Building Workforce Models: A Brief Introduction

December 2016

Contents

This document outlines why we need workforce models and how to build them. It outlines an approach adopted by the Healthy London Partnership Workforce Programme in 2016. It does not provide a complete picture of all available approaches to workforce modelling.

There are six core sections:

1. Glossary of Key terms
2. Introduction to Workforce Modelling
3. Introduction to Modelling
4. Planning and Research
5. How to build the Workforce Model
6. Frameworks for the Model
7. Modelling hints and tips

Glossary of terms

The Glossary below defines some of the key terms as used in the context of this document:

- Stella - a computer simulation-based model building tool developed by ISEE Systems.
- System dynamics – an approach which looks at the relationship between different parts of a complex system.
- Assumption – a value within the model that, in the absence of firm data, can enable testing to begin. It should be revised if information suggests it is no longer accurate or likely to happen by those engaged in the modelling process.
- Customer – end user of model. The person or team who will drive the modelling and/or use the findings.
- Baseline – a minimum position or starting point used for comparisons. We use a ‘baseline’ to show what is likely to happen in the future if there is little or no change to the status quo.
- Scenario – where a future change, perhaps an intervention or something external, causes the main assumptions from the baseline model to change we call this a scenario. The intention is to enable comparison between the original baseline position and potential future states.
- Validation – strengthening & measuring the accuracy of the inputs to the model and gaining agreement from stakeholders and users of the model to proceed with information provided.

What does workforce modelling provide?

Workforce modelling is applied to support workforce planning. For instance, workforce modelling can test current and future scenarios including new ways of working, new roles, the adoption of new technology and demographic and societal changes. The five key enablers below are essential.

How is workforce modelling carried out?

Workforce modelling uses existing data to develop a quantitative analysis of an organisation or system's workforce needs.

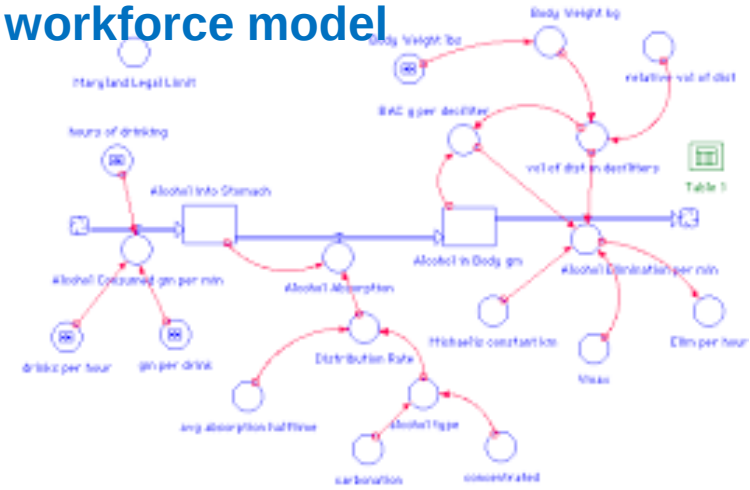
This presentation will explore what is required to develop a workforce model, and explain the necessary steps.

The key points covered include:

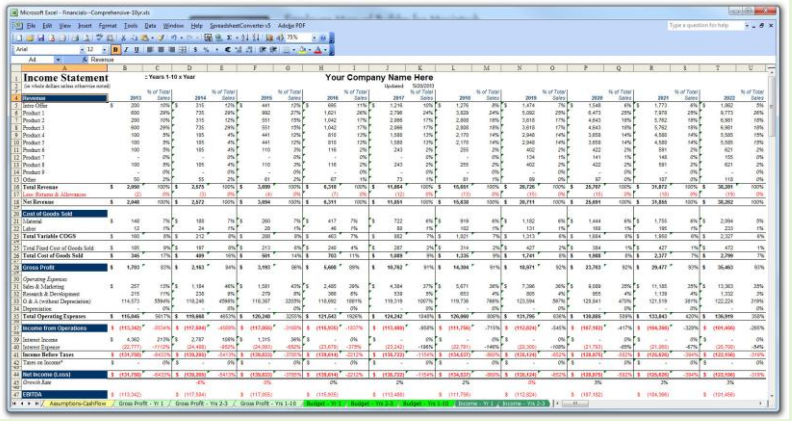
- Types of data and assumptions required for a workforce model
- Appropriate stakeholder management to deliver a workforce model
- Different types of workforce models that can be developed
- Tools that can be used to support workforce model development

Workforce Model Examples

1. A System Dynamics 'Stella' workforce model



2. An Excel based workforce model



What is required to build a successful workforce model?

The key building blocks required to build a successful workforce model include…

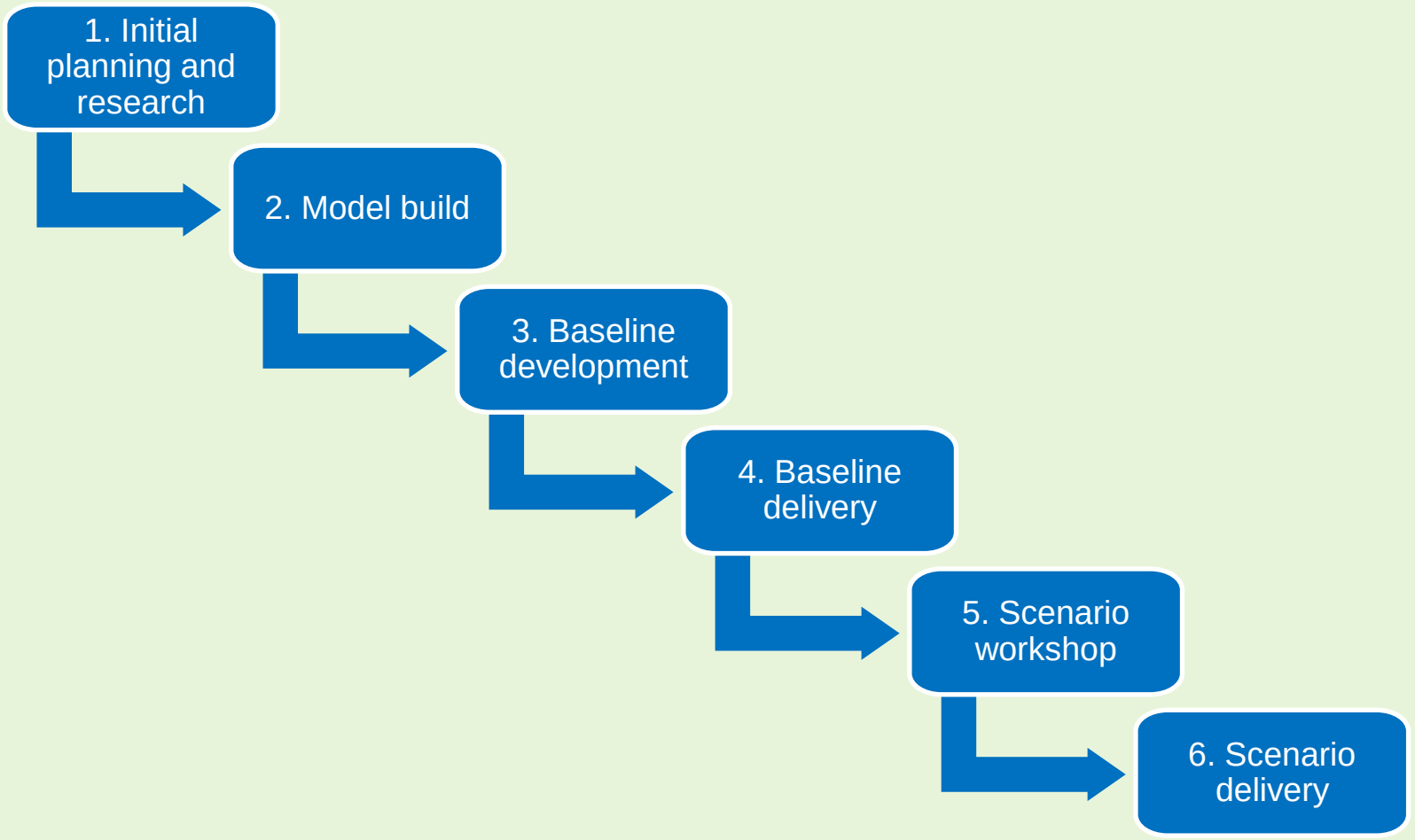
Customer engagement at each touchpoint is key

1. Well established need for quantitative workforce information
2. Well defined customer / owner for the workforce model
3. Clearly defined scope and measurable objectives for the engagement
4. Trusted & robust data sources to support the model. Local ownership and validation at each level is key
5. A clear understanding of who the key stakeholders and final users to act on the workforce model are

What are the stages of building a workforce model?

When building a workforce model, it is important to adopt a well defined and logical approach. The following sets out a recommended approach in simplified form:

Receive brief from customer…



1. Initial planning and research (1/3)

1. Initial planning and research → 2. Model build → 3. Baseline development → 4. Baseline delivery → 5. Scenario workshop → 6. Scenario delivery

The main objectives of this phase are to:

- build a high level understanding of the area that is being researched
- define the key business question to be answered

Staff types to model

Activities carried out

Drivers of demand

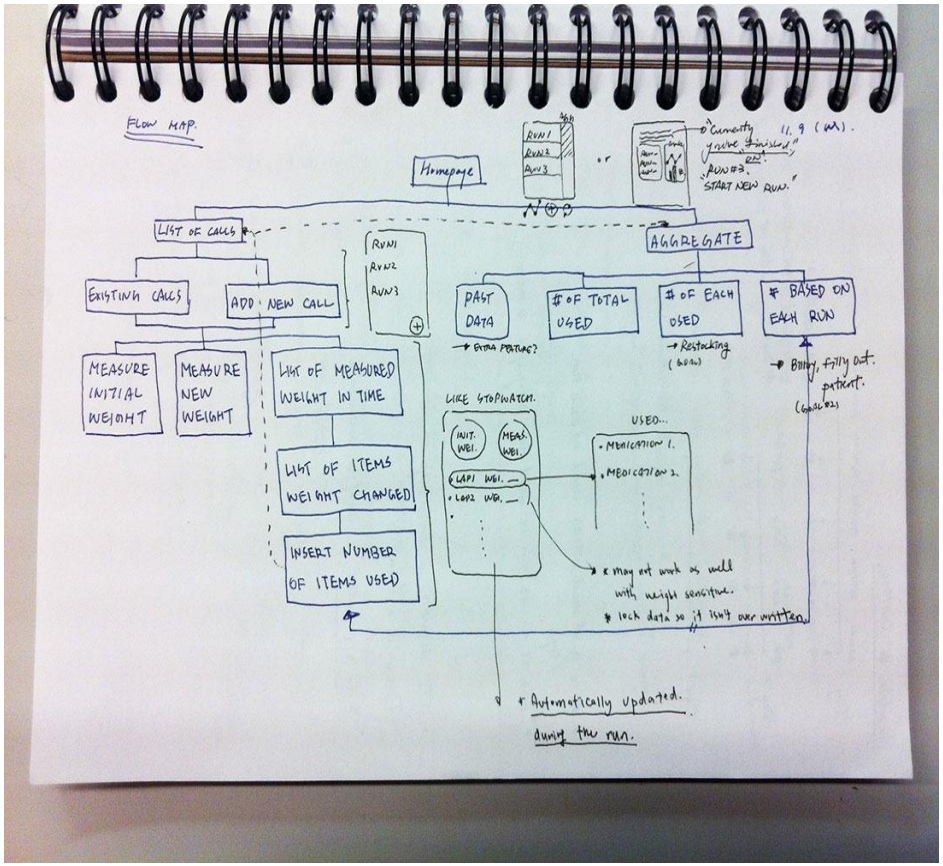
Data that is available

Stakeholder Engagement

1. Initial planning and research (2/3)

1. Initial planning and research → 2. Model build → 3. Baseline development → 4. Baseline delivery → 5. Scenario workshop → 6. Scenario delivery

It is vital to understand the sector and the structure of the workforce you intend to model. This informs the type of workforce model you should use.



Types of workforce model include…

1. Equilibrium model

This is designed to explain the behaviour of staff supply, demand, and other factors in a complex health economy with several interacting markets. It seeks to determine in which circumstances the assumptions of general equilibrium (typically supply/demand matching) will hold.

2. Network flow model

Network Flow Models deal specifically with the completion of a clinical process or patient pathway for a given population, by changing multiple stages or variables such as how care is delivered or by which staff groups. The model generally aims to test total time, complexity or cost to provide the required standards of care and therefore support decision making to improve overall capacity.

3. Optimisation model

This is designed to identify a 'best' configuration from a given range of e.g. staff /skill mix to provide a given output, such as delivering X patient appointments. This approach relies on computing the value of the function.

1. Choosing your methodology (3/3)

When building a workforce model it is important to assess a number of different methodologies in the planning stage. Our approach to modelling has focused on Excel and System Dynamics models. The benefits of Excel are generally known, but System Dynamics provides an alternative approach which can help users to…

- Understand and analyse risk
- 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
- Test the complex changing relationships of different factors over time through feedback loops

2. How to build a workforce model? (1/3)

1. Initial planning and research → **2. Model build** → 3. Baseline development → 4. Baseline delivery → 5. Scenario workshop → 6. Scenario delivery

Before starting to build a workforce model, the follow five key items should be in place.

A An outline understanding of system and the staff roles being carried out within it

B Knowledge of what data is available

C Well defined key business question

D Identified key organisations / people to engage

E Preliminary model framework

2. How to build a workforce model? (2/3)

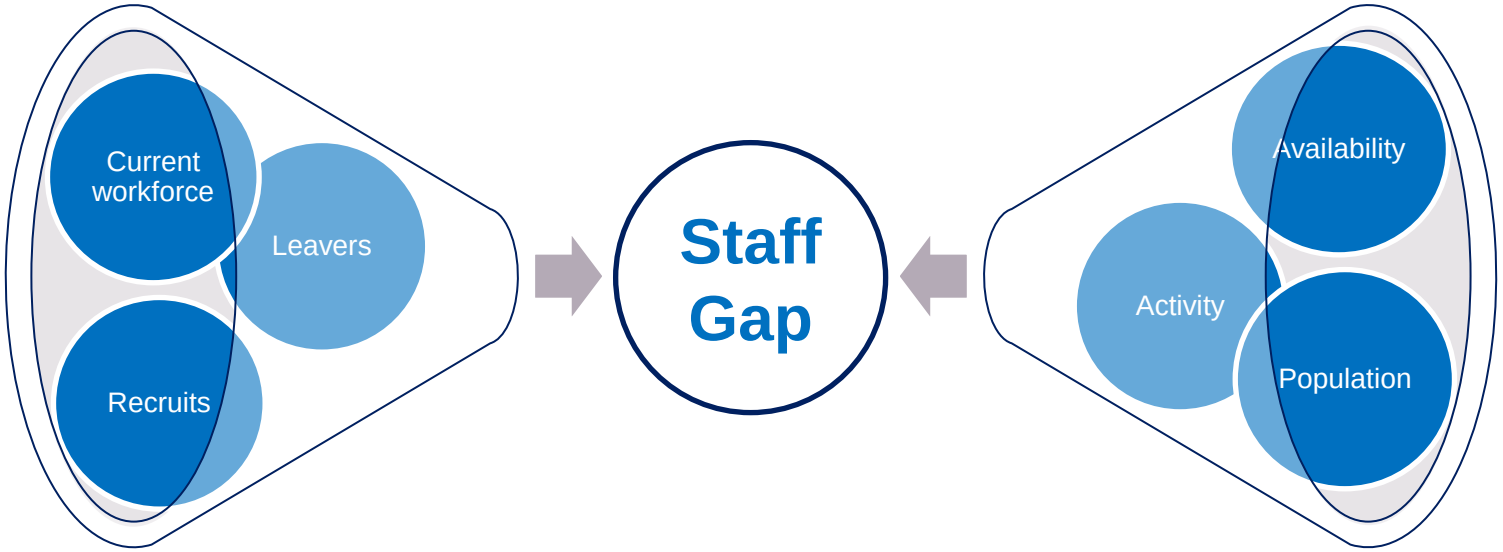
1. Initial planning and research → **2. Model build** → 3. Baseline development → 4. Baseline delivery → 5. Scenario workshop → 6. Scenario delivery

Constructing the first workforce model iteration

It is important to focus on the key business question when determining the type of model to be developed. This should be resolved as part of the outline stakeholder engagement in the previous stage.

Initial steps to take:

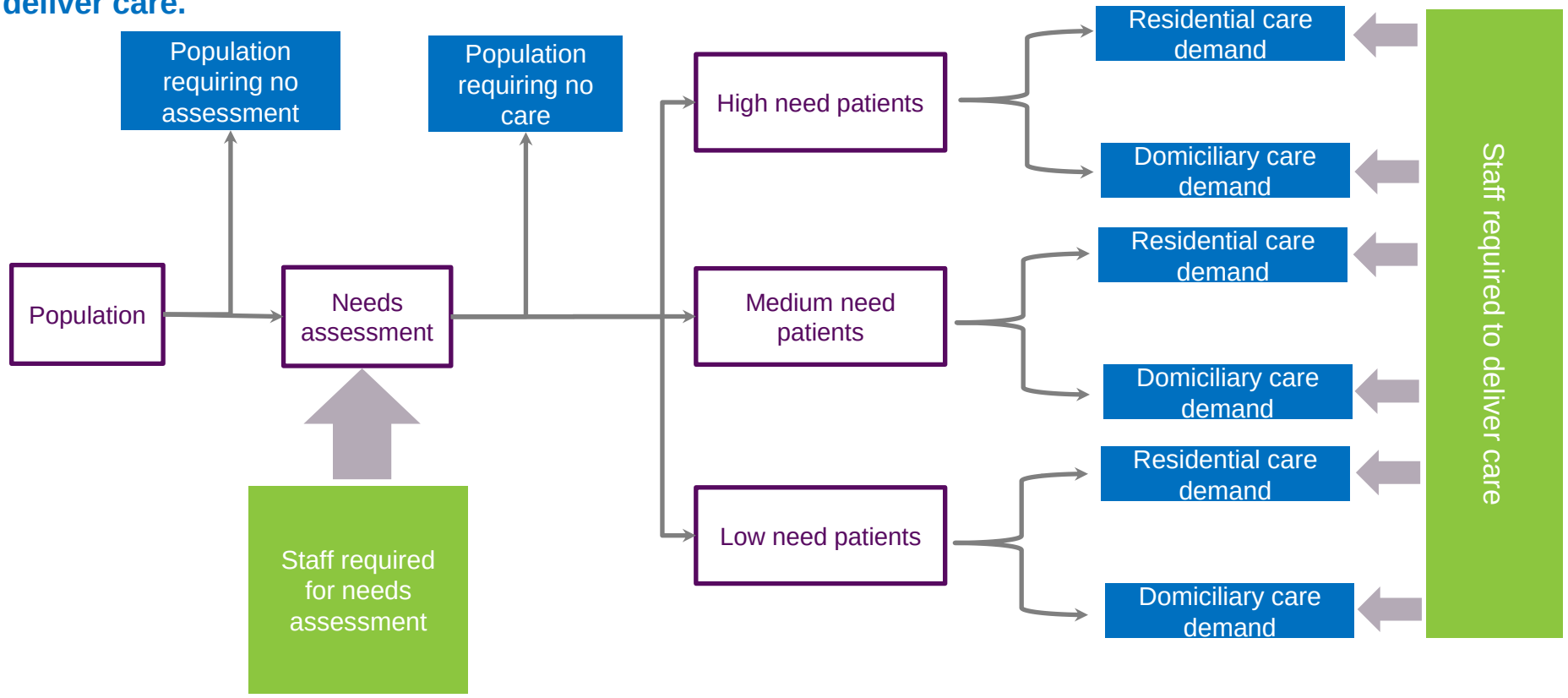
1. The initial stage of building a model is defining the demand and supply sides.
2. Demand will be predominantly driven by population and the skills required to service the population.
3. The supply calculation is based on current staff numbers, estimated recruitment and staff leaver rates.
4. From this information the difference between supply and demand, or supply gap, can be established.



2. Example model framework (3/3)

1. Initial planning and research → **2. Model build** → 3. Baseline workshop → 4. Baseline delivery → 5. Scenario workshop → 6. Scenario delivery

The example below is a framework for a demand side model of the social care workforce in a London local authority. This demonstrates the logical flow: the drivers of activity and where staff are required to deliver care.



In this section we try to understand the level of demand for workforce

In this section we look at the intensity of demand of each assessment

In this section we understand the setting of appointments

Staff requirements

3. Baseline projections

1. Initial planning and research → 2. Model build → **3. Baseline workshop** → 4. Baseline delivery → 5. Scenario workshop → 6. Scenario delivery

The first product in a workforce modelling project is to assess the 'as-is' or current state of the existing workforce projected for the next five years.

A The baseline is a demonstration of the result of not changing current workforce models, skill mix or ways of working

B The baseline should be based on existing workforce data

C The future baseline scenario is purely based on projecting forward the current ways of working

4. Customer workshop to agree workforce baseline

1. Initial planning and research → 2. Model build → 3. Baseline workshop → **4. Baseline delivery** → 5. Scenario workshop → 6. Scenario delivery

People

- 6 to 10 people
- The group should contain frontline staff, clinicians and key stakeholders & key influencers who can own the work and drive it forward.

Logistics

- 1.5-2 hrs for the workshop is ideal
- 40 minutes should be spent on an introduction

Content

- Provide contextual justification of need for model
- Ensure all assumptions are described and well researched

Objectives

- Reach agreement with the group that the model is necessary and will add value
- Encourage the participants to advocate use of the model
- Agreement on the key business question to be answered, the correct scope of the model and how findings could be taken forward to influence change
- Agreement on assumptions required for the model

4. Benefits of workforce modelling workshops

1. Initial planning and research → 2. Model build → 3. Baseline development → **4. Baseline delivery** → 5. Scenario workshop → 6. Scenario delivery

Workshops are an effective way of validating the workforce model structure, data to be used and achieving buy-in from key stakeholders.

Benefits

- Assumptions are locally owned and validated from the outset.
- Stakeholder buy-in to the outputs ensuring key findings are accepted.
- Stakeholder feedback on model can be shared.
- Difficult questions can be debated as a group with conclusions agreed in real time.

Outcomes

- Agreement on the key data sources and assumptions to be underpin the workforce modelling.
- Engagement and buy-in to continue the work with active support.
- Agreement to re-convene to test initial results, and model any future interventions / scenarios.
- Skills and capabilities transfer to existing workforce.

5. Developing future workforce model scenarios

1. Initial planning and research → 2. Model build → 3. Baseline development → 4. Baseline delivery → **5. Scenario workshop** → 6. Scenario delivery

Key actions to deliver this in a workshop environment:

Having forecast future workforce needs based on running services as they are today, the next step is to test a range of potential new operating model scenarios with your existing stakeholder group.

Before…

- Prepare at least 3 case studies to stimulate discussion. Use findings from other organisations or regions.
- Evaluate different modelling approaches to present your preferred option to the group.

During…

- Put your objectives into context to increase buy-in.
- Try to keep the discussion as focused as possible on the key business question.
- Ensure the group commit to quantified assumptions and values to be used in the modelling.

After…

- Agreement on future ways of working that will be modelled.
- Defined scope for each scenario to model.
- Agreed assumptions to be used or links to where scenarios can be researched.

6. How to present workforce modelling scenarios findings

1. Initial planning and research → 2. Model build → 3. Baseline development → 4. Baseline delivery → 5. Scenario workshop → **6. Scenario delivery**

This is an extract of a workforce modelling scenario the team delivered as part of the London Workforce Programme. Applying learning from other areas, a range of different impacts were presented based on low / medium / high levels of uptake of the initiative being modelled.

Indicative findings – not for circulation

Reduce the administrative burden on GPs

- Based on discussions in NWL and clinicians across London the model assumes that current GPs spend 33% of their total time on non-patient facing activities.
- Initiatives such as primary care clinical personal assistants, which were piloted at Pullborough medical group practice and then extended to Brighton and Hove. Were found to reduce the administrative burden on GPs by up to 40 minutes per day or a 6% reduction in administration time, assuming a 10.5 hour day
- Alternative methods of reducing the amount of time a GP spends completing non-patient facing tasks include upskilling receptionists to take on more of the administrative burden or improving IT systems.

GP FTE Demand scenario modelling

Scenario	non-patient facing GP time - 2016	non- patient facing of GP time - 2021	Annual change (% points)
Baseline	33%	33%	0
Scenario 1	33%	30.5%	0.5
Scenario 2	33%	28%	1
Scenario 3	33%	25.5%	1.5

- To quantify the potential impact of decreasing the amount of time a GP spends on administration we have modelled 3 scenarios
- In each scenario the amount of time a GP spends on admin is reduced by an increment every year in scenario 1 this number is 0.5% reducing the total time a GP spends on administrative tasks to 30.5% in 2021 vs 33% in the baseline
- The effect of different rates of reduction in non-patient facing time are investigated to demonstrate the potential effect of the gradual implementation of new ways of working could have on demand

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Indicative findings – not for circulation

Reduce the administrative burden on GPs

- As explained on the previous page we have modelled the effects of incrementally reducing the amount of time that a GP spends on non patient facing activities over the 5 year period to 2021
- This demonstrates the potential gains that can be made from introducing new ways of working incrementally over the next 5 years

GP FTE Demand scenario modelling

- Reducing the administrative burden on GPs by 0.5% per year until 2021 (scenario 1) reduces the total FTE required to meet demand by 52 FTE.
- This demonstrates the significant effect a relatively small change in the ways GPs work in NWL can have on the number of GPs that will be needed in 2021
- The most drastic reduction (scenario 3, 1.5% point annual reduction) on GP FTE required reduces the demand for GPs by 145 FTEs in 2021
- Scenario 3 reduces the gap between GP supply and demand to 157 FTE in 2021 compared to 302 FTE in the baseline model
- This reduction of 145 FTEs is a 48% reduction compared to the baseline, demonstrating the positive effect a small year on year improvement can have
- Even a 0.5 point reduction (scenario 1) reduces the GP gap by 52 FTE, a 17% reduction

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6. Handing over the workforce model to the customer

To ensure the workforce model can be both of immediate and sustainable benefit to the customer, you must…..

1. **Make sure the model is flexible**
2. **Develop detailed guidance documentation to support the model**
3. **Make sure there is a designated ‘model owner’ at the customer organisation/system**
4. **Ensure more than one employee of the customer organisation/system is well trained in using the model**

Model Building Hints

When building any model there are some helpful hints to bear in mind. These apply to all software packages and make the model easier to build and maintain. Most importantly:

1. Understand the system you are modelling – be able to articulate the interdependencies that will enable you to construct a model of workforce demand and supply
2. Continually refer back to the key business question, to ensure what you are doing will add value.

Make sure you also remember to do the following:

- Build the model in sections
- Clearly label all elements and keep a detailed record of all values and assumptions used
- Have a clear plan for the overall structure before building the model
- Keep the flow as simple as possible
- Find previous trends to compare your models outputs or validate the outputs with experts
- Build in flexibility so that the model can be adapted to capture different ways of working both if the baseline needs to be refreshed as well as for future scenarios.