Health Education England – Large Speciality Programme, simulation of new commissions for Paediatrics

Briefing paper – April 2016

DRAFT 1 (1st April 2016)

Whole Systems Partnership

Contents:

Executive summary

The modelling reflected in this report is the product of several years of engagement and model development as part of the Workforce Modelling Collaborative. This work commenced in 2012 in Yorkshire & Humberside and was adopted into the LETB Collaborative and subsequently chosen as an area for further development in the HEE Large Speciality Programme. Over the past 6-9 months the work to arrive at this point has included engagement with senior clinicians both nationally and within LETBs, the lead Workforce Planner for the RCPCH and commissioners and planners from across England, in particular those in Yorkshire and Humberside and the East of England. We have also gathered national data and had this validated by LETB planners, as well as triangulating this with intelligence available from the RCPCH.

Our 'exam question' has been to identify the most appropriate number of ST1 starts in Paediatrics from 2017 in the context of future needs for consultants and the overall shape of the medical workforce. Paediatrics training, whilst not unique, is distinct in a number of ways, particularly in regard to the length of training, the extent of out of programme activity and less than full time working, in part due to the high proportion of females undertaking this training. As a result we have estimated that it will be, on average, 11 years between the start of training and someone typically taking up a consultant position.

This 'lag' in the system poses particular challenges and has the risk of producing decadal 'boom and bust' behaviour unless it is carefully managed. Significant increases in training numbers over the past 10 years have meant that we are in a position where moderation of training numbers would be wise, whilst reliance on the current high level of trainees to deliver services needs to be recognised and managed so as not to undermine local delivery.

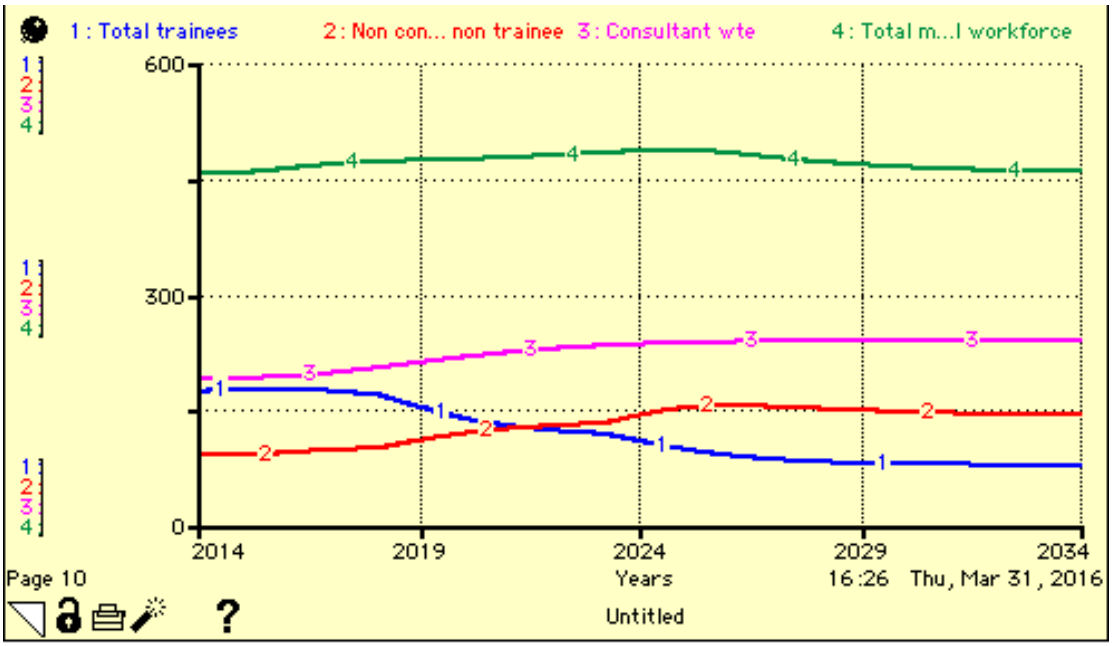
Our modelling has been based on the development of a System Dynamics simulation tool that is populated at a LETB level. The outputs from these individual models are aggregated to arrive at an all-England picture, an approach that has ensured local buy-in and sensitivity to local factors that are reflected in our recommendations. In calibrating the model we have used national objectives or targets, such as the RCPCH Facing the Future report to indicate the future need for consultant wte capacity. We have also considered future projections of need based on a simple weighted demographic driver that is again sensitive to local LETB population needs.

Before considering the longer term we also undertook a simple 'now-casting' exercise based on the current pipeline of trainees and the assumptions we had arrived at for out of programme activity, less than full training and attrition. This provided reassurance that over the next 10 years the RCPCH targets would be approached with a surplus of new appointments over and above replacement factors for consultants being experienced each year up to 2024. We also matched this 'now-casting' spreadsheet approach to modelling with the first ten years of the System Dynamics model and found a good match.

After detailing the assumptions and model design within the simulation tool we identified the rate of programme toward target, which on current projections would occur in 2028. We then explore a 'safe' level of reduction in ST1 trainee starts consistent with the longer term needs and avoiding boom and bust in later years. We conclude that ST1 starts can be safely reduced from just under 400 to around 350 by 2020 without jeopardising future supply.

To understand how such a reduction would impact on the overall medical workforce over time we used one of the LETB tools (with 'average' conditions) to simulate 'what-if' scenarios based on shortened training and the creation of Middle Grade or Senior Fellow posts to protect service delivery at this critical middle-grade level. We were also able to explore how the system at this level might behave in terms of requirements for additional non-consultant/non-trainee posts and whether there might be a tendency to increase loss-to-service were the balance between supply and demand to become significantly out of

sync. We used the model to explore 5 scenarios and were able to demonstrate that a scenario that moderates reductions in ST1 starts whilst introducing shortened training and additional middle-grade roles stands the best chance of balancing ongoing growth in consultant wte numbers with future risks of over-supply and short to medium term challenges focussed on service delivery. The figure below shows this scenario, in which reductions in trainees is matched by continued increases in consultants and middle-grade roles that maintain the overall medical workforce. Whilst reflecting one LETB position this scenario is consistent with a national picture in which total ST1 starts reduces from 2017 as indicated above.



Shape of the medical workforce in one LETB consistent with the suggested reduction in ST1 starts from 2017

Finally, we have considered each LETB position in the light of the national picture and their respective starting points. Historic levels of commissioning and any inequalities between population need and consultant workforce have been considered within the modelling tool so that it is possible to suggest how any national reductions in ST1 commissions might be best distributed. We have concluded that the strongest case for maintaining ST1 starts can be made for KSS, the North East and the South West whilst the strongest case for reductions can be made for the East of England, London and Yorkshire and Humberside.

1 Introduction

1.1 Background

Understanding and having confidence in the consequence of decisions and actions today on the future supply of the Paediatric workforce is recognised as a challenging undertaking. 'Now-casting' over the short term has benefit and can provide an initial platform from which to explore medium term scenarios. Now-casting typically captures the current position and makes assumptions on a year by year basis. However, as with any modelling, each year you move forward introduces additional uncertainty.

No modelling tool can remove this uncertainty, but using System Dynamics does significantly reduce the complexity of making 'what-if' assessments as well as providing an environment in which there is much greater potential for engagement with a wide set of stakeholders. This report reflects both approaches, but uses System Dynamics to answer the more strategic question being addressed, i.e. ***how many new trainees should be commissioned to meet future service requirements?***

The simulation model on which this report is based has been used as a learning tool since 2012 when the Yorkshire & Humberside LETB undertook to model the training pathway as part of a collaborative approach that was emerging across the LETBs. After being adopted into the HEE Large Specialty Programme, a review meeting was held involving senior HEE and LETB planners and clinicians in July 2015[1]. The engagement event considered future service models, and the benefits from consultant paediatrician input to a wider range of services.

This engagement led to a modified specification for the systems model. The analysis, model development and testing are all embedded in an iterative engagement process that ensures clarity, transparency and ownership of the end product. This document therefore sets out the approach and assumptions for the large specialty programme review of the Paediatrics modelling tool. Following the review meeting continued engagement and feedback was received from key individuals[2].

1.2 Modelling approach

The approach adopted in developing a modelling tool that is 'fit for purpose' for both the issue and the context within which it has been developed has followed the 'good practice' guide published by the Whole Systems Partnership[3]. This has built on over 20 years of experience in using these tools. Using system dynamics modelling supports the development of understanding and decision support in a number of ways:

- It looks at flows through the system enabling identification of key drivers or components of the system;
- By being focused on the question to be answered, it enables boundaries to be drawn, and prevents drift into non critical topics;
- It encourages clinical and data expert engagement, and the owning of models by those making the decisions;

[1] Participants in this were Hilary Cass (Senior Clinical Advisor to HEE), John Stock (HEE), Andrew Billington (Yorkshire & Humber) and Peter Lacey (WSP) and a group of National Workforce Planners.

[2] Particular recognition needs to be paid to Hilary Cass, Martin McColgan (Senior workforce analyst at the RCPCH), Aisha Morley and Alison Berry (HEE analysts), Andrew Billington, Simon Clark (Consultant Paediatrician) and Will Carroll (Consultant Paediatrician & HoS, East Midlands).

[3] The Whole Systems partnership has provided strategic consultancy services to a range of health and social care partners for over 20 years. Its good practice guide in the selection and use of systems thinking and system dynamics modelling can be downloaded here.

- Through examination of 'what if' questions, practical and political constraints can be used to override model parameters, thereby enabling the full range of determining factors to be taken into account;
- Using consistent modelling across local areas enables efficient calibration and benchmarking for enhanced understanding of regional variations.

2 Context

2.1 National documents

The RCPCH 'Facing the Future' document (2011) sets the direction for child health services which, along with the revised (2015) Standards for Acute Care and the Medical Workforce Census (2013), provided a comprehensive basis on which to consider the number of Paediatricians needed in the light of configuration options. Table 9 in Facing the Future (reproduced below) identifies a range for the desired level of paediatric consultant workforce for the UK from 4,853wte to 4,488wte depending on the extent of acute sector reconfiguration that has the potential to impact on General Consultant Paediatric workforce numbers.

	2009 wte	wte requirement in 'Facing the Future' (April 2011)		
		No change	Moderate reconfiguration	Maximum reconfiguration
General	1,331	1,875	1,647	1,510
Neonatology	357	863	863	863
Community	662	915	915	915
Other specialists	804	1,200	1,200	1,200
TOTAL	3,084	4,853	4,625	4,488
England 'share'		4,072	3,880	3,765

Table 1 Total Consultant Workforce Requirements for the UK in wte's (taken from Facing the Future: A Review of Paediatric Services, April 2011)

Since the publication of these aspirations the number of Consultant wte Paediatricians has continued to grow. For example, the 2013 census showed an increase in consultant wte from the 3,084wte reported in 2011 to 3,462wte in 2013 (UK total).

This report is based on ESR/NTS data for September 2015 for individual LETBs, aggregated to an all-England total. We have therefore added to Table 1 the England 'share' of the RCPCH targets, which were not originally included in the RCPCH document.

More recently than Facing the Future, but consistent with the recognition of the contribution that Paediatricians make across a wide range of settings, is '*The future of primary care – Creating teams for tomorrow*' (July 2015). This report from the HEE Primary Care Workforce Commission identifies population groups with particular needs in primary care, including care for children. It recommends that '*GP practices should have access to a named paediatrician……*' and that whilst '*hospital paediatricians are increasingly specialised… that Primary care paediatrics may need to be part of their training if they are to be most effective in supporting staff in primary care*.' The wider workforce, including community children's nurses and health visitors, also need to be considered in this context, but there is no doubt that Consultant Paediatric input to primary care is recognised and should therefore be considered in ongoing work.

2.2 LETB requirements

Because the modelling tool developed with the LETB collaborative is effectively a shell into which local data is imported to simulate local requirements, and only then aggregated to an all-England total, it was necessary to determine a LETB share of the three RCPCH

'targets' shown in Table 1. This share is used to set the LETB targets in a way that needed to be sensitive to local configuration and underlying population health needs. In coming to the final shares (shown in Figure 2) we have worked closely with Martin McColgan, Workforce Information Manager at the RCPCH.

Through a process of analysis and discussion we determined an appropriate LETB weighting for each of the four groups of consultants (General, Neonatology, Community and Other Specialists), and then weighted this to give an overall share of Paediatric need. The basis for each of these weightings was:

- For General Paediatrics (38.6% share of weighting) the LETB distribution was based on the required medical staffing levels by inpatient unit size (very small/small/medium and large) determined by emergency admissions for 2012/13, i.e. the same methodology as underpinning the Facing the Future calculations;
- For Neonatology (17.8% share of weighting) the LETB distribution was based on the location of Neonatology units, as was the case for Other Specialist consultants (24.7% share of weighting) in respect of specialist centres;
- For Community (18.9% share of weighting) the LETB distribution was based on 0-19 deprivation weighted population.

Figure 1 shows the output from this exercise for each of the four groups of Consultant Paediatricians. It, in particular, shows the presence of specialist centres in London.

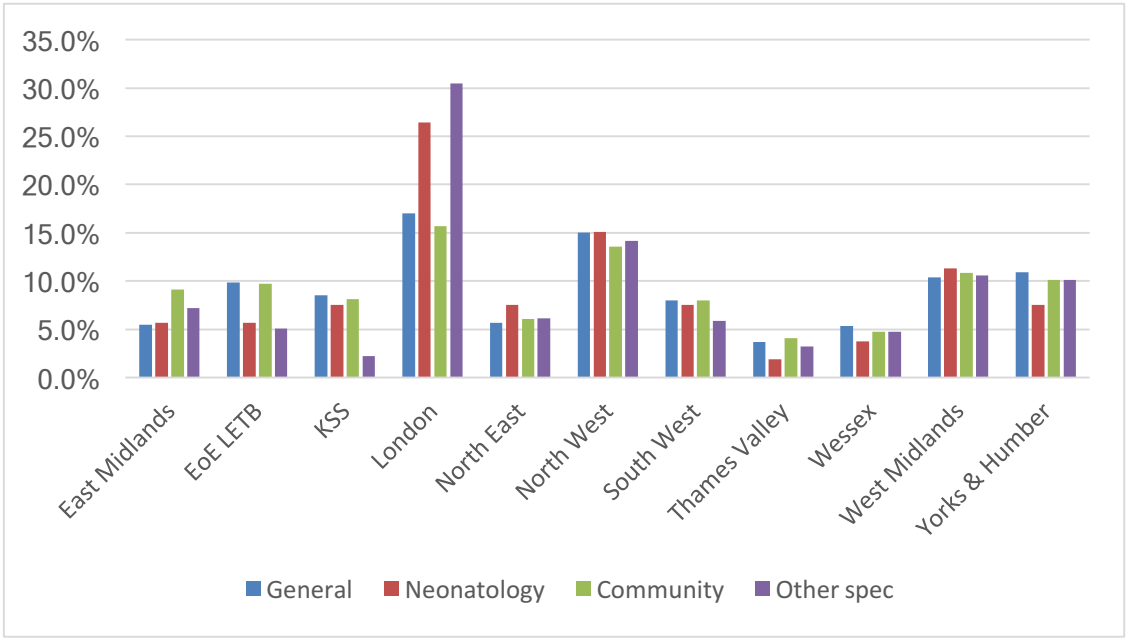


Figure 1 LETB distribution of need for each component of the Paediatric workforce

Figure 2 compares the weighted average from the four groups of consultants compared with the 2015 starting position for total Consultant Workforce. It suggests that despite allowances made in the weighting for specialist units in London the current share of Paediatricians is higher than that suggested by needs. In the context of rising numbers of Paediatricians overall this does not mean that a reduction in London is required, just that the growth requirements will be less. We will return to the significance of this when considering the impact on LETB commissioning requirements later in the report. At an all-England level this analysis resolves itself to a 'zero-sum'.

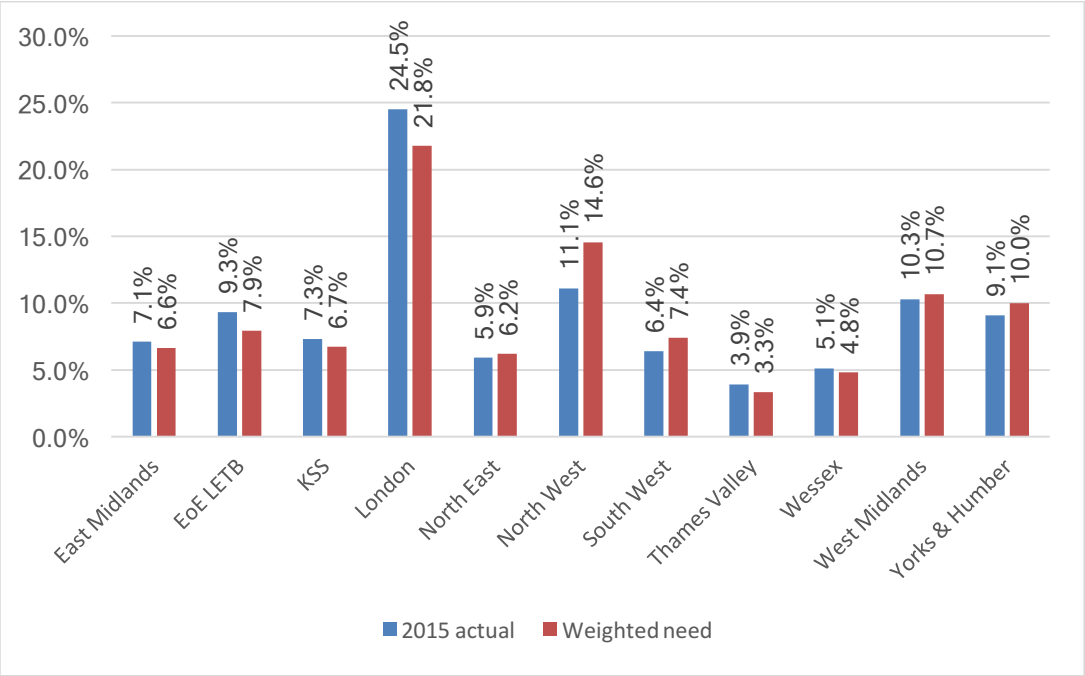


Figure 2 Comparison of future distribution of wte Consultant capacity based on need by LETB compared with 2015 wte

2.3 Future population demand driver

Work undertaken by WSP on behalf of the Workforce Modelling Collaborative during 2014 identified a future demand driver based on population projections and analysis of the Millennium Cohort Study[4]. For the purposes of this modelling we have applied that earlier work to LETB population projections for children and young people. These are shown in Figure 3 and Table 2 below. They combine with the future share calculations described above to give an indication of need over time by LETB.

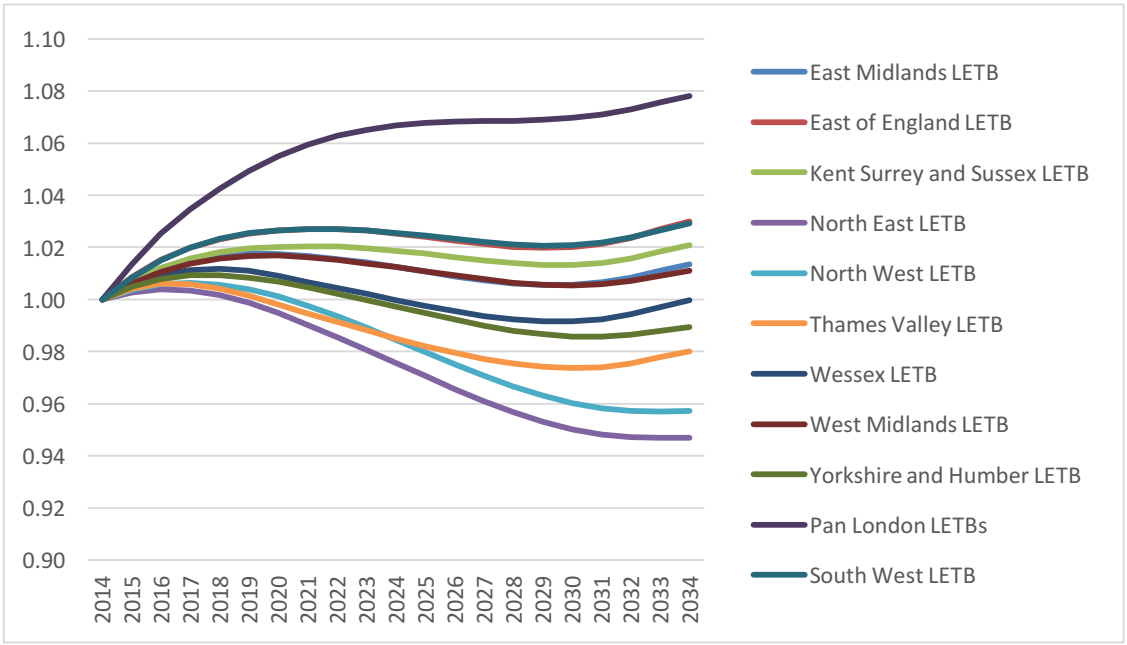


Figure 3 Future demand driver for child health needs by LETB (for detail on the 'end-point' see Table 2)

[4] The *Millennium Cohort Study* (MCS) is an on-going survey of circa 19,000 babies born between September 2000 and January 2002 into families living in the UK.

E Midlands: +1%	E of England: +3%	KSS: +2%	N East: -5%
N West: -4%	T Valley: -2%	Wessex: 0	W Midlands: +1%
Y & Humber: -1%	London: +8%	S West: +3%	

Table 2 Change in child health needs by 2020 by LETB compared to 2014 baseline

Whilst the changes shown in Table 2 are not very large their combined effect in some instances is expected to have an impact, for example in the North West where the share needs to rise whilst total needs is falling, or in London where the share needs to fall whilst the underlying population needs are rising.

3 The baseline position

3.1 Paediatricians in training

There were 3,065 Paediatricians active in training in September 2015 across England. It is recognised that there is significant Out of Programme activity and maternity leave for trainee Paediatricians, which is excluded from the figure above but included in the modelling (see later). The OOP impact means that up to c.10% of trainees are not progressing their training at any point in time across the whole programme. This has the effect of extending the length of training by about 1 year. In addition, less than full time training reduces capacity and again extends training time, again by about 1 year on average. The 8 year training programme therefore currently takes on average 10 years to complete.

The gender mix for trainees in the 2015 data was 78% female and 22% male and Figure 4 shows the distribution of all trainees excluding OOP across the years of training.

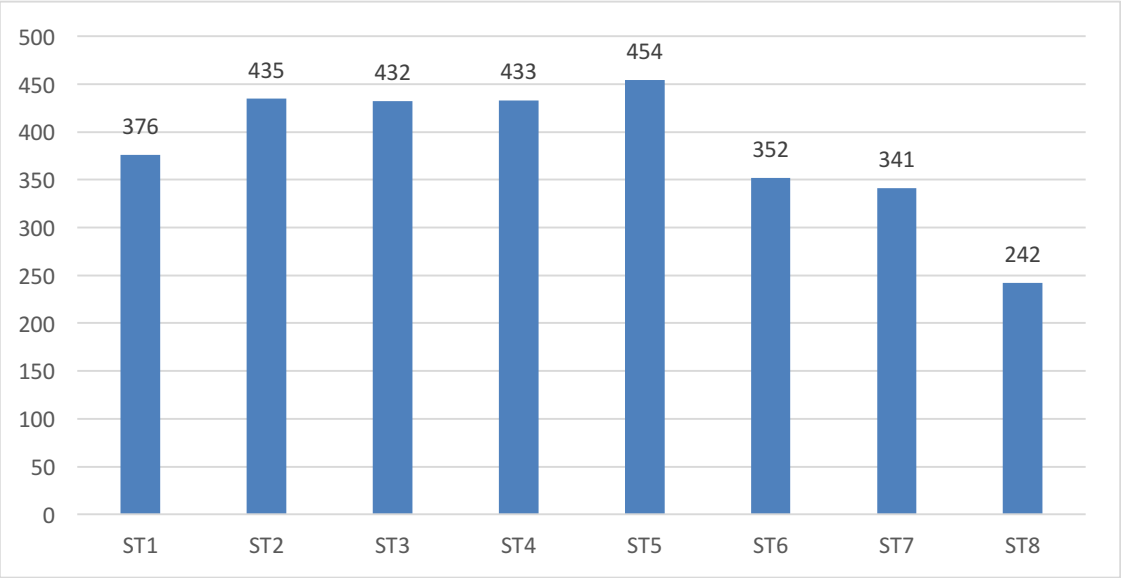


Figure 4 Paediatricians in training – England total (ESR & NTS data, Sept 2015),

3.2 Non-training/non-consultant capacity

We have also identified 1,199 wte non-trainee, non-consultant Paediatricians working in a range of roles. Average participation rates for this staff group at 96% for men and 85% for women.

3.3 Consultant numbers

Consultant wte for September 2015 totals 2,684 (plus 161wte academic wte posts) across England. Figure 5 shows the distribution of the workforce across the English LETBs and Figure 6 summarises the overall age and gender mix as used in the modelling. Current participation rates amongst Consultant Paediatricians are higher for men than for women, although evidence from other specialties suggest that this gap is closing. Current participation rates are 99% and 95% for men under and over 50, and 91% and 90% respectively for women.

Other model assumptions relevant to the overall dynamic of the system are summarised in the next section.

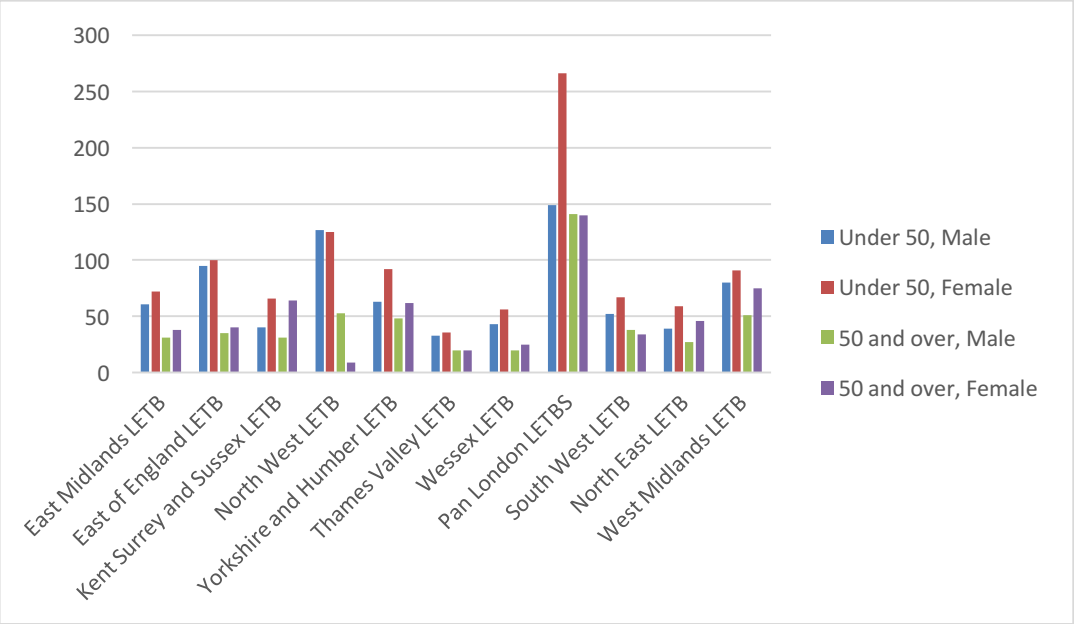


Figure 5 Distribution of wte Consultant Paediatricians (Sept 2015)

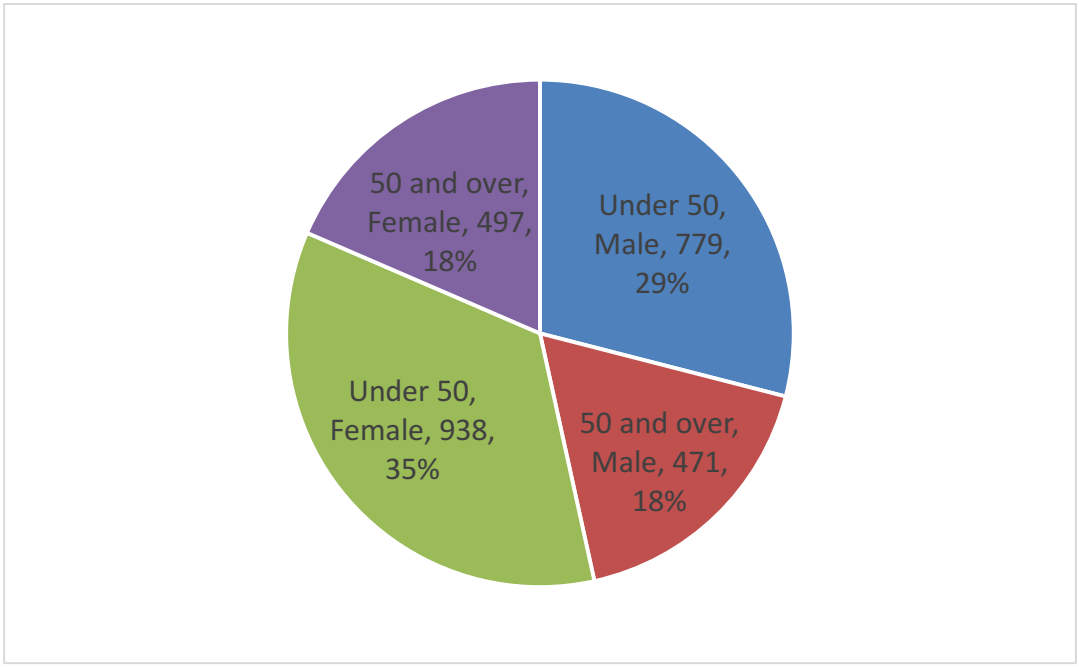


Figure 6 Age and gender mix of wte consultants (Sept 2015)

3.4 A simple 'now-cast' for newly qualified CTC holders

It is possible to undertake a simple projection for completion of CCT based on the trainees in the 'pipe-line', adjusted for attrition from training and extensions due to out of programme activity and less than full time training. Our 'now-casting' calculations are based on the 376 new ST1 starts in September 2015, plus the numbers in training shown in Figure 4. As well as there being delays in completion due to OOP activity and less than full time training there is also a gap between CCT completion and taking up a consultant post as people apply for posts, which is factored in to this now-cast. The attrition from training, as well as other assumptions used in our modelling is shown in Table 3.

		ST1	ST2	ST3	ST4	ST5	ST6	ST7	ST8
Attrition from training		4.0%	6.8%	8.8%	7.1%	8.3%	5.9%	8.0%	3.3%
Proceeding to OOP	M	0	5	5	10	15	10	5	0
	F	0	10	10	15	25	15	10	0
Participation rates[5]	M	0.98	0.99	1.00	1.00	1.00	0.98	1.04	0.99
	F	0.96	0.95	0.92	0.89	0.87	0.84	0.85	0.84

Table 3 Assumptions for progression along the training pathway

The now-cast also takes account of the likely numbers of paediatricians either retiring or leaving the profession in order to arrive at an estimate of the total number of Consultant wte in the system. The average age when this occurs for the over 50s has been calculated as being 59.1 years old for men and 62.7 years old for women, giving a weighted average of 61.0 years old. The growth in the number of wte Consultant Paediatricians over the next 10 years as a result of those currently in training entering the workforce, taking account of attrition and OOP activity, and netting off the expected number of consultants leaving the profession, is shown in Figure 7. It suggests an increase to 3,650 by 2025 (just below the 3,750 wte recommended by the RCPCH for England).

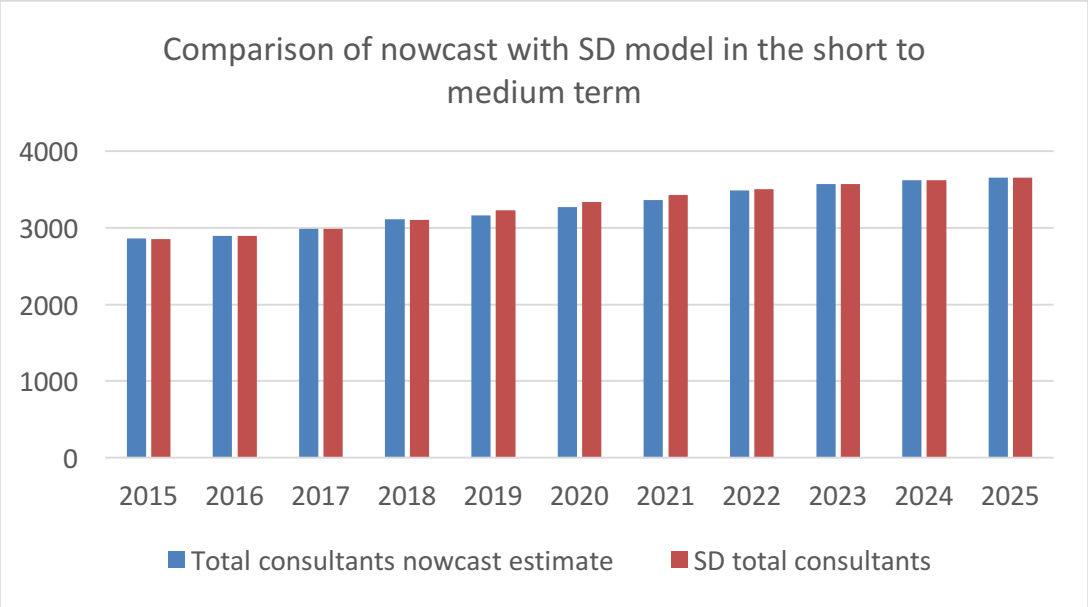


Figure 7 Growth in consultant wte from existing pool of trainees

Figure 8 shows the numbers with CCTs each year being appointed to the consultant workforce as well as the numbers expected to leave the profession. As can be seen from this, the numbers being added to the workforce are greater than those leaving up to and

[5] Based on ESR and NTS 2015 data and averaged across England.

including 2024. Questions regarding numbers beyond 2025 need to be addressed using the System Dynamics modelling tool that will be described in the next section.

Figure 8 Numbers expected to be appointed to consultant posts & leaving the profession to achieve the expected growth show in Figure 4

4 Further assumptions and model design

4.1 The training pathway

The System Dynamics modelling tool takes account of each year of training along with key assumptions concerning out of programme activity, less than full time training and attrition (as shown in Table 2). One such year is shown in Figure 9, which is repeated along the full length of the training pathway.

4.2 Adoption into the workforce

We are aware of the time that it can take between obtaining a CCT and being appointed to a consultant position, which can in some instances be longer than the 'grace period' of 6 months. It is difficult to identify numbers in this position but the delay can be significant if OOP opportunity has been difficult to obtain during training and/or there is any degree of over-supply or competition for consultant appointments. If we do not take this into account, we risk over-estimating the time that consultants have in post and therefore the wte consultant workforce.

The modelling logic for this part of the pathway is illustrated in Figure 10. The 'stock' is initialised using an estimate from the inflow and current expectations of the delay to appointment, i.e. of c.1yr. It is also at this point that CCT holders may look for post in another region, hence the outflow. This is estimated from historic data. Finally, any significant increase in the delay to taking up a post is assumed to have an impact and lead to further loss from the system. If this picture pertains across England it would be an indication of a significant oversupply of CCT holders. The relationship between average years in buffer and the loss from the buffer through over supply is graphical, i.e. it follows a sigmoidal rather than linear profile with most of the increase in the loss fraction taking place as the average time in the buffer moves from 1.5 to 3years. The RCPCH cohort studies have the potential to add intelligence to this part of the modelling. For example, it is thought that about 10% of CCT holders go overseas, which is reflected in the loss assumed in our modelling at this point in the pathway.

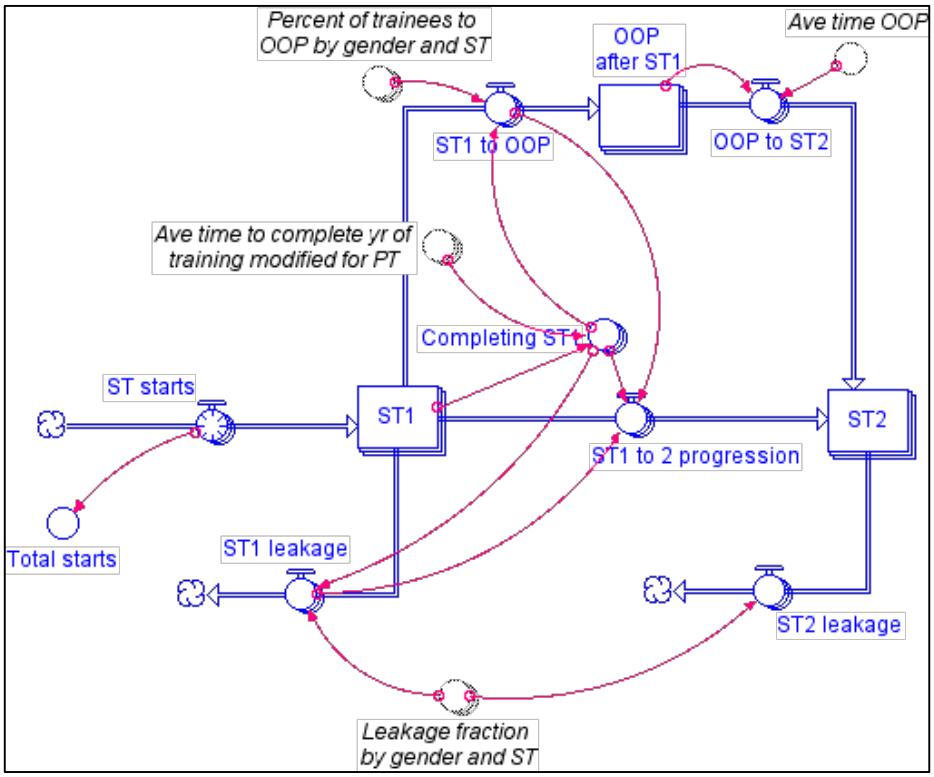


Figure 9 Illustration of model for ST1, progressing to ST2

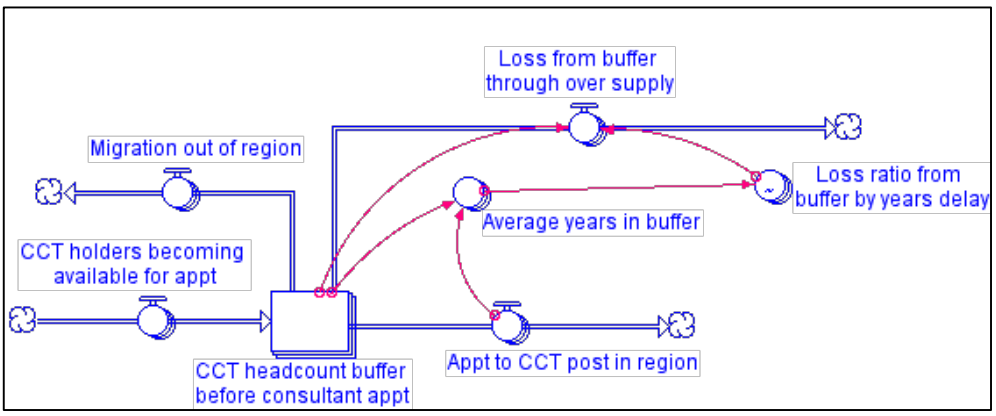


Figure 10 The 'buffer' between obtaining a CCT and appointment to a consultant post

4.3 The medical workforce

The ***consultant workforce*** sector is modelled with an under/over 50-year-old split, which is relevant for the application of different participation rates and the impact of changes in retirement age. This part of the model also remains split by gender.

Non-consultant/non-trainee wte capacity (1,199 wte in the Sept 2015 analysis) forms an important part of the overall capacity requirements to deliver care. However, as the consultant numbers rise and the overall shape of the medical workforce changes it is expected that the number in 'traditional' non-training/non consultant posts will reduce.

Academic posts are modelled as a separate career pathway from training. The RCPCH review indicated around 6% of the workforce are in academic posts (headcount of c.125 in England). Our analysis for September 2015 identified 160.7 wte Academic Paediatricians (or 5.7% of the total consultant workforce), which is factored into the modelling. We have also calculated turnover of 6.9% pa, which means that at current levels there is a need for a replacement factor of 11wte pa.

5 Model outputs

5.1 All-England model outputs and recommendations

When the assumptions and model logic described above are used to simulate the future medical workforce it suggests that the 'target' identified in Facing the Future under the maximum configuration option is achieved by 2028. This is just beyond the potential of the 'now-cast' modelling to identify, as described in section 3.4 above. Figure 11 shows the progress toward this target, which is modified over time by the aggregate future demand driver described in section 2.3 above.

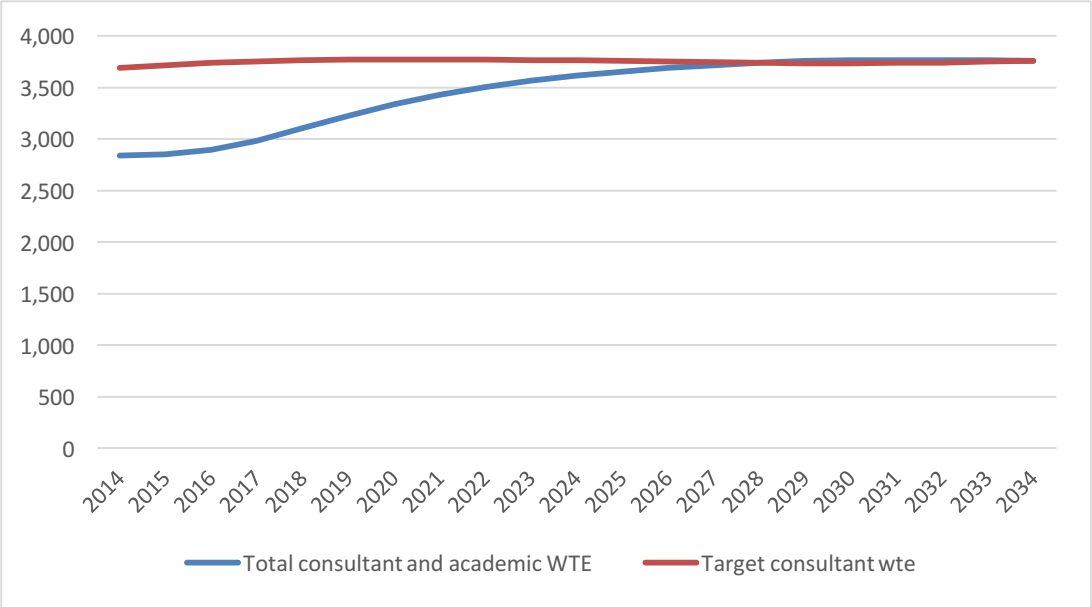


Figure 11 Modelled wte consultant Paediatric capacity compared to target

Because of the high numbers currently in training the wte Consultant capacity over the next decade is not sensitive to short term changes in the number of new trainees commencing training. However, were current trainee starts to be maintained there would be a significant risk of over-supply in the mid-late 2020's and into the 2030's. The modelling tool considers this longer term picture and is able to simulate the level of training commissions that is necessary to maintain, but not over-shoot, the 'right' level of future capacity.

With the current number of trainees exceeding the number of consultants (3,065 active trainees compared with 2,845, including academics) it is clear that this balance is unsustainable over the longer term, despite the importance to service delivery that higher trainees in particular provide. However, the imbalance in the current position also poses the risk of causing peaks and troughs on a roughly decadal basis going forward. Whilst the model suggests that reducing the number of new ST1 starts gradually to as low as 200 by 2030, this would need to be reversed a decade later – even though this scenario would maintain consultant numbers at around the 3,800 wte level.

It is therefore the conclusion of this modelling work that total ST1 starts can be safely reduced from just under 400 to around 350 by 2020 without jeopardising future supply of consultant capacity, whilst measures to maintain 'middle-grade' capacity to support service delivery from 2020 should be the subject of local planning, as outlined in the next section of this report. Longer term reductions to 300 ST1 starts during the 2020's are theoretically possible without causing significant 'boom and bust' in the longer term, but should not be considered until the impact of current plans are explored.

Strategies to manage the overall balance of the medical workforce (trainees, non-trainee/non-consultant and consultants) are best achieved within a national framework, but determined at a local level. The next section of the report will describe scenarios under which this can be achieved, including options around changes in the length of training and the creation of additional roles within the medical workforce.

5.2 The impact of changing training pathways

The all-England totals described above are the product of combining the 11 LETB level models, each with their distinctive starting points and targets. These outputs are based on 'business as usual' in terms of the training pathway and current non-consultant/non-training posts.

However, the review meeting held in June 2015 suggested that modelling the impact of a shortened period of training, with completion of CCT after ST5, could usefully be explored. This could help to ensure that the balance of middle-grade staff can be maintained and address the concerns of some about a presumption for specialisation reducing the availability of expert generalists in Paediatrics. In the light of increasing needs for 'out of hospital' care and support to primary care these considerations can usefully be explored using the simulation model. To reflect these alternatives the model has been prepared with options or 'what-if' levers that can simulate individually or together the impact of:

1. Obtaining a CCT at ST5, with a proportion of trainees taking 3 rather than 2 years to complete level 1 training (i.e. ST1 & ST2) – the default assumptions when this option is switched on is that the first intake for these trainees would be 2018 and that 50% of trainees would take 3 years rather than 2 to complete level 1 training. Both the start year and the proportion taking 3 years for level 1 training can be varied in the model.
2. That a new Middle Grade Service job role would be created between ST3 and ST4, thus slowing down the progression through training – the default assumptions when this option is switched on is that the year in which these job roles would first be offered would be 2018, that 50% of trainees would take up such a role and that people would stay in these posts for an average of 3 years before progressing their training. Again, the start year, proportion of students and length of time in these job roles can be varied.
3. That a new Senior Fellow role would be created for CCT holders before appointment to Consultant – the default assumption when this option is switched on is that the first year that this was offered would be 2018 and that the average time as a Senior Fellow before appointment to Consultant posts would be 3 years.

Other options within the model include changing the overall percentage of non-consultant/non-training posts in the system and changing the proportion of the consultant workforce in academic posts. It is also possible to change the assumptions for the extent of reconfiguration under the RCPCH target and to set a different minimum or maximum number of ST1 trainees, so as to avoid future 'boom and bust' behaviour.

To explore these options we have chosen one LETB whose initial conditions are a reflection of the national picture. The equivalent to Figure 11 for this LETB is shown in Figure 12. In this case the target wte consultant capacity is achieved in 2025, slightly ahead of the national average, a position that can be achieved with a modest reduction in ST1 starts from 26 in 2016 to 23 in 2017 and then to 20 in 2018. Further reductions are theoretically possible but this then enters the field of risks to middle-grade cover, something that the alternative options outlined above could contribute to managing.

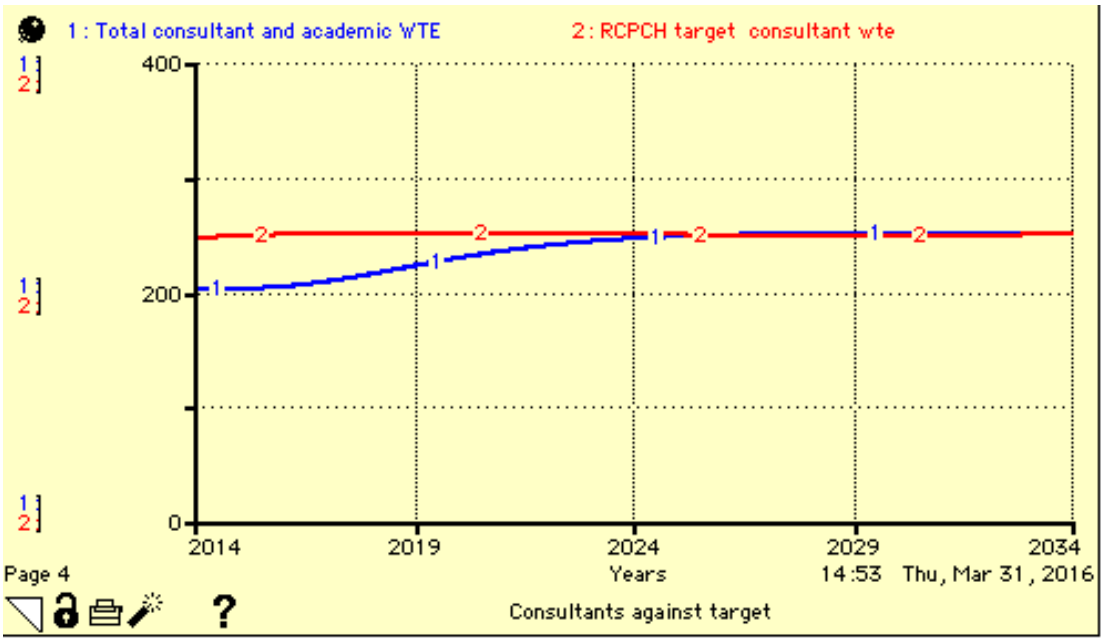


Figure 12 Modelled wte consultant Paediatric capacity compared to target for an average LETB

In testing alternative scenarios a number of model outputs need to be weighed, in particular we have chosen to reflect:

- The total medical workforce as well as consultant wte;
- The loss through over-supply;
- The additional appointments to non-consultant/non-trainee posts over and above absorption from trainee attrition.

Scenario 1: place a minimum number of ST1 starts at a level that is consistent with the very long term rather than the peaks and troughs evident in the simulation. Under this scenario we have constrained the model not to appoint less than 20 new ST1's, compared with the 26 who commenced in 2016. The effect of this scenario on the three system indicators above is:

- That the total medical workforce is maintained whilst the number of consultants reaches its target, as in the baseline scenario in 2025;
- The loss through oversupply increases over the baseline scenario from the mid-2020's, but not before;
- There is a slight reduction in the need for appointments to non-consultant/non-trainee posts from the mid 2020's as the larger trainee pool attrition feeds into this workforce in a proportionate way.

This scenario appears to satisfy the broad requirements of the service relatively well.

Scenario 2: increase the % of non-consultant/non-trainee wte to the point where overall medical workforce is maintained (i.e. from 26.6% to 35%). In this case ST1 trainees is allowed to fall below 20 but new appointments to non-consultant/non-trainee posts are required:

- The total medical workforce increases by c.13% by 2022 and then reduces;
- Loss through oversupply of CCT holders is minimised;
- Appointments to non-consultant/non-trainee posts needs to rise from 2pa to 14pa, although it then falls back to 7 or 8pa in the longer term.

This scenario has some perverse consequences, including the retention of 'boom and bust' outputs.

Scenario 3: the minimum ST1 starts used in scenario 2 plus the introduction of CCT at ST5. This scenario suggests the following outcomes:

- The total medical workforce dips in the mid-2020's as a result of shorter training;
- There is a 'blip' of oversupply around 2023-2027 due to the convergence of old and new training pathway CCT completions;
- There is a small increase in the number of non-consultant/non-trainee appointments needed at the same time, rising from 2pa to 4pa.

Scenario 4: scenario 3 plus the creation of the new Middle Grade and Senior Fellow roles. The combined effect of these two roles is to create an additional c.60wte roles that result in:

- An overall increase in the medical workforce from c.460 to c.490 over the 20 year period;
- A short term reduction in loss through over-supply, although with some bounce-back in the late 2020's;
- There is a small increase in the number of non-consultant/non-trainee appointments needed during the mid-2020's, rising from 2pa to 4pa.

This scenario potentially over-provides on the targets set.

Scenario 5: scenario 4, but with a further reduction in ST1 trainee starts from 20 to 16 from 2019. This scenario moderates the potential oversupply of scenario 4 whilst minimising the risk of over-supply or reliance on appointments to non-consultant/non-trainee posts. The 'shape' of the medical workforce under this scenario is shown in Figure 13.

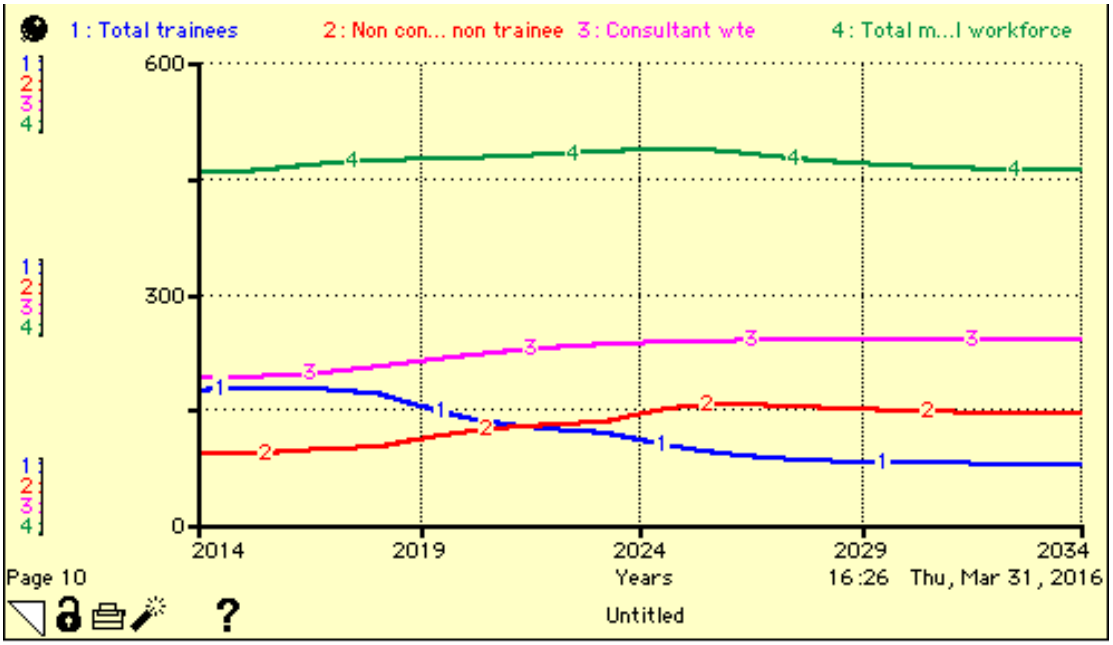


Figure 13 Shape of the medical workforce under scenario 5

In each of the above scenarios the number of wte consultants reaches its RCPCH target. However, there are different outputs for the three indicators described above. These are shown in Figures 14 to 16 with the outputs being numbered consistently with the scenarios.

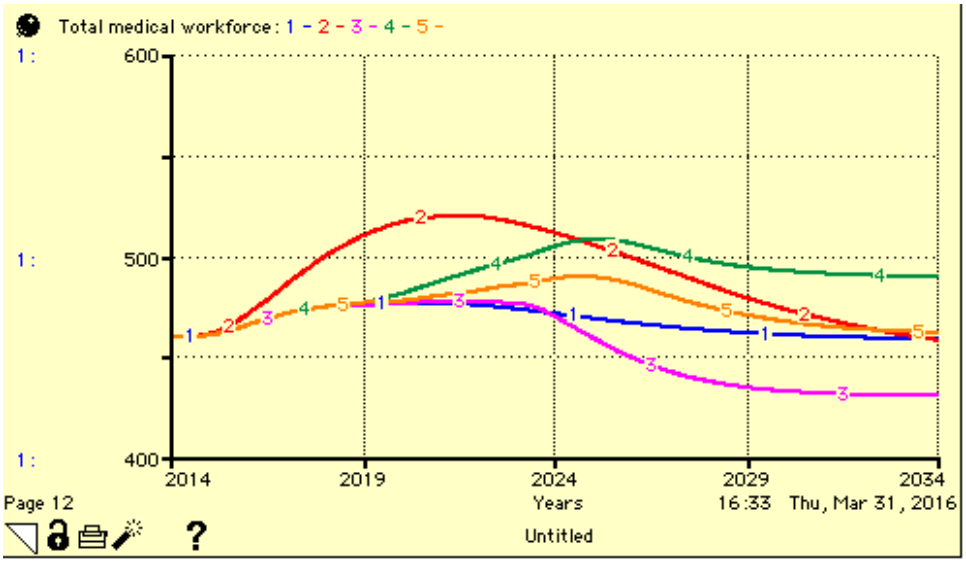


Figure 14 Total medical workforce under the 5 scenarios

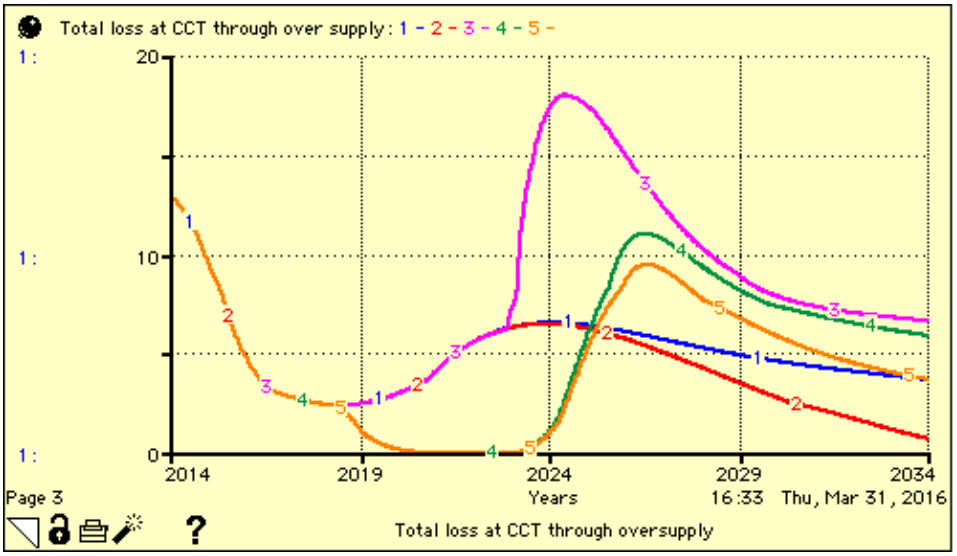


Figure 15 Loss through over-supply under the 5 scenarios

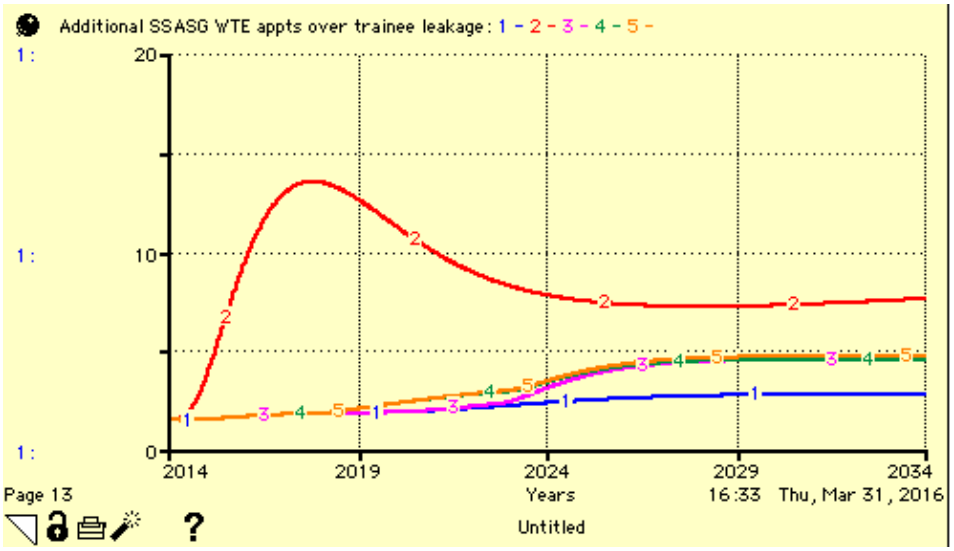


Figure 16 Additional appointments to non-consultant/non-trainee posts pa under the 5 scenarios

5.3 LETB implications

Section 5.2 explored alternative scenarios to manage the number of new trainee starts in such a way as to avoid significant future over-supply whilst maintaining middle-grade staffing levels using one of the 11 English LETB areas (London being considered as one for these purposes). As described in the earlier part of this report the modelling tool relies on this LETB level of modelling to arrive at an overall England position. However, each LETB has a different starting point and therefore any blanket changes in targets has the risk of disadvantaging some whilst maintaining some of the historic imbalances within the system. Table 4 therefore details a number of the factors that contribute to making the judgement on the number of ST1 starts that are appropriate, whilst still combining to meet the national position outlined above.

LETB	% gap to share of need (Fig 2) - +ive is over, -ive is under share of need	Growth in population need between 2014 and 2034 (Table 2)	Current ratio of trainees to consultants	2015 ST1 starts per 100 wte future share of RCPCH target
EM	6.5%	1.4%	1:0.91	12
EoE	14.8%	3.0%	1:1.07	13
KSS	8.0%	2.1%	1:0.66	7
London	11.2%	7.8%	1:1.44	13
NE	-4.9%	-5.3%	1:0.76	6
NW	-31.1%	-4.3%	1:0.97	7
SW	-15.6%	2.9%	1:0.78	8
TV	14.4%	-2.0%	1:0.91	15
Wessex	5.4%	0	1:0.91	10
W Mids	-3.7%	1.1%	1:0.88	8
Y&H	-9.6%	-1.1%	1:1.57	14

Table 4 LETB level position and recommendations

The significance of these three factors is as follows:

- Where the gap to share of need is negative there is a case for maintaining ST1 starts, whilst reducing in other LETBs to contribute toward a rebalancing across England on the basis of service and current population needs;
- Where the change in future population need is highest there is also a case for maintaining levels of ST1 starts;
- Where the number of consultants per trainee is particularly high there is a case for reductions in trainees;
- Where the 2015 ST1 starts per 100wte future share of RCPCH target is low there is a case for maintaining ST1 starts.

None of these factors stand alone, but when combined with the other modelling assumptions they begin to suggest those LETBs where reductions may be less, or not appropriate at all, and those LETBs where reductions are most appropriate as part of the overall reduction suggested by this modelling work.

From this analysis, and the outputs of the modelling tool, the strongest case for maintaining ST1 starts can be made for KSS, the North East and the South West whilst the strongest case for reductions can be made for the East of England, London and Yorkshire and Humberside.