	1	2
2020-07-13	16	3	20	4	82	8	1	1	1
2020-07-14	15	3	18	4	75	7	1	1	1
2020-07-15	14	3	17	3	69	7	1	1	1
2020-07-16	13	3	15	3	62	7	1	1	1
2020-07-17	12	3	14	3	57	7	1	1	1
2020-07-18	11	3	13	3	52	6	1	1	1
2020-07-19	10	3	12	3	47	6	1	1	1
2020-07-20	10	2	11	3	43	6	1	1	1
2020-07-21	9	2	10	3	39	6	1	1	1
2020-07-22	9	2	10	3	36	6	1	1	1
2020-07-23	8	2	9	3	33	5	1	1	1
2020-07-24	8	2	9	3	30	5	1	1	1
2020-07-25	7	2	9	3	27	5	1	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	New patients (ICU+HDU)
2020-07-26	7	2	8	3	25	5	1	1	1
2020-07-27	7	2	8	2	23	4	1	1	1
2020-07-28	7	2	8	2	21	4	1	1	1
2020-07-29	7	2	7	2	19	4	1	1	1
2020-07-30	7	2	7	2	18	4	0	1	1
2020-07-31	7	2	7	2	17	4	1	1	1
2020-08-01	6	2	6	2	15	4	0	0	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.

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

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	New patients (ICU+HDU)
2020-04-01	20	3	16	3	6	2	1	1	5
2020-04-02	22	3	18	3	6	2	1	1	6
2020-04-03	24	4	20	4	7	2	2	1	7
2020-04-04	27	4	22	4	8	3	2	1	7
2020-04-05	30	4	25	4	9	3	2	1	8
2020-04-06	33	4	27	4	10	3	2	2	9
2020-04-07	36	5	30	5	11	3	2	2	10
2020-04-08	40	5	34	5	12	3	3	2	11
2020-04-09	44	5	37	5	13	3	3	2	12
2020-04-10	49	5	41	5	15	3	3	2	14
2020-04-11	55	6	46	5	17	4	3	2	16
2020-04-12	61	6	52	6	19	4	4	2	17
2020-04-13	68	6	57	6	20	4	4	2	19
2020-04-14	76	6	63	6	23	4	5	2	21
2020-04-15	84	7	70	7	25	5	5	2	23
2020-04-16	94	7	78	7	28	5	6	2	26
2020-04-17	104	8	86	7	31	5	7	3	29
2020-04-18	115	8	96	8	35	5	7	3	31
2020-04-19	128	8	106	8	39	6	8	3	35
2020-04-20	141	9	117	9	43	6	9	3	38
2020-04-21	156	9	129	9	48	6	10	3	42
2020-04-22	173	10	142	9	53	6	11	3	46
2020-04-23	191	10	157	10	58	7	12	4	51
2020-04-24	210	10	172	11	65	7	14	4	55
2020-04-25	231	11	190	11	72	8	15	4	61
2020-04-26	254	12	208	11	79	8	17	4	66
2020-04-27	279	13	228	12	87	9	18	4	72
2020-04-28	305	13	250	12	96	9	20	4	78
2020-04-29	333	13	273	13	107	10	22	5	84
2020-04-30	363	14	297	14	117	10	24	5	91
2020-05-01	395	15	323	14	129	11	27	5	98
2020-05-02	429	15	351	14	142	11	29	5	105
2020-05-03	464	15	380	15	156	12	31	5	112
2020-05-04	502	16	410	15	171	12	34	6	120
2020-05-05	541	17	442	16	188	12	37	6	127
2020-05-06	581	18	474	17	206	13	40	6	134
2020-05-07	623	19	507	18	225	14	43	7	141
2020-05-08	664	20	541	19	246	15	46	7	148
2020-05-09	707	21	576	20	268	16	50	7	154
2020-05-10	749	22	610	21	291	16	53	7	160
2020-05-11	791	23	643	21	316	17	56	7	165
2020-05-12	833	23	676	22	342	17	60	8	170
2020-05-13	874	24	708	22	368	18	63	8	174

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	New patients (ICU+HDU)
2020-05-14	913	24	738	23	396	18	67	8	177
2020-05-15	951	25	767	23	425	18	70	8	179
2020-05-16	984	26	793	23	455	19	73	8	180
2020-05-17	1014	26	818	24	486	19	76	9	180
2020-05-18	1041	26	839	24	517	21	78	9	180
2020-05-19	1064	26	859	24	548	21	81	8	178
2020-05-20	1082	27	875	24	581	22	83	9	175
2020-05-21	1095	27	887	25	612	22	85	9	172
2020-05-22	1105	26	897	24	643	22	86	9	168
2020-05-23	1108	25	903	24	674	23	87	9	163
2020-05-24	1108	25	905	25	704	24	87	9	158
2020-05-25	1101	25	906	25	733	25	87	9	152
2020-05-26	1091	25	902	25	761	26	88	9	146
2020-05-27	1076	25	895	26	788	26	87	9	140
2020-05-28	1055	25	885	25	813	27	84	9	133
2020-05-29	1034	25	874	26	837	27	83	9	127
2020-05-30	1008	25	860	26	858	27	82	8	120
2020-05-31	978	24	844	26	877	27	80	9	113
2020-06-01	945	24	824	25	894	28	78	9	106
2020-06-02	911	23	804	24	910	28	75	9	100
2020-06-03	874	21	781	23	923	28	72	9	93
2020-06-04	836	21	757	24	932	30	69	8	87
2020-06-05	797	21	732	24	939	29	66	8	81
2020-06-06	757	20	706	24	944	29	63	8	75
2020-06-07	717	20	678	23	946	29	60	8	70
2020-06-08	678	20	651	22	945	28	56	7	65
2020-06-09	639	20	624	21	942	29	54	8	60
2020-06-10	600	19	595	21	937	29	50	7	55
2020-06-11	563	19	565	21	930	30	47	7	51
2020-06-12	526	19	537	21	920	29	44	7	47
2020-06-13	491	18	509	20	907	29	41	6	43
2020-06-14	458	18	481	19	892	29	38	6	40
2020-06-15	427	17	454	19	876	28	35	6	37
2020-06-16	397	16	427	19	857	28	33	6	34
2020-06-17	368	15	401	18	836	27	30	5	31
2020-06-18	341	15	376	18	814	27	29	5	29
2020-06-19	315	14	351	17	790	26	27	5	26
2020-06-20	291	14	327	16	765	25	24	5	24
2020-06-21	269	13	305	15	739	25	23	4	22
2020-06-22	248	13	284	14	711	24	21	5	20
2020-06-23	228	12	264	14	682	23	19	4	19
2020-06-24	211	11	245	14	652	23	18	4	17
2020-06-25	195	11	227	13	623	22	16	4	16

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	New patients (ICU+HDU)
2020-06-26	180	11	211	13	593	22	15	4	15
2020-06-27	166	10	195	12	564	22	14	4	14
2020-06-28	152	10	181	13	535	21	13	4	12
2020-06-29	140	9	167	12	506	20	12	3	11
2020-06-30	128	8	154	11	478	20	11	3	10
2020-07-01	118	8	143	11	450	19	10	3	10
2020-07-02	109	8	132	10	423	18	9	3	9
2020-07-03	100	8	121	10	397	18	8	3	8
2020-07-04	93	7	112	10	372	18	8	3	8
2020-07-05	85	7	103	9	347	17	7	3	7
2020-07-06	79	7	95	9	325	16	6	3	7
2020-07-07	73	6	87	9	303	16	6	2	6
2020-07-08	67	6	81	8	282	16	6	2	6
2020-07-09	62	6	75	8	262	15	5	2	5
2020-07-10	57	6	68	7	243	15	5	2	5
2020-07-11	53	6	64	7	226	15	4	2	5
2020-07-12	49	6	59	7	210	14	4	2	4
2020-07-13	46	6	54	6	194	13	4	2	4
2020-07-14	43	5	50	6	180	13	3	2	4
2020-07-15	39	5	46	6	166	13	3	2	3
2020-07-16	36	5	43	6	153	12	3	2	3
2020-07-17	34	5	39	6	142	11	3	2	3
2020-07-18	31	4	36	5	131	11	3	2	3
2020-07-19	29	4	34	5	121	10	2	1	3
2020-07-20	28	4	32	5	111	10	2	1	3
2020-07-21	26	4	30	5	103	9	2	2	2
2020-07-22	24	4	27	5	95	9	2	1	2
2020-07-23	22	4	26	4	87	9	2	1	2
2020-07-24	21	4	24	4	80	8	2	1	2
2020-07-25	19	4	23	4	74	8	2	1	2
2020-07-26	18	3	21	4	69	8	2	1	2
2020-07-27	17	3	20	4	64	7	1	1	2
2020-07-28	16	3	19	4	59	7	1	1	2
2020-07-29	15	3	17	4	55	7	1	1	1
2020-07-30	14	3	16	3	50	7	1	1	1
2020-07-31	13	3	15	3	47	6	1	1	1
2020-08-01	12	3	13	3	41	6	0	0	1

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	New patients (ICU+HDU)
2020-03-06	0	0	0	0	0	0	0	0	0
2020-03-07	0	0	0	0	0	0	0	0	0
2020-03-08	0	0	0	0	0	0	0	0	0
2020-03-09	1	1	0	1	0	0	0	0	1
2020-03-10	1	1	1	1	0	0	0	0	1
2020-03-11	1	1	2	1	0	0	0	0	1
2020-03-12	2	1	2	1	0	0	0	0	1
2020-03-13	2	1	2	1	0	0	0	0	1
2020-03-14	3	1	3	1	0	0	0	0	1
2020-03-15	3	1	3	1	0	0	0	0	1
2020-03-16	4	1	3	1	0	1	0	1	1
2020-03-17	4	1	4	1	1	1	0	0	1
2020-03-18	5	2	4	1	1	1	0	1	1
2020-03-19	5	2	4	1	1	1	0	1	1
2020-03-20	6	2	4	2	1	1	0	1	2
2020-03-21	7	2	5	2	2	1	0	1	2
2020-03-22	7	2	6	2	2	1	1	1	2
2020-03-23	8	2	6	2	2	1	0	1	2
2020-03-24	9	2	7	2	2	1	1	1	2
2020-03-25	9	2	7	2	2	1	1	1	2
2020-03-26	10	2	8	2	3	1	1	1	2
2020-03-27	11	3	9	2	3	2	1	1	3
2020-03-28	12	3	10	3	3	2	1	1	3
2020-03-29	13	3	11	3	4	2	1	1	3
2020-03-30	14	3	11	3	4	2	1	1	3
2020-03-31	15	3	12	3	5	2	1	1	4
2020-04-01	16	3	13	3	5	2	1	1	4
2020-04-02	17	3	14	3	6	2	1	1	4
2020-04-03	19	3	16	3	6	2	1	1	5
2020-04-04	21	3	17	3	7	2	1	1	5
2020-04-05	22	3	18	3	8	3	2	1	5
2020-04-06	24	4	20	4	9	3	2	1	6
2020-04-07	26	4	21	4	9	3	2	1	6
2020-04-08	28	4	23	4	10	3	2	1	7
2020-04-09	30	4	25	4	11	3	2	1	7
2020-04-10	33	4	27	4	12	3	2	1	8
2020-04-11	35	4	29	4	13	3	2	2	9
2020-04-12	38	5	32	4	14	4	2	2	9
2020-04-13	41	5	34	5	16	4	3	2	10
2020-04-14	45	5	37	5	17	4	3	2	11
2020-04-15	48	5	40	5	18	4	3	2	12
2020-04-16	52	6	44	5	20	4	3	2	13
2020-04-17	57	6	47	5	21	4	4	2	14

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	New patients (ICU+HDU)
2020-04-18	61	6	51	6	23	4	4	2	15
2020-04-19	66	6	55	6	25	5	4	2	16
2020-04-20	72	6	60	6	27	5	5	2	18
2020-04-21	78	7	65	7	30	5	5	2	19
2020-04-22	85	7	70	7	32	5	6	2	21
2020-04-23	92	7	76	7	35	5	6	2	22
2020-04-24	99	8	82	7	37	6	7	2	24
2020-04-25	107	8	88	7	41	6	7	3	26
2020-04-26	116	8	95	8	44	6	8	3	28
2020-04-27	126	9	102	8	48	7	8	3	30
2020-04-28	136	9	110	9	52	7	9	3	32
2020-04-29	146	9	118	9	56	7	10	3	34
2020-04-30	157	9	127	10	60	7	11	3	37
2020-05-01	170	10	137	10	65	7	11	3	40
2020-05-02	183	10	148	10	70	8	12	3	43
2020-05-03	196	11	159	10	76	8	13	4	45
2020-05-04	209	12	172	11	81	8	14	4	48
2020-05-05	224	12	184	11	88	9	15	4	52
2020-05-06	240	12	198	11	95	9	17	4	55
2020-05-07	257	12	211	12	102	9	18	4	59
2020-05-08	275	13	226	12	110	10	19	4	62
2020-05-09	294	13	241	12	119	10	20	5	66
2020-05-10	314	14	257	13	128	11	21	5	70
2020-05-11	334	14	273	13	137	11	23	5	74
2020-05-12	356	15	291	14	148	11	25	5	78
2020-05-13	377	15	308	14	159	12	27	5	82
2020-05-14	400	15	326	14	171	12	28	5	86
2020-05-15	424	16	345	14	183	12	29	6	91
2020-05-16	448	16	365	15	195	13	31	6	95
2020-05-17	473	16	386	15	209	13	33	5	99
2020-05-18	498	17	406	16	224	13	35	6	103
2020-05-19	523	17	426	16	239	13	37	6	107
2020-05-20	549	17	448	16	255	14	39	6	111
2020-05-21	574	18	468	16	271	15	41	6	114
2020-05-22	599	18	490	18	288	15	43	6	118
2020-05-23	624	18	510	18	306	15	45	6	121
2020-05-24	648	18	531	19	324	17	47	7	124
2020-05-25	672	18	551	19	342	17	50	7	126
2020-05-26	695	19	571	20	361	17	51	7	129
2020-05-27	716	19	589	20	381	17	53	7	130
2020-05-28	737	20	607	21	401	18	55	7	132
2020-05-29	756	21	623	20	421	18	57	7	133
2020-05-30	775	21	637	20	442	19	58	8	134

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	New patients (ICU+HDU)
2020-05-31	790	21	652	20	463	19	60	7	134
2020-06-01	804	21	664	20	484	21	62	8	134
2020-06-02	815	22	675	21	505	21	63	8	133
2020-06-03	824	22	685	21	525	22	63	8	132
2020-06-04	832	22	693	21	546	22	65	8	131
2020-06-05	837	22	699	22	565	22	65	8	130
2020-06-06	841	22	705	22	585	21	65	8	128
2020-06-07	841	23	708	22	604	22	65	8	125
2020-06-08	840	23	709	21	623	22	66	7	122
2020-06-09	836	23	708	22	641	23	66	8	120
2020-06-10	830	24	704	21	658	23	65	8	116
2020-06-11	823	23	701	22	673	23	65	8	113
2020-06-12	812	22	696	22	687	23	64	8	109
2020-06-13	800	22	689	21	701	23	64	8	106
2020-06-14	785	22	681	21	714	23	63	8	102
2020-06-15	769	22	671	21	724	23	61	7	98
2020-06-16	751	22	660	22	735	23	61	8	94
2020-06-17	732	22	647	23	743	22	59	7	90
2020-06-18	713	22	633	22	750	22	57	7	86
2020-06-19	692	21	620	21	755	24	56	8	83
2020-06-20	669	21	606	20	759	24	54	7	79
2020-06-21	647	20	590	20	760	23	53	7	75
2020-06-22	624	19	573	20	760	24	51	6	71
2020-06-23	601	18	556	20	758	24	49	7	68
2020-06-24	577	18	538	19	756	25	47	6	64
2020-06-25	554	18	521	19	752	25	45	6	61
2020-06-26	529	18	503	19	747	26	43	6	57
2020-06-27	505	17	484	19	740	26	41	6	54
2020-06-28	482	17	466	19	731	25	39	6	51
2020-06-29	458	17	448	19	721	25	37	6	48
2020-06-30	436	16	430	19	711	25	36	6	46
2020-07-01	414	16	411	18	699	24	34	6	43
2020-07-02	394	15	394	18	686	24	32	6	41
2020-07-03	373	16	376	17	671	24	31	6	38
2020-07-04	353	15	359	16	655	24	30	6	36
2020-07-05	334	15	342	16	639	23	27	5	34
2020-07-06	316	14	325	15	623	23	26	5	32
2020-07-07	298	14	309	14	606	23	25	5	30
2020-07-08	281	13	293	14	588	21	23	5	28
2020-07-09	265	13	277	14	569	21	22	4	26
2020-07-10	250	12	262	13	550	20	21	4	25
2020-07-11	236	12	248	13	531	20	20	5	23
2020-07-12	222	12	234	13	512	20	18	4	22

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	New patients (ICU+HDU)
2020-07-13	210	12	221	13	492	20	17	4	21
2020-07-14	198	11	209	13	473	20	16	4	19
2020-07-15	186	11	197	13	455	20	15	4	18
2020-07-16	175	11	186	12	436	19	15	4	17
2020-07-17	165	10	175	12	417	18	14	4	16
2020-07-18	155	10	165	11	398	18	13	4	15
2020-07-19	145	10	155	11	379	17	12	3	14
2020-07-20	136	9	146	11	361	17	11	3	13
2020-07-21	128	9	138	11	343	16	10	3	12
2020-07-22	120	9	130	10	326	16	10	3	12
2020-07-23	113	9	123	10	310	15	9	3	11
2020-07-24	106	8	115	10	294	15	9	3	10
2020-07-25	99	8	109	9	278	16	8	3	10
2020-07-26	93	8	102	9	263	15	8	3	9
2020-07-27	88	7	96	9	249	15	7	3	9
2020-07-28	82	7	90	8	236	14	7	3	8
2020-07-29	78	7	85	8	223	14	6	2	8
2020-07-30	73	7	80	8	210	14	6	2	7
2020-07-31	69	7	75	8	198	13	6	2	7
2020-08-01	65	7	67	8	178	13	0	0	7