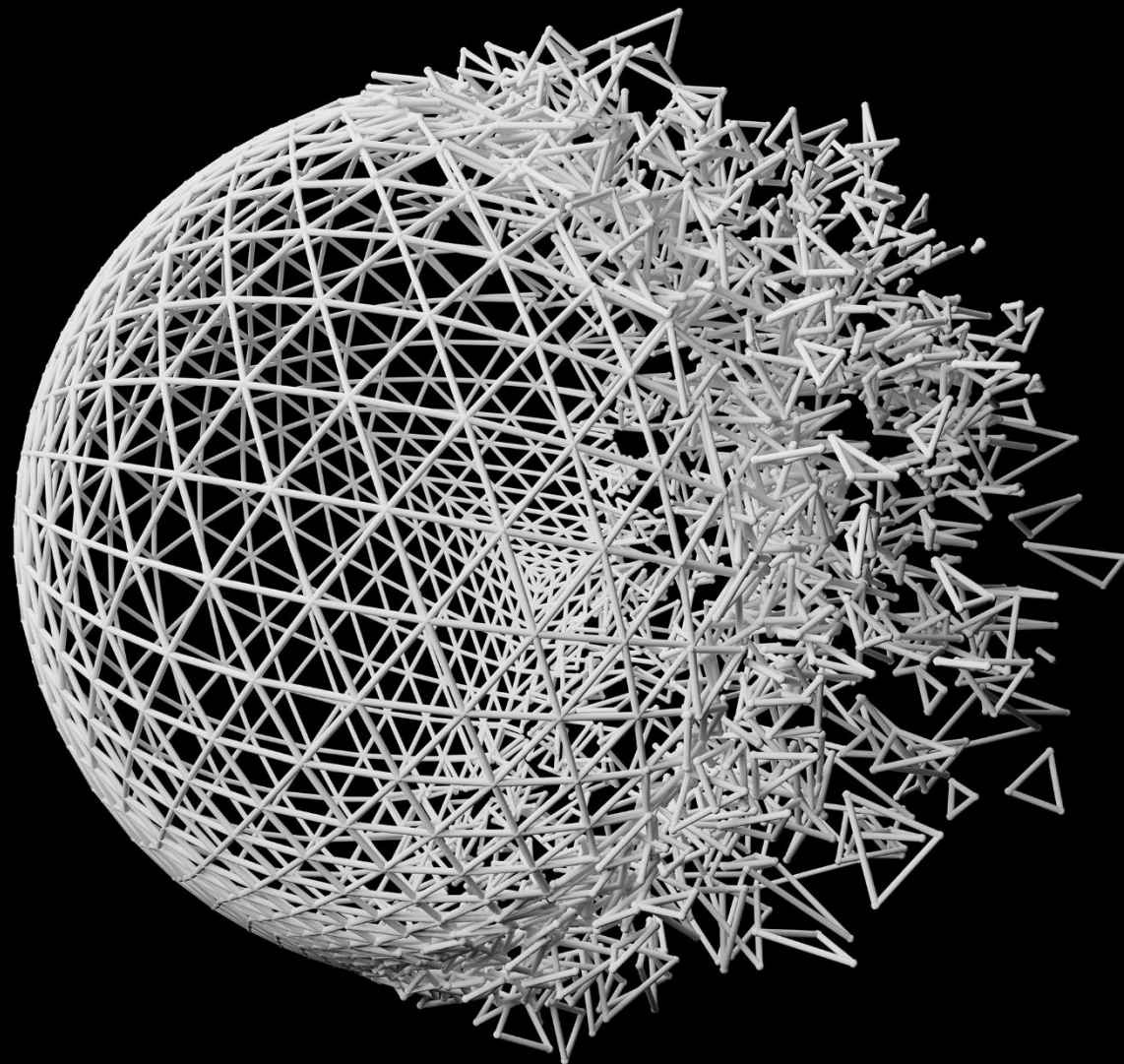# Deloitte.

Deloitte COVID-19

Ashleigh Theophanides

20 May 2020

Disclaimer

Results are data and behaviour dependant

Model results have been based on model calibration against available data up to 19 May 2020. We have not performed detailed assurance on the various data sources used in the projections.

Future projections are then based on assuming the successful implementation of nation wide testing, tracking and tracing initiatives which will continue from early April 2020 onwards.

The projections are very sensitive to the impact of policy decisions, behaviour of the general population of South Africa and external environment factors such the non-availability of vaccines and the seasonal impacts of weather on virus transmission.

Therefore projections must be updated on a developing basis as new information arises in order to be as accurate as possible. This is particularly true of forecasts which are more than one month in advance.
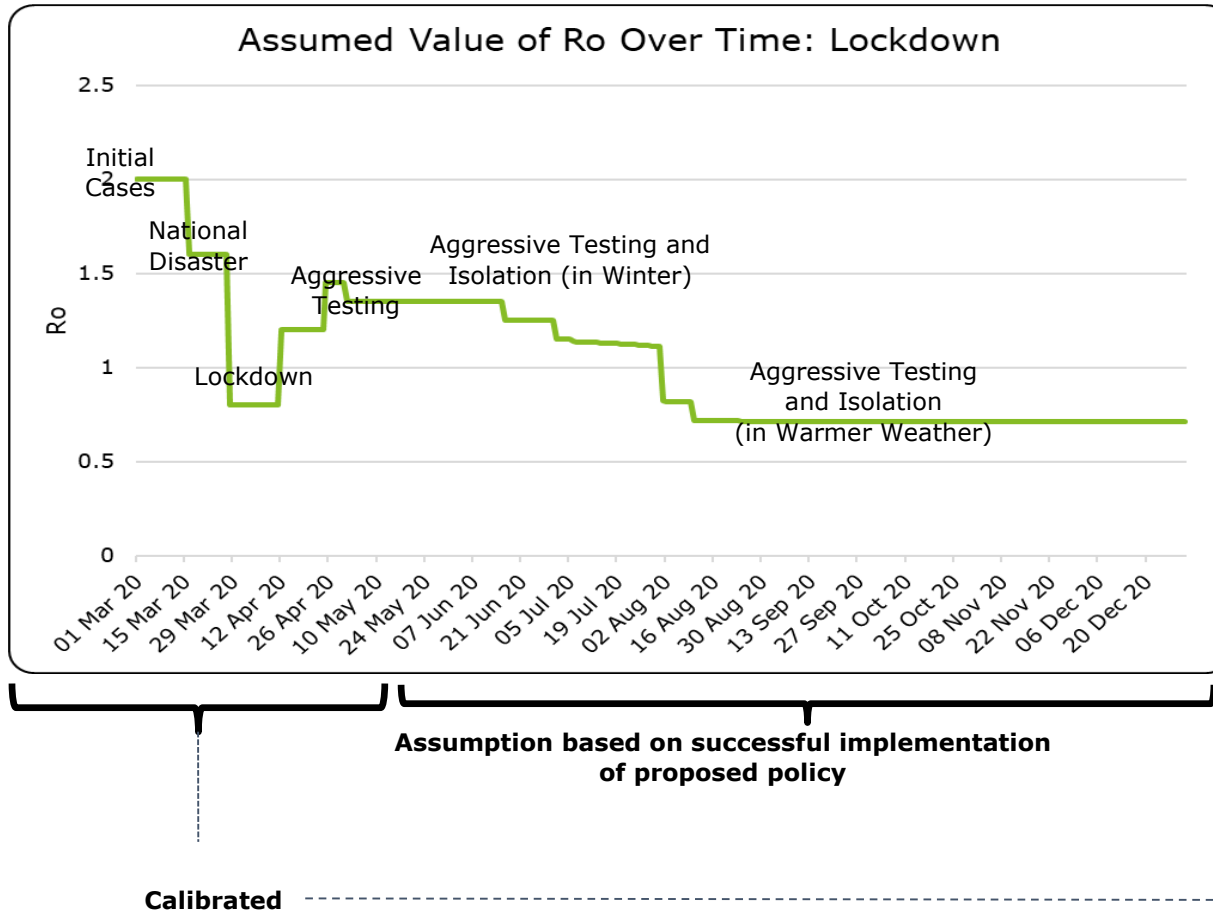
These results have been produced to support B4SA in the support they are providing to the various government departments.
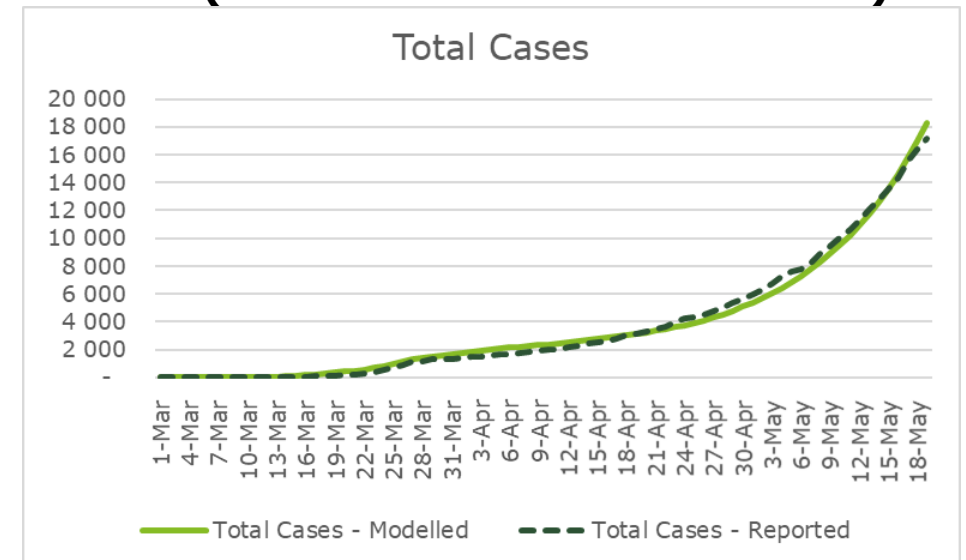
Assumptions

Model Assumptions

Model Calibration of Ro and Projected Ro

Assumed Value of Ro Over Time: Lockdown

Initial Cases

National Disaster

Aggressive Testing

Lockdown

Aggressive Testing and Isolation (in Winter)

Aggressive Testing and Isolation (in Warmer Weather)

Assumption based on successful implementation of proposed policy

Calibrated

Year to Date Calibration of Ro (Based on Cumulated Cases)

Total Cases

Total Cases - Modelled   Total Cases - Reported

Model Assumptions

Year to date transition of COVID 19 severity assumptions

Hospitalisation Rate Over Time

20% of General Ward cases recover in up to 7 days

The remaining 80% of these cases are allocated to ICU or High Care

42% of these cases recover within 14 days

58% of these cases result in fatality within 14 days
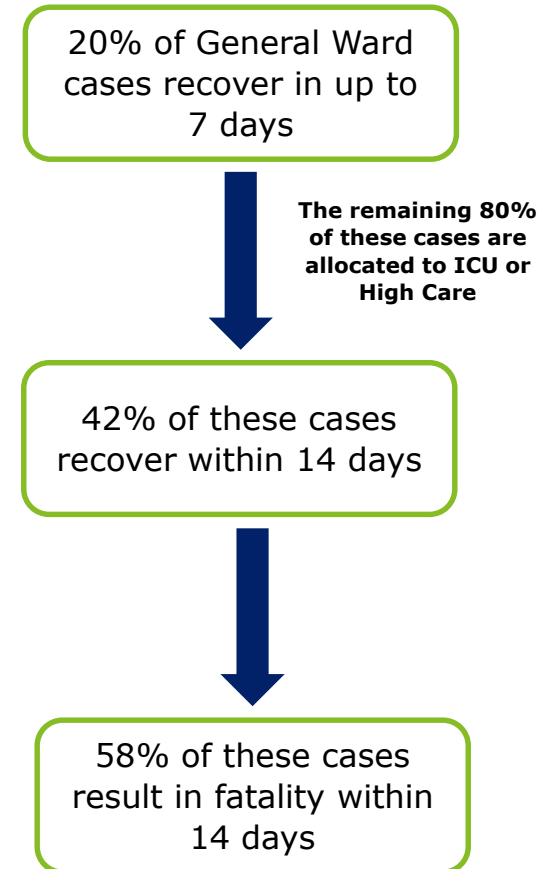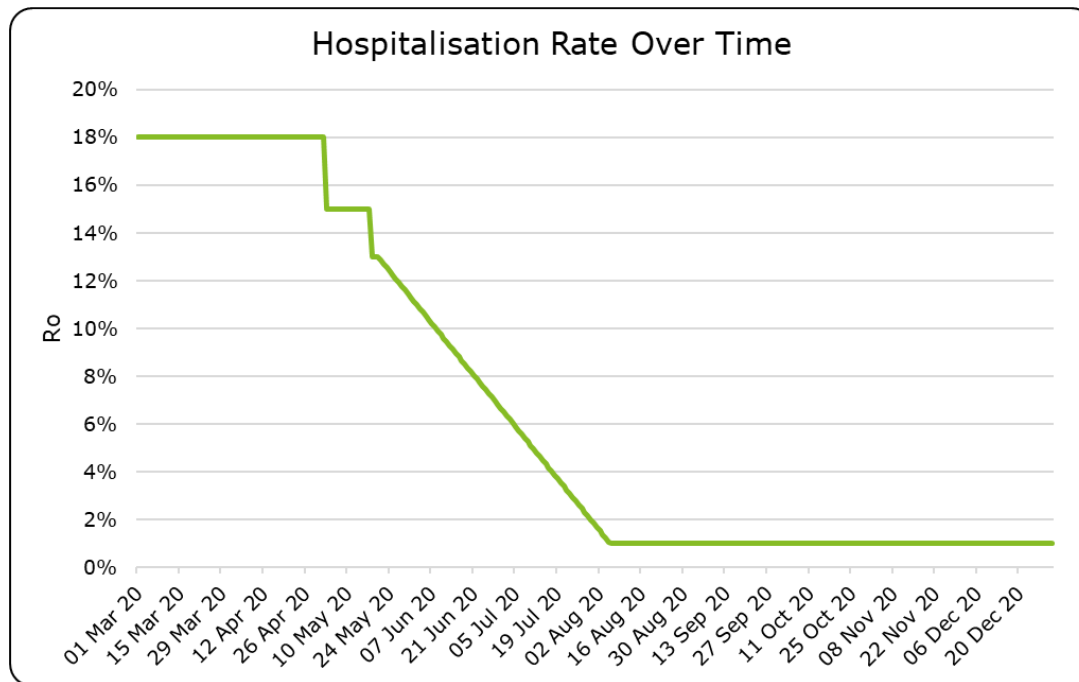
These are highly heterogeneous assumptions based on available private hospital data and will be updated as more data emerges.

Model Output- at 20 April 2020

Model Results – Allowing for PUI admissions

Projected Ventilators Required Assumptions

We now also considered PUI (patients under investigation) admissions, based on the experience in the private hospitals. Needs further analysis.
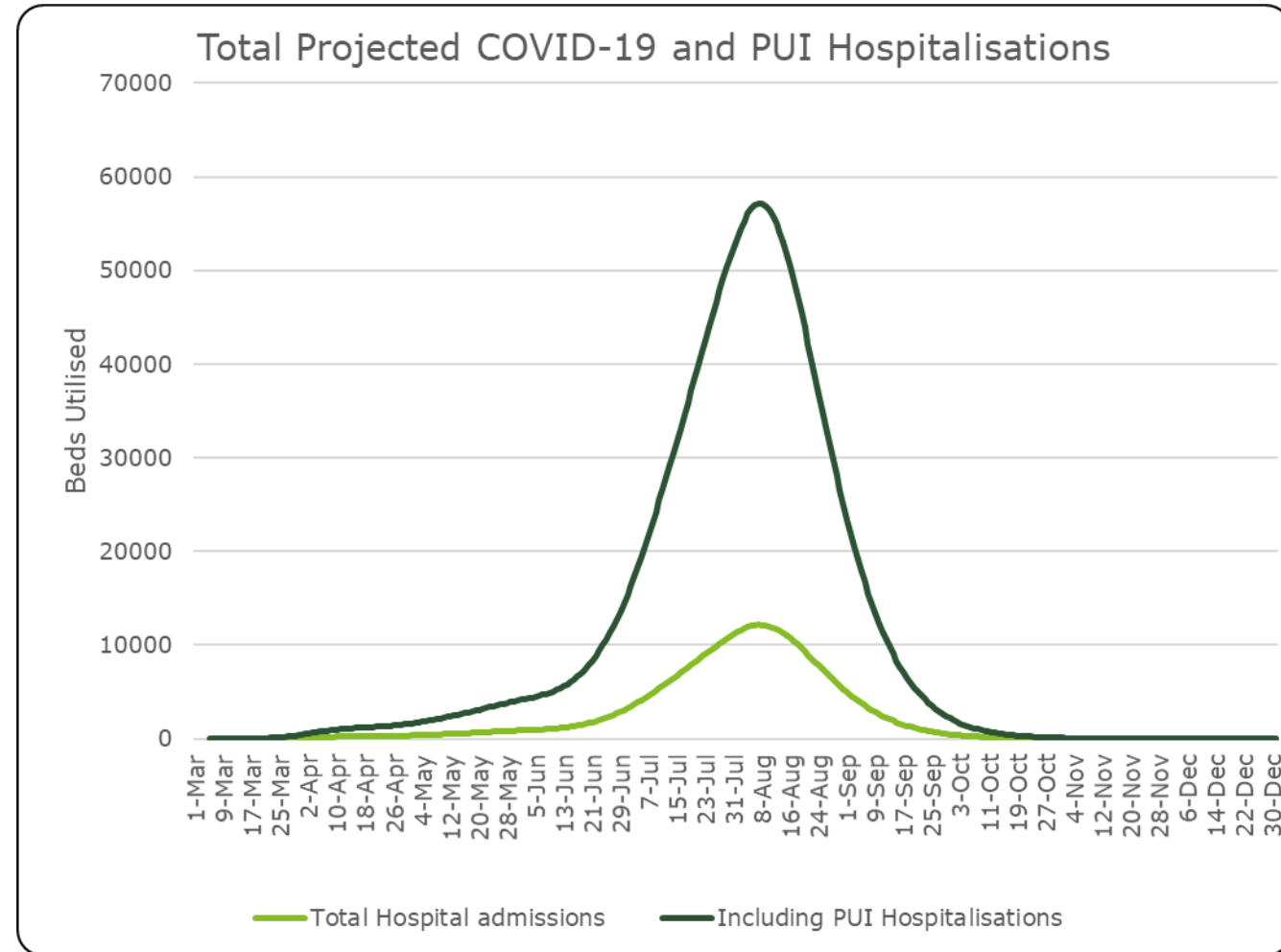
PUI Adjustment:
GW 6.20968
HC 3.496
ICU 2.812676

This gives a more accurate indication of the number of beds occupied.

Ventilator requirements is assumed at 15% of ICU and HC bed days allowing for both COVID-19 and PUI admissions. This is based on actual experience in the private hospitals.

Oxygen requirements is assumed at 23% of Admissions, this is based on actual experience.

Total Projected COVID-19 and PUI Hospitalisations

— Total Hospital admissions   — Including PUI Hospitalisations

Model Results – Allowing for PUI admissions

Projected Ventilators & Oxygen Required Assumptions

Apr 2020	Including PUI beds (Crude estimate)
Expected Max ICU Beds Needed	263
Expected Max High Care Beds Needed	268
Expected MaxVentilators Needed	80
Expected Total Hospital Bed Days Needed	32 209
Expected Max Hospitalisations Needed	1 402
Expected Deaths at end April	131
Expected Max Oxygen Needed	322

May 2020	Including PUI beds (Crude estimate)
Expected Max ICU Beds Needed	493
Expected Max High Care Beds Needed	477
Expected MaxVentilators Needed	146
Expected Total Hospital Bed Days Needed	60 492
Expected Max Hospitalisations Needed	2 638
Expected Deaths at end May	419
Expected Max Oxygen Needed	607

Model Results – Allowing for PUI admissions

Projected Ventilators & Oxygen Required Assumptions

Jun-20

	Including PUI beds (Crude estimate)
Expected Max ICU Beds Needed	1 585
Expected Max High Care Beds Needed	1 240
Expected MaxVentilators Needed	424
Expected Total Hospital Bed Days Needed	139 622
Expected Max Hospitalisations Needed	9 152
Expected Deaths at end June	978
Expected Max Oxygen Needed	2 105

Jul-20

	Including PUI beds (Crude estimate)
Expected Max ICU Beds Needed	6 232
Expected Max High Care Beds Needed	5 751
Expected MaxVentilators Needed	1 797
Expected Total Hospital Bed Days Needed	656 372
Expected Max Hospitalisations Needed	33 185
Expected Deaths at end July	3 563
Expected Max Oxygen Needed	7 632

Aug-20

	Including PUI beds (Crude estimate)
Expected Max ICU Beds Needed	7 049
Expected Max High Care Beds Needed	7 499
Expected MaxVentilators Needed	2 182
Expected Total Hospital Bed Days Needed	907 124
Expected Max Hospitalisations Needed	36 170
Expected Deaths at end Aug	9 115
Expected Max Oxygen Needed	8 319

Model Results – Allowing for PUI admissions

Projected Ventilators & Oxygen Required Assumptions

Total Projected COVID-19 Numbers

Model Results – allowing for PUI admissions

Projected PPE Required Assumptions

Assumed demand for PPE based on admissions for PUI and COVID-19 admissions.

These are the estimated requirements per bed per day.

	Rounded number per occupied bed per day
N-95 masks	25
Surgical masks	120
Eye/face Shields	35
Gowns	55
Gloves	10
Testing swabs	2

Source: Deloitte estimate

Apr 2020	
Expected number based on Hospital Days	**Modelled**
N-95 masks	805 217
Surgical masks	3 865 044
Eye/face Shields	1 127 304
Gowns	1 771 478
Gloves	322 087
Testing swabs	64 417

May 2020	
Expected number based on Hospital Days	**Modelled**
N-95 masks	1 512 303
Surgical masks	7 259 054
Eye/face Shields	2 117 224
Gowns	3 327 067
Gloves	604 921
Testing swabs	120 984

Jun 2020	
Expected number based on Hospital Days	**Modelled**
N-95 masks	3 490 542
Surgical masks	16 754 602
Eye/face Shields	4 886 759
Gowns	7 679 193
Gloves	1 396 217
Testing swabs	279 243

Model Results – allowing for PUI admissions

Projected PPE Required Assumptions

Expected number based on Hospital Days	Modelled
N-95 masks	805 217
Surgical masks	3 865 044
Eye/face Shields	1 127 304
Gowns	1 771 478
Gloves	322 087
Testing swabs	64 417

Jun 2020	
Expected number based on Hospital Days	Modelled
N-95 masks	3 490 542
Surgical masks	16 754 602
Eye/face Shields	4 886 759
Gowns	7 679 193
Gloves	1 396 217
Testing swabs	279 243

| May 2020	
Expected number based on Hospital Days	Modelled
N-95 masks	1 512 303
Surgical masks	7 259 054
Eye/face Shields	2 117 224
Gowns	3 327 067
Gloves	604 921
Testing swabs	120 984

Jul 2020	
Expected number based on Hospital Days	Modelled
N-95 masks	16 409 300
Surgical masks	78 764 639
Eye/face Shields	22 973 020
Gowns	36 100 460
Gloves	6 563 720
Testing swabs	1 312 744

Model Output- update in progress

Model Results

Infections Projected
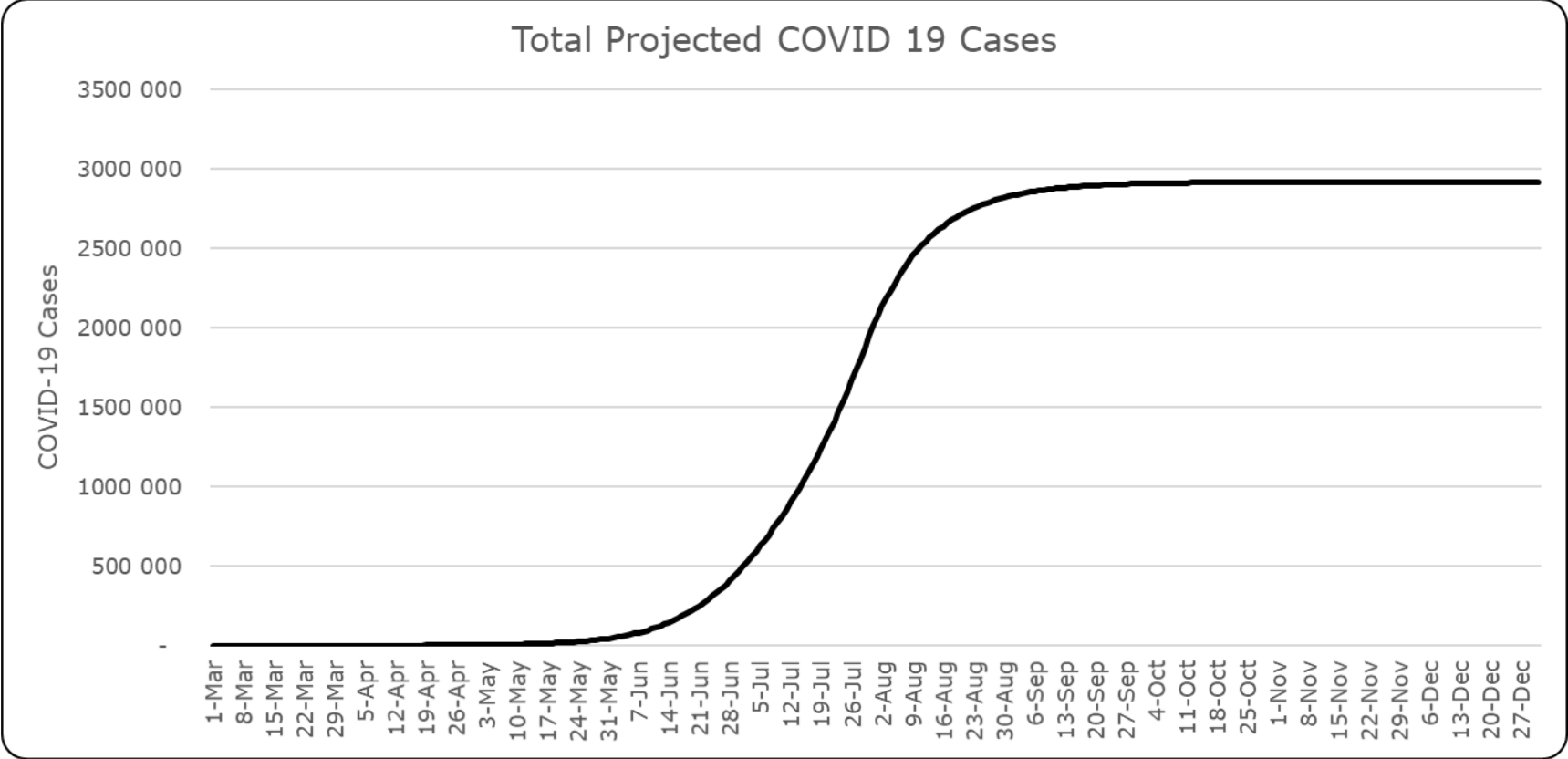
Total Projected COVID 19 Cases

Model Results – Allowing for PUI admissions

Projected Ventilators Required Assumptions

We now also considered PUI (patients under investigation) admissions, based on the experience in the private hospitals.

PUI Adjustment:
GW 6.20968
HC 3.496
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This gives a more accurate indication of the number of beds occupied.

Ventilator requirements is assumed at 15% of ICU and HC bed days allowing for both COVID-19 and PUI admissions. This is based on actual experience in the private hospitals.

Oxygen requirements is assumed at 23% of Admissions, this is based on actual experience.

Total Projected COVID-19 and PUI Hospitalisations
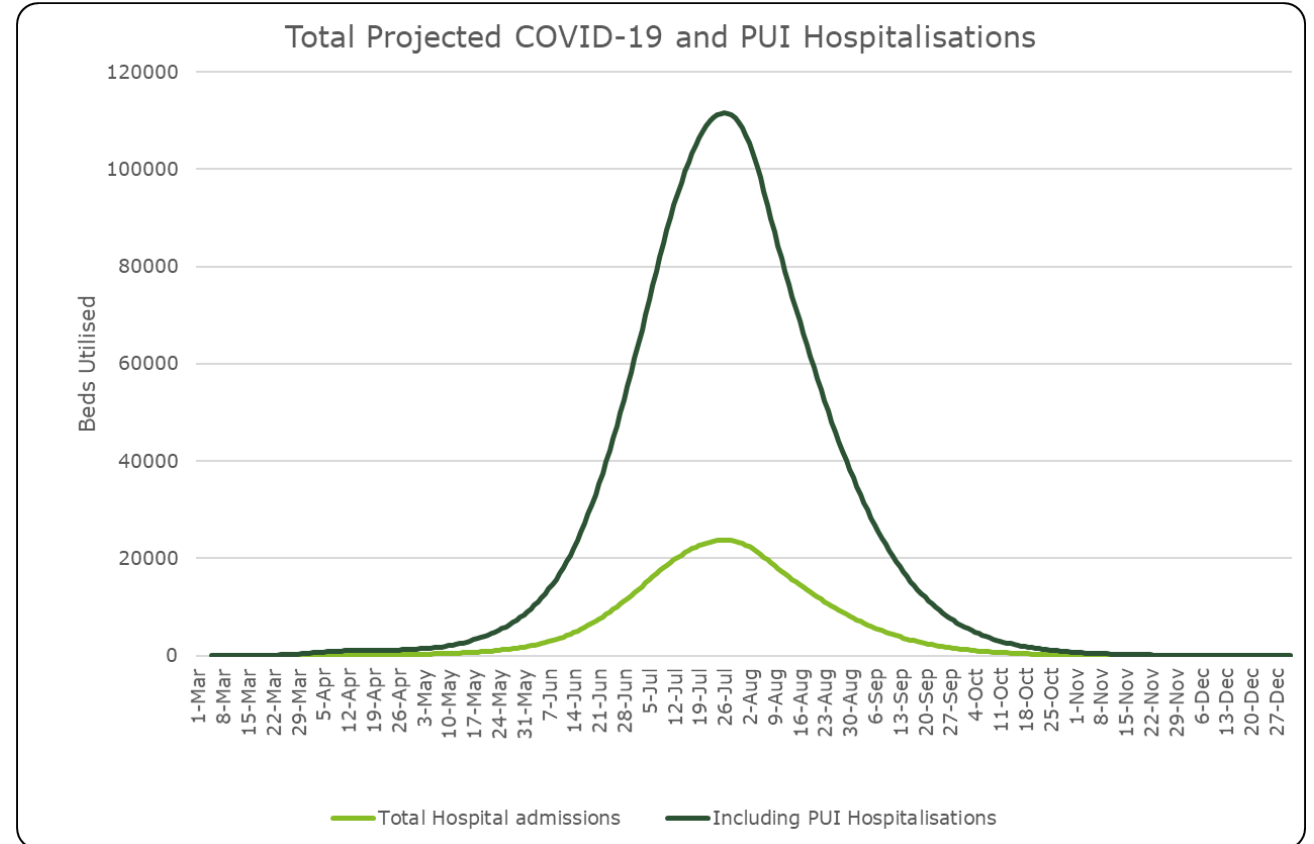
Model Results – Allowing for PUI admissions

Projected Ventilators & Oxygen Required Assumptions

Jun-20	Including PUI beds (Crude estimate)
Expected Max ICU Beds Needed	10 197
Expected Max High Care Beds Needed	8 933
Expected MaxVentilators Needed	2 869
Expected Total Hospital Bed Days Needed	837 807
Expected Max Hospitalisations Needed	58 158
Expected Deaths at end June	3 551
Expected Max Oxygen Needed	13 376

Jul-20	Including PUI beds (Crude estimate)
Expected Max ICU Beds Needed	21 048
Expected Max High Care Beds Needed	25 072
Expected MaxVentilators Needed	6 918
Expected Total Hospital Bed Days Needed	2 957 907
Expected Max Hospitalisations Needed	111 591
Expected Deaths at end July	18 207
Expected Max Oxygen Needed	25 666

Aug-20	Including PUI beds (Crude estimate)
Expected Max ICU Beds Needed	20 482
Expected Max High Care Beds Needed	25 206
Expected MaxVentilators Needed	6 853
Expected Total Hospital Bed Days Needed	2 175 291
Expected Max Hospitalisations Needed	107 118
Expected Deaths at end Aug	34 804
Expected Max Oxygen Needed	24 637

Model Results – allowing for PUI admissions

Projected PPE Required Assumptions

Assumed demand for PPE based on admissions for PUI and COVID-19 admissions.

These are the estimated requirements per bed per day.

	Rounded number per occupied bed per day
N-95 masks	25
Surgical masks	120
Eye/face Shields	35
Gowns	55
Gloves	10
Testing swabs	2

Source: Deloitte estimate

Apr 2020	
Expected number based on Hospital Days	**Modelled**
N-95 masks	745 623
Surgical masks	3 578 990
Eye/face Shields	1 043 872
Gowns	1 640 370
Gloves	298 249
Testing swabs	59 650

May 2020	
Expected number based on Hospital Days	**Modelled**
N-95 masks	2 821 954
Surgical masks	13 545 381
Eye/face Shields	3 950 736
Gowns	6 208 300
Gloves	1 128 782
Testing swabs	225 756

Jun 2020	
Expected number based on Hospital Days	**Modelled**
N-95 masks	20 945 172
Surgical masks	100 536 823
Eye/face Shields	29 323 240
Gowns	46 079 377
Gloves	8 378 069
Testing swabs	1 675 614

Model Results – allowing for PUI admissions

Projected PPE Required Assumptions

Expected number based on Hospital Days	Jul 2020 Modelled
N-95 masks	73 947 665
Surgical masks	354 948 794
Eye/face Shields	103 526 731
Gowns	162 684 864
Gloves	29 579 066
Testing swabs	5 915 813

Model Results

Cumulative Projected Deaths