# Primary Care Model: The Approach

December 2016

# Contents

This document is intended describe the approach and provide user guidance to HLP's System Dynamics Primary Care Model. It contains an introductory section explaining the background and context to the model before the in-depth look at the model itself.

**Key Sections:**



Alongside this document, a number of other user guides are published. Please also refer to…

- Guide to Building Workforce Models
- Guide to using Stella – our System Dynamics tool

# 01
# Workforce Modelling

***To provide training and an introduction to workforce modelling in support of the transition of the HLP Workforce Modelling team***

***London Workforce Programme***

# Workforce modelling for Primary Care

**In order to effectively plan for the future, all organisations need to understand and support the development of their workforce.  A key element of this, especially within the healthcare sector, is to understand how the evolving needs for services will affect the numbers and types of staff required.**

Workforce modelling is an approach that allows the quantification of how the current workforce is performing to meet demand. It helps investigate if the current channels of recruitment and retention will be sufficient to enable future demand to be met.

Workforce modelling tools have been applied in a variety of ways through the HLP Workforce Programme: from predicting the supply of GPs over a 5 year period to modelling the optimal usage of various staff types.

This pack outlines how the Primary Care workforce modelling workstream has built a model and used it to aid understanding of GP workforce challenges.

# What is workforce modelling?

## Workforce modelling is designed to ensure five key enablers are in place

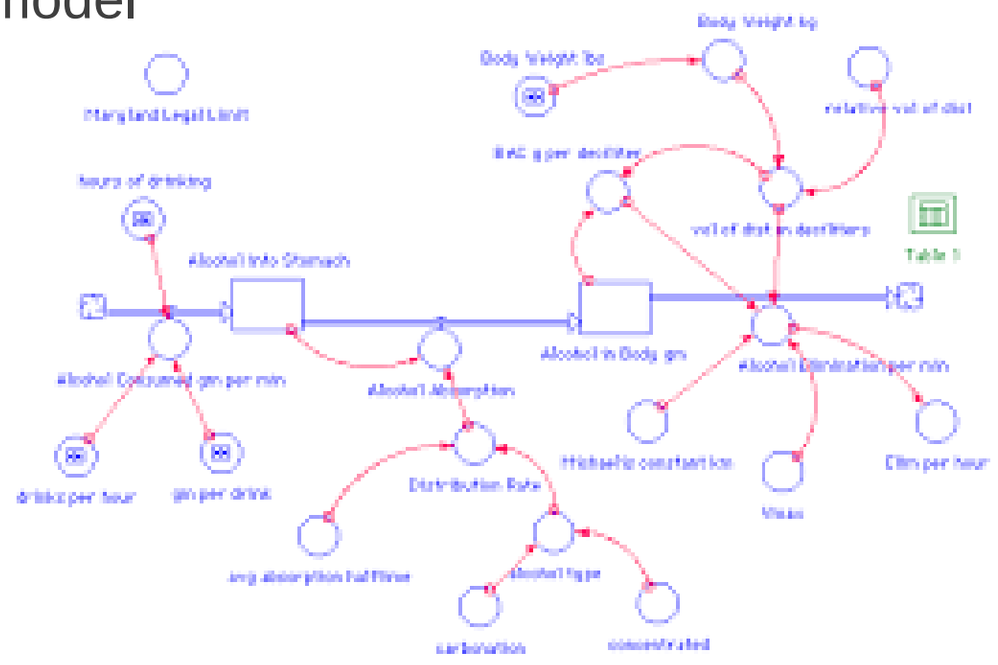
# How to develop a workforce model

**Workforce modelling takes existing data and uses it to develop a quantitative analysis of an organisation's workforce needs. This presentation will explore what is required to develop a workforce model. The key points we will be covering include:**

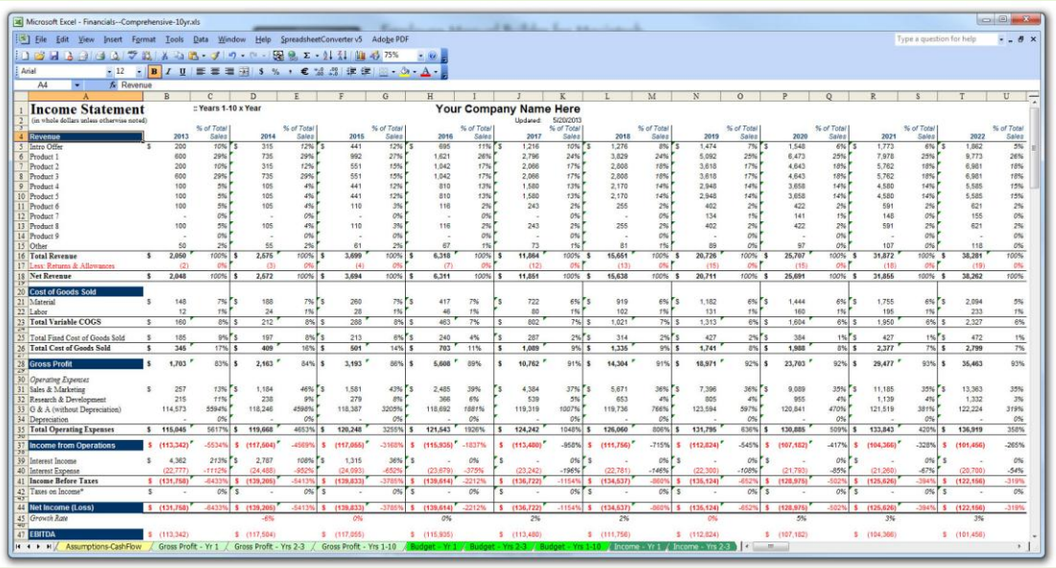
- Types of data and assumptions required for a workforce model.
- Appropriate stakeholder management to deliver a workforce model.
- Different types of workforce models that can be developed.
- Tools that can be used to support workforce model development.

## Workforce Model Examples

### 1. A System Dynamics 'Stella' workforce model




### 2. An Excel based workforce model



# Different approaches to workforce modelling

**When building the workforce model for Primary Care, a number of different options were available. A System Dynamics model had been used to support the transformation of services in North East London and it was decided to build on this approach for the pan-London work. System Dynamics allows users to:**

- Understand and analyse risk
- Design better strategies
- Develop more effective project plans
- Accelerate collective learning about potential behaviour and impacts of complex systems
- Model and test policy and program design options
- Analyse and improve business processes
- Understand program performance and sustainability
- Facilitate constructive dialogue among stakeholders
- Lead to strategic decisions that are realistically framed and more likely to accomplish their objectives.

System Dynamics was deemed to be the best approach for this workstream as its functionality enables functions such as feedback loops to be included in the modelling. This would not always be possible when using Excel.

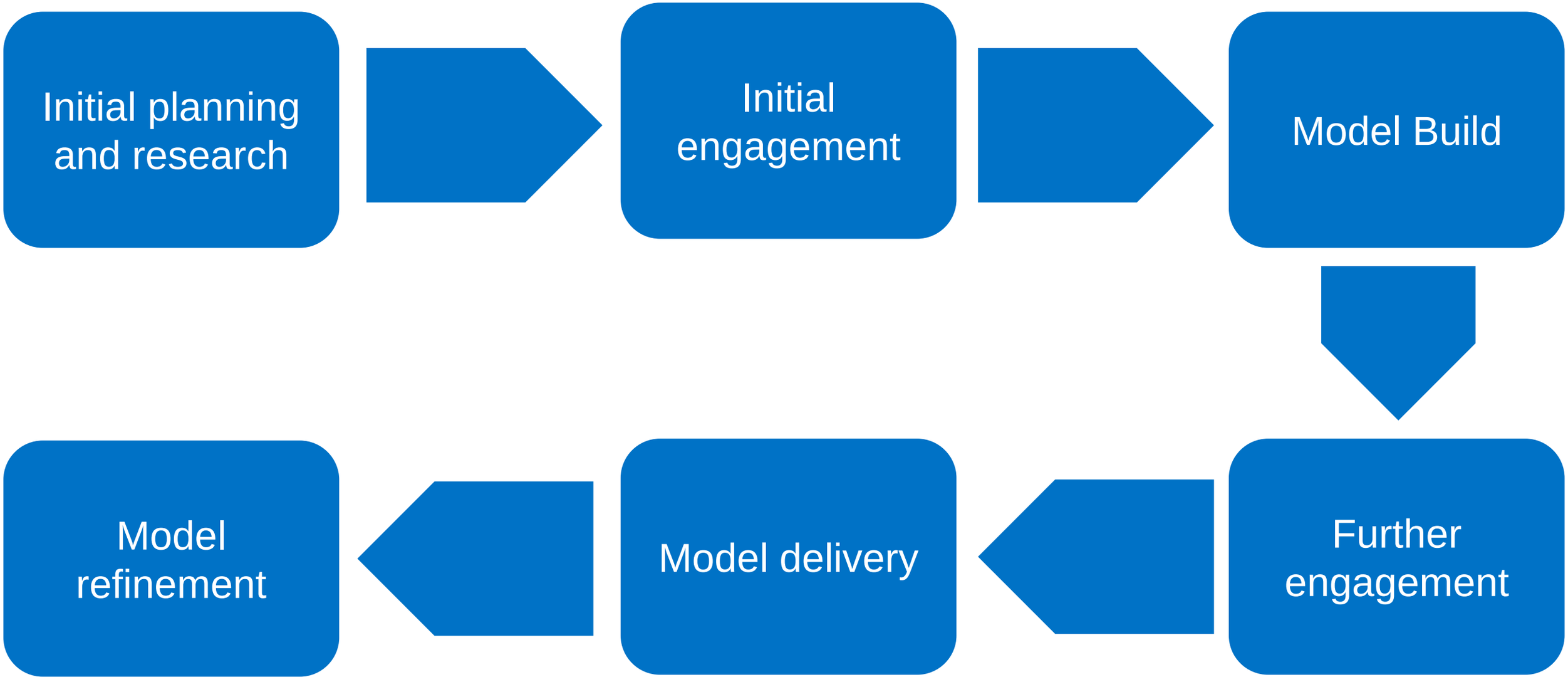
# Fundamental principles

**Workforce modelling is based on the principles of supply and demand. In simple terms the model compares the current and future supply to the expected demand.**

- The elements of the supply function will vary, generally depending on the time scale that you are looking to map.  In each case, this consists of the number of each staff type and their availability to work, potentially combined with longer term factors such as recruitment and retirement rates.
- The demand side of the model is built by combining the activities that require time from the workforce.
- Depending on the available data and the objective of the piece of work, optimisation techniques such as linear programming can be applied to produce an optimal strategy for using the existing workforce.

# How to build a model

**When building a workforce model it is important to follow a well defined logical approach. The process below is a high level guide of how to approach building a workforce model that can be applied regardless objectives or sector.**



# General hints for building a model

**When building any model there are several important considerations which apply to all software packages and make the model easier to build and operate effectively.**

- Build the model in sections - if there are errors it is easier to find them. In Stella these sections can be “modules”. Each section should have a readout of the numbers at this stage of the model, this is key when checking the results to see if they are correct or not.
- If possible find previous trends to compare your models outputs to. If this data doesn’t exist make sure that you validate the outputs with local experts (in the case of Primary Care this is likely to include: GPs, Practice managers, Practice Nurses and other colleagues working across General Practice).
- Always refer back to the key business question, to ensure what you are doing will add value.
- Build in flexibility: a segment or filter that is not required in the initial iteration might be needed at a later stage. It is easier to include this flexibility and avoid having to make significant changes to the model structure further along in the development of the model.
- Modelling is an iterative process, so make sure you continuously revise the model throughout the project to reflect any new information that you receive.
- In the first instance, build a model that reflects a “no change” scenario. This reduces the number of assumptions around future ways of working that are required making the model more accurate. It is also easier to understand the results of not changing, this makes it easier for your results to be validated by either existing data sources or your steering group.

# 02

# Background to Primary Care workforce model

***To provide support to STPs and CCGs in London, understanding their key workforce cost and capacity challenges***

***London Workforce Programme***

# Background and Context to the Model

**It was accepted within General Practice that a problem existed, but limited understanding of the scale of the challenge on workforce cost and capacity.**

**The primary care workforce in London currently faces a range of population demand and workforce issues that have implications for the delivery of primary (community-based) care strategies. Currently we face:**

- A growing and ageing population with more complex cases presenting in higher numbers than ever before at their GP surgery.

- A national and local shortage of GPs and other primary care staff coming into the profession, exacerbated by high projected retirement rates amongst GPs. Estimates suggest 22% could step back from front line patient care within 5 years.

- Central initiatives to promote multi-disciplinary team working are not gaining traction fast enough, in part due to a lack of local buy-in amongst single-handed practices.

- The present funding environment requires efficiency savings to be found to maintain care levels and quality.

# The brief to Primary Care Model

**The HLP team were given a three part brief illustrated below:**

Part 1 – Work with STP areas to build a model investigating the current primary care workforce and its ability to meet future demand by 2021.

Part 2 – Investigate the potential benefits of new ways of working on the primary care workforce to 2021.

Part 3 – Support local (CCG) workforce planning teams.

Key Steps:

Phase 1:
- Develop understanding of the ways patients are treated in primary care
- Find data on current primary care workforce numbers and population
- Build working group of primary care specialists

Phase 2:
- Look for case studies of where new models of care have been implemented in primary care nationally
- Develop realistic assumption regarding savings that could be made by new models of care
- Test the systems appetite for implementing each identified new method of working

Phase 3:
- Identify areas that have the greatest need for a workforce model
- Investigate new models of care being piloted locally
- Identify local contacts to test results

# Planning and Research

**Following the brief, we researched how a typical GP surgery functions and the key staff types that are involved in treating patients.**

**Practice Processes**:

- The key staff types currently involved in treating patients are: GPs, nurses and healthcare assistants
- The three appointment types are: face-to-face consultations, phone consultations, and home visits. How these differed in terms of staff time was significant.

**Staff and Patient Data Sources**:

- The best data source available for primary care staff is the HSCIC – which provides increasingly robust FTE numbers in recent collections.
- Two accurate sources of population data were identified:  the Greater London Authority (GLA) and Office for National Statistics.  It was decided to use the GLA.
- Each locality splits it's patients into groups based on the level of demand placed on the system.  This was calculated by the number of long-term conditions a patient has.

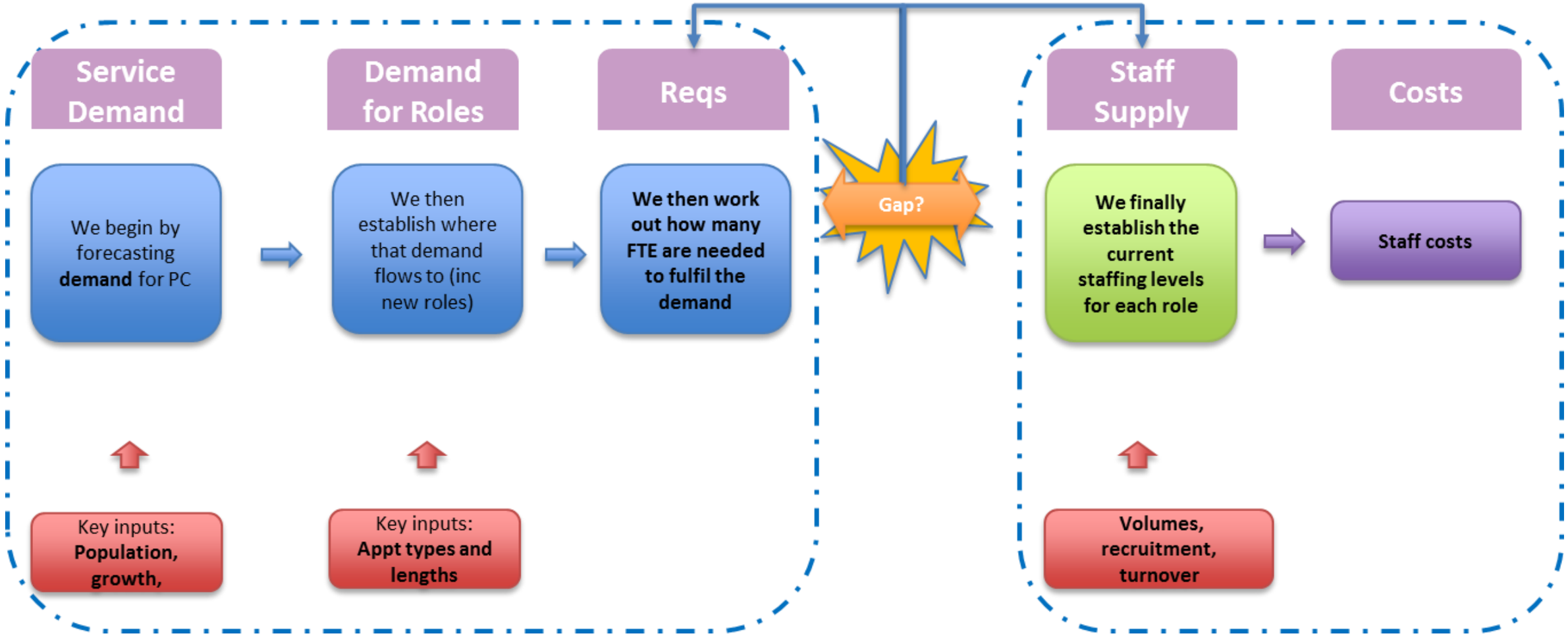
**Recruitment and Retention**

- The main source of new GPs are the ST-1 trainees.  There are currently 458 across London.
- Approximately 6% of London GPs leave their roles every year.
- Retirement can be assumed to be equal to 10% / year of the GP population over 55.

# The Model Framework

**The model enables the forecasting of demand and supply over a defined time period. Demand and supply are expressed in terms of 'contacts' in the Primary Care setting. In summary….**

STEP 1: Run for 2016 'as is' position.
STEP 2: Run for 2021 'do nothing' baseline scenario.
STEP 3: Run for each possible 2021 intervention scenario to capture learning.




The model enables tracking of the core Primary Care metrics over the 5 year STP period to 2021 to build an understanding of how demand (for appointments) and supply (available staff appointment time) will evolve over time.

# Calculations

**When building the model we separated out the supply and demand sections. Supply and demand are both calculated in hours and then compared to calculate the supply gap.**

The key factors that contribute to the demand of care (in minutes) in primary care are:

- Population (and population growth)
- Segmentation of the population by healthcare need
- Number of contacts per patient type
- Average appointment length
- Appointment setting.

The factors that contribute to the supply of care (in minutes) are:

- Number of staff (current)
- Number of days worked per year
- Number of hours worked per day
- Proportion of time spent facing patients vs time spent in administrative tasks
- Recruitment, retirement, turnover.

# How was the Primary Care tool created?

**The creation of a modelling tool should consist of a number of stages:**

- Initial workshops with a broad operational group to test assumptions about the main model elements, concentrating on care pathways and specifying / agreeing the model structure.
- Detailed work with a range of operational staff:  GPs, the LMC, HLP and those responsible for data / information management  to confirm the detailed structure of the model and determine the best sources of data or proxy measures if the necessary data was unavailable.
- Building the revised model and entering data.
- Testing the revised model with a range of operational and information management staff and using the model as the basis for strategic scenario testing exercises.

# 03

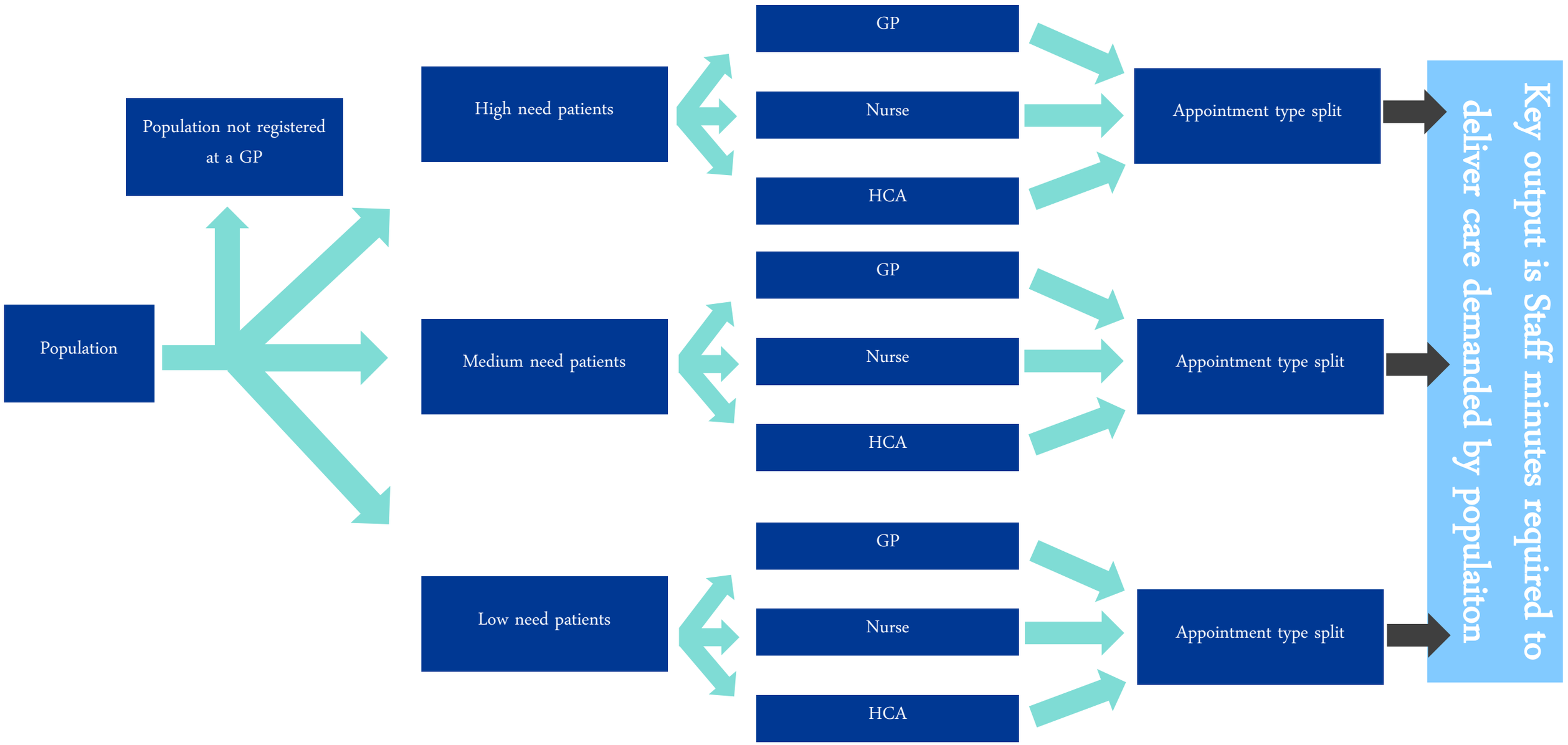
# The Model Explained: The Framework

***Detailed user guidance on the model in Stella***

***London Workforce Programme***

# Primary Care Model Demand Side Framework (I)

The Framework below shows the demand side of the model in simple terms. The population is split into need groups, then broken down by the staff types that see patients and the type of appointment.




Existing Population and projections around growth form basis of demand model

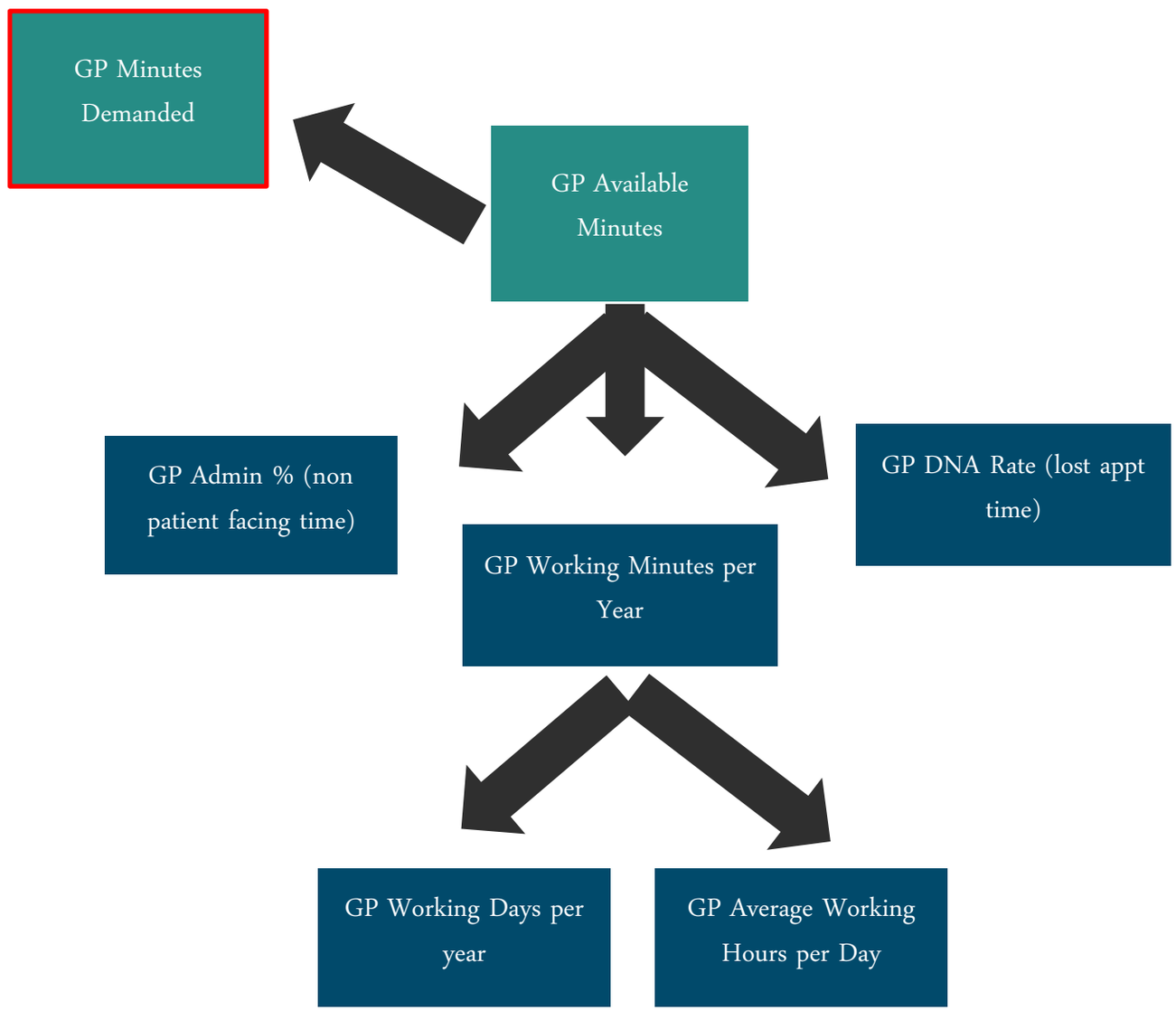
Split Population into complexity levels and assign average activity to each

The patient activity is then distributed to each role present in General Practice

Split between different appointment types and assign average length to each

# Primary Care Model Demand side Availability Framework (II)

The Framework below shows how the Demand side of the model translates into the volume of staff needed. The model requires various inputs around the working day and pattern of each role to give the volume of available patient facing minutes in a given year.



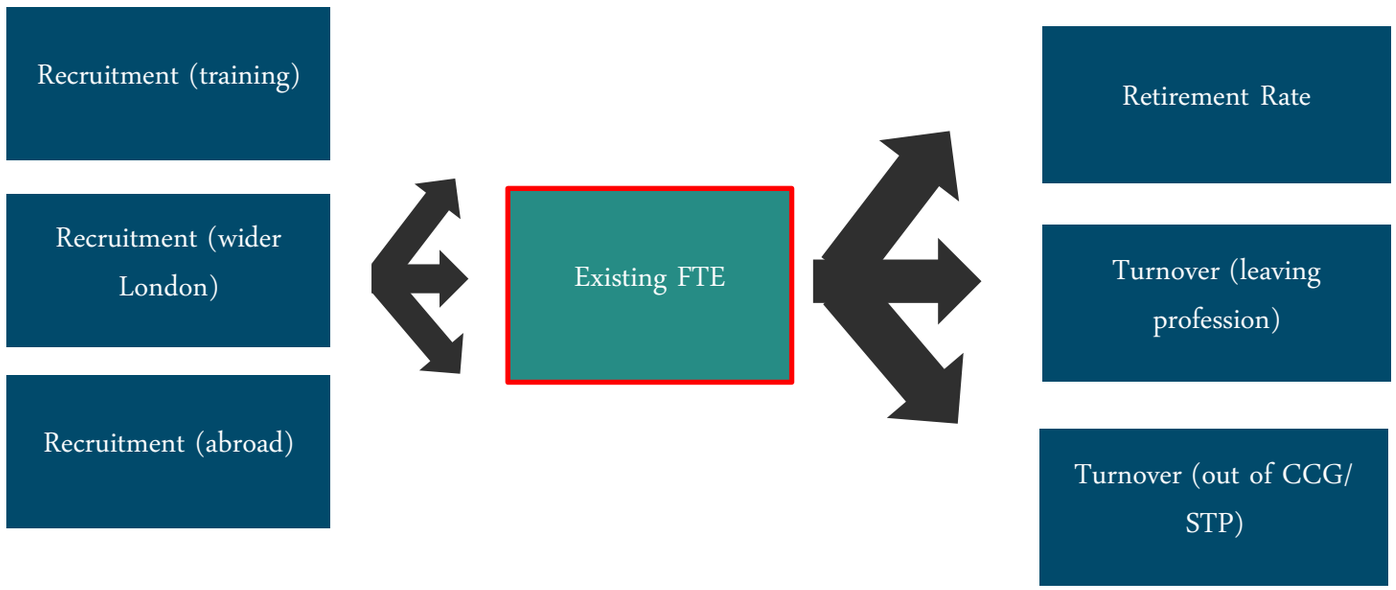

This calculation divides the GP Available Minutes over the GP Demanded Minutes to give the Volume of GP FTE Needed

These inputs are designed to calculate how many available minutes for seeing patients each role has

These inputs are designed to calculate how many working minutes in a each role has

# Primary Care Model Supply Side Framework

The Framework below shows the supply side of the model in simple terms. The model is fairly straightforward in that the Existing FTE (supply of roles) is a result of the addition of recruitment minus outputs of turnover and retirement.




Inputs into Supply Pool – additions to current FTE

Existing FTE Supply taken from HSCIC survey

Turnover out of model – subtracts from Existing FTE

# 04

# How to operate the Primary Care model in Stella

***Detailed user guidance on the model in Stella***

***London Workforce Programme***

# How Demand for FTE is calculated

**The central function of the demand model is to predict how many FTE of each role in General Practice will be required (demanded) over the course of the coming 5 years. This is modelled based on the calculations below:**

There are some user defined inputs that kick off the demand aspect of the model. The main ones are:

- Proportion of FTE each staff group spends with patients different complexities (low, medium or high) (variable 1).
- Proportion of each profession that deal with patient contact (variable 2).
- Proportion of FTE each staff group spends on each appointment type (variable 3).
- Length of each type of appointment (face to face, phone call, home visit) (variable 4).
- Current population by CCG or STP or Practice (variable 5).
- Population growth by CCG or STP or Practice (variable 6).

Demand process:

- The population input (variable 5) is split by patient complexity (variable 1) and using the total contacts per complexity is derived.
- This is then separated by profession (variable 2), then by appointment type (variable 3).
- The proportion of contacts for each grouping (complexity, profession, and type) is calculated.
- These proportions are multiplied by the number of minutes each appointment type takes (variable 4). This provides us with the **total number of minutes each profession needs** based on each type of appointment and each complexity level.

# How Demand for FTE is calculated?

Once the initial part of the model is complete we will have the **total number of minutes each profession needs** based on each type of appointment and each complexity level. We then need to transfer this into the number of FTE required. The Supply process is outlined in the next slide.

Using other variables, including what proportion of time is allocated to admin, the number of working days in a year, hours in a day etc, the model calculates the **number of minutes available** for each profession.

**Total minutes** / **Available minutes** calculates FTE needed.

**The time capacity of one FTE is calculated by the following**:

Hours worked in day x days worked in year x % of time spent in administrative non-patient facing activity. This x 60 will provide the total capacity per role per year in minutes.

The demand for FTE is therefore produced by dividing total demanded time for roles / capacity per role per year:

- Total time needed / Role available minutes

This provides the role FTE Needed.

The output of this will change over time as inputs into demand and availability vary.

# How Supply for FTE is calculated?

**The central function of the supply model is to predict how many FTE of each role in General Practice will be available to provide capacity over the course of the coming five years. This is modelled based on the calculations below:**

There are some user defined inputs that form most of the supply aspect of model for each profession within Primary Care (GP, Nurse, HCA and other). These are:

“In flows”

- Current FTE of staff group – data obtained from HSCIC data releases.
- Recruitment of newly qualified into staff group. (ST1 for GP) – data obtained from HEE where possible, otherwise agreed in conjunction with local group.

“Out flows”

- Proportion of staff retiring – calculation based on age profile of workforce.

In/Out flows

- Proportion of turnover with other areas within London.
- Proportion of turnover out of the localised model scope (i.e. outside of London/the profession).

# Key Calculations within Supply modelling

**'In flows' to the Supply model rely on the addition of new roles to the existing workforce base. Key calculations are based around out flows**

There are some user defined inputs that form most of the supply aspect of model for each profession within Primary Care (GP, Nurse, HCA and other). These are repeated across each of the roles to provide the supply modelling:

Out flows

- Proportion of staff retiring – calculation based on age profile of workforce.
  - We take the % of staff who are over 55 and apply a factor to this to achieve retirement. A typical distribution would see 10% of staff over 55 retire and leave the model each year. For example: 25% staff over 55, if 100 FTE total calculation is:
  - 100 (Current FTE) x (0.25*0.1) = 2.5 retirees per year would be subtracted from the original base.
- Proportion of turnover from the CCG / STP.
  - We take the % of staff who are likely to leave the CCG/STP and subtract this from the overall total of existing FTE. This turnover could result from any factor including leaving London, leaving the profession, or moving abroad. We purposely separate it out from the retirement leavers to provide clarity between the two.
  - For example 100 (Current FTE) x 0.06 = 6 roles turn over from the model each year and this figure is subtracted from the original base of FTE.

# How the gap for FTE is calculated?

The FTE shortfall is calculated by subtracting the FTE needed from the current FTE supply.

This shows the shortfall for a singular role, with the process repeated across each profession to determine the overall gaps.

A few points to note:

- Shortfalls are calculated in FTE (rather than head count which requires a further calculation)
- Shortfalls or over-supplies are evident at each time-established interval. In the case of the Primary Care model these are calculated at annual intervals – but this could be amended if preference existed.
- Demand and Supply are independent variables in the model, calculated based on user- test assumptions. Using predictive formulas to link demand and supply was considered but it was decided not to adopt this approach for simplicity and accuracy.

# 05

# Conclusion

## *Summary guidance on the model in Stella*

***London Workforce Programme***

# Data, research informed value and assumptions

The model requires a range of data inputs to produce the required results. These inputs vary in their flexibility from accepted robust data sources to locally provided health data and audited local surveys and assumptions to test. The inputs range in their nature from population, to complexity, and to operational and staffing based data inputs.

| | |
|---|---|
| Primary Care demand | Derived from GLA and ONS population data sources with population growth modelled through (and population figures rising from current to 2021) |
| Patient Complexity data | Population health complexity data provided by local area in the form of its population segmentation model. |
| Workforce Supply | GP and Primary Care workforce volumes data taken from HSCIC counts, most recently updated in September 2016 (figures accurate to April 2016). Where HSCIC counts are not 100% complete, calculations are made to round up for a local region. The latest HSCIC staffing count is 88% complete, with assumptions made to account for the final 12%. |
| Activity | Appointment timings, length, average contacts per patient and appointment setting taken from locally provided audits, evidence and tested with group of GPs and other clinicians at baselining workshops to validate. Data can be further tested and refined as appropriate. |

# Baseline Assumptions Required

For the baseline assessment the following core assumptions are required:

1. Population size (current) and estimated growth - typically as per 2014/15 GLA Projection tables.
2. Staff supply – existing FTE staff supply modelled to reflect most current HSCIC Primary Care staffing counts (released 27 April 2016 and September 2016), refreshed every 6 months.
3. Average appointments per patient per year.
4. Available working time - working days per year, hours per day % non patient facing time (patient facing admin and non-patient facing admin).
5. Split of patient activity – between activity undertaken by GP, Nurses and other roles.
6. Split of appointment type – 75% face to face consultation, 21% telephone contact, 4% home visit.
7. Recruitment – GP, DPC and Nurse recruitment numbers provided by HEE where possible, otherwise agreed in conjunction with local groups.
8. Turnover – assumption – each of the GP, Nurse and PA workforce per year. We typically modelled this to reflect various studies suggesting high leavers rates amongst current group within Primary Care.
9. Retirement Rates assumptions – typically 10% retirement rates per year within the over 55 workforce category can be expected.
10. Fully costed average salaries – for each of the FTE roles within Primary Care.
11. Net average appointment time (for home visits, surgery visits and telephone consultations, split between staffing groups and complexity where appropriate).
12. Local area population complexity and average contacts data provided – provided locally where accessible.

Caveats

- Data should be agreed in conjunction with the local steering group and is subject to ownership and accuracy of assumptions agreed.
- Data subject to accuracy of HSCIC figures.

# Concluding hints and tips

Following the delivery of results from the modelling, a number of key learning points were gained. Most of these are basic business tips but nevertheless important to bear in mind.

1. **When discussing new scenarios be well prepared and use case studies.**
2. **Know the data you use, in particular the way it has been collected and how it has changed over time.**
3. **Be prepared to travel:  face to face contact with stakeholders and your engagement group is vital.**
4. **Build the model with flexibility in mind.**
5. **First explain the model in high level terms then in medium level terms and only finally go into detail once it is fully understood.**