

# UCLH bed needs modelling

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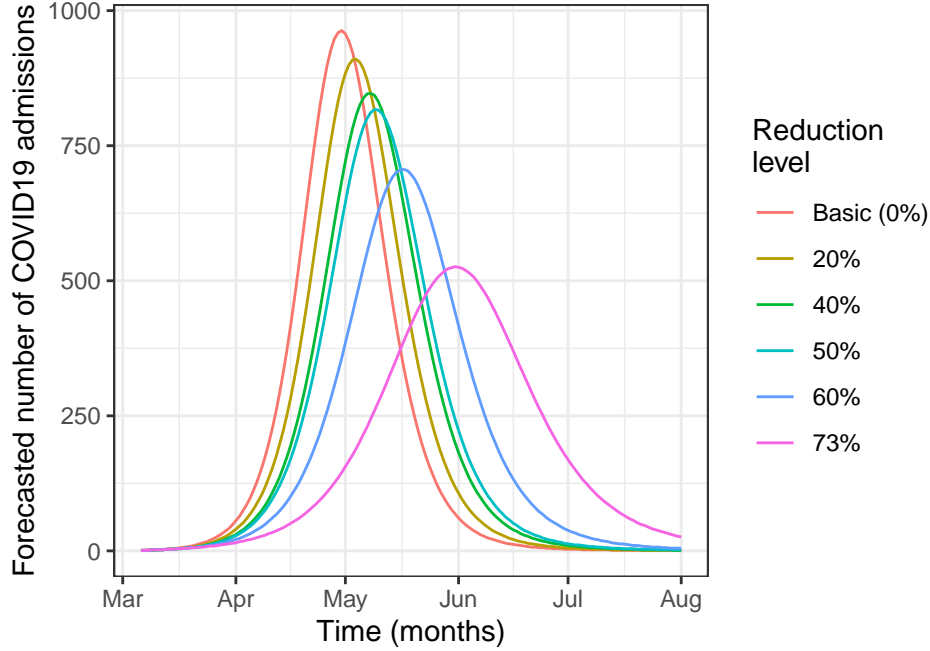
Monday 06 April 2020

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## 1 Model input

- Forecasted COVID19 hospital admissions, taking Pietro/Richard forecasts for 0% (base) / 20% / 40% / 50% / 60% / 73% reduction in contact rates (Figure 1)
- Patient pathways
  - 1) intubated (mechanical ventilation) – mean LoS assumption: 14 days in ICU (with 50% mortality), 7 days HDU, 14 days ward bed, then discharge
  - 2) not intubated (non-invasive ventilation/CPAP) – mean LoS assumption: 7 days HDU (with 50% 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) 50% 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% of forecasted COVID19 admissions require critical care. For each admission, we randomly draw the pathway (50-50). 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 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 from a Poisson distribution with mean 10, and record that a death has occurred at that time, and that an ICU bed will be needed up to that time. If the patient does not die, we randomly draw the length of stay in the ICU bed from a Poisson distribution with mean 14 days. After this duration, the patient moves on to the next step of the pathway.

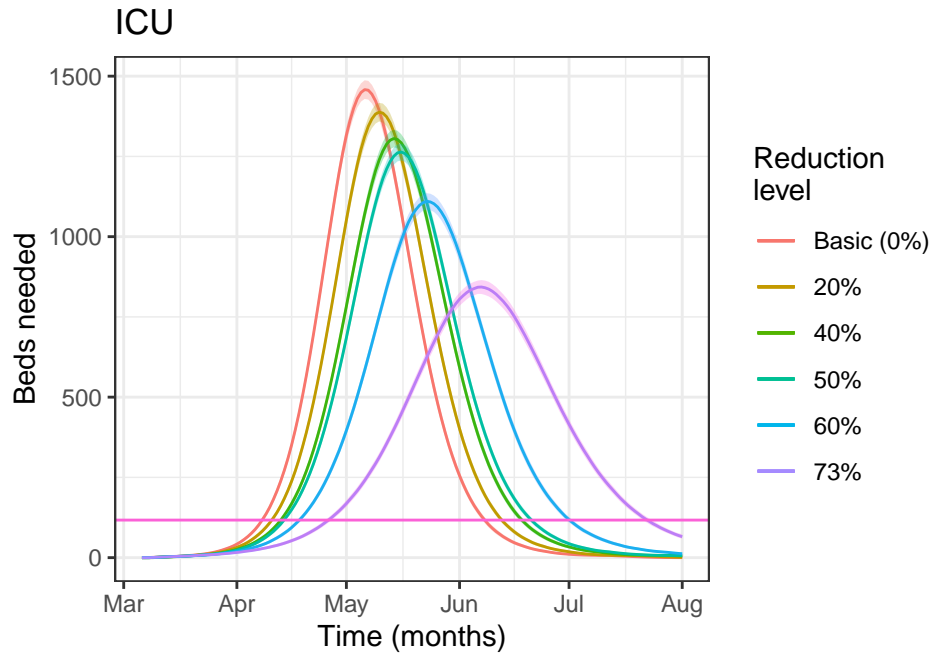
We repeat the process to draw a length of stay for each remaining step (type of bed occupancy) in turn on the pathway, systematically recording the time interval when a bed will be needed. This allows us to account for the fact that beds are only needed for a limited period of time, and will eventually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

## 3 Model output

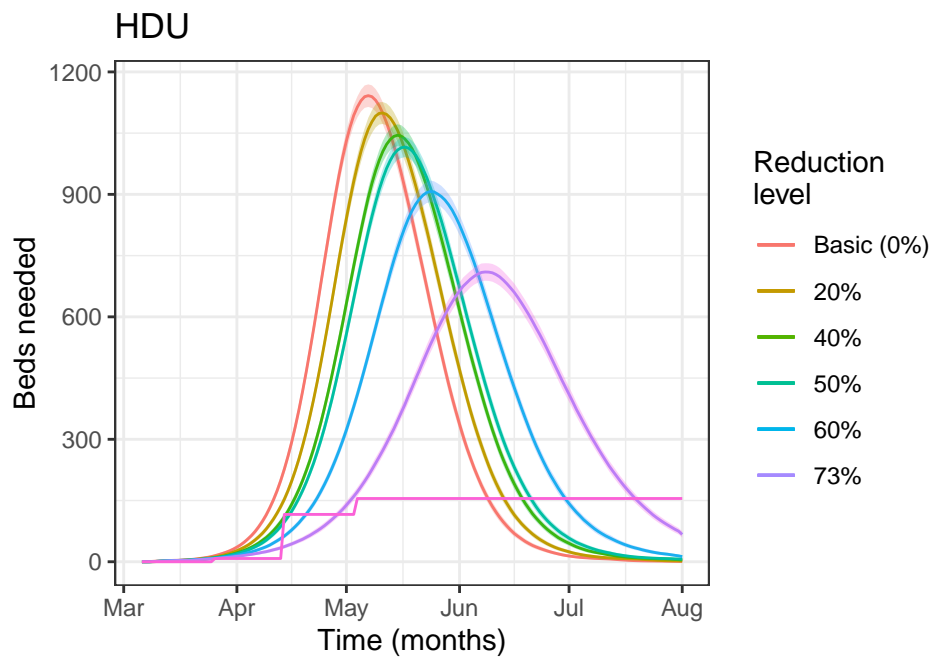
The model outputs the number of beds that would be needed each day to accommodate all of the admitted critical care COVID19 patients. The model can be run multiple times to provide us a mean and error range for these outputs. The uncertainty presented arises from the stochastic model sampling from distributions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

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

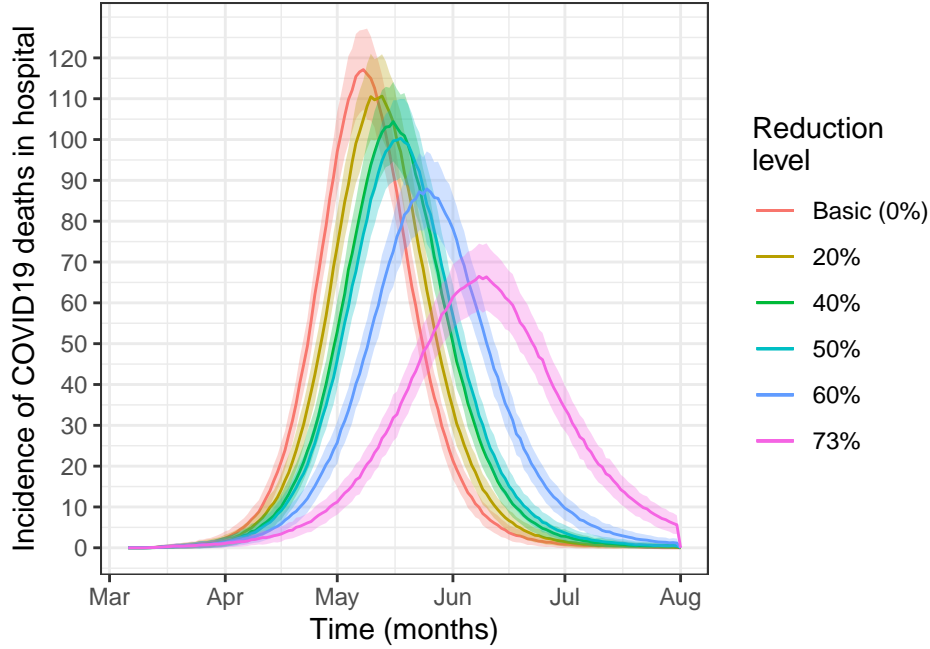
### 3.1 Summary



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



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



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

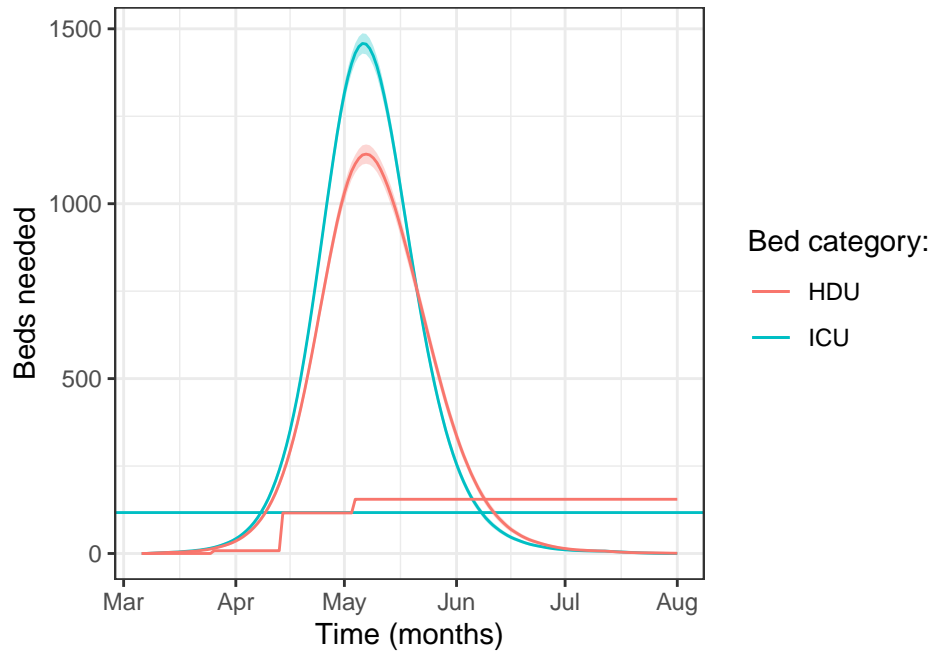
**Table 1:** Summary model output from 500 model runs for all scenarios. Scenarios are: 0% reduction in contact rate (base), 20%, 40%, 50%, 60% and 73% reduction in contact rates SD: standard deviation. Note that ward bed needs only represent the need for critical care patients, NOT the need for total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

Scenario	ICU peak bed needs			HDU peak bed needs			Ward peak bed needs			Cumulative deaths	
	Peak time	Mean beds	SD	Peak time	Mean beds	SD	Peak time	Mean beds	SD	Mean deaths	SD
Base (0%)	2020-05-06	1458	29	2020-05-07	1142	28	2020-05-22	1144	31	3631	511
20% reduction	2020-05-10	1388	29	2020-05-11	1099	27	2020-05-25	1109	28	3620	523
40% reduction	2020-05-14	1306	27	2020-05-15	1045	27	2020-05-29	1066	28	3609	537
50% reduction	2020-05-16	1264	26	2020-05-17	1016	25	2020-05-31	1041	28	3600	544
60% reduction	2020-05-23	1110	25	2020-05-24	907	27	2020-06-07	948	28	3555	564
73% reduction	2020-06-07	843	22	2020-06-08	710	21	2020-06-21	761	24	3366	576

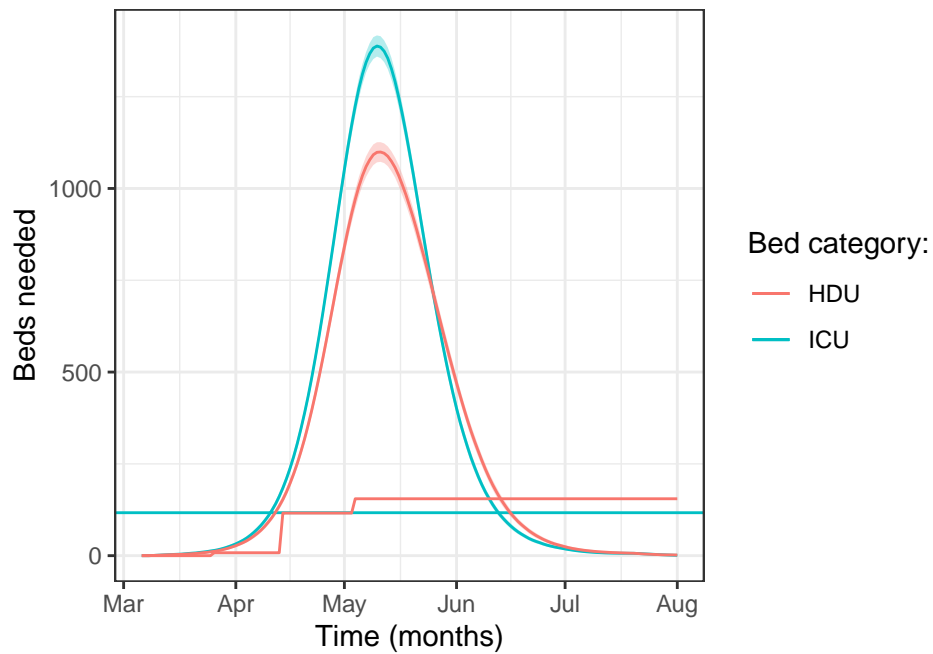
### 3.2 Model Limitations

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

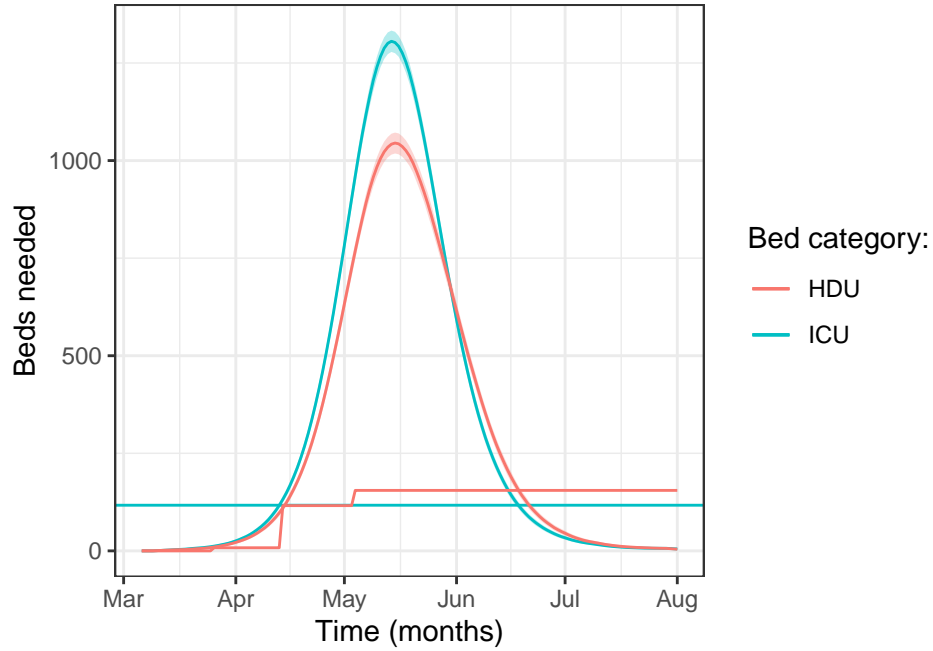
### 3.3 Individual scenario plots and tables



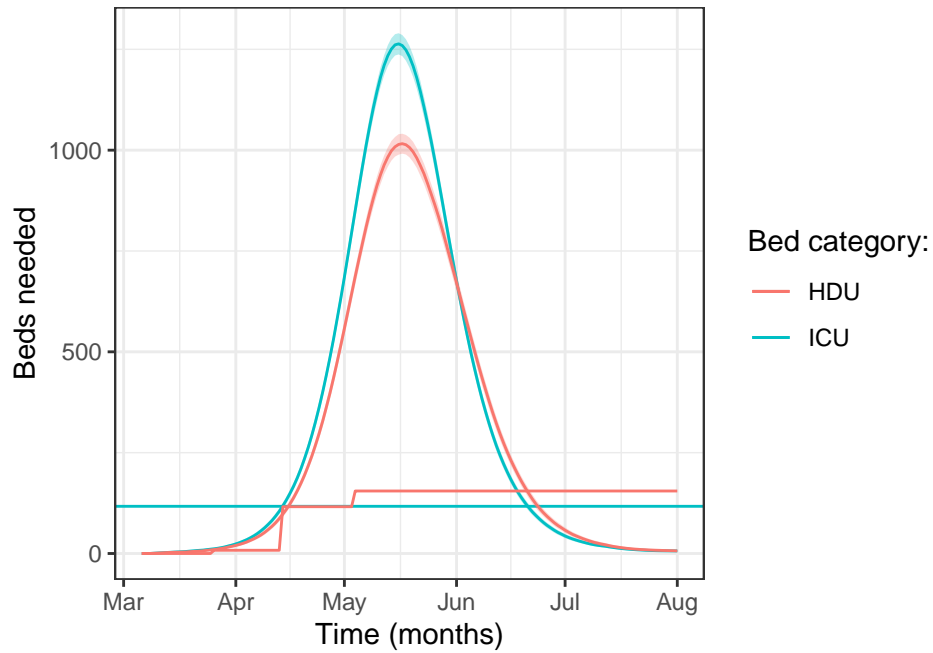
**Figure 5:** Output from 500 model runs for the base scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average  $\pm$  standard deviation.



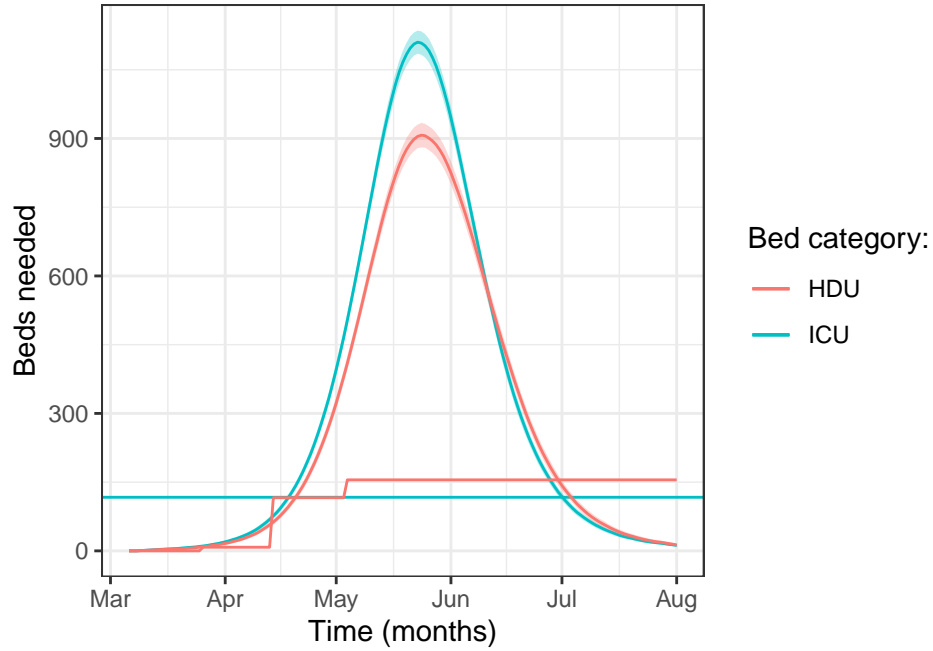
**Figure 6:** Output from 500 model runs for the 20% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average  $\pm$  standard deviation.



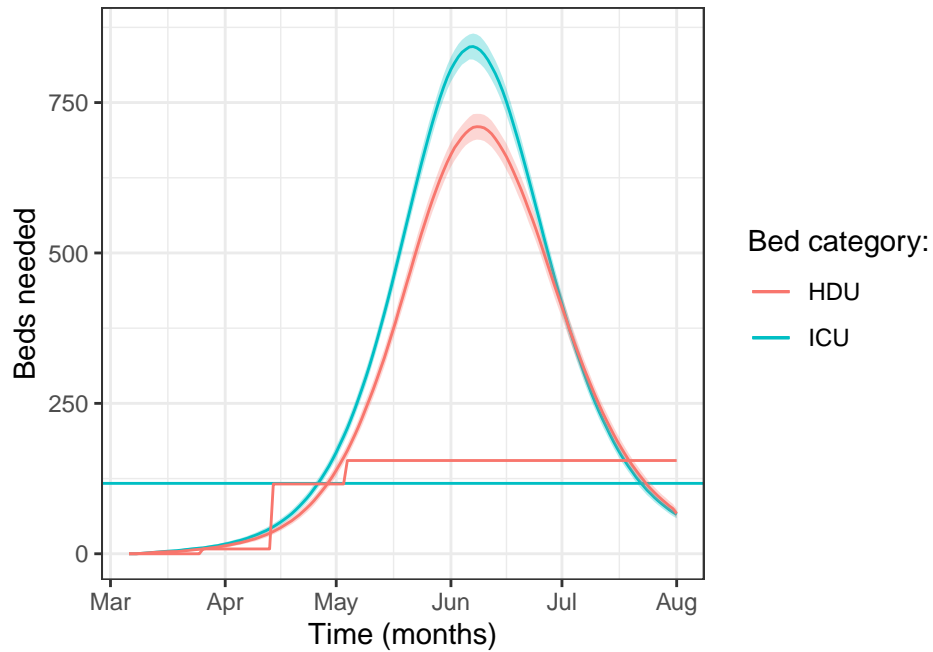
**Figure 7:** Output from 500 model runs for the 40% reduction scenario. The horizontal lines represent the current maximum bed capacity for the different units. Lines are average daily incidence, shaded area represents average  $\pm$  standard deviation.



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



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



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

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
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	2	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	2	3	1	0	1	0	1	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	0	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
2020-03-23	12	3	10	2	2	1	1	1	4
2020-03-24	13	3	11	3	3	1	1	1	4
2020-03-25	15	3	13	3	3	2	1	1	5
2020-03-26	17	3	15	3	4	2	1	1	6
2020-03-27	20	3	17	3	4	2	1	1	7
2020-03-28	24	4	20	4	5	2	1	1	8
2020-03-29	27	4	23	4	6	2	2	1	9
2020-03-30	32	4	27	4	7	2	2	1	10
2020-03-31	36	4	31	4	8	3	2	1	12
2020-04-01	42	5	36	5	9	3	2	2	14
2020-04-02	49	5	41	5	10	3	3	2	16
2020-04-03	57	5	48	5	12	3	3	2	19
2020-04-04	66	6	56	5	14	4	4	2	22
2020-04-05	76	6	64	6	16	4	5	2	25
2020-04-06	88	7	74	6	19	4	5	2	29
2020-04-07	102	8	86	7	22	4	6	2	34
2020-04-08	118	8	99	8	25	5	7	3	39
2020-04-09	136	9	114	8	29	5	8	3	44
2020-04-10	157	9	132	9	34	5	9	3	51
2020-04-11	181	10	151	10	39	5	10	3	58
2020-04-12	208	11	173	10	45	6	12	3	66
2020-04-13	238	11	199	11	52	6	14	4	75
2020-04-14	272	12	227	12	60	7	16	4	84
2020-04-15	310	13	258	12	69	7	19	4	95
2020-04-16	351	14	293	14	80	8	21	5	106
2020-04-17	398	15	331	15	92	9	24	5	119
2020-04-18	449	16	372	15	106	10	28	5	131



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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-04-19	505	16	417	16	121	10	31	5	145
2020-04-20	565	17	465	17	139	11	35	6	158
2020-04-21	629	18	516	18	158	12	40	6	172
2020-04-22	697	19	569	18	180	12	45	7	185
2020-04-23	767	20	624	19	204	13	49	7	198
2020-04-24	840	22	681	20	232	13	56	7	210
2020-04-25	915	23	737	21	261	14	62	8	220
2020-04-26	989	23	792	22	292	15	67	8	229
2020-04-27	1061	24	847	24	327	16	73	8	236
2020-04-28	1132	24	899	23	364	17	79	9	242
2020-04-29	1199	25	948	24	403	18	86	9	245
2020-04-30	1261	25	992	24	445	18	91	9	246
2020-05-01	1316	26	1031	24	489	19	97	10	244
2020-05-02	1362	27	1065	25	534	20	101	10	240
2020-05-03	1401	27	1093	25	580	21	106	10	235
2020-05-04	1430	28	1114	26	627	22	110	11	228
2020-05-05	1449	29	1130	27	674	23	112	10	219
2020-05-06	1458	29	1139	28	720	24	115	10	209
2020-05-07	1456	29	1142	28	767	24	117	10	198
2020-05-08	1444	29	1139	28	811	25	117	10	187
2020-05-09	1423	29	1131	27	854	26	116	11	175
2020-05-10	1393	27	1117	27	896	27	115	10	162
2020-05-11	1354	28	1098	27	935	28	113	10	150
2020-05-12	1309	27	1076	27	971	28	109	10	139
2020-05-13	1258	27	1049	27	1004	29	106	10	127
2020-05-14	1203	27	1020	27	1034	30	101	10	116
2020-05-15	1142	25	988	26	1060	29	97	10	106
2020-05-16	1080	25	953	26	1084	30	92	9	96
2020-05-17	1014	25	916	25	1104	30	87	9	86
2020-05-18	949	24	877	25	1119	31	81	9	78
2020-05-19	883	23	838	24	1131	31	75	8	70
2020-05-20	819	22	797	24	1140	32	69	8	63
2020-05-21	756	21	756	23	1144	31	64	8	56
2020-05-22	696	21	715	22	1144	31	59	7	50
2020-05-23	637	20	674	22	1141	30	54	7	45
2020-05-24	581	20	632	22	1133	30	49	7	40
2020-05-25	530	19	591	22	1122	29	45	7	36
2020-05-26	481	18	551	21	1107	29	41	7	32
2020-05-27	435	16	511	20	1089	29	37	6	28
2020-05-28	393	15	473	20	1067	30	34	6	25
2020-05-29	353	15	436	19	1042	29	30	5	22
2020-05-30	318	14	401	18	1012	29	27	5	20
2020-05-31	285	14	368	17	982	28	24	5	18

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-06-01	255	13	337	16	947	27	21	5	16
2020-06-02	228	12	307	16	911	27	19	4	14
2020-06-03	204	12	279	14	873	27	17	4	12
2020-06-04	182	11	254	14	833	27	15	4	11
2020-06-05	162	10	229	13	791	26	14	4	10
2020-06-06	145	10	208	12	750	26	12	4	9
2020-06-07	129	10	187	12	707	25	11	3	8
2020-06-08	116	9	168	12	665	24	10	3	7
2020-06-09	102	9	151	11	624	23	8	3	6
2020-06-10	91	8	135	11	581	22	8	3	6
2020-06-11	82	8	121	11	541	20	7	2	5
2020-06-12	73	7	109	10	501	20	6	2	5
2020-06-13	65	7	97	9	464	19	6	2	4
2020-06-14	58	6	87	9	427	18	5	2	4
2020-06-15	52	6	78	8	391	17	4	2	3
2020-06-16	47	6	69	8	359	17	4	2	3
2020-06-17	42	5	62	7	328	17	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	30	4	45	6	246	15	3	2	2
2020-06-21	27	4	40	6	223	14	2	2	2
2020-06-22	25	4	36	5	201	14	2	1	2
2020-06-23	22	4	33	5	181	13	2	1	2
2020-06-24	20	4	30	5	163	12	2	1	2
2020-06-25	19	4	27	5	147	12	2	1	1
2020-06-26	17	3	24	4	132	11	1	1	1
2020-06-27	15	3	21	4	118	10	1	1	1
2020-06-28	14	3	19	4	106	10	1	1	1
2020-06-29	12	3	17	4	95	9	1	1	1
2020-06-30	11	3	16	4	85	9	1	1	1
2020-07-01	11	3	14	4	76	8	1	1	1
2020-07-02	10	3	13	3	68	8	1	1	1
2020-07-03	9	2	12	3	61	7	1	1	1
2020-07-04	9	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	8	2	9	3	39	6	1	1	1
2020-07-08	7	2	8	2	35	6	1	1	1
2020-07-09	7	2	8	2	32	5	1	1	1
2020-07-10	7	2	8	2	28	5	0	1	1
2020-07-11	7	2	7	2	26	5	1	1	1
2020-07-12	7	2	7	2	23	5	1	1	1
2020-07-13	6	2	6	2	21	5	1	1	0

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-07-14	6	2	6	2	19	4	0	1	0
2020-07-15	5	2	5	2	17	4	1	1	0
2020-07-16	5	2	4	2	16	4	0	1	0
2020-07-17	4	2	4	2	15	4	0	1	0
2020-07-18	4	2	3	2	13	3	0	1	0
2020-07-19	3	2	3	2	12	3	0	1	0
2020-07-20	3	1	2	1	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	8	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	6	2	0	0	0
2020-07-27	0	1	2	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
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.

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
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	1	0	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	3	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	2	4	1	1	1	0	1	1
2020-03-18	5	2	4	2	1	1	0	1	2
2020-03-19	6	2	5	2	1	1	0	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*)

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-03-20	7	2	5	2	1	1	0	1	2
2020-03-21	8	2	6	2	1	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	3	9	2	2	1	1	1	3
2020-03-25	13	3	10	3	3	2	1	1	4
2020-03-26	14	3	12	3	3	2	1	1	4
2020-03-27	16	3	13	3	4	2	1	1	5
2020-03-28	18	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	20	3	6	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	9	3	2	1	12
2020-04-03	42	5	36	4	10	3	2	2	13
2020-04-04	48	5	41	5	11	3	3	2	15
2020-04-05	55	6	47	5	13	3	3	2	18
2020-04-06	63	6	53	6	15	3	4	2	20
2020-04-07	73	6	61	6	17	4	4	2	23
2020-04-08	83	7	70	6	19	4	5	2	26
2020-04-09	95	7	80	7	22	4	6	2	30
2020-04-10	108	8	92	7	26	4	7	3	34
2020-04-11	124	8	104	8	29	5	7	3	39
2020-04-12	141	9	119	8	33	5	9	3	44
2020-04-13	161	9	135	9	38	5	10	3	50
2020-04-14	184	10	153	10	44	6	11	3	57
2020-04-15	210	11	174	10	50	6	12	3	64
2020-04-16	238	12	197	11	57	7	14	4	72
2020-04-17	270	13	223	11	65	7	16	4	81
2020-04-18	306	14	252	12	74	8	18	4	91
2020-04-19	346	14	284	12	84	8	21	4	101
2020-04-20	388	15	318	13	96	9	24	5	111
2020-04-21	435	15	356	14	109	9	27	5	123
2020-04-22	485	16	397	15	124	10	30	5	135
2020-04-23	540	17	440	15	140	11	34	6	147
2020-04-24	598	18	487	17	158	11	38	6	159
2020-04-25	658	19	535	17	178	12	42	7	171
2020-04-26	722	20	585	19	201	13	47	7	182
2020-04-27	787	20	637	19	226	13	52	7	193
2020-04-28	853	21	689	20	254	13	57	7	203
2020-04-29	920	22	742	22	283	14	63	7	212
2020-04-30	987	23	793	22	315	15	69	8	220
2020-05-01	1052	24	841	23	349	16	74	8	225

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-05-02	1114	26	887	24	386	17	79	9	230
2020-05-03	1171	26	931	25	424	18	85	9	232
2020-05-04	1225	26	970	25	464	19	89	9	232
2020-05-05	1272	27	1005	26	506	20	94	9	231
2020-05-06	1312	28	1035	26	549	21	99	10	227
2020-05-07	1344	28	1060	28	593	22	102	10	222
2020-05-08	1367	29	1078	28	637	22	105	10	215
2020-05-09	1382	30	1092	28	681	23	108	10	208
2020-05-10	1388	29	1098	27	725	25	111	11	199
2020-05-11	1385	30	1099	27	767	26	110	10	189
2020-05-12	1374	30	1096	27	810	26	110	10	179
2020-05-13	1354	30	1088	27	850	26	111	10	168
2020-05-14	1326	30	1074	27	889	27	109	11	157
2020-05-15	1291	28	1057	27	925	28	107	10	146
2020-05-16	1249	28	1036	28	958	29	104	10	136
2020-05-17	1203	27	1010	28	989	28	100	10	125
2020-05-18	1152	26	983	27	1016	29	97	10	115
2020-05-19	1098	25	953	26	1040	29	92	10	105
2020-05-20	1041	25	921	25	1060	29	88	10	96
2020-05-21	982	24	887	25	1078	30	83	9	87
2020-05-22	922	25	850	25	1091	30	78	8	79
2020-05-23	862	23	814	24	1101	30	73	8	72
2020-05-24	803	23	776	24	1107	29	68	8	65
2020-05-25	745	22	737	24	1109	28	63	8	58
2020-05-26	689	21	698	23	1109	29	59	8	53
2020-05-27	635	20	659	22	1105	29	54	7	47
2020-05-28	583	19	619	21	1096	29	49	7	42
2020-05-29	534	19	581	21	1085	29	45	7	38
2020-05-30	487	18	543	21	1070	29	41	6	34
2020-05-31	443	17	506	20	1052	30	37	6	30
2020-06-01	401	16	470	18	1031	30	34	6	27
2020-06-02	363	15	435	17	1007	29	30	6	24
2020-06-03	329	14	402	17	979	29	28	5	22
2020-06-04	297	14	369	17	949	29	25	5	19
2020-06-05	267	14	339	17	917	28	23	4	17
2020-06-06	240	13	311	16	883	28	20	4	16
2020-06-07	215	12	284	15	848	28	19	4	14
2020-06-08	193	10	259	14	812	27	16	4	12
2020-06-09	173	10	235	14	774	26	14	4	11
2020-06-10	155	10	213	13	734	26	13	3	10
2020-06-11	139	9	193	13	693	26	12	3	9
2020-06-12	124	9	174	13	653	24	10	3	8
2020-06-13	111	8	157	12	613	22	9	3	7

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-06-14	100	8	142	11	574	22	8	3	7
2020-06-15	90	7	128	10	537	21	7	3	6
2020-06-16	80	7	115	9	499	21	7	2	5
2020-06-17	72	7	104	8	462	20	6	2	5
2020-06-18	65	6	93	8	427	20	5	2	4
2020-06-19	58	6	84	8	393	19	5	2	4
2020-06-20	52	6	76	7	362	17	4	2	4
2020-06-21	47	5	68	7	332	17	4	2	3
2020-06-22	42	5	61	7	303	16	3	2	3
2020-06-23	39	5	55	7	277	15	3	2	3
2020-06-24	35	5	49	6	252	14	3	2	3
2020-06-25	32	5	44	6	229	14	3	2	2
2020-06-26	29	4	40	5	208	13	2	2	2
2020-06-27	26	4	36	5	189	12	2	2	2
2020-06-28	24	4	32	5	171	11	2	1	2
2020-06-29	22	4	30	5	154	11	2	1	2
2020-06-30	20	4	27	4	139	10	2	1	2
2020-07-01	18	3	24	4	125	10	2	1	1
2020-07-02	17	3	22	4	113	9	1	1	1
2020-07-03	15	3	20	4	101	9	1	1	1
2020-07-04	14	3	18	4	91	8	1	1	1
2020-07-05	12	3	16	4	82	8	1	1	1
2020-07-06	11	3	15	4	74	7	1	1	1
2020-07-07	10	3	14	4	66	7	1	1	1
2020-07-08	10	3	13	3	60	7	1	1	1
2020-07-09	9	3	12	3	54	6	1	1	1
2020-07-10	8	2	11	3	48	6	1	1	1
2020-07-11	8	2	10	3	43	6	1	1	1
2020-07-12	8	2	10	3	39	5	1	1	1
2020-07-13	7	2	9	3	35	5	1	1	1
2020-07-14	7	2	8	3	32	5	1	1	1
2020-07-15	7	2	8	2	29	5	0	1	1
2020-07-16	7	2	8	2	27	5	1	1	1
2020-07-17	7	2	7	2	24	5	0	1	1
2020-07-18	7	2	7	2	22	5	1	1	1
2020-07-19	6	2	7	2	20	4	0	1	1
2020-07-20	6	2	7	2	19	4	0	1	1
2020-07-21	6	2	6	2	17	4	1	1	0
2020-07-22	5	2	5	2	16	4	0	1	0
2020-07-23	5	2	5	2	15	4	0	1	0
2020-07-24	4	2	4	2	13	4	0	1	0
2020-07-25	4	2	4	2	12	3	0	1	0
2020-07-26	3	2	3	2	12	3	0	1	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. (*continued*)

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-07-27	3	1	3	2	11	3	0	1	0
2020-07-28	2	1	2	1	10	3	0	1	0
2020-07-29	2	1	2	1	9	3	0	1	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.

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
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	0	1	1	1	0	0	0	0	1
2020-03-11	1	1	1	1	0	0	0	0	1
2020-03-12	1	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	2	3	1	0	1	0	0	1
2020-03-18	4	2	3	1	1	1	0	0	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	2	1	0	1	2
2020-03-23	8	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	2	1	1	1	3
2020-03-26	12	3	10	3	3	2	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	17	3	15	3	4	2	1	1	5
2020-03-30	20	3	17	3	5	2	1	1	6
2020-03-31	23	4	19	3	5	2	1	1	7
2020-04-01	26	4	22	4	6	2	2	1	8

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
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	4	36	4	11	3	3	2	13
2020-04-06	48	5	41	5	12	3	3	2	15
2020-04-07	55	5	46	5	14	3	3	2	17
2020-04-08	62	6	52	5	15	4	4	2	19
2020-04-09	70	6	59	6	18	4	4	2	21
2020-04-10	80	6	67	6	20	4	5	2	24
2020-04-11	91	7	76	7	23	4	6	2	28
2020-04-12	103	7	86	7	26	5	6	2	31
2020-04-13	116	8	97	8	29	5	7	3	35
2020-04-14	132	8	110	8	33	5	8	3	40
2020-04-15	149	9	124	9	38	5	9	3	44
2020-04-16	168	10	140	9	43	6	10	3	50
2020-04-17	190	10	158	10	49	6	12	3	56
2020-04-18	213	10	178	10	55	6	13	4	62
2020-04-19	240	11	199	11	62	7	15	4	69
2020-04-20	269	12	223	12	71	7	17	4	77
2020-04-21	301	13	248	12	80	8	19	4	85
2020-04-22	336	13	276	14	90	8	21	4	94
2020-04-23	374	14	308	14	101	8	24	5	104
2020-04-24	416	15	341	14	114	9	26	5	113
2020-04-25	460	16	377	15	128	10	29	5	123
2020-04-26	508	16	415	16	144	10	32	6	134
2020-04-27	558	17	455	17	162	11	36	6	144
2020-04-28	611	19	498	18	181	11	40	6	155
2020-04-29	668	19	541	19	202	12	44	7	165
2020-04-30	725	20	586	19	224	13	49	7	175
2020-05-01	783	21	633	19	249	14	53	8	184
2020-05-02	843	22	678	21	276	15	58	8	192
2020-05-03	902	23	724	22	304	16	62	8	200
2020-05-04	960	24	769	21	334	17	68	8	206
2020-05-05	1017	24	812	21	366	17	72	8	211
2020-05-06	1070	24	853	22	401	18	77	8	214
2020-05-07	1119	25	892	23	436	19	81	9	216
2020-05-08	1165	26	927	23	473	19	86	9	216
2020-05-09	1206	27	958	23	511	19	90	10	215
2020-05-10	1240	27	984	25	551	20	94	9	212
2020-05-11	1267	28	1006	26	591	21	97	10	208
2020-05-12	1288	28	1022	26	631	21	100	10	203
2020-05-13	1301	28	1034	26	672	21	102	10	196
2020-05-14	1306	27	1042	27	712	22	103	10	189



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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-05-15	1303	27	1045	27	752	23	103	10	181
2020-05-16	1293	27	1043	27	790	24	104	10	172
2020-05-17	1276	27	1036	26	826	25	103	9	163
2020-05-18	1252	27	1026	26	860	25	102	9	153
2020-05-19	1224	26	1012	25	893	26	101	10	144
2020-05-20	1188	26	993	25	924	27	99	10	134
2020-05-21	1148	25	971	26	953	28	96	9	125
2020-05-22	1105	25	947	26	978	28	91	10	116
2020-05-23	1058	24	920	25	1001	29	88	9	107
2020-05-24	1008	24	891	27	1020	30	84	9	98
2020-05-25	956	25	860	27	1037	29	80	9	90
2020-05-26	903	23	826	26	1049	29	77	9	82
2020-05-27	849	23	792	25	1058	29	71	8	75
2020-05-28	795	22	758	24	1065	29	67	8	69
2020-05-29	743	21	722	23	1066	28	62	8	62
2020-05-30	692	21	688	22	1065	29	58	8	57
2020-05-31	641	21	651	22	1060	30	54	7	51
2020-06-01	593	20	616	21	1053	30	50	7	46
2020-06-02	546	20	579	21	1043	29	46	7	42
2020-06-03	503	18	544	20	1030	29	43	6	38
2020-06-04	461	18	509	20	1012	28	39	6	34
2020-06-05	422	17	476	19	993	27	35	6	31
2020-06-06	385	17	443	19	971	27	33	6	28
2020-06-07	350	16	412	18	947	27	30	5	25
2020-06-08	319	15	381	17	919	27	27	5	23
2020-06-09	289	14	352	16	890	26	24	5	20
2020-06-10	263	13	323	16	859	26	22	5	18
2020-06-11	239	13	297	15	826	26	20	4	17
2020-06-12	216	12	272	15	792	25	18	4	15
2020-06-13	196	11	250	14	757	24	16	4	14
2020-06-14	177	11	229	14	720	24	15	4	12
2020-06-15	160	11	209	13	683	23	14	4	11
2020-06-16	144	10	191	13	646	23	12	4	10
2020-06-17	130	10	174	12	609	22	11	3	9
2020-06-18	118	9	158	11	573	21	10	3	8
2020-06-19	107	8	143	10	537	21	9	3	7
2020-06-20	96	8	130	10	502	20	8	3	7
2020-06-21	87	7	117	10	468	20	7	3	6
2020-06-22	79	7	107	9	435	20	6	2	6
2020-06-23	71	7	97	9	403	19	6	2	5
2020-06-24	65	7	88	8	373	19	5	2	5
2020-06-25	59	6	80	8	343	18	5	2	4
2020-06-26	53	6	72	7	317	17	4	2	4

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-06-27	48	6	66	7	291	16	4	2	4
2020-06-28	44	6	59	7	267	15	4	2	3
2020-06-29	40	5	54	7	244	15	3	2	3
2020-06-30	36	5	49	6	224	14	3	2	3
2020-07-01	33	5	45	6	204	14	3	2	3
2020-07-02	30	5	41	6	186	13	3	2	2
2020-07-03	28	4	37	5	170	12	2	2	2
2020-07-04	25	4	33	5	154	12	2	1	2
2020-07-05	23	4	30	5	141	11	2	1	2
2020-07-06	22	4	28	5	128	10	2	1	2
2020-07-07	20	4	25	5	116	10	2	1	2
2020-07-08	19	3	23	4	105	9	1	1	2
2020-07-09	17	3	22	4	95	9	1	1	2
2020-07-10	16	3	20	4	87	8	1	1	1
2020-07-11	15	3	18	3	79	8	1	1	1
2020-07-12	13	3	17	3	71	8	1	1	1
2020-07-13	12	3	15	3	65	7	1	1	1
2020-07-14	11	3	14	3	59	7	1	1	1
2020-07-15	11	2	13	3	54	7	1	1	1
2020-07-16	10	2	12	3	49	7	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	34	6	1	1	1
2020-07-21	8	2	9	3	31	5	1	1	1
2020-07-22	7	2	8	3	28	5	1	1	1
2020-07-23	7	2	8	2	26	5	1	1	1
2020-07-24	7	2	8	2	23	4	1	1	1
2020-07-25	7	2	7	2	22	4	1	1	1
2020-07-26	7	2	7	2	20	4	1	1	1
2020-07-27	7	2	7	2	18	4	1	1	1
2020-07-28	7	2	7	2	17	4	1	1	1
2020-07-29	7	2	6	2	16	4	1	1	1
2020-07-30	6	2	6	2	15	4	1	1	0
2020-07-31	5	2	5	2	14	3	0	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.

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
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	0	0	0	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	3	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	1	0	0	1
2020-03-16	4	1	3	1	0	1	0	0	1
2020-03-17	4	2	3	1	1	1	0	1	1
2020-03-18	5	2	4	1	1	1	0	1	1
2020-03-19	6	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	6	2	1	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	2	1	1	3
2020-03-27	13	3	11	3	3	2	1	1	4
2020-03-28	14	3	12	3	4	2	1	1	4
2020-03-29	16	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	4	6	2	1	1	7
2020-04-02	27	4	22	4	7	2	2	1	8
2020-04-03	30	4	25	4	8	3	2	1	9
2020-04-04	34	4	28	4	9	3	2	1	10
2020-04-05	39	5	32	4	10	3	2	1	12
2020-04-06	44	5	36	5	12	3	3	2	13
2020-04-07	50	5	41	5	13	3	3	2	15
2020-04-08	56	5	46	5	15	3	3	2	17
2020-04-09	64	6	52	6	17	4	4	2	19
2020-04-10	73	6	60	6	19	4	4	2	22
2020-04-11	82	6	67	6	21	4	5	2	24
2020-04-12	93	7	76	7	23	4	6	2	28
2020-04-13	105	7	86	7	26	5	6	2	31
2020-04-14	118	8	98	8	30	5	7	3	35
2020-04-15	133	8	110	8	34	5	8	3	39
2020-04-16	150	9	123	8	38	6	9	3	43
2020-04-17	167	9	139	9	43	6	10	3	48

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-04-18	188	10	156	9	49	6	12	3	54
2020-04-19	210	10	174	10	55	7	13	4	60
2020-04-20	236	11	194	10	63	7	15	4	67
2020-04-21	263	12	217	11	70	7	17	4	74
2020-04-22	293	12	241	11	79	8	18	4	81
2020-04-23	326	13	268	13	90	8	20	4	90
2020-04-24	362	14	297	13	101	9	23	5	98
2020-04-25	400	15	328	14	113	10	26	5	107
2020-04-26	441	15	362	15	126	10	29	5	117
2020-04-27	485	15	397	15	141	11	32	5	126
2020-04-28	532	17	435	17	158	12	35	6	136
2020-04-29	581	17	475	17	176	12	38	6	146
2020-04-30	632	18	516	17	196	13	42	7	155
2020-05-01	685	19	558	19	217	13	46	7	164
2020-05-02	740	20	600	19	240	14	51	7	173
2020-05-03	795	21	644	20	265	15	55	8	182
2020-05-04	851	22	687	21	292	15	59	7	189
2020-05-05	906	23	729	21	321	16	64	8	195
2020-05-06	960	23	769	21	351	17	68	8	200
2020-05-07	1012	23	809	22	384	19	72	9	204
2020-05-08	1060	24	846	22	418	19	77	9	207
2020-05-09	1105	24	880	23	453	20	80	9	208
2020-05-10	1145	24	912	23	489	20	85	9	208
2020-05-11	1181	24	939	24	526	21	88	9	207
2020-05-12	1211	25	964	23	565	22	92	9	204
2020-05-13	1234	26	983	24	602	22	95	10	200
2020-05-14	1251	27	998	24	641	23	97	9	195
2020-05-15	1261	27	1008	24	680	22	98	9	188
2020-05-16	1264	26	1014	25	717	23	100	10	181
2020-05-17	1259	26	1016	25	753	23	100	10	174
2020-05-18	1248	27	1014	24	789	24	100	10	165
2020-05-19	1231	27	1007	24	824	25	99	11	157
2020-05-20	1208	27	996	25	856	25	99	10	148
2020-05-21	1179	27	981	24	887	25	97	10	139
2020-05-22	1146	26	962	25	914	25	94	9	130
2020-05-23	1107	26	942	25	941	25	92	9	121
2020-05-24	1066	25	917	25	964	26	88	9	113
2020-05-25	1022	25	891	25	983	27	84	10	105
2020-05-26	975	24	864	25	1001	27	82	9	96
2020-05-27	926	24	836	25	1015	27	78	9	89
2020-05-28	876	23	805	25	1027	28	74	9	82
2020-05-29	825	23	772	24	1035	28	69	8	75
2020-05-30	775	22	739	23	1039	28	65	8	68

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-05-31	725	21	704	22	1041	28	61	7	62
2020-06-01	676	20	671	22	1040	28	57	8	57
2020-06-02	629	19	637	21	1036	29	53	7	52
2020-06-03	582	19	602	21	1027	29	49	7	47
2020-06-04	539	18	568	20	1017	29	46	7	43
2020-06-05	497	17	535	20	1002	29	42	6	39
2020-06-06	457	17	501	20	985	29	39	6	35
2020-06-07	420	16	469	19	967	29	36	6	32
2020-06-08	385	15	437	19	945	28	32	5	29
2020-06-09	352	15	407	18	921	27	30	5	26
2020-06-10	322	14	377	18	894	28	27	5	24
2020-06-11	294	13	349	17	865	27	24	5	21
2020-06-12	267	13	322	16	834	26	23	5	19
2020-06-13	244	12	297	16	802	26	20	4	18
2020-06-14	222	12	274	15	770	26	18	4	16
2020-06-15	202	11	252	14	735	25	17	4	15
2020-06-16	184	10	231	13	700	25	15	4	13
2020-06-17	167	10	213	13	665	25	14	4	12
2020-06-18	151	10	195	12	630	24	12	3	11
2020-06-19	138	9	178	12	595	23	11	3	10
2020-06-20	125	9	162	11	561	23	10	3	9
2020-06-21	113	8	148	11	527	21	10	3	8
2020-06-22	103	8	134	11	494	20	9	3	7
2020-06-23	93	7	122	10	461	19	8	3	7
2020-06-24	85	7	111	10	430	19	7	3	6
2020-06-25	77	7	101	9	401	19	6	2	6
2020-06-26	70	6	92	8	372	18	6	2	5
2020-06-27	64	6	84	8	344	18	5	2	5
2020-06-28	58	6	76	8	318	17	5	2	4
2020-06-29	52	6	69	8	292	16	4	2	4
2020-06-30	48	6	64	7	269	15	4	2	4
2020-07-01	43	5	58	6	247	15	4	2	3
2020-07-02	40	5	53	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	13	3	2	3
2020-07-05	31	4	40	5	174	12	2	2	3
2020-07-06	28	4	37	5	159	12	2	1	2
2020-07-07	26	4	33	5	145	12	2	1	2
2020-07-08	24	4	30	5	132	11	2	1	2
2020-07-09	22	4	28	5	120	10	2	1	2
2020-07-10	20	4	26	5	109	10	2	1	2
2020-07-11	19	3	24	4	99	9	2	1	2
2020-07-12	18	3	22	4	90	8	1	1	2

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-07-13	17	3	20	4	82	8	1	1	1
2020-07-14	15	3	18	4	75	8	1	1	1
2020-07-15	14	3	17	4	68	7	1	1	1
2020-07-16	13	3	15	3	62	7	1	1	1
2020-07-17	12	3	14	3	57	6	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	3	11	3	43	6	1	1	1
2020-07-21	9	3	11	3	39	6	1	1	1
2020-07-22	9	2	10	3	36	5	1	1	1
2020-07-23	8	2	9	3	33	5	1	1	1
2020-07-24	8	2	9	2	30	5	1	1	1
2020-07-25	7	2	9	2	28	5	1	1	1
2020-07-26	7	2	8	2	25	4	1	1	1
2020-07-27	7	2	8	2	23	4	1	1	1
2020-07-28	7	2	8	2	21	4	0	1	1
2020-07-29	7	2	7	2	20	4	0	1	1
2020-07-30	7	2	7	2	18	4	1	1	1
2020-07-31	6	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.

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
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	0	0	0	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	3	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	3	1	1	1	0	1	1
2020-03-18	5	2	4	1	1	1	0	1	1

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
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	1	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	1	1	2
2020-03-24	9	2	7	2	2	1	1	1	2
2020-03-25	10	2	8	2	2	1	1	1	3
2020-03-26	11	3	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	3	4	2	1	1	4
2020-03-29	15	3	12	3	4	2	1	1	4
2020-03-30	16	3	13	3	4	2	1	1	4
2020-03-31	18	3	15	3	5	2	1	1	5
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	3	7	2	2	1	7
2020-04-04	27	4	22	4	8	2	2	1	7
2020-04-05	30	4	24	4	9	3	2	1	8
2020-04-06	33	4	27	4	10	3	2	1	9
2020-04-07	36	4	30	4	11	3	2	1	10
2020-04-08	40	4	33	4	12	3	3	1	11
2020-04-09	45	4	37	4	14	3	3	2	12
2020-04-10	50	5	41	5	15	4	3	2	14
2020-04-11	56	5	46	5	17	4	3	2	16
2020-04-12	62	6	51	5	19	4	4	2	17
2020-04-13	69	6	57	6	21	4	4	2	19
2020-04-14	76	6	63	6	23	5	5	2	21
2020-04-15	84	7	70	6	25	5	5	2	23
2020-04-16	94	7	78	6	28	5	6	2	26
2020-04-17	105	7	86	7	31	5	7	3	29
2020-04-18	116	8	96	7	34	5	7	3	31
2020-04-19	128	8	106	7	38	6	8	3	35
2020-04-20	141	8	117	8	42	6	9	3	38
2020-04-21	157	9	129	9	47	6	10	3	42
2020-04-22	173	9	142	9	53	7	11	3	46
2020-04-23	191	10	156	9	58	7	12	3	51
2020-04-24	210	11	172	10	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	8	19	4	72
2020-04-28	305	13	250	13	96	9	20	4	78
2020-04-29	333	14	272	13	106	9	22	5	84
2020-04-30	364	14	297	13	117	10	24	5	91

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-05-01	396	15	323	14	129	10	26	5	98
2020-05-02	430	16	351	14	142	11	29	5	105
2020-05-03	466	16	380	15	156	11	31	5	112
2020-05-04	504	17	409	15	172	12	34	6	120
2020-05-05	543	17	441	16	188	12	37	6	127
2020-05-06	584	18	473	16	207	13	40	6	134
2020-05-07	625	18	506	17	226	14	43	6	141
2020-05-08	667	18	540	18	246	14	46	7	148
2020-05-09	710	19	574	18	268	14	49	7	154
2020-05-10	753	20	609	19	292	15	53	7	160
2020-05-11	796	21	642	20	316	16	56	7	165
2020-05-12	838	21	674	20	341	16	59	8	170
2020-05-13	879	23	708	21	368	16	63	8	174
2020-05-14	917	23	738	22	396	18	67	8	177
2020-05-15	954	24	767	22	425	18	70	8	179
2020-05-16	987	24	794	22	455	19	73	9	180
2020-05-17	1018	24	819	22	485	19	76	9	180
2020-05-18	1045	25	841	23	517	20	78	9	180
2020-05-19	1067	25	860	24	549	20	82	8	178
2020-05-20	1084	25	876	25	580	21	83	9	175
2020-05-21	1097	26	889	25	612	21	85	9	172
2020-05-22	1106	25	898	26	643	22	85	9	168
2020-05-23	1110	25	905	26	675	22	87	9	163
2020-05-24	1108	26	907	27	705	23	87	9	158
2020-05-25	1102	26	906	26	735	24	88	9	152
2020-05-26	1092	26	901	26	764	25	87	9	146
2020-05-27	1077	26	895	26	790	26	86	9	140
2020-05-28	1058	26	886	26	815	26	86	9	133
2020-05-29	1034	25	875	26	839	28	84	9	127
2020-05-30	1008	25	861	26	860	29	82	8	120
2020-05-31	978	25	844	25	880	29	80	9	113
2020-06-01	945	24	825	25	898	28	78	8	106
2020-06-02	910	24	803	25	912	29	75	8	100
2020-06-03	873	23	781	24	925	29	72	8	93
2020-06-04	834	23	757	23	934	29	69	8	87
2020-06-05	795	22	733	24	941	28	65	8	81
2020-06-06	757	22	706	23	946	28	63	7	75
2020-06-07	718	21	679	23	948	28	60	8	70
2020-06-08	679	20	650	23	947	29	57	7	65
2020-06-09	640	20	622	22	944	28	54	7	60
2020-06-10	602	20	593	22	939	28	50	7	55
2020-06-11	564	19	564	20	931	29	47	7	51
2020-06-12	528	19	535	21	919	29	44	7	47



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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-06-13	493	18	508	19	907	28	42	6	43
2020-06-14	459	18	480	19	892	28	38	6	40
2020-06-15	427	17	452	19	875	28	35	6	37
2020-06-16	397	17	426	18	855	27	33	6	34
2020-06-17	368	16	401	17	835	27	31	6	31
2020-06-18	340	16	376	17	812	27	28	5	29
2020-06-19	315	15	351	16	788	26	27	5	26
2020-06-20	291	15	328	15	763	26	24	5	24
2020-06-21	270	14	305	15	737	25	23	5	22
2020-06-22	249	13	284	15	709	25	21	4	20
2020-06-23	230	12	264	14	681	24	19	4	19
2020-06-24	211	12	245	14	651	24	18	4	17
2020-06-25	195	11	227	13	622	23	16	4	16
2020-06-26	180	11	211	13	593	23	15	4	15
2020-06-27	166	10	196	13	564	22	14	3	14
2020-06-28	152	10	181	13	534	21	12	4	12
2020-06-29	140	9	167	12	505	20	12	3	11
2020-06-30	128	9	154	11	477	19	11	3	10
2020-07-01	118	9	143	10	449	19	10	3	10
2020-07-02	109	8	132	10	423	19	9	3	9
2020-07-03	100	8	121	9	396	18	9	3	8
2020-07-04	92	7	112	9	372	18	8	3	8
2020-07-05	85	7	103	9	348	17	7	3	7
2020-07-06	78	7	95	9	325	17	7	2	7
2020-07-07	72	7	88	8	303	17	6	2	6
2020-07-08	67	6	81	8	282	16	6	2	6
2020-07-09	62	6	74	8	262	15	5	2	5
2020-07-10	57	6	69	7	243	15	5	2	5
2020-07-11	53	6	64	7	226	14	4	2	5
2020-07-12	49	6	59	7	209	13	4	2	4
2020-07-13	45	5	55	7	193	13	4	2	4
2020-07-14	42	5	50	6	179	12	3	2	4
2020-07-15	39	5	47	6	165	12	3	2	3
2020-07-16	36	5	43	6	153	12	3	2	3
2020-07-17	33	4	40	5	141	11	3	2	3
2020-07-18	31	4	37	5	130	10	3	2	3
2020-07-19	29	4	34	5	120	10	2	2	3
2020-07-20	27	4	32	5	111	9	2	1	3
2020-07-21	25	4	29	5	102	9	2	1	2
2020-07-22	23	4	27	5	94	9	2	1	2
2020-07-23	22	4	25	5	87	9	2	1	2
2020-07-24	20	4	24	4	80	8	2	1	2
2020-07-25	19	4	22	4	74	8	2	1	2

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-07-26	18	3	20	4	68	8	1	1	2
2020-07-27	17	3	19	4	63	7	1	1	2
2020-07-28	17	3	18	4	58	7	1	1	2
2020-07-29	15	3	17	4	54	7	1	1	1
2020-07-30	14	3	16	3	50	7	1	1	1
2020-07-31	13	3	14	3	46	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.

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
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	0	0	0	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	3	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	0	1
2020-03-17	4	1	3	1	1	1	0	1	1
2020-03-18	5	2	4	2	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	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	2	1	1	2
2020-03-27	11	2	9	2	3	2	1	1	3
2020-03-28	12	3	10	3	3	2	1	1	3
2020-03-29	13	3	10	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

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
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	3	1	1	5
2020-04-05	22	3	18	3	8	3	2	1	5
2020-04-06	24	4	20	3	8	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	36	5	29	4	13	3	2	2	9
2020-04-12	38	5	31	5	14	3	2	2	9
2020-04-13	42	5	34	5	15	3	3	2	10
2020-04-14	45	5	37	5	17	4	3	2	11
2020-04-15	49	5	40	5	18	4	3	2	12
2020-04-16	53	6	44	5	20	4	3	2	13
2020-04-17	57	6	47	5	21	4	4	2	14
2020-04-18	62	6	51	6	23	4	4	2	15
2020-04-19	67	6	55	6	25	5	4	2	16
2020-04-20	73	6	60	6	27	5	5	2	18
2020-04-21	79	7	65	6	30	5	5	2	19
2020-04-22	85	7	70	7	32	6	6	2	21
2020-04-23	92	7	76	7	35	5	6	2	22
2020-04-24	99	7	82	7	38	6	6	3	24
2020-04-25	108	8	88	8	41	6	7	3	26
2020-04-26	116	8	96	8	44	6	8	3	28
2020-04-27	125	8	103	8	48	6	9	3	30
2020-04-28	135	9	111	8	52	6	9	3	32
2020-04-29	145	9	120	9	56	7	10	3	34
2020-04-30	157	10	129	9	60	7	11	3	37
2020-05-01	169	10	139	10	65	7	11	3	40
2020-05-02	182	10	149	10	71	8	12	3	43
2020-05-03	195	11	160	10	76	8	13	4	45
2020-05-04	209	11	171	11	82	8	14	4	48
2020-05-05	224	12	184	11	89	8	15	4	52
2020-05-06	240	12	197	11	96	9	17	4	55
2020-05-07	257	12	211	12	103	9	17	4	59
2020-05-08	275	13	226	13	111	10	19	4	62
2020-05-09	293	13	241	13	120	10	20	4	66
2020-05-10	312	14	257	13	129	10	21	4	70
2020-05-11	333	14	273	14	138	10	23	5	74
2020-05-12	355	14	290	14	149	11	25	5	78
2020-05-13	377	15	308	15	160	11	27	5	82

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-05-14	400	15	326	15	171	12	28	5	86
2020-05-15	423	16	345	15	183	12	30	5	91
2020-05-16	447	17	365	16	196	12	32	6	95
2020-05-17	472	17	385	16	209	13	33	6	99
2020-05-18	497	18	406	17	223	13	35	6	103
2020-05-19	523	18	427	17	238	14	37	6	107
2020-05-20	548	18	448	18	254	14	39	6	111
2020-05-21	573	18	469	18	270	15	42	6	114
2020-05-22	599	19	490	19	287	16	43	6	118
2020-05-23	624	19	511	20	305	16	45	6	121
2020-05-24	648	20	532	20	323	16	48	7	124
2020-05-25	672	20	551	20	342	17	49	7	126
2020-05-26	695	21	570	20	361	18	51	7	129
2020-05-27	716	20	588	20	381	18	53	7	130
2020-05-28	738	20	605	21	401	18	55	7	132
2020-05-29	757	20	622	21	421	19	57	8	133
2020-05-30	775	20	637	20	441	19	58	7	134
2020-05-31	792	21	651	21	462	19	60	8	134
2020-06-01	805	21	664	21	484	19	61	8	134
2020-06-02	816	21	675	21	505	20	62	8	133
2020-06-03	826	21	684	21	526	21	63	8	132
2020-06-04	834	21	692	20	546	21	64	8	131
2020-06-05	838	21	699	20	566	21	65	8	130
2020-06-06	842	21	705	21	585	21	65	8	128
2020-06-07	843	22	709	22	605	23	66	8	125
2020-06-08	841	22	710	21	623	23	66	8	122
2020-06-09	837	23	710	22	641	23	66	8	120
2020-06-10	830	22	708	22	657	24	66	8	116
2020-06-11	821	23	704	22	672	24	65	8	113
2020-06-12	810	22	698	22	688	24	64	8	109
2020-06-13	798	22	690	21	702	24	64	8	106
2020-06-14	784	22	681	21	715	24	63	8	102
2020-06-15	769	22	671	21	725	24	61	8	98
2020-06-16	751	22	660	22	735	23	60	7	94
2020-06-17	732	21	647	21	743	23	59	8	90
2020-06-18	711	21	634	21	750	24	57	7	86
2020-06-19	691	21	619	21	755	24	55	7	83
2020-06-20	669	21	605	21	759	24	54	7	79
2020-06-21	646	20	589	21	761	24	52	7	75
2020-06-22	623	19	572	21	760	23	51	7	71
2020-06-23	600	19	556	21	758	24	49	7	68
2020-06-24	576	18	539	20	756	24	47	7	64
2020-06-25	553	18	521	19	751	24	46	7	61

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

Date	ICU		HDU		Ward		Deaths		New patients (ICU+HDU)
	Bed needs	SD	Bed needs	SD	Bed needs	SD	Average	SD	
2020-06-26	528	17	502	19	746	24	43	6	57
2020-06-27	505	17	483	20	739	24	41	6	54
2020-06-28	482	17	465	19	731	24	39	6	51
2020-06-29	459	17	446	19	720	24	38	6	48
2020-06-30	437	16	428	19	709	24	36	6	46
2020-07-01	415	16	410	18	697	24	34	6	43
2020-07-02	394	16	392	18	685	24	33	5	41
2020-07-03	374	16	374	17	670	23	31	5	38
2020-07-04	354	15	357	17	655	24	29	5	36
2020-07-05	335	15	340	16	639	24	27	5	34
2020-07-06	317	14	324	15	622	24	26	5	32
2020-07-07	299	14	307	15	605	23	24	5	30
2020-07-08	282	13	292	14	587	22	23	5	28
2020-07-09	266	13	277	14	568	22	22	5	26
2020-07-10	251	12	262	13	549	21	20	4	25
2020-07-11	237	12	248	13	530	21	20	4	23
2020-07-12	223	12	234	13	511	21	18	4	22
2020-07-13	211	12	222	13	492	20	18	4	21
2020-07-14	198	11	210	13	472	19	16	4	19
2020-07-15	186	11	198	12	453	19	15	4	18
2020-07-16	175	10	187	12	434	19	14	4	17
2020-07-17	164	10	176	12	415	19	14	4	16
2020-07-18	154	10	166	11	396	18	13	3	15
2020-07-19	145	9	156	11	378	17	12	3	14
2020-07-20	136	9	147	11	360	17	11	3	13
2020-07-21	128	9	139	10	343	16	11	3	12
2020-07-22	120	9	130	10	326	16	10	3	12
2020-07-23	113	9	123	10	310	15	10	3	11
2020-07-24	106	8	115	9	294	15	9	3	10
2020-07-25	100	8	108	9	278	14	8	3	10
2020-07-26	94	7	102	9	263	14	8	3	9
2020-07-27	88	7	96	9	249	13	7	3	9
2020-07-28	83	7	90	8	236	13	7	3	8
2020-07-29	78	7	85	8	223	13	6	2	8
2020-07-30	73	7	80	8	210	13	6	3	7
2020-07-31	69	7	75	8	199	13	6	2	7
2020-08-01	65	6	67	8	179	13	0	0	7