COVID-19: Projections for demand on health services in Wales (RWC)

Methods

- Simple application of existing model to population of Wales using spreadsheet calculations
- Model is based on work of Ferguson et al (Imperial College) supplied to NHS and SAGE
- Health boards: small population (132K); medium (445K); high (698K)
- Scaling- to 25%, 50%, 75% and 100% of reasonable worst case scenario (RWC)

Key points

- 1. New cases are expected to **peak 11 weeks from start of epidemic** without behavioural interventions
- 2. Without behavioural interventions demand for services is likely to peak around weeks 12-14
- 3. There will be **considerable variation by health board** based on the local timing of the outbreak, size of the resident (and non resident) population, and proportion of vulnerable people (older, co-morbidities, social deprivation)
- 4. Adjusting the model assumptions by simple scaling down gives lower demand but **even with a 25% scaling, demand will exceed supply** (>12000 prevalent cases requiring hospitalisation)
- 5. CDSC is well placed to prospectively monitor health service demands as part of its surveillance function

Key terms

• Figures are based on Reasonable Worst Case (RWC) for strategic planning purposes

Prevalence/ caseload

- Number of cases of a category existing at any one time
- Expressed as mean daily prevalence for a given week
- "Snapshot" of that case category e.g. "currently 48,000 patients with CoV admitted in Wales hospitals"
- Comparable with bed capacity (total beds available e.g. ICU)

• Incidence/new cases

- New events falling into a category
- Symptomatic cases, hospitalisations, deaths
- Can sum to obtain total, but units are per day (so x7 for weekly totals)
- Comparable with rate of hospital admissions per day/week

Uncertainty in estimates

- Proportions of admissions/intensive treatment/deaths will vary
- Treatment could alter outcome prevalence but likely to be used in hospitals

ions and totals for Reasonable Worst Case	(RWC)	scena	rio	
		Quartiles	of RWC	
Reasonable Worst Case)	25%	50%	75%	100%
3,100,000				
80% of entire population	620,000	1,240,000	1,860,000	2,480,00
50% of infected population	387,500	775,000	1,162,500	1,550,00
90% of hospitalisations range from 3-8 days post showing first symptoms				
13% of those symptomatic hospitalised	50,375	100,750	151,125	201,50
4 I/min, average length of stay 7.8 days				
9% of those hospitalised - 6 l/min, average length of stay 11.7 days	4,534	9,068	13,601	18,13
9% of those hospitalised - 8 l/min, average length of stay 15.6 days	4,534	9,068	13,601	18,13
1% of those infected, based on WUHAN - overwhelmed system	6,200	12,400	18,600	24,80
	ions and totals for Reasonable Worst Case Reasonable Worst Case) 3,100,000 80% of entire population 50% of infected population 90% of hospitalisations range from 3-8 days post showing first symptoms 13% of those symptomatic hospitalised 4 l/min, average length of stay 7.8 days 9% of those hospitalised - 6 l/min, average length of stay 11.7 days 9% of those hospitalised - 8 l/min, average length of stay 15.6 days 1% of those infected, based on WUHAN - overwhelmed system	ions and totals for Reasonable Worst Case (RWC)Reasonable Worst Case)25%3,100,000620,00080% of entire population620,00050% of infected population387,50090% of hospitalisations range from 3-8 days post showing first symptoms50,37513% of those symptomatic hospitalised50,3754 l/min, average length of stay 7.8 days4,5349% of those hospitalised - 6 l/min, average length of stay 11.7 days4,5349% of those infected, based on WUHAN - overwhelmed system6,200	Gons and totals for Reasonable Worst Case (RWC) scena Quartiles Reasonable Worst Case) 25% 50% 3,100,000 620,000 1,240,000 80% of entire population 620,000 1,240,000 50% of infected population 387,500 775,000 90% of hospitalisations range from 3-8 days post showing first symptoms 100,750 100,750 13% of those symptomatic hospitalised 50,375 100,750 9% of those hospitalised - 6 l/min, average length of stay 11.7 days 4,534 9,068 9% of those hospitalised - 8 l/min, average length of stay 15.6 days 4,534 9,068 1% of those infected, based on WUHAN - overwhelmed system 6,200 12,400	ions and totals for Reasonable Worst Case (RWC) scenario Reasonable Worst Case) 3,100,000 80% of entire population 50% of infected population 50% of infected population 387,500 90% of hospitalisations range from 3-8 days post showing first symptoms 13% of those symptomatic hospitalised 4/min, average length of stay 11.7 days 9% of those hospitalised - 6 l/min, average length of stay 11.7 days 9% of those hospitalised - 8 l/min, average length of stay 15.6 days 9% of those infected, based on WUHAN - overwhelmed system 13% of those infected, based on WUHAN - overwhelmed system 13% of those infected, based on WUHAN - overwhelmed system 13% of those infected, based on WUHAN - overwhelmed system 13% of those infected, based on WUHAN - overwhelmed system 14% of those infected, based on WUHAN - overwhelmed system 15% of th





					Peak daily	new	Peak daily	/			
					episodes		prevalent	caseload			
Scenario	Geography	Total symptomatic cases	Total hospitalisations	Total deaths	Symptomatic cases	Hospitalisations	Symptomatic	Hospitalised (all)	Hospitalised (O2 only)	Hospitalised (O2+NIV)	Hospitalised (Ventilated)
RWC	All Wales	1,679,167	204,858	25,352	53,750	6,486	993,889	48,681	36,785	7,222	4,690
	HB low	70,859	8,645	1,070	2,268	274	41,941	2,054	1,552	305	5 198
	HB med	238,177	29,057	3,596	7,624	920	140,975	6,905	5,218	1,024	665
	HB high	373,627	45,582	5,641	. 11,960	1,443	221,148	10,832	8,185	1,607	1,044
75% RWC	All Wales	1,259,375	153,644	19,014	40,313	4,865	745,417	36,511	27,589	5,417	3,518
	HB low	53,144	6,484	802	1,701	. 205	31,456	5 1,541	1,164	229	9 148
	HB med	178,632	21,793	2,697	5,718	690	105,731	5,179	3,913	768	8 499
	HB high	280,220	34,187	4,231	8,970	1,082	165,861	8,124	6,139	1,205	5 783
50% RWC	All Wales	839,584	102,429	12,676	26,875	3,243	496,945	5 24,341	18,393	3,611	2,345
	HB low	35,430	4,322	535	1,134	. 137	20,971	1,027	776	152	99
	HB med	119,088	14,529	1,798	3,812	460	70,488	3,453	2,609	512	333
	HB high	186,814	22,791	2,821	5,980	722	110,574	5,416	5 4,092	803	522
25% RWC	All Wales	419,792	51,215	6,338	13,438	1,622	248,472	12,170	9,196	1,806	i 1,173
	HB low	17,715	2,161	267	567	68	10,485	5 514	388	76	5 49
	HB med	59,544	7,264	899	1,906	230	35,244	1,726	5 1,304	256	5 166
	HB high	93,407	11,396	1,410	2.990	361	55.287	2,708	3 2.046	402	261

Summary table- Hospital capacity in Wales and COVID case burden (without behavioural interventions)

Health Board	Average daily available beds 2018/19	Peak COVID caseload	Total level 3 ICU capacity	Peak ventilated cases COVID	Annual admissions 2018/19	Daily mean admissions 2018/19*	Peak daily COVID admissions
All Wales	10,563	48,681	129	4,690	827,369	2,267	6,486
Small Health Board	214	2,054	a	198	4,760	13	274
Medium Health Board	1,210	6,905	16	665	82,128	225	920
Large HB	2,220	10,832	18	1,044	166,324	456	1,443

Sources: StatsWales (beds); PEDW (admissions); communications with health boards (ICU). ***50% admissions are emergency, 50% are elective**

Summary table- Hospital capacity in Wales and COVID case burden (with behavioural interventions – reduction of 66% in peak burden)

Health Board	Average daily available beds 2018/19	Peak CoV caseload	Total level 3 ICU capacity	Peak ventilated cases CoV	Annual admissions 2018/19	Daily mean admissions 2018/19*	Peak daily CoV admissions
All Wales	10,563	16,552	129	1,595	827,369	2,267	2,205
Small Health Board	214	698	0	67	4,760	13	93
Medium Health Board	1,210	2,348	16	226	82,128	225	313
Large HB	2,220	3,683	18	355	166,324	456	491

Behavioural interventions are combination of case isolation (CI), household quarantine (HQ) and Social distancing for older people (SDO), enacted at an early trigger of ICU cases

Sources: StatsWales (beds); PEDW (admissions); communications with health boards (ICU).

*50% admissions are emergency, 50% are elective

Delay and Flatten

- We are still in contain phase, however will move into delay and flatten to help NHS resilience.
- A number of behavioural and social interventions are being considered, including their effectiveness in containing the outbreak and delaying the peak.
 - Stopping large events such as concerts and sports
 - o Closure of schools
 - Home isolation of symptomatic cases
 - Whole household isolation
 - Social distancing
 - Social distancing for those over 65 (nursing homes and households)



