

Appendix 4B

2.4 Activity and Capacity Modelling

The Central Midlands Commissioning Support Unit (CSU) was commissioned to support the health economy in Shropshire and Telford to develop a range of models to estimate future activity levels in the local health economy as part of the Future Fit Programme. The activity modelling was planned in sequential stages as follows:

Future Fit Phase 1b: Initial Acute and Community Hospital Activity Models – To estimate the impact of demographic change, traditional commissioner activity avoidance and provider efficiency strategies on acute and community hospital activity;

Future Fit Phase 2: Effects of new models of care – Building on the initial models, to estimate the consequences of more radical redesign proposals generated by the three clinical redesign workstreams: acute and episodic, planned care and long term conditions and frailty;

Future Fit Phase 3: Option appraisals – Building on the models above, to estimate the likely activity levels at various sites under consideration.

To date, Phases 1 and 2 of the activity modelling have been completed, and are reflected within this SOC.

The **Phase 1 modelling**, undertaken between November 2013 and May 2014, estimated the levels of activity that Shropshire and Telford acute hospitals and the Shropshire community hospitals might be expected to manage in 2018/19 taking into account demographic change (two scenarios were considered and are explored further later in the SOC), a range of commissioner activity avoidance schemes and provider efficiency schemes.

The phase 1 activity models were produced by the CSU's Strategy Unit, supported by a reference group of clinical and managerial representatives from the local CCGs and provider trusts. The reference group – the Activity and Capacity subgroup of the Future Fit Programme Board – met on 7 occasions between November 2013 and February 2014 to define the scope of the model, agree the model components and set the model's change parameters. The Phase 1 modelling approach is summarised in Figure 1:

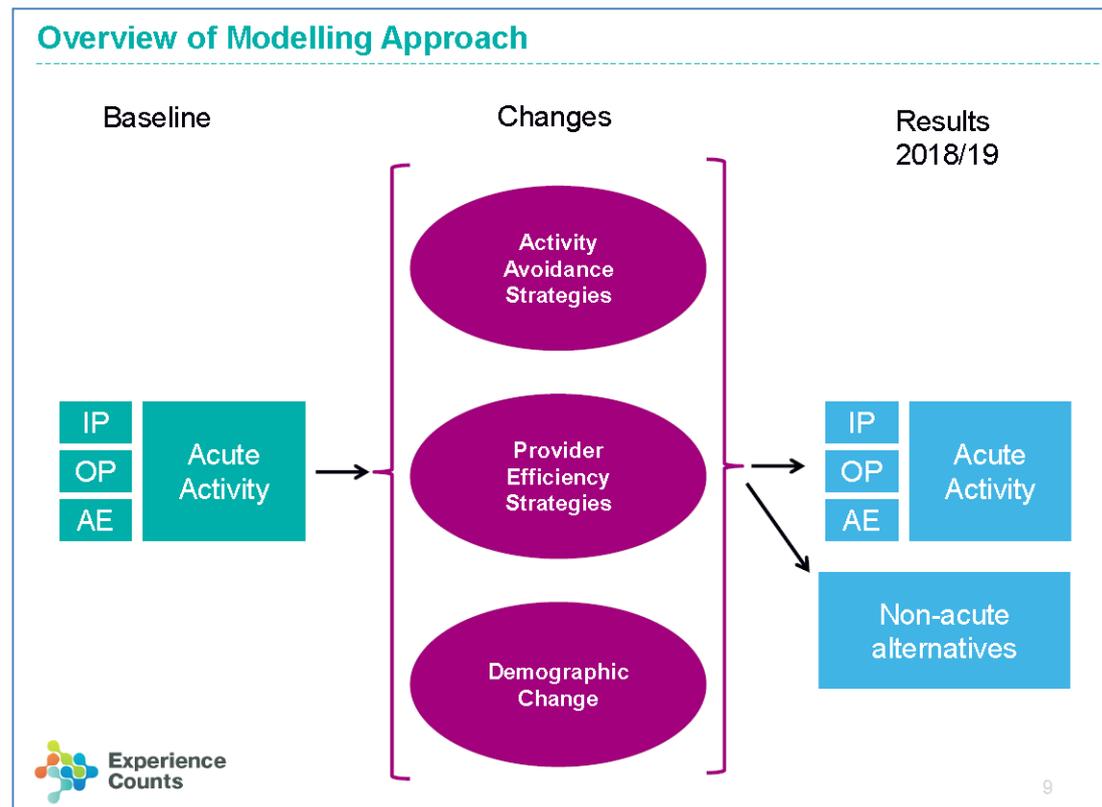


Figure 1: Phase 1 Modelling Approach

Three aspects of **demographic change** were considered;

Changes in population size were derived from the Office for National Statistics (ONS) sub-national population projections;

Changes in population age profile were also be derived from ONS sub-national population projections;

Changes in age-specific population health status may offset some of the aging population effect as the population's age-specific health status improves. The reference group considered trends in life-expectancy and disability free life expectancy as a means of making judgments about whether there will be an expansion or compression of morbidity at the end of life. The reference group requested that two scenarios were modelled:

1. No change in disability free life expectancy over the 5 year period covered by the model. In this scenario no changes are applied to age specific utilisation rates;
2. An increase in disability free life expectancy, but at half the rate than has been experienced nationally over the past decade or so. In this scenario, age specific utilisation rates are altered by 1 year over the 5 year period, such that an average 91 year old in 2018 has the health status, and associated utilisation rates of a 90 year old in the baseline year.

A range of **commissioner activity avoidance strategies** was analysed and considered. These subsets of acute activity commonly form the basis of commissioner Quality,

Innovation, Productivity and Prevention (QIPP) plans. The reference group reviewed materials comparing activity of these types at Shrewsbury and Telford Hospital NHS Trust with other trusts in the West Midlands, encompassing activity trends, comparative rates of change and detailed diagnostic breakdowns. Based on this contextual information and knowledge of planned or potential QIPP schemes, the group set their expectation for activity of this type to change over the next 5 years across the following activity categories:

- Conditions amenable to ambulatory care;
- Medicines-related admissions;
- Self-harm related admissions;
- Falls related admissions;
- Vaccine-preventable admissions;
- Alcohol-related admissions;
- Smoking-related admissions;
- Obesity-related admissions;
- End of life care;
- Medically unexplained symptoms;
- Zero day stays with no procedure;
- Cancelled operations;
- Procedures of limited clinical value;
- Frail elderly – step-up admissions;
- Psychiatric liaison in A&E;
- Readmissions;
- GP referral management;
- New to follow-up outpatient ratios;
- Consultant-to-consultant outpatient referrals;
- Outpatient procedures;
- Patients who left A&E without being treated;
- Low-cost A&E attendances referred to GP or discharged;
- Frequent A&E attenders.

The **provider efficiency strategies** considered are commonly the focus of provider Cost Improvement Plans (CIPs) and in both elective care and urgent care and aim to reduce the bed usage for admitted patients or the resource impact of outpatient and A&E activity. The reference group set out their expectations for changes in the following areas in the next 5 years:

- Increased use of day surgery;

- Enhanced recovery;
- Excess bed days;
- Ambulatory emergency care;
- Stroke early supported discharge;
- Psychiatric liaison for inpatients;
- Pre-operative length of stay;
- Frail elderly stepdown care;
- A&E attendance duration;
- A&E number of investigations.

The outputs of the first phase of activity modelling were summarised in two documents;

Modelling Future Activity Levels Shrewsbury & Telford Hospital NHS Trust, published in May 2014;

Modelling Future Community Hospital Provision in Shropshire and Telford, published in February 2014.

Figure 2: Headline changes in acute activity, resource and costs between 2012/13 and 2018/19 shows the headline changes in acute activity, resource use and costs between the baseline year 2012/13 and 2018/19, under the two demographic scenarios.

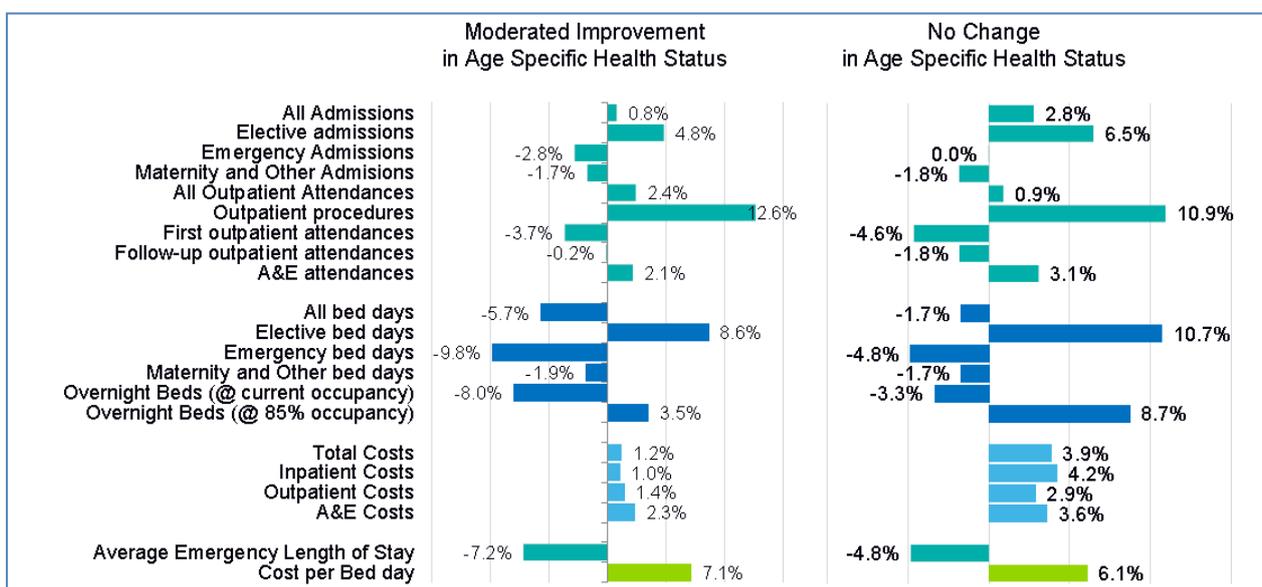


Figure 2: Headline changes in acute activity, resource and costs between 2012/13 and 2018/19

The **Phase 2 modelling** was undertaken between June and December 2014 to assess the activity consequences of the Future Fit Clinical Model. The outputs were summarised in the document:

Modelling the Activity Implications of the Future Fit Clinical Model, published in December 2014.

This Phase 2 modelling built on the initial models to estimate the consequences of more radical redesign proposals generated by the three clinical redesign workstreams: acute and episodic, planned care and long term conditions and frailty.

The **acute and episodic care model** suggests that 69% of front door urgent care activity incorporating activity current managed in ED, direct GP admissions community hospital step-up admissions, MIU and WIC attendances, Diagnostics, Assessment and Access to Rehabilitation and Treatment (DAART) assessments and GP Out of Hours (OoH) Primary Care Commissioning (PCC) contacts) could be managed at an urgent care centre, with the remaining 31% (circa 68,000 attendances) requiring the emergency centre. 75% of the activity being managed by the urgent care centres will take the form of minor injuries or ailments, 12% as ambulatory emergency care, 8% as frailty management with 5% taking other forms.

The **planned care model** suggests that 67% of the planned care activity in 2018/19 would take place in Local Planned Care Centres, 29% at a Diagnostic and Treatment Centre and 4% in an Emergency Centre. Approximately 35,000 follow-up outpatient attendances managed by the local planned care centres could take place virtually.

Long Term Conditions and Frailty: there were approximately 10,000 emergency admissions associated with either frailty or long term conditions in 2012/13. The phase 1 models suggested these admissions could fall by 8% by 2018/19 largely as a consequence of improvements in primary care management and through better use of community hospitals. The Phase 2 models suggest that a further 24% could be avoided by reducing the prevalence of the key risk factors that give rise to LTCs (e.g. smoking, cholesterol, blood pressure) and through greater integration of community and primary care.

Activity Modelling Results

The results of the activity modelling are summarised in 1. This shows the baseline and projected future activity for each activity type.

Please note that the below activity represents the activity held in the Secondary Uses Service (SUS) and does not directly represent how activity is commissioned.

Activity Type	Activity Baseline 2012/13	Projected 2018/19 Activity
Daycase admissions	46,043	47,640
Elective Inpatient admissions	6,959	7,867
Non-elective Inpatient admissions	40,942	40,111
Maternity admissions	6,666	6,613
Regular Day attenders	26,532	28,337
Outpatient attendances	266,310	258,789
Outpatient procedures	98,878	109,656
A&E / Urgent Care attendances	131,607	134,380
Walk-in Centre attendances	38,611	39,068
DAART attendances	3,525	3,719
Community Hospital Step-up assessments	476	1,588
Direct GP MAU attendances	19,044	18,631
GP Out of Hours contacts	27,314	27,754

Table 1: Activity: Baseline 2012/13 and Projected 2018/19 by activity type

A more detailed breakdown of acute inpatient activity for adults and children by bed group is shown in Table 2.

Bed Group	Activity Baseline 2012/13: Adults	Activity Baseline 2012/13: Children & Adolescents	Projected 2018/19 Activity: Adults	Projected 2018/19 Activity: Children & Adolescents
Short Stay Frailty	1,377		1,494	
Short Stay Medicine	9,774		10,303	
Short Stay Surgery	3,297		3,370	
Acute Medicine	9,227		9,853	
Oncology	496		567	
Acute Surgery	3,782		4,514	
Trauma	2,304		2,392	
Children	4	4,719	4	4,748
Maternity	5,808	181	5,779	168
Neonatology		1,987		1,888
DTC (Elective) Inpatients	2,562		2,998	

Table 2: Acute Inpatient Activity: Baseline and projected 2018/19 by bed group

Note: this table includes overnight stay activity only

The activity modelling process mapped the projected future activity into the main functional units proposed in the Future Fit clinical model. The results of this are summarised in 3.

Functional Unit	EC	DTC	Maternity	UCCs	Local Planned Care Direct	Local Planned Care Virtual	Avoided Long Term Conditions activity
Daycase admissions	2,727	36,483			8,430		
Elective Inpatient admissions	3,999	3,868					
Non-elective Inpatient admissions	40,111						
Maternity admissions			6,613				
Regular Day attenders					28,337		
Outpatient attendances		70,288			153,681	34,821	
Outpatient procedures	12,205	19,127			78,325		
A&E / Urgent Care attendances	53,744			79,346			1,291
Walk-in Centre attendances				39,068			
DAART attendances				3,719			
Community Hospital Step-up assessments				1,588			
Direct GP MAU attendances	14,711			3,919			
GP Out of Hours contacts				27,754			

Table 3: Activity: Projected 2018/19 by activity type and main functional unit

The projected future diagnostic imaging activity by setting is summarised in Table 12.

Setting	EC	DTC	LPC/UCC
CT scans	12,330	11,343	
MRI scans	2,164	8,118	
Diagnostic ultrasound	7,688	8,099	26,385
Plain film x-ray	48,857	9,255	60,669

Table 4: Diagnostic Imaging Activity: projected activity 2018/19 by setting

Capacity Projections

The detailed activity modelling was used to calculate the capacity requirements for the future. In doing this, the following throughput and utilisation assumptions have been made as shown in Table.

Category	Capacity Modelling Assumption
Inpatient % occupancy*	90%
Daycase turnover rate	1.5
Theatre weeks per year	52
Theatre sessions per week	10
Theatre minutes per session	210
Theatre end utilisation**	80%
Outpatient attendances per room per year: 1 st attendances	2,500
Outpatient attendances per room per year: follow-up attendances	3,500
Outpatient attendances per room per year: outpatient procedures	2,500

Table 5: Throughput and Utilisation assumptions

* 90% inpatient occupancy rate relates to the main medicine and surgery bed pools, with remaining beds calculated at 85% occupancy.

** Theatre end utilisation takes account of multiple factors, including cancelled sessions as well as non-operating time within sessions (due to gaps between patients etc), and logistical scheduling issues

The resulting capacity requirements for the future are summarised in Table.

Bed Group	Projected Inpatient Bed Requirements
Short Stay Acute Frailty	9
Short Stay Acute Medicine	33
Short Stay Acute Surgery	18
Acute Medicine	304
Oncology	8
Acute Surgery	79
Trauma	57
Critical Care	30
Children	41
Maternity	51
Neonatology	20
DTC Inpatients	20
Sub-Total Inpatient Beds	670
PAU (Paediatric Assessment Unit)	16
DAART	8
Stepdown sub-acute care to be re-provided in other ways	55
Total Inpatient Beds	749

Table 6: Projected Inpatient Bed Requirements 2018/19

Work has been undertaken to quantify and plan for inpatients that no longer require acute hospital care. This cohort of patients equates to those who are classified by the acute trust as “Fit to Transfer” and it has been agreed that their subsequent care does not need to take place within the Emergency Centre. The EC inpatient bed requirement in Table has accordingly been reduced by 55 beds to reflect this.

Acute bed numbers have been adjusted to reflect an expectation that the models of care developed by the programme would improve assessment and discharge processes and would substantially reduce unnecessary delays in a hospital setting. Typically there will be around 65 patients across the hospital who are deemed “fit for transfer”. These plans assume that this figure would be reduced to 10 patients, recognising it is will not be possible entirely to eliminate delays in this group of patients but setting a challenging standard for delayed transfers of care.

Area	EC	DTC	Maternity	Local Planned Care
Cath Lab	2			
Endoscopy Room	1	5		
Maternity Theatre*			2	
Procedure Room	3	5		5
Theatre*	8	9		4
Cath Lab Stage 1 Recovery	2			
Cath Lab Stage 2/3 Recovery	8			
Endoscopy Stage 1 Recovery	1	5		
Endoscopy Stage 2/3 Recovery	2	10		
Daycase Theatre Stage 1 Recovery		18		8
Daycase Theatre Stage 2 Recovery		36		16
Daycase Theatre / Procedure Room Stage 3 Recovery		30		16

Table 7: Projected Theatre and Procedure Room Requirements 2018/19

* Allowance made for NCEPOD and emergency maternity theatres

Area	EC		DTC		LPC		UCCs
	Adult	Child	Adult	Child	Adult	Child	
General OPD		2	10	3	51	7	
ENT		1			6	1	
Dental		4	5		3	1	
Eyes			11		2		
Dermatology					5		
Oncology			4		2		
Maternity					9		
GP Out of Hours							8

Table 8 Projected Outpatient Consult / Exam Room Requirements 2018/19