

Modelling NHS 111 Service Design

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Introduction

The Health Economics Unit (HEU) created an interactive tool to support NHS 111 in modelling its telephony and online service design.



The aims of the programme were to:

- Create a model that encapsulates the critical elements of the NHS 111 service design.
- Incorporate the model into a user tool that is then easily accessible to decision-makers.
- Allow the tool to be further developed in the future with updated evidence.

The project involved gaining a detailed understanding of how service users interact with the NHS 111 service, both from telephony and online. This was achieved by analysing NHS 111 data, consulting with key stakeholders, and observing 111 calls at a site visit.

We modelled NHS 111 activity, service user outcomes, and costs, and we transformed these into a scenario modelling user tool using R Shiny. We provided extensive documentation and code to allow the model to be used and developed at later stages.

Why is the project important?

This project was commissioned for many reasons:

- NHS 111 interacts with a substantial proportion of England's population, providing recommendations on the different services users need.
- The service is complex; there are many different recommendations that can be provided, for example, these include: ambulance, emergency treatment centre, dental, and pharmacy dispositions.
- Estimating costs of the service and to the wider healthcare system is challenging.
- Service users may engage differently with the telephony and online services.
- Different types of staff operate at 111, and this needs to be considered in decision-making.

Methodology

This project methodology involved many different stages:

- **Phase 1 research** – We previously gained an initial understanding of the NHS 111 user pathway and identified key priority questions around the service design.
- **Pathway review** – We mapped out the NHS 111 user pathway, including the interaction between the different services and types of staff (health versus clinical advisors). This considered the many different types of disposition that can be made by NHS 111.
- **Stakeholder opinion** – We incorporated stakeholder feedback throughout the project, for both the design of the service user pathway and user tool functionality.
- **Data review** – We analysed data from NHS 111 concerning both the numbers of service users receiving different dispositions from different staffing types and other staffing matters.
- **Unit cost estimation** – We estimated cost parameters using published reference costs.
- **Model development** – We created a complex model within R Shiny around the NHS 111 pathway, incorporating important parameters which might be changeable from a service perspective. The simplified pathway is presented in Figure 1.
- **User tool** – We created a user tool within R Shiny to help commissioners perform decision-making around its service design. A snapshot of the tool is shown in Figure 2 and example tool outputs are given in Figure 3.
- **Quality assurance** – The work was reviewed extensively internally, and various aspects (including the pathway and user tool) were quality checked externally by NHS England.
- **Recommendations** – We reviewed limitations in the modelling to make targeted recommendations for future iterative development. The R Shiny code has been provided to NHS 111.

Figure 2 Snapshot of the user tool.

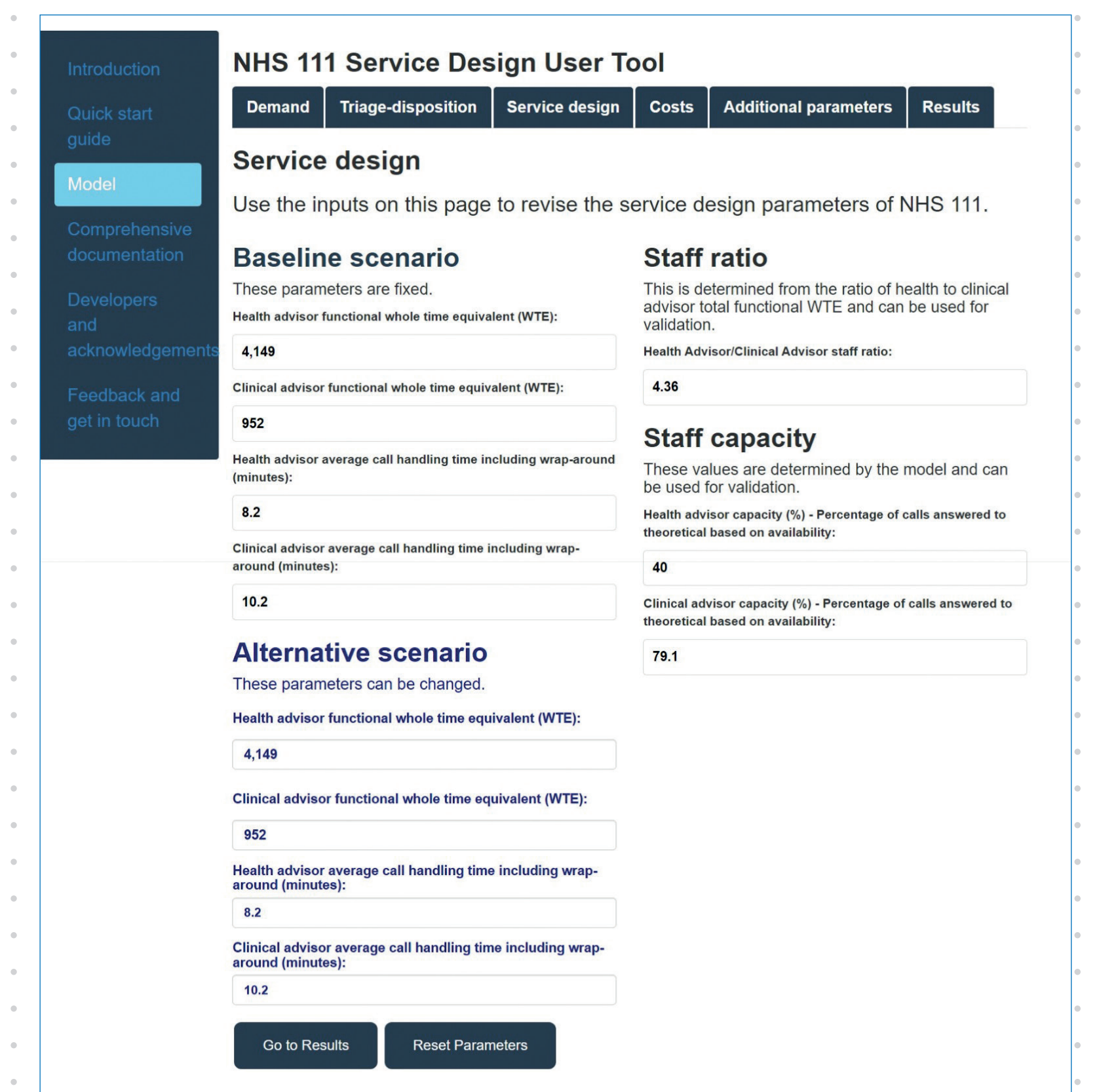


Figure 1 The NHS 111 pathway (simplified).

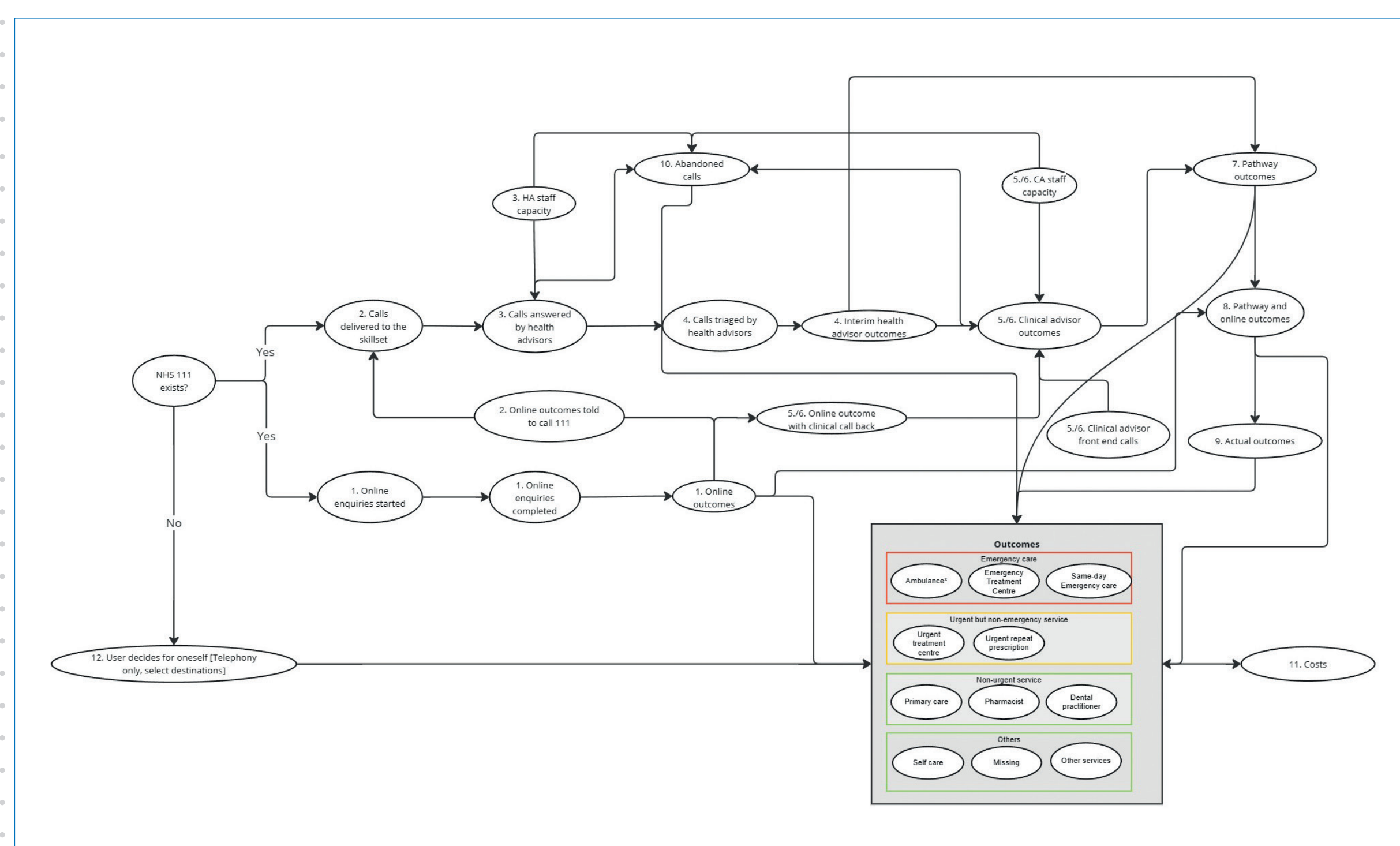
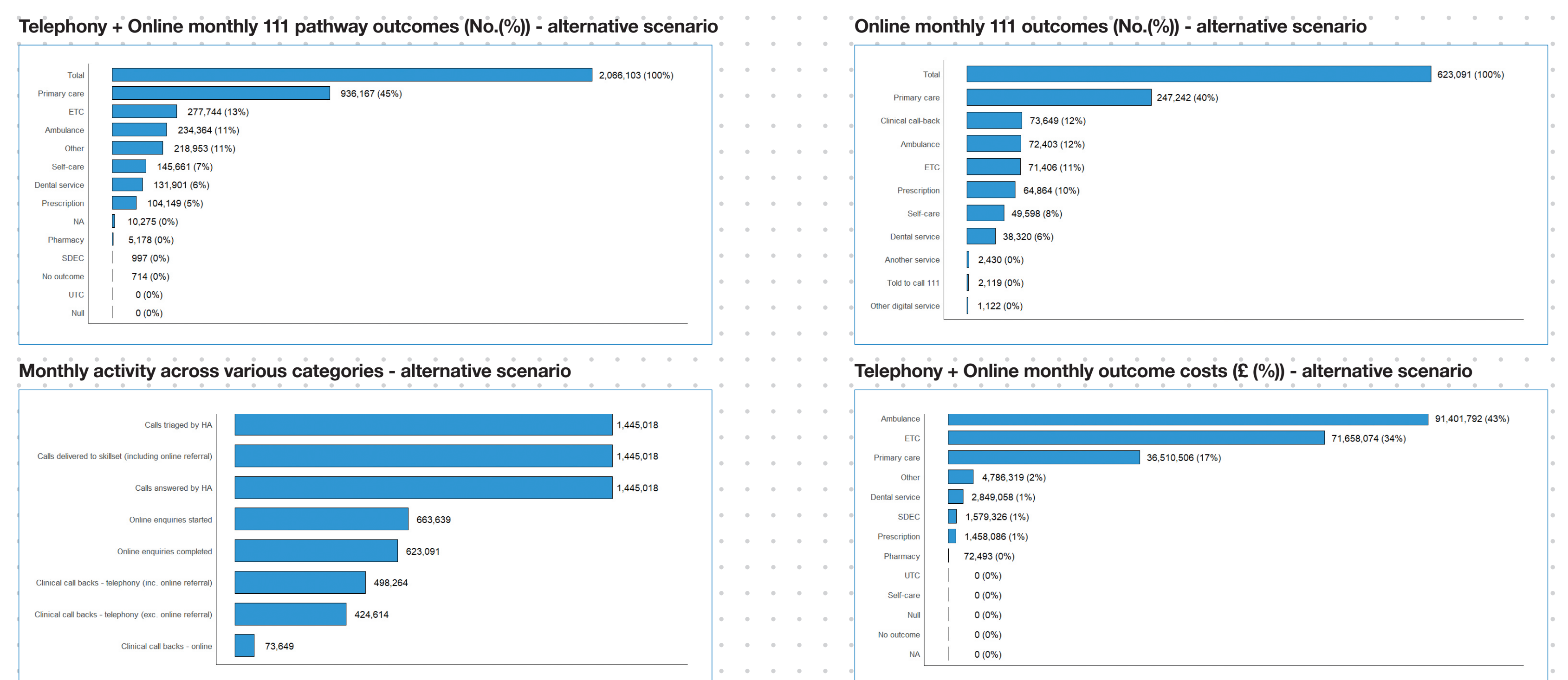


Figure 3 Example interactive tool outputs. Numbers shown are for illustration purposes only.



Recommendations

To our knowledge, this is the first of a kind model for NHS 111. We make the following recommendations for future development of the tool:

- Improve confidence in health and clinical advisor NHS pathway outcomes data to more accurately model service user outcomes.
- Identify operational costs of the NHS 111 service.
- Identify unit costs of individual service user outcomes.
- Acquire data to understand how the influence of the clinical advisory service and user compliance affect NHS 111 outcomes.
- Acquire data to understand the needs of telephony and online users, and the unmet need of the population.
- Determine the impact if NHS 111 sent users to the wrong service.
- Perform a randomised control trial, or some other cohort matching technique, to better analyse the impact of 111 versus the absence of the service.
- Analyse how the demographics of the service user population affect outcomes.
- Model the effect of telephony call queuing.

