Detailed modelling for Somerset Stroke Reconfiguration

Modelling parameters

The activity modelling was undertaken by NHS South, Central and West Commissioning Support Unit (SCW), as outlined below:

- Modelling is focussed on activity shifts under option 5 (no HASU at YDH) and option 6 (no HASU or ASU at YDH)
- Dataset – 2021 Sentinel Stroke National Audit Programme (SSNAP) Core Dataset (Twelve Somerset Foundation Trust – SFT - records from the SSNAP dataset were excluded from the modelling due to data quality issues, as agreed with the Data Coordinator for Neurological Rehabilitation & Stroke Services at SFT)
- Site modelling logic is that assuming closure of HASU at Yeovil District Hospital (YDH), activity will shift to the next closest provider based on patient postcode, and journey times calculated by the SCW Geospatial Team as follows: journey time from service user's residential postcodes to all current HASUs in the region was modelled using Travel Time routing analysis (https://traveltime.com/). The journey time was modelled based on driving by car at 03:00 on a Tuesday morning (as a standard proxy measure for blue-light ambulance journey times).
- Under option C, it was broadly assumed that patients would return to YDH for their ASU care (on the basis that YDH is the closest provider), and under option D it was broadly assumed that the patient would stay at the same provider for their ASU as that to which they were admitted for their stroke presentation
- Workforce modelling is based on applying national best-practice staffing ratios (per bed) to the modelled bed numbers (bed numbers based on assuming actual length of stay). Non-stroke unit beds assume same ratios as ASU.

Stress testing

The activity and bed modelling are based on a baseline year of admissions and related lengths of stay.

Whilst further modelling of tolerance levels in relation to the baseline admissions will be undertaken, a number of additional analyses have been undertaken as part of the PCBC modelling which help to stress-test the modelled outputs.

These are as follows:

- Growth rates were applied to the baseline admissions to give 5/10-year projected admissions and bed requirements – these are based on age-weighted ONS population projections and national assumptions around increases in stroke incidence, and hence estimate a range of admission levels on the number of beds required.
- Accounting for variability in length of stay:
    - By applying occupancy assumptions in the bed calculations, the modelled bed numbers implicitly assume a level of variability in length of stay.
    - Analysis was undertaken in relation to the historic variability in bed occupancy for stroke patients, to assess the impact of applying this variability to the modelled bed numbers.

The analysis undertaken so far will be augmented by further modelling of the potential variation at different stages of the pathway and assessing the risks and mitigations which may be required.

Information Governance

Information governance advice was sought to ensure the relevant data sharing agreements were in place as follows, and that a Data Protection Impact Assessment (DPIA) was completed:

- Data sharing agreement (DSA) between the two acute providers and Somerset CCG – either a specific agreement relating to the sharing of this dataset, or a general one which would cover this dataset.
- Data Processing Agreement (DPA) between Somerset CCG and SCW – again, either a specific agreement relating to this dataset, or a general one which would cover this dataset.

SCW provided a summary document to support the decision making regarding the choice of data set for the modelling.

This was an essential aspect of the modelling and ensured that all stakeholders recognised the data being used and the outputs from the modelling.

Dataset	Pros	Cons	Questions	Comments
SSNAP from providers	• Recognised numbers agreed by stakeholders • Very detailed dataset	• Requires dataset to be re-sent with postcode or Lower Super Output Area (LSOA) added • Need to ensure that data sharing guidelines are adhered to • These could both present timing issues	• Confirm whether stroke mimic patients are included and if so how these can be identified • Is more historic data available (e.g. back to 2016) to help understand longer term trends to inform growth levels to model?	If we can receive the updated dataset in a timely manner whilst adhering to data sharing rules this would be the preferable approach
Ambulance dataset (SWAST)	• Dataset already available and authorised for use	• Doesn't include self-presenters or strokes which		Not preferable to use this dataset

Dataset	Pros	Cons	Questions	Comments
– dataset in SCW data warehouse	• Includes pick-up postcode rather than postcode of residence	occur when an inpatient at the time of their stroke • Includes postcode sector only, with no centroid (additional work for GIS Team) • Data is not available for Mar-20, so extrapolation would be required		
Commissioning Dataset (SUS) - Admissions	• Dataset already available and authorised for use • Includes most of the data fields required, including geographical information • Includes longer-term trend data to inform growth • Likely relatively high level of coding quality / completeness	• Stroke numbers are lower than SSNAP • Stroke mimics unlikely to be identifiable, so uplift to stroke numbers required • Difficult to identify which patients arrived via ambulance vs self-presenter's vs already inpatient	• Confirm whether stroke mimic patients can be identified with providers	Suggest this should be second choice if SSNAP unavailable in timescales
Commissioning Dataset (SUS) – ED attendances	• Dataset already available and authorised for use • Includes some of the data fields required, including geographical information	• Some key data items unavailable e.g., length of stay • Longer term trend data likely to be unavailable (strokes only identifiable when ECDS introduced)	• Analysis required to determine whether numbers look reasonable • Coding quality / completeness uncertain • Query whether stroke mimics identifiable/included within stroke numbers	Not preferable to use this dataset

Modelling assumptions

Description	Assumption	Source
Population growth	ONS projections at 5 year age band level, based on CCG of residence	ONS sub-national population projections (2018-based)
Non-demographic growth	Stroke incidence rates will stay the same up to 2035 for those aged 45 to 84, and rise by 0.5% per year for those aged 85 and over	'Current, future and avoidable costs of stroke in the UK' Summary Report published by the Stroke Association
Diagnostic tests - percentage of stroke admissions receiving tests	CT 100%, including mimics (50% for non-initial presentations)	Advised by Rob Whiting 7/6/22 & 12/7/22
	MRI 12%	'Somerset Stroke: Case for Change' (Table 12, p37), based on July – Sept 2021 SSNAP Reports
	Both 15%	

Description	Assumption	Source
LoS for hyperacute phase	3 days	'BNSSG Stroke Services Reconfiguration Programme Pre-Consultation Business Case' (p167-8, figure 40) - "The expected flows in the BNSSG future state stroke pathway have been calculated drawing on data from best practice systems, such as London and Greater Manchester (Salford)"
LoS for acute phase	6 days	
Occupancy rates	HASU 85%	
	ASU 90%	
	Non-stroke unit 90%	
Percentage of expected stroke presentations which are mimics	56% (MPH 49%, YDH 66%)	SSNAP Sprint audit for stroke mimics - YDH and SFT results combined
Percentage of mimics admitted to stroke unit	39% (MPH 46%, YDH 30%)	
Average LoS (days) for stroke mimic admissions (stroke unit)	2.0 days (in line with MPH and national average - YDH is an outlier at 7.1 days)	
Percentage of mimics admitted to General Medicine ward	35%	SSNAP Sprint audit for stroke mimic - based on 39% admitted to stroke unit and 26% discharged on day of presentation, so 100%-39%-26%=35%
Average LoS (days) for stroke mimic admissions (General Medicine ward)	2.5 days	Advised by Rob Whiting 13/6/22
MRI - percentage of stroke mimic patients receiving tests	60%	Advised by Rob Whiting
BNSSG patients expected to attend Musgrove Park as a result of the BNSSG stroke services reconfiguration	3.1 per week (1 stroke, 2 mimic)	'Somerset Stroke: Case for Change' (Table 23, p56), based on analysis by BNSSG

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Activity

Table 1

The table below shows the high-level summary of activity volumes by site for each modelled option, by geographical area of residence. It is based on actual length of stay and excludes mimics.

		Scenario						Change from 'do nothing'			
Metric	Hospital Site	Site_Option1 Do nothing	Site_Option2 Single delivery team	Site_Option5A No HASU YDH-Weston open	Site_Option5B No HASU YDH-Weston closed	Site_Option6A No HASU/ASU YDH- Weston open	Site_Option6B No HASU/ASU YDH- Weston closed	Site_Option5A No HASU YDH-Weston open	Site_Option5B No HASU YDH-Weston closed	Site_Option6A No HASU/ASU YDH- Weston open	Site_Option6B No HASU/ASU YDH- Weston closed
Activity	Musgrove Park Hospital	691	691	769	815	769	815	78	124	78	124
	Yeovil District Hospital	454	454	0	0	0	0	-454	-454	-454	-454
	Dorset County Hospital	0	0	255	259	255	259	255	259	255	259
	Weston General Hospital	0	0	55	0	55	0	55	0	55	0
	RUH Bath	0	0	46	51	46	51	46	51	46	51
	Salisbury Hospital	0	0	17	17	17	17	17	17	17	17
	Southmead Hospital	0	0	2	2	2	2	2	2	2	2
	Royal Devon & Exeter	0	0	1	1	1	1	1	1	1	1
	All Sites	**1,145**	**1,145**	**1,145**	**1,145**	**1,145**	**1,145**	**0**	**0**	**0**	**0**
Beds_HASU	Musgrove Park Hospital	6.4	6.4	7.0	7.4	7.0	7.4	0.7	1.0	0.7	1.0
	Yeovil District Hospital	3.4	3.4	0.0	0.0	0.0	0.0	-3.4	-3.4	-3.4	-3.4
	Dorset County Hospital	0.0	0.0	1.9	2.0	1.9	2.0	1.9	2.0	1.9	2.0
	Weston General Hospital	0.0	0.0	0.4	0.0	0.4	0.0	0.4	0.0	0.4	0.0
	RUH Bath	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Salisbury Hospital	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**9.7**	**9.7**	**9.9**	**9.9**	**9.9**	**9.9**	**0.1**	**0.2**	**0.1**	**0.2**
Beds_ASU	Musgrove Park Hospital	13.2	13.2	13.2	13.2	14.8	15.6	0.0	0.0	1.6	2.3
	Yeovil District Hospital	8.0	8.0	8.0	8.0	0.0	0.0	-0.1	-0.1	-8.0	-8.0
	Dorset County Hospital	0.0	0.0	0.0	0.0	4.2	4.3	0.0	0.0	4.2	4.3
	Weston General Hospital	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
	RUH Bath	0.0	0.0	0.0	0.0	0.8	0.9	0.0	0.0	0.8	0.9
	Salisbury Hospital	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.5	0.5
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**21.3**	**21.3**	**21.3**	**21.3**	**21.3**	**21.3**	**0.0**	**0.0**	**0.0**	**0.0**
Beds_NonSU	Musgrove Park Hospital	2.3	2.3	3.1	3.6	3.1	3.6	0.8	1.2	0.8	1.2
	Yeovil District Hospital	4.3	4.3	0.0	0.0	0.0	0.0	-4.3	-4.3	-4.3	-4.3
	Dorset County Hospital	0.0	0.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	Weston General Hospital	0.0	0.0	0.8	0.0	0.8	0.0	0.8	0.0	0.8	0.0
	RUH Bath	0.0	0.0	0.3	0.6	0.3	0.6	0.3	0.6	0.3	0.6
	Salisbury Hospital	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**6.7**	**6.7**	**6.6**	**6.5**	**6.6**	**6.5**	**-0.1**	**-0.2**	**-0.1**	**-0.2**
Beds_Total	Musgrove Park Hospital	22.0	22.0	23.4	24.2	25.0	26.5	1.4	2.3	3.0	4.6
	Yeovil District Hospital	15.7	15.7	8.0	8.0	0.0	0.0	-7.8	-7.8	-15.7	-15.7
	Dorset County Hospital	0.0	0.0	4.2	4.2	8.4	8.6	4.2	4.2	8.4	8.6
	Weston General Hospital	0.0	0.0	1.1	0.0	2.1	0.0	1.1	0.0	2.1	0.0
	RUH Bath	0.0	0.0	0.7	1.0	1.5	1.9	0.7	1.0	1.5	1.9
	Salisbury Hospital	0.0	0.0	0.3	0.3	0.7	0.7	0.3	0.3	0.7	0.7
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**37.7**	**37.7**	**37.7**	**37.7**	**37.7**	**37.7**	**0.0**	**0.0**	**0.0**	**0.0**
Diagnostics	Musgrove Park Hospital	754	754	835	882	835	882	81	128	81	128
	Yeovil District Hospital	480	480	0	0	0	0	-480	-480	-480	-480
	Dorset County Hospital	0	0	271	274	271	274	271	274	271	274
	Weston General Hospital	0	0	56	0	56	0	56	0	56	0
	RUH Bath	0	0	49	55	49	55	49	55	49	55
	Salisbury Hospital	0	0	19	19	19	19	19	19	19	19
	Southmead Hospital	0	0	2	2	2	2	2	2	2	2
	Royal Devon & Exeter	0	0	1	1	1	1	1	1	1	1
	All Sites	**1,234**	**1,234**	**1,234**	**1,234**	**1,234**	**1,234**	**0**	**0**	**0**	**0**
ED_Atts	Musgrove Park Hospital	684	684	760	805	760	805	76	120	76	120
	Yeovil District Hospital	444	444	0	0	0	0	-444	-444	-444	-444
	Dorset County Hospital	0	0	250	254	250	254	250	254	250	254
	Weston General Hospital	0	0	53	0	53	0	53	0	53	0
	RUH Bath	0	0	45	50	45	50	45	50	45	50
	Salisbury Hospital	0	0	17	17	17	17	17	17	17	17
	Southmead Hospital	0	0	2	2	2	2	2	2	2	2
	Royal Devon & Exeter	0	0	1	1	1	1	1	1	1	1
	All Sites	**1,129**	**1,129**	**1,129**	**1,129**	**1,129**	**1,129**	**0**	**0**	**0**	**0**

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Table 2

The table below shows the high-level summary of activity volumes by site for each modelled option, by geographical area of residence. It is based on actual length of stay and includes mimics.

		Scenario						Change from 'do nothing'			
Metric	Hospital Site	Site_Option1 Do nothing	Site_Option2 Single delivery team	Site_Option5A No HASU YDH-Weston open	Site_Option5B No HASU YDH-Weston closed	Site_Option6A No HASU/ASU YDH- Weston open	Site_Option6B No HASU/ASU YDH- Weston closed	Site_Option5A No HASU YDH-Weston open	Site_Option5B No HASU YDH-Weston closed	Site_Option6A No HASU/ASU YDH- Weston open	Site_Option6B No HASU/ASU YDH- Weston closed
Activity	Musgrove Park Hospital	1,026	1,026	1,136	1,198	1,136	1,198	109	172	109	172
	Yeovil District Hospital	647	647	0	0	0	0	-647	-647	-647	-647
	Dorset County Hospital	0	0	365	370	365	370	365	370	365	370
	Weston General Hospital	0	0	76	0	76	0	76	0	76	0
	RUH Bath	0	0	67	75	67	75	67	75	67	75
	Salisbury Hospital	0	0	25	25	25	25	25	25	25	25
	Southmead Hospital	0	0	3	3	3	3	3	3	3	3
	Royal Devon & Exeter	0	0	1	1	1	1	1	1	1	1
	All Sites	**1,673**	**1,673**	**1,673**	**1,673**	**1,673**	**1,673**	**0**	**0**	**0**	**0**
Beds_HASU	Musgrove Park Hospital	8.5	8.5	9.4	9.9	9.4	9.9	0.9	1.3	0.9	1.3
	Yeovil District Hospital	4.6	4.6	0.0	0.0	0.0	0.0	-4.6	-4.6	-4.6	-4.6
	Dorset County Hospital	0.0	0.0	2.6	2.7	2.6	2.7	2.6	2.7	2.6	2.7
	Weston General Hospital	0.0	0.0	0.5	0.0	0.5	0.0	0.5	0.0	0.5	0.0
	RUH Bath	0.0	0.0	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6
	Salisbury Hospital	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**13.2**	**13.2**	**13.3**	**13.3**	**13.3**	**13.3**	**0.1**	**0.2**	**0.1**	**0.2**
Beds_ASU	Musgrove Park Hospital	13.2	13.2	13.2	13.2	14.8	15.6	0.0	0.0	1.6	2.3
	Yeovil District Hospital	8.0	8.0	8.0	8.0	0.0	0.0	-0.1	-0.1	-8.0	-8.0
	Dorset County Hospital	0.0	0.0	0.0	0.0	4.2	4.3	0.0	0.0	4.2	4.3
	Weston General Hospital	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0
	RUH Bath	0.0	0.0	0.0	0.0	0.8	0.9	0.0	0.0	0.8	0.9
	Salisbury Hospital	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.5	0.5
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**21.3**	**21.3**	**21.3**	**21.3**	**21.3**	**21.3**	**0.0**	**0.0**	**0.0**	**0.0**
Beds_NonSU	Musgrove Park Hospital	2.3	2.3	3.1	3.6	3.1	3.6	0.8	1.2	0.8	1.2
	Yeovil District Hospital	4.3	4.3	0.0	0.0	0.0	0.0	-4.3	-4.3	-4.3	-4.3
	Dorset County Hospital	0.0	0.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	Weston General Hospital	0.0	0.0	0.8	0.0	0.8	0.0	0.8	0.0	0.8	0.0
	RUH Bath	0.0	0.0	0.3	0.6	0.3	0.6	0.3	0.6	0.3	0.6
	Salisbury Hospital	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**6.7**	**6.7**	**6.6**	**6.5**	**6.6**	**6.5**	**-0.1**	**-0.2**	**-0.1**	**-0.2**
Beds_Total	Musgrove Park Hospital	24.1	24.1	25.7	26.7	27.3	29.0	1.6	2.6	3.2	4.9
	Yeovil District Hospital	17.0	17.0	8.0	8.0	0.0	0.0	-9.0	-9.0	-17.0	-17.0
	Dorset County Hospital	0.0	0.0	4.9	5.0	9.1	9.3	4.9	5.0	9.1	9.3
	Weston General Hospital	0.0	0.0	1.3	0.0	2.3	0.0	1.3	0.0	2.3	0.0
	RUH Bath	0.0	0.0	0.9	1.1	1.7	2.0	0.9	1.1	1.7	2.0
	Salisbury Hospital	0.0	0.0	0.3	0.3	0.7	0.7	0.3	0.3	0.7	0.7
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**41.1**	**41.1**	**41.1**	**41.1**	**41.1**	**41.1**	**0.0**	**0.0**	**0.0**	**0.0**
Diagnostics	Musgrove Park Hospital	2,094	2,094	2,314	2,438	2,314	2,438	220	344	220	344
	Yeovil District Hospital	1,306	1,306	0	0	0	0	-1,306	-1,306	-1,306	-1,306
	Dorset County Hospital	0	0	739	749	739	749	739	749	739	749
	Weston General Hospital	0	0	150	0	150	0	150	0	150	0
	RUH Bath	0	0	135	150	135	150	135	150	135	150
	Salisbury Hospital	0	0	54	54	54	54	54	54	54	54
	Southmead Hospital	0	0	6	6	6	6	6	6	6	6
	Royal Devon & Exeter	0	0	3	3	3	3	3	3	3	3
	All Sites	**3,400**	**3,400**	**3,400**	**3,400**	**3,400**	**3,400**	**0**	**0**	**0**	**0**
ED_Atts	Musgrove Park Hospital	1,522	1,522	1,684	1,777	1,684	1,777	163	255	163	255
	Yeovil District Hospital	961	961	0	0	0	0	-961	-961	-961	-961
	Dorset County Hospital	0	0	543	550	543	550	543	550	543	550
	Weston General Hospital	0	0	112	0	112	0	112	0	112	0
	RUH Bath	0	0	99	110	99	110	99	110	99	110
	Salisbury Hospital	0	0	39	39	39	39	39	39	39	39
	Southmead Hospital	0	0	5	5	5	5	5	5	5	5
	Royal Devon & Exeter	0	0	2	2	2	2	2	2	2	2
	All Sites	**2,483**	**2,483**	**2,483**	**2,483**	**2,483**	**2,483**	**0**	**0**	**0**	**0**

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Table 3

Proportion (%) of YDH activity (total 454 admissions) that would attend each modelled site based on patients' geographical area (CCG) of residence			
CCG	**Hospital Site**	**Option C (1)** No HASU YDH WGH open	**Option C (2)** No HASU YDH WGH closed
Total	Musgrove Park Hospital	17.2%	27.3%
	Dorset County Hospital	56.2%	57.0%
	Weston General Hospital	12.1%	0.0%
	RUH Bath	10.1%	11.2%
	Salisbury Hospital	3.7%	3.7%
	Southmead Hospital	0.4%	0.4%
	Royal Devon & Exeter	0.2%	0.2%
Somerset CCG residents	Musgrove Park Hospital	21.3%	33.2%
	Dorset County Hospital	51.5%	52.6%
	Weston General Hospital	14.4%	0.0%
	RUH Bath	12.5%	13.9%
	Salisbury Hospital	0.3%	0.3%
	Southmead Hospital	0.0%	0.0%
	Royal Devon & Exeter	0.0%	0.0%
Dorset CCG residents	Musgrove Park Hospital	0.0%	0.0%
	Dorset County Hospital	82.5%	82.5%
	Weston General Hospital	0.0%	0.0%
	RUH Bath	0.0%	0.0%
	Salisbury Hospital	17.5%	17.5%
	Southmead Hospital	0.0%	0.0%
	Royal Devon & Exeter	0.0%	0.0%
Other CCG residents	Musgrove Park Hospital	0.0%	28.6%
	Dorset County Hospital	0.0%	0.0%
	Weston General Hospital	28.6%	0.0%
	RUH Bath	0.0%	0.0%
	Salisbury Hospital	28.6%	28.6%
	Southmead Hospital	28.6%	28.6%
	Royal Devon & Exeter	14.3%	14.3%

Table 4

The modelling logic for admissions is detailed below:

Actual stroke admissions

	Stroke unit	Non-stroke unit	Grand Total
First admission in sequence	958	106	**1,064**
Not first admission in sequence	48	33	**81**
Grand Total	**1,006**	**139**	**1,145**

Stoke mimic admissions

Assumes that 39% of mimic presentations are admitted to a stoke unit and 35% are admitted to a General Medicine ward

Assume subsequent admissions aren't included in multiplier as the SSNAP mimic audit is based only on initial presentation

	Stroke unit	Non-stroke unit	Grand Total	General Medicine
First admission in sequence	528	0	**528**	474
Not first admission in sequence	0	0	**0**	0
Grand Total	**528**	**0**	**528**	**474**

Admissions - total

	Stroke unit	Non-stroke unit	Grand Total	General Medicine
Strokes	1,006	139	**1,145**	0
Mimics	528	0	**528**	474
Grand Total	**1,534**	**139**	**1,673**	**474**

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Beds

This modelling contains only the bed outputs.

The table below shows the predicted impact on bed numbers for each option at each site:

Metric	Hospital Site	Site_Option1 Do nothing	Site_Option2 Single delivery team	Site_Option5A No HASU YDH-Weston open	Site_Option5B No HASU YDH-Weston closed	Site_Option6A No HASU/ASU YDH- Weston open	Site_Option6B No HASU/ASU YDH- Weston closed
Beds_HASU	Musgrove Park Hospital	8.5	8.5	9.4	9.9	9.4	9.9
	Yeovil District Hospital	4.6	4.6	0.0	0.0	0.0	0.0
	Dorset County Hospital	0.0	0.0	2.6	2.7	2.6	2.7
	Weston General Hospital	0.0	0.0	0.5	0.0	0.5	0.0
	RUH Bath	0.0	0.0	0.5	0.6	0.5	0.6
	Salisbury Hospital	0.0	0.0	0.2	0.2	0.2	0.2
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**13.2**	**13.2**	**13.3**	**13.3**	**13.3**	**13.3**
Beds_ASU	Musgrove Park Hospital	13.2	13.2	13.2	13.2	14.8	15.6
	Yeovil District Hospital	8.0	8.0	8.0	8.0	0.0	0.0
	Dorset County Hospital	0.0	0.0	0.0	0.0	4.2	4.3
	Weston General Hospital	0.0	0.0	0.0	0.0	1.0	0.0
	RUH Bath	0.0	0.0	0.0	0.0	0.8	0.9
	Salisbury Hospital	0.0	0.0	0.0	0.0	0.5	0.5
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**21.3**	**21.3**	**21.3**	**21.3**	**21.3**	**21.3**
Beds_NonSU	Musgrove Park Hospital	2.3	2.3	3.1	3.6	3.1	3.6
	Yeovil District Hospital	4.3	4.3	0.0	0.0	0.0	0.0
	Dorset County Hospital	0.0	0.0	2.3	2.3	2.3	2.3
	Weston General Hospital	0.0	0.0	0.8	0.0	0.8	0.0
	RUH Bath	0.0	0.0	0.3	0.6	0.3	0.6
	Salisbury Hospital	0.0	0.0	0.1	0.1	0.1	0.1
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**6.7**	**6.7**	**6.6**	**6.5**	**6.6**	**6.5**
Beds_Total	Musgrove Park Hospital	24.1	24.1	25.7	26.7	27.3	29.0
	Yeovil District Hospital	17.0	17.0	8.0	8.0	0.0	0.0
	Dorset County Hospital	0.0	0.0	4.9	5.0	9.1	9.3
	Weston General Hospital	0.0	0.0	1.3	0.0	2.3	0.0
	RUH Bath	0.0	0.0	0.9	1.1	1.7	2.0
	Salisbury Hospital	0.0	0.0	0.3	0.3	0.7	0.7
	Southmead Hospital	0.0	0.0	0.0	0.0	0.0	0.0
	Royal Devon & Exeter	0.0	0.0	0.0	0.0	0.0	0.0
	All Sites	**41.1**	**41.1**	**41.1**	**41.1**	**41.1**	**41.1**

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Metric	Hospital Site	Site_Option1 Do nothing	Site_Option2 Single delivery team	Site_Option5A No HASU YDH- Weston open	Site_Option5B No HASU YDH- Weston closed	Site_Option6A No HASU/ASU YDH- Weston open	Site_Option6B No HASU/ASU YDH- Weston closed
Beds_HASU	Musgrove Park Hospital	9	9	9	10	9	10
	Yeovil District Hospital	5	5	0	0	0	0
	All Sites	**14**	**14**	**9**	**10**	**9**	**10**
Beds_ASU	Musgrove Park Hospital	13	13	13	13	15	16
	Yeovil District Hospital	8	8	8	8	0	0
	All Sites	**21**	**21**	**21**	**21**	**15**	**16**
Beds_NonSU	Musgrove Park Hospital	2	2	3	4	3	4
	Yeovil District Hospital	4	4	0	0	0	0
	All Sites	**6**	**6**	**3**	**4**	**3**	**4**
Beds_Total	Musgrove Park Hospital	24	24	26	27	27	29
	Yeovil District Hospital	17	17	8	8	0	0
	All Sites	**41**	**41**	**34**	**35**	**27**	**29**

Beds required (hybrid)

Uses actual LoS to determine the overall bed requirement.

Increases the modelled HASU beds by reducing the non-stroke unit beds, to reflect that some stroke patients may not be able to access a HASU bed due to non-stroke patients using the beds. HASU bed number has been adjusted to reflect an assumed LoS of 3 days for all stroke admissions.

	HASU	ASU	Non-stroke unit	Grand Total	General Medicine
Strokes	10.3	21.3	**6.1**	**37.7**	0.0
Mimics	3.4	0.0	**0.0**	**3.4**	3.6
Grand Total	**13.7**	**21.3**	**6.1**	**41.1**	**3.6**

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The modelling logic for beds is detailed below:

Acute stroke beddays (based on actual LoS)

	Stroke unit	Non-stroke unit	Grand Total
First admission in sequence	8,857	2,009	**10,866**
Not first admission in sequence	636	733	**1,370**
Grand Total	**9,494**	**2,743**	**12,236**

Calculated metrics

Beddays - HASU/ASU split

Assumes subsequent admissions are not treated in HASU

Assumes first 72 hours (or entire spell where LoS<72 hours) is spent in HASU bed

	HASU	ASU	Non-stroke unit	Grand Total
First admission in sequence	2,505	6,352	2,009	**10,866**
Not first admission in sequence		636	733	**1,370**
Grand Total	**2,505**	**6,988**	**2,743**	**12,236**

Beddays - mimics

Based on assumed mimic admissions and average LoS of 2.0 days (assumes all beddays in HASU)

General Medicine beddays based on assumed LoS of 2.5 days

	HASU	ASU	Non-stroke unit	Grand Total	General Medicine
First admission in sequence	1,056		0	**1,056**	1,185
Not first admission in sequence				**0**	
Grand Total	**1,056**	**0**	**0**	**1,056**	**1,185**

Beddays - total

	HASU	ASU	Non-stroke unit	Grand Total	General Medicine
Strokes	2,505	6,988	2,743	**12,236**	0
Mimics	1,056	0	0	**1,056**	1,185
Grand Total	**3,562**	**6,988**	**2,743**	**13,293**	**1,185**

Beds required

Assumes 85% occupancy for HASU, 90% for ASU/non-stroke unit/General Medicine stroke mimics

	HASU	ASU	Non-stroke unit	Grand Total	General Medicine
Strokes	8.1	21.3	8.3	**37.7**	0.0
Mimics	3.4	0.0	0.0	**3.4**	3.6
Grand Total	**11.5**	**21.3**	**8.3**	**41.1**	**3.6**

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Diagnostics

The table below shows the predicted impact on diagnostics for each option at each site:

		Scenario						Change from 'do nothing'			
Metric	Hospital Site	Site_Option1	Site_Option2	Site_Option5A	Site_Option5B	Site_Option6A	Site_Option6B	Site_Option5A	Site_Option5B	Site_Option6A	Site_Option6B
		Do nothing	Single delivery team	No HASU YDH-Weston open	No HASU YDH-Weston	No HASU/ASU YDH-	No HASU/ASU YDH-	No HASU YDH-Weston open	No HASU YDH-Weston	No HASU/ASU YDH-	No HASU/ASU YDH-
Diagnostics	Musgrove Park Hospit	754	754	835	882	835	882	81	128	81	128
	Yeovil District Hospital	480	480	0	0	0	0	-480	-480	-480	-480
	Dorset County Hospita	0	0	271	274	271	274	271	274	271	274
	Weston General Hospi	0	0	56	0	56	0	56	0	56	0
	RUH Bath	0	0	49	55	49	55	49	55	49	55
	Salisbury Hospital	0	0	19	19	19	19	19	19	19	19
	Southmead Hospital	0	0	2	2	2	2	2	2	2	2
	Royal Devon & Exeter	0	0	1	1	1	1	1	1	1	1
	All Sites	**1,234**	**1,234**	**1,234**	**1,234**	**1,234**	**1,234**	**0**	**0**	**0**	**0**

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The modelling logic for diagnostics is detailed below:

Diagnostics - CT scans - stroke patients

Assumes all initial stroke presentations have a CT scan, and that 50% of subsequent admissions have a CT scan

	Stroke unit	Non-stroke unit	Grand Total
First admission in sequence	958	106	**1,064**
Not first admission in sequence	19	13	**32**
Grand Total	**977**	**119**	**1,096**

Diagnostics - CT scans - stroke mimic patients

Assumes all stroke mimic presentations have a CT scan

	Stroke unit	Non-stroke unit	Grand Total
First admission in sequence	1,219	135	**1,354**
Not first admission in sequence	0	0	**0**
Grand Total	**1,219**	**135**	**1,354**

Diagnostics - CT scans - total

	Stroke unit	Non-stroke unit	Grand Total
Strokes	977	119	**1,096**
Mimics	1,219	135	**1,354**
Grand Total	**2,196**	**254**	**2,451**

Diagnostics - MRI scans - stroke patients

Assumes 12% of initial stroke presentations have a MRI scan, and that 12% of subsequent admissions have a MRI scan

	Stroke unit	Non-stroke unit	Grand Total
First admission in sequence	115	13	**128**
Not first admission in sequence	5	3	**8**
Grand Total	**120**	**16**	**135**

Diagnostics - MRI scans - stroke mimic patients

Assumes 60% of stroke mimic presentations have a MRI scan

	Stroke unit	Non-stroke unit	Grand Total
First admission in sequence	732	81	**813**
Not first admission in sequence	0	0	**0**
Grand Total	**732**	**81**	**813**

Diagnostics - MRI scans - total

	Stroke unit	Non-stroke unit	Grand Total
Strokes	120	16	**135**
Mimics	732	81	**813**
Grand Total	**851**	**97**	**948**

Diagnostics - total

	Stroke unit	Non-stroke unit	Grand Total
Strokes	1,097	135	**1,232**
Mimics	1,951	216	**2,167**
Grand Total	**3,048**	**351**	**3,399**

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Emergency Department attendances

The table below shows the predicted impact on ED attendances for each option at each site:

		Scenario						Change from 'do nothing'			
Metric	Hospital Site	Site_Option1	Site_Option2	Site_Option5A	Site_Option5B	Site_Option6A	Site_Option6B	Site_Option5A	Site_Option5B	Site_Option6A	Site_Option6B
		Do nothing	Single delivery team	No HASU YDH-Weston open	No HASU YDH-Weston	No HASU/ASU YDH-	No HASU/ASU YDH-	No HASU YDH-Weston open	No HASU YDH-Weston	No HASU/ASU YDH-	No HASU/ASU YDH-
ED_Atts	Musgrove Park Hospit	684	684	760	805	760	805	76	120	76	120
	Yeovil District Hospital	444	444	0	0	0	0	-444	-444	-444	-444
	Dorset County Hospita	0	0	250	254	250	254	250	254	250	254
	Weston General Hospi	0	0	53	0	53	0	53	0	53	0
	RUH Bath	0	0	45	50	45	50	45	50	45	50
	Salisbury Hospital	0	0	17	17	17	17	17	17	17	17
	Southmead Hospital	0	0	2	2	2	2	2	2	2	2
	Royal Devon & Exeter	0	0	1	1	1	1	1	1	1	1
	All Sites	**1,129**	**1,129**	**1,129**	**1,129**	**1,129**	**1,129**	**0**	**0**	**0**	**0**

The modelling logic for ED admissions is detailed below:

ED attendances - strokes

Assumes all stroke initial presentations go through ED, but for subsequent admissions assume 80% go through ED

	Stroke unit	Non-stroke unit	Grand Total
First admission in sequence	958	106	**1,064**
Not first admission in sequence	38	26	**65**
Grand Total	**996**	**132**	**1,129**

ED attendances - mimics

Assumes that mimics account for 56% of suspected stroke presentations (Somerset) and 68% (BNSSG)

Assume subsequent admissions aren't included in multiplier as the SSNAP mimic audit is based only on initial presentation

	Stroke unit	Non-stroke unit	Grand Total
First admission in sequence	1,219	135	**1,354**
Not first admission in sequence	0	0	**0**
Grand Total	**1,219**	**135**	**1,354**

ED attendances - total

	Stroke unit	Non-stroke unit	Grand Total
Strokes	996	132	**1,129**
Mimics	1,219	135	**1,354**
Grand Total	**2,216**	**267**	**2,483**

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