INCREASING THE PACE AND ACCURACY OF DESIGN BY INTEGRATING ACTIVITY DATA AND FUNCTIONAL BRIEFING

RLB Rider Levett Bucknall

EUROPEAN HEALTHCARE DESIGN

ROYAL COLLEGE OF PHYSICIANS, LONDON

17th June 2019

RLB VIEW – WHY THE CONCERN?

- European Health needs process reform to reduce rising demand drivers of demographic, technology, pharmacology and clinical development.
- Healthcare inflation typically grows by 4-6% p.a. In 2016 OECD spending +3.4% (GDP LTC further 2% per annum) (Maisonneuve & Martins OECD 2015)
- Government Health & long term care by 2060 9.5% cost containment or 14% in cost pressure – excluding 1/3 private expenditure representing 20-30% of costs in Europe.
- Health system facing capital and revenue shortage
- Need to move more to ambulatory care and build stronger LTC, health alliances & across different providers to speed reform and deliver price cuts
- Which means increased modelling and scenario planning ahead of design is imperative
- It's not really about the capital plans – it's the revenue

Year	Public Health Europe GDP Averages
1960	3%
1970	4%
2000	5%
2006	6.7%
2060	+9%

Cost of Design 0.1
Cost of Building 1
Cost of Maintenance 5
Cost of in use to client 50-200

SELECTION OF UK CLIENTS 2018/19

NHS Bedford Hospital NHS Trust

NHS Camden and Islington NHS Foundation Trust

NHS Cheshire and Wirral Partnership NHS Foundation Trust

NHS England and NHS Improvement

NHS Portsmouth Hospitals NHS Trust

NHS Birmingham Women's and Children's NHS Foundation Trust

NHS The Princess Alexandra Hospital NHS Trust

NHS Mersey Care NHS Foundation Trust

NHS North West Surrey Clinical Commissioning Group

NHS The Dudley Group NHS Foundation Trust

NHS Great Western Hospitals NHS Foundation Trust

NHS Property Services

NHS Sussex Community NHS Foundation Trust

NHS Trafford Healthcare NHS Trust

NHS University Hospitals Coventry and Warwickshire NHS Trust

NHS Sheffield Health and Social Care NHS Foundation Trust

NHS South London and Maudsley NHS Foundation Trust

NHS Surrey Downs Clinical Commissioning Group

NHS The Robert Jones and Agnes Hunt Orthopaedic Hospital NHS Foundation Trust

Design Quality Indicator

NHS Worcestershire Acute Hospitals NHS Trust

NHS United Lincolnshire Hospitals NHS Trust

NHS University Hospitals of Leicester NHS Trust

NHS Whittington Health NHS Trust

NHS Wye Valley NHS Trust

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BMI Healthcare

ben Here for the automotive industry Support for life

Cityheart

KIER

IHP

Interserve

Public Health England

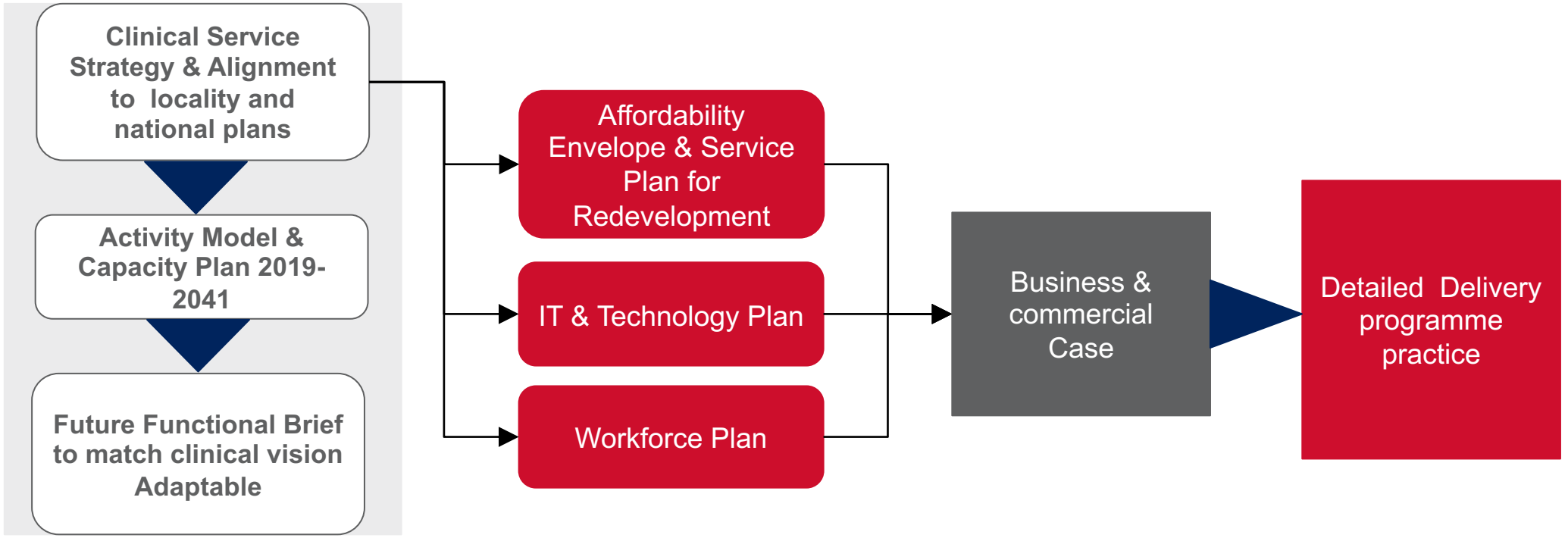
Nuffield Health

VINCI UK

We work globally for:

- Health providers
- Investors
- Commissioners

LINKING THE MODEL OF CARE TO FUNCTIONAL REQUIREMENTS



Financial Sustainability

Stakeholder Engagement & Consultation

Right capacity
Right space setting

Future functionality and flexibility
LEAN

Right quality, revenue and link to National ten year plan- meet commissioner intent

THE DESIGN & ACTIVITY CONTEXT

Complexities

- Signing off brief/design requires wide stakeholder input - commissioners, clinicians, town planners, health organisations, finance
- Factors constantly change – clinical, technical, affordability
- Often see multiple iterations of project documents across financial years

Positive developments

- Design industry developments have enabled greater client understanding, reduced risk of design errors and increased potential efficiency/cost benefits
- BIM, 3D+, repeatable rooms, standard component products & open architecture systems

Further required improvements

- Separate systems are slow, lack auditability and pose risk of errors when updates are required across the board
- Most attempts to speed up interaction between raw and modelled data tend to focus on data, but provide only generic high level typical department adjustments

THE DESIGN & ACTIVITY CONTEXT

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Often projects undertaken separately:

- Estates appoints design team
- Strategy appoints Business case and activity
- Finance appoints legal and financial
- Separate processes – liaise, but not dovetailed

- Process is iterative – commissioners update or federate local or regional services and numbers change
- Disconnect between activity and SOA
- Dangers of replication , version control, objectivity, speed and synergy

RLB aim was to simplify

BENEFITS OF DATA ANALYSIS AND MODELLING

Providing the opportunity to build an evidence based strategy

Futureproofing

Cost effective tool for assessing impact of growth, identifying opportunities for efficiency gains/improved outcomes, testing changes in practice and planning for the future

Stakeholder buy-in

Building confidence through use of dynamic visuals and ability to rapidly consider scenarios and show impact of changes, particularly where gaps in baseline data may exist

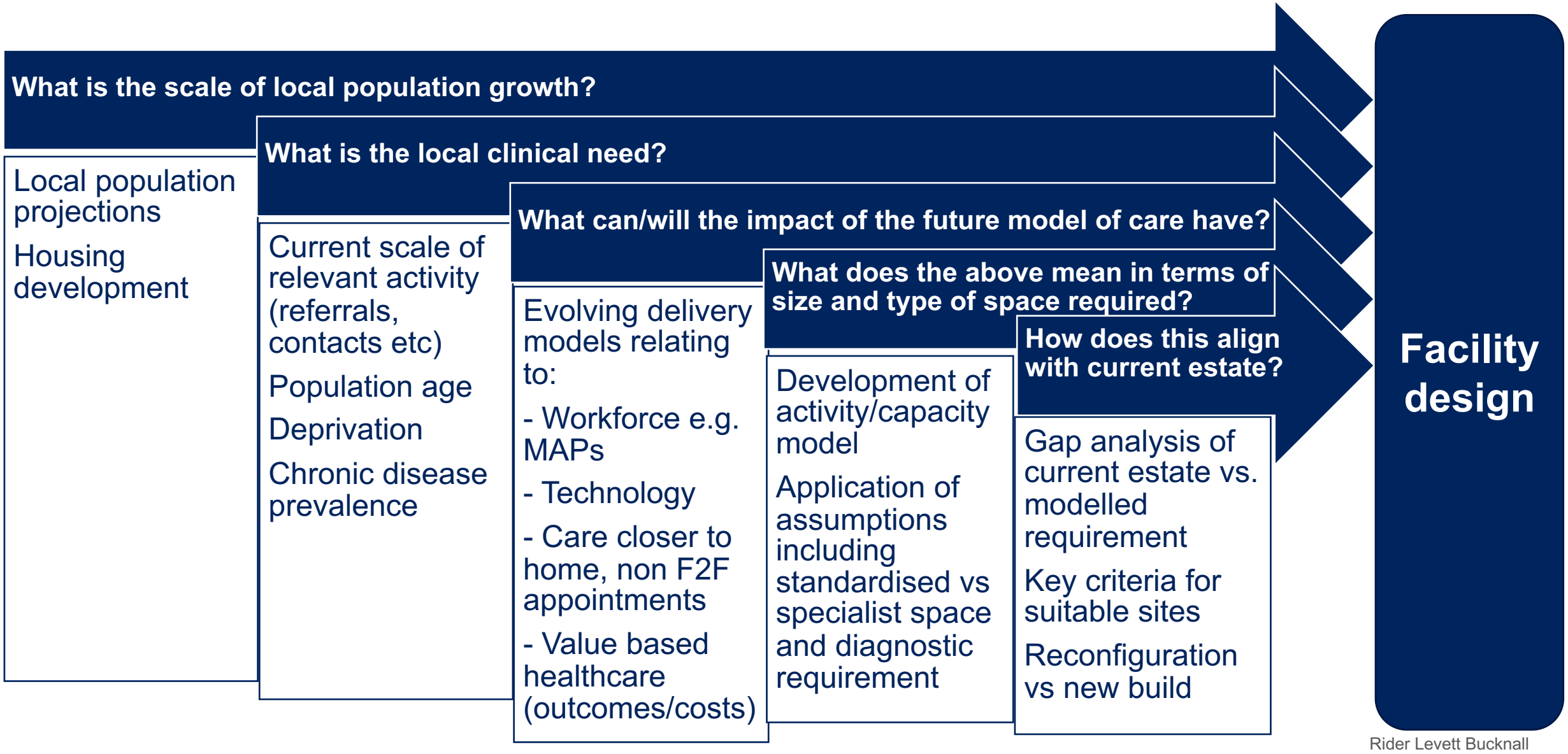
Level of detail

Potential to cost/time-effectively consider activity at a detailed level where appropriate e.g. complex services with a range of pathways/patient types requiring consideration

Efficient and robust design process

Potential to streamline the iterative design process through upfront stakeholder engagement, modelling and scenario testing

DEVELOPING AN ACTIVITY AND CAPACITY MODEL OVERARCHING PROCESS

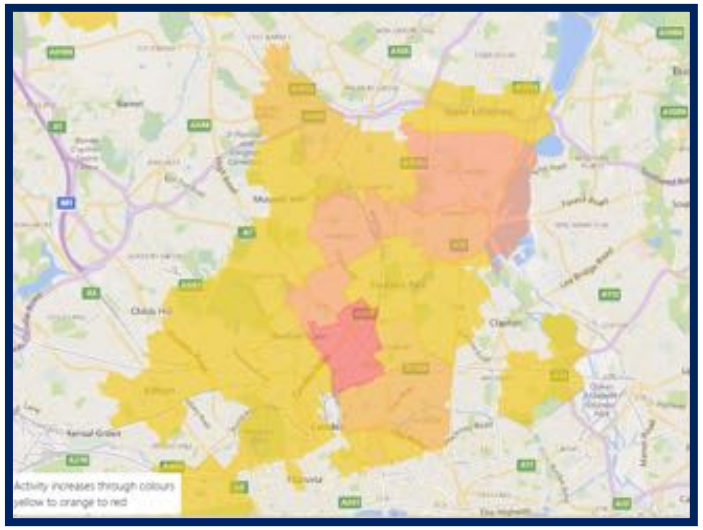


METHODOLOGY & APPLICATION

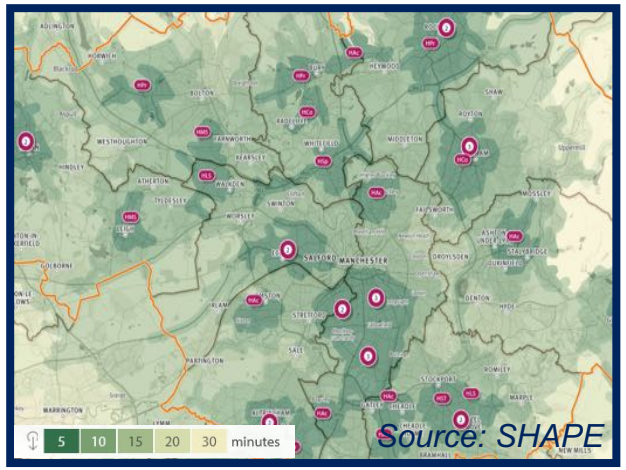
Range of methodologies can be used depending on the scheme specifics, but the approach remains the same

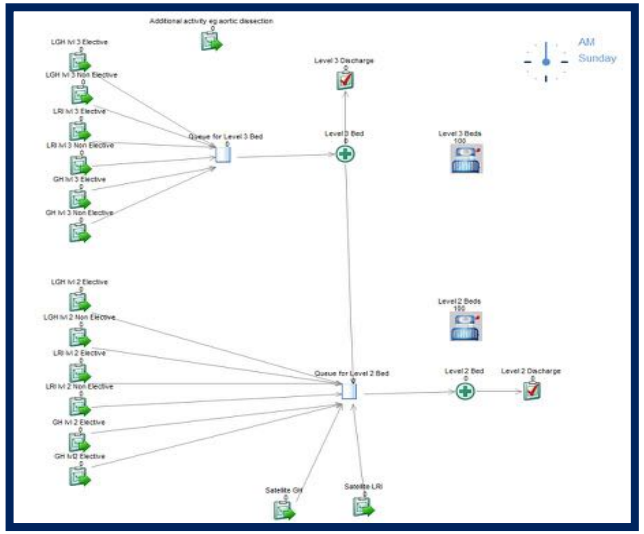
- **Activity and capacity modelling**
- **Local health economy supply and demand modelling**
- **Simulation**
- **Activity mapping and benchmarking**

METHODOLOGY & APPLICATION



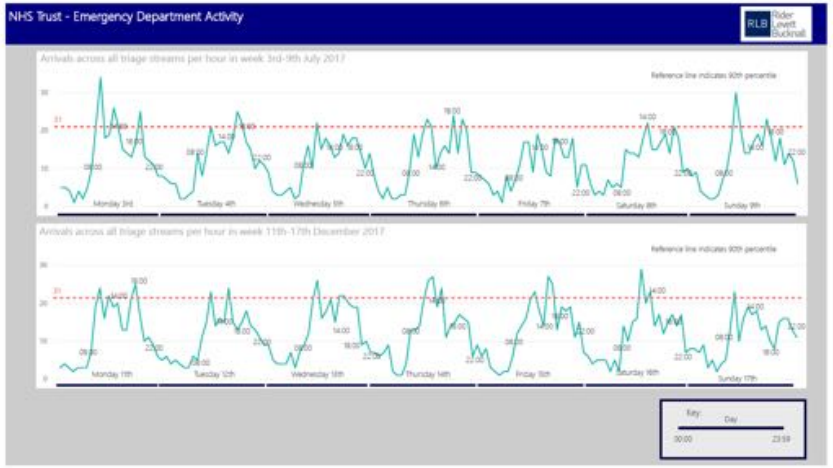
HES data							
	Region	% of activity in STP geography	Number of first attendances in STP geography projected 2028	Number of follow up attendances in STP geography projected 2028	Total projected attendances within STP geography (inc. efficiency gain)	Assumed first attendance activity to transfer	Assumed follow up activity to transfer
dation Trust	1	100%	141482	316218	434815	53265	98920
	1	40%	56202	96874	145422	17814	33084
HS Foundation Trust	1	20%	14523	60643	71407	8747	16245
ds NHS Foundation Trust	1	100%	323182	869178	1132742	138761	257699
Foundation Trust	1	50%	2218	13748	15168	1858	3451
	2	100%	79967	124591	194330	23805	44210
S Foundation Trust	3	100%	3781	16078	18865	2311	4292
Foundation Trust	4	100%	4675	13424	17193	2106	3911
	2	100%	257935	448160	670790	82172	152605
	2	100%	175962	347451	497242	60912	113123
	1	100%	117243	246009	345089	42273	78508
NHS Foundation Trust	2	100%	96313	190447	272423	33372	61976
	3	100%	47382	392085	412744	50561	93899
er NHS Foundation Trust	3	100%	153846	388543	515269	63120	117224
Foundation Trust	4	20%	22999	73165	91356	11191	20784
undation Trust	4	20%	29068	69806	93930	11506	21369





DEVELOPING AN ACTIVITY AND CAPACITY MODEL KEY CONSIDERATIONS

- Root baseline demand in current local activity where possible
  - Stratify to level required to apply differing assumptions to cohorts of activity (age, clinical criteria) and plan functional content
- Project for appropriate time horizon for the scheme
  - Work with local municipalities to agree projections for at least 10-15 yrs
  - Recognise error bars associated with long term projection by conducting sufficient scenario testing
- Non-demographic growth needs to be applied where demand is likely to be above and beyond that deemed attributable to demographics
  - Local knowledge of strategic demand changes (e.g. transfers of activity), changes in practice, high level research data on incidence



DEVELOPING AN ACTIVITY AND CAPACITY MODEL KEY CONSIDERATIONS

- Clinical challenge is key when generating assumptions about the future
  - Agree model of care and clinical pathway – where activity will occur in the future and how it will be delivered
  - Robust model design should enable scenario testing ‘art of the possible’ and building stakeholder confidence
- Scenario testing should include best practice nationally and internationally
- ***High quality activity modelling avoids abortive work, builds confidence in the strategic basis for a scheme and its design; and supports business case approval process***

A&E

Performing Unit	Spaces 2017/18	Spaces 2023	Spaces 2028	Spaces 2033
All (excl. Resus)	29	36	42	48

Theatres

Type	Theatres 2017/18	Theatres 2023	Theatres 2028	Theatres 2033
Theatres	6	7	7	8

Outpatients

Type	Rooms 2017/18	Rooms 2023	Rooms 2028	Rooms 2033
Onsite Adult C/E	39	47	44	44
Offsite Adult C/E	3	5	5	4

Critical Care

Type	Beds 2017/18	Beds 2023	Beds 2028	Beds 2033
ITU	10	12	14	16
NICU/SCBU	16	16	16	16

ACTIVITY AND CAPACITY MODELLING PRODUCING AUDITABLE OUTPUTS

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Inputs

Quantitative and qualitative data relating to:

- Demographics
- Model of care
- Current demand/activity
- Any known strategic changes impacting demand e.g. transfers of activity
- Benchmarking

Modelling

Spreadsheet based model built to:

- Incorporate baseline data provided
- Enable application of evidence based assumptions relating to growth and future model of care
- Scenario test and project requirement for different types of functional content e.g. generic vs specialist rooms

Outputs

Report detailing:

- Baseline activity dashboard
- Population analysis
- Data sources used for modelling
- Modelling assumptions and rationale
- Modelling results identifying functional content required
- Results link to Schedule of Accommodation to determine total m2

ACTIVITY AND CAPACITY MODELLING PRODUCING AUDITABLE OUTPUTS

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INPUT ANALYSIS

MODEL

	A	B	C	D	E	F
1		April	May	June	July	August
2	**Baseline activity**					
3	Current numbers of admissions to community beds	108	108	108	108	108
4	Unmet demand from delayed transfers of care from acute	0	0	0	0	0
5						
6						
7	**Future activity**					
8	Demographic growth	31%	31%	31%	31%	31%
9	Non-demographic growth (activity trend not population based)	0%	0%	0%	0%	0%
10						
11						
12	**Model of care transformation**					
13	Potential reduction in admissions from new models (Community Treatment team/Integrated Rehab team etc)	0%	0%	0%	0%	0%
14	Future LOS due to new models (Community Treatment team/Integrated Rehab team/Discharge nurse etc)	14	14	14	14	14
15						
16						
17	**Capacity requirement**					
18	Required bed days based on above	1980.7	1980.7	1980.7	1980.7	1980.7
19	Available bed days	30	31	30	31	31
20	Utilisation	92%	92%	92%	92%	92%
21	Number of beds required	71.8	69.5	71.8	69.5	69.5
22						

CAPACITY REPORT

Activity			Capacity requirements		
	Projected 2028	Projected 2033			
	140906	131121	Rooms required 2023	Rooms required 2028	Rooms required 2033
	272163	240600	28	23	21
			48	37	33
IP and DC section)	4626	4464	2.3	2.3	2.2
			Total 78	63	57

Paediatric Outpatient							
Activity type	Baseline 2017-18 including DNA allowance	Projected 2023	Projected 2028	Projected 2033	Rooms required 2023	Rooms required 2028	Rooms required 2033
First	12,729	10529	8709	8104	2	1	1
FU and unknown	18,944	15670	12962	12062	2	2	2
				Total	4	3	3

EXAMPLE ACTIVITY MODEL – HEALTH ECONOMY LEVEL

Assumption	Value used	Rationale
Growth pa elective (inc. waiting list and DC)	0.90%	Continuing trend from final quarter of 2017-18 as published in https://www.england.nhs.uk/statistics/wp-content/uploads/sites/2/2019/02/QAR-commentary-Q3-1819-V2.pd
Growth pa emergency (inc. other)	0.50%	
Growth pa demographic	0.51%	Added to above non-demographic growth - assumes published trend does not include any proportion of demo growth
Modelling period (years)	15	
Operational days emergency & other	365	Other admissions are unplanned admissions from a source other than A&E
Operational days elective	275	50 weeks, 5.5 days per week
Operational hours DC	3600	50 weeks, 6 days per week, 12 hours per day
Target reduction in average LOS	20%	Assumed that new facility/clinical pathways will enable this to be achieved
Average LOS inpatient (days)	4.2	Calculated by dividing FCE bed days by FCE admissions (less day case and zero LOS admissions)
Average LOS DC surgical (days)	0.5	Activity split into surgical and non-surgical on the basis of specialty name including 'surgery'
Average LOS DC non-surgical (days)	0.12	
Average LOS inpatient zeros (days)	0.5	
Utilisation	85%	Assumed best practice standard
Shift of 1+ day emergency admissions to sub 24hr per 5 year milestone	10%	Assumed anticipated efficiencies from same day emergency care agenda
Shift of day case to outpatient setting per 5 year milestone	10%	Assumed anticipated efficiencies from left shift agenda

Inpatient assumptions should cover at least:

- Growth (demographic and non-demographic)
- Future operational hours and utilisation
- Potential model of care efficiencies such as left shifts of activity and reductions in LOS

Capacity output stratified to a level of detail which can be mapped to differing functional content

Baseline and Projected Activity

Elective (inc. waiting list and excludes DC assuming all within elective figures)

Admission type	Baseline 2017-18	Projected 2023	Projected 2028	Projected 2033
1+ days	8,365	8971	9620	10315
Zero	2,040	2187	2346	2515

Emergency and Other

Admission type	Baseline 2017-18	Projected 2023	Projected 2028	Projected 2033
1+ days	32,766	31623	30519	29454
Zero	13,855	18371	23091	28034

Day case

Admission type	Baseline 2017-18	Projected 2023	Projected 2028	Projected 2033
Surgical	10,213	9856	9512	9180
Non-surgical	49,211	47494	45837	44237

Capacity requirements

Beds/spaces required 2023	Beds/spaces required 2028	Beds/spaces required 2033
129	138	148
5	5	5

Beds/spaces required 2023	Beds/spaces required 2028	Beds/spaces required 2033
342	330	319
30	37	45

Spaces required 2023	Spaces required 2028	Spaces required 2033
39	37	36
45	43	42

EXAMPLE ACTIVITY MODEL – HEALTH ECONOMY LEVEL

Assumption	Value used		Rationale
Growth First	0.67%		Based on trend in total outpatient activity from 2016-17 to 2017-18. Assumed this trend will continue and shifts in activity will occur as below. https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity/2017-18
Growth FU	0.67%		
DNA contingency	5.00%		Assumed increase in non-F2F appointments may improve DNA rates from current average of 6.7% across England https://www.rcplondon.ac.uk/projects/outputs/outpatients-future-adding-value-through-sustainability
Modelling period (years)	15		
Operational weeks per year	50		
Operational days per week	6		
Sessions per day	2		
Hours per session	4		
Average length of first appt (mins)	20		
Average length of FU and unknown appt (mins)	12		
Average length of specialty/procedure appt (mins)	60		
Assumed proportion of total FUs requiring longer appointment for procedures or certain specialties	10%		Proportion is applied to the total number of FUs, but it is assumed this would impact on some specialties more than others
Utilisation	85%		
Reduction in FU appts due to F2F appt not being required	Yrs 1-5	10%	Based on reported max % of patients who could have telephone rather than F2F appointment https://www.rcplondon.ac.uk/projects/outputs/outpatients-future-adding-value-through-sustainability and applied at 5 yr. milestones
	Yrs 6-10	5%	
	Yrs 11-15	5%	
Shift of 1st appts from acute to community setting	Yrs 1-5	20%	Applied at 5 year milestones to total number of 1st appointments and assumed the proportion shifting would be relevant activity that can be more effectively delivered from community hub settings e.g. chronic disease management
	Yrs 6-10	20%	
	Yrs 11-15	10%	
Shift of FU appts from acute to community setting	Yrs 1-5	20%	Applied to resulting FU appointments after reduction above applied. Assumed the proportion shifting would be relevant activity that can be more effectively delivered from community hub settings e.g. chronic disease management
	Yrs 6-10	20%	
	Yrs 11-15	10%	

Outpatient assumptions should cover at least:

- Growth (demographic and non-demographic) inc. accounting for DNAs
- Future operational hours, length of appointment and utilisation
- Opportunities for left shift of activity to community setting or home via telephone (or not required due to technology advances)

Baseline and Projected Activity | **Capacity requirements**

Adult Outpatient

Activity type	Baseline 2017-18 including DNA allowance	Projected 2023	Projected 2028	Projected 2033		Rooms required 2023	Rooms required 2028	Rooms required 2033
First	205,944	170349	140906	131121		28	23	21
FU and unknown	465,246	346350	272163	240600		48	37	33
Day case (activity shifting from DC to OP setting as assumed in IP and DC section)		4793	4626	4464		2.3	2.3	2.2
					Total	78	63	57

Paediatric Outpatient

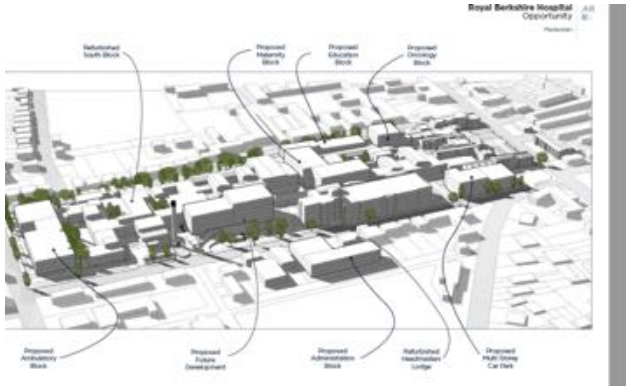
Activity type	Baseline 2017-18 including DNA allowance	Projected 2023	Projected 2028	Projected 2033		Rooms required 2023	Rooms required 2028	Rooms required 2033
First	12,729	10529	8709	8104		2	1	1
FU and unknown	18,944	15670	12962	12062		2	2	2
					Total	4	3	3

LINKING ACTIVITY DATA TO THE ACCOMMODATION SCHEDULE

The second part of the process was to standardise SOA facilities

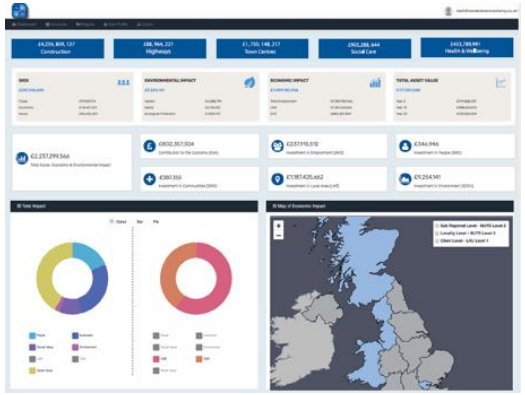
Sufficient detail even at SOC by type room by room, grouped used facilities by each type and where needed as proportion of overall, using our studies and projects including

- Emergency department, cubicles, AMU, Observation/short stay beds,
- Inpatient Wards
- Endoscopy
- Theatres & ICU
- Imaging/pathology/pharmacy etc
- Day case & Ambulatory care
- Office spaces & FM
- Specialist services including (e.g. Renal/Oncology/Paediatrics/women's)
- Flexible, aim was minimising risk, meeting HBN or providing audit for derogations
- RLB model is aimed at providing a quick response through using an integrated model with embedded formulas and groups activities proportionately



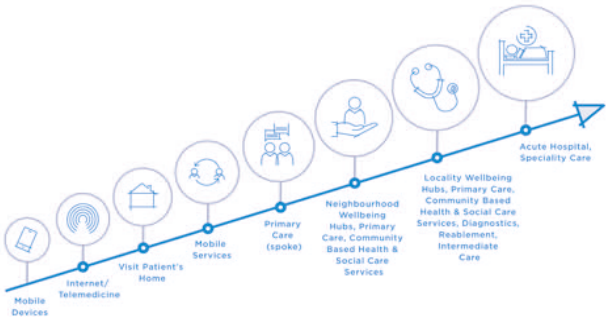
RUNNING PROTOTYPES

- NHSI ‘New for Old’ - community and primary care 30-50k population hubs
  - Kit of parts for best practice design and standardised approach to modelling with a suite of assumptions relating to demand and transformative out of hospital model of care
- Acute model tested on 500k population using national data as baseline
- 2 separate UK hospitals of 480+ beds
- 3 European and 2 Far East projects in Summer 2019
- Early indications: great to model for regional/sub regional flows using national baseline data where needed or locally defined
- Refined model will require detailed input project by project



DELIVERING OPERATIONAL IMPROVEMENTS AND SUSTAINABLE SYSTEMS

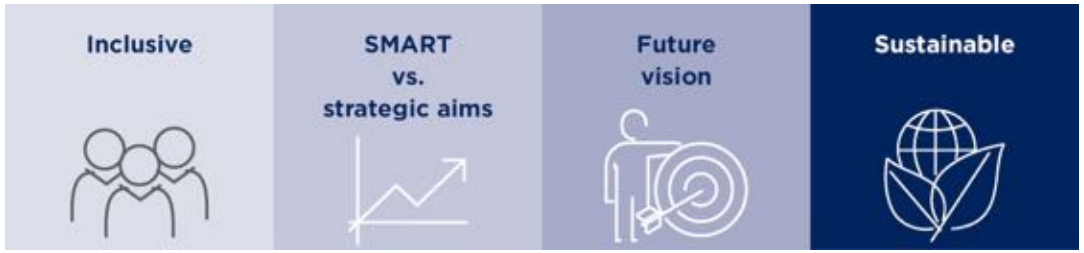
- Capital costs are a one off - maximise land values & look at JV revenue type arrangements
- IT solutions can ensure facilities meet service needs - maximises integration & minimises revenue
- Use standard platforms, repeatable rooms, NHSI future kit of parts to streamline & use proven lessons
- Engage clinically for the right brief, be brave: similar function, same approach = same room
- Visit projects and build up analysis of the type of clinic, rehabilitation, community or hospital as part of an agreed integrated system

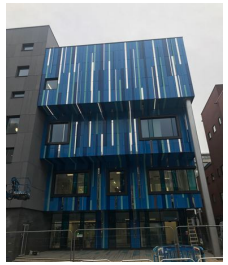


COLLABORATE

- Systems must federate for sustainability and maximising total expenditure with public, 3rd sector and private parties
- Match operational intent with lifecycle
- Deliver flexible facilities that maximise investment return and provide high quality environments
- SMART allocation

- Ask the right questions:
  - Why this process?
  - Can we make it more efficient?
  - How can we provide quicker and safer operating?
- Meet balanced scorecard
- Consider monetarising Social v*alue*
- Integrate activity and function
- Use local data where possible, but national aggregated data should deliver viable proxies; and can quickly generate outputs for scenario testing















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