Project H4_12: The role of Patient Initiated Follow-up and ‘Digital Outpatients’ in supporting the elective recovery

Can we better size potential for clearing the backlog?

Health Service Modelling Associates (HSMA) Programme, 4th edition – Final Presentation Event
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Background

Elective recovery and role of PIFU

Pandemic and elective backlog

The pandemic has had a considerable impact on elective care in England.
As of June 2022, 6.7 M people are on the waiting list.

Elective Recovery and interventions

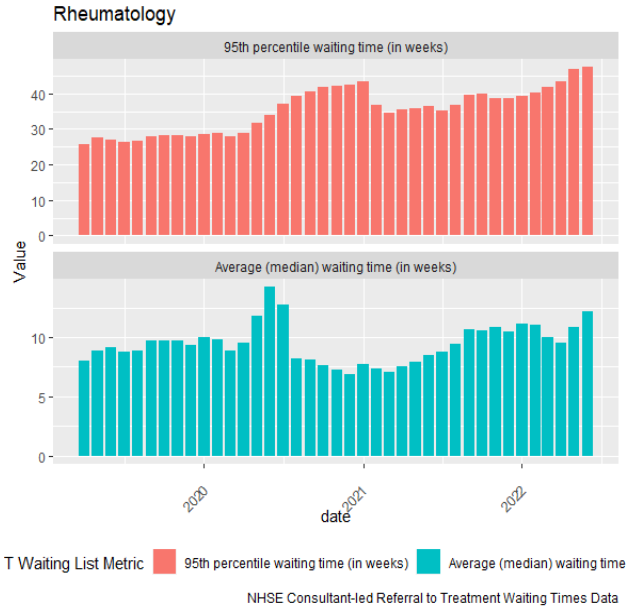
- NHSE and services are actively working on the **recovery phase**.

- **Patient Initiated Follow Up (PIFU)** is one of the main tools in the Recovery Plan, alongside other digital solutions such as **advice & guidance (A&G) e-referrals**.

- **PIFU** is when a patient arranges their own follow-up appointments as-and-when needed for them, rather than attending regular scheduled appointments.

- **PIFU benefits include:**
  - Avoiding unnecessary appointments or trips to the hospital
  - People taking control of their healthcare
  - **More quality time for complex patients and upstream care**
  - **Reduction of pressure on services, including waiting lists (-> COVID elective recovery)**
  - Reduction of CO2 emissions

4. Using patient initiated follow-ups as part of the NHS COVID-19 recovery



NHSE Consultant-led Referral to Treatment Waiting Times Data

Approach

interplay of intervention efficiencies and upstream backlog

Aim: what role can PIFU play in the redeployment of capacity to address the backlog?

Map outpatient pathway for rheumatology sub-pathway

Using discrete event simulation (DES),
Do what-if modelling based on:

a) the proportion of patients on a PIFU pathway
b) the rate of PIFU patient-initiated requests
c) use of advice & guidance

To understand how:

a) how released resource is redeployed
b) how the upstream **referral-to-treatment (RTT)** waiting list behaves (size and waiting time)

Background

Rheumatology as the specialty of choice for modelling use case

Focus on **rheumatology** :

- **Rheumatology has a good clinical evidence base on PIFU**
- Documented pathways
- PIFU actively endorsed

Papers

Patient initiated outpatient follow up in rheumatoid arthritis: six year randomised controlled trial

Sarah Hewlett, John Kirwan, Jon Pollock, Kathryn Mitchell, Maggie Hehir, Peter S Blair, David Memel, Mark G Perry

"Patients had **38% fewer control visits** than those controlled at scheduled intervals [over six years] ". Median 8 v 13, p<0.0001

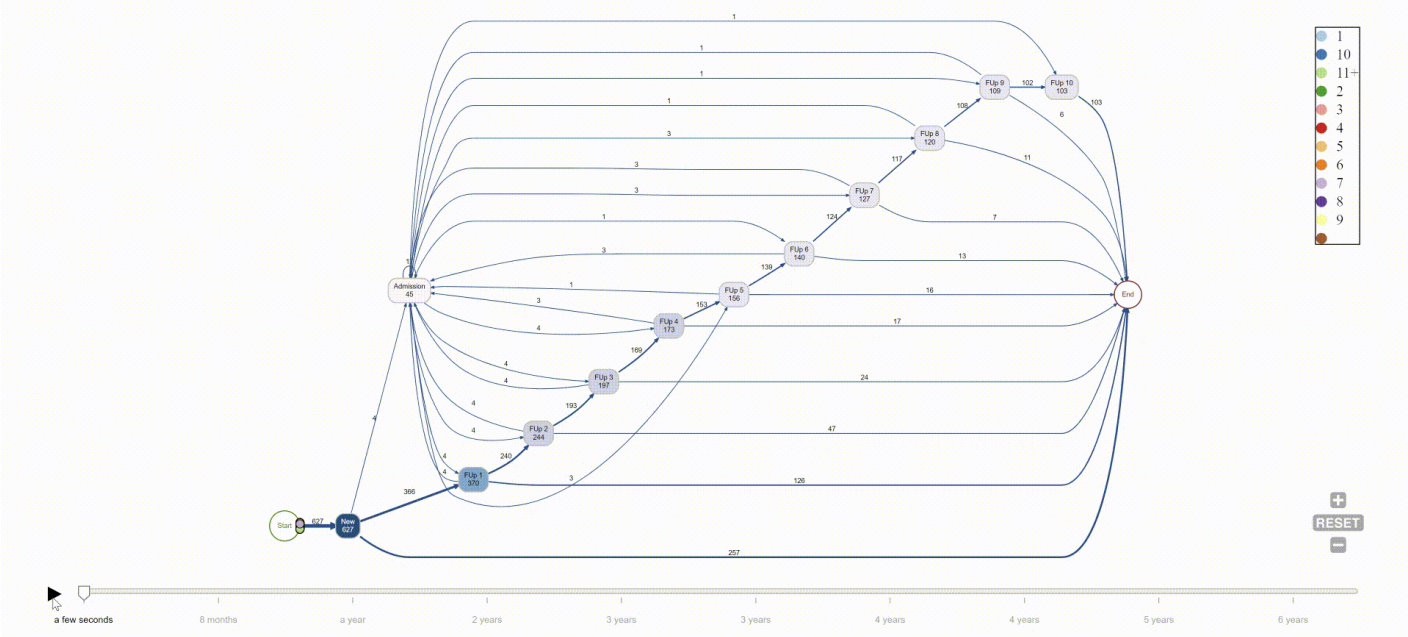
“Patients […] were **clinically and psychologically at least as well** as patients having traditional reviews initiated by a physician.”

Background

Rheumatology as the specialty of choice for modelling use case

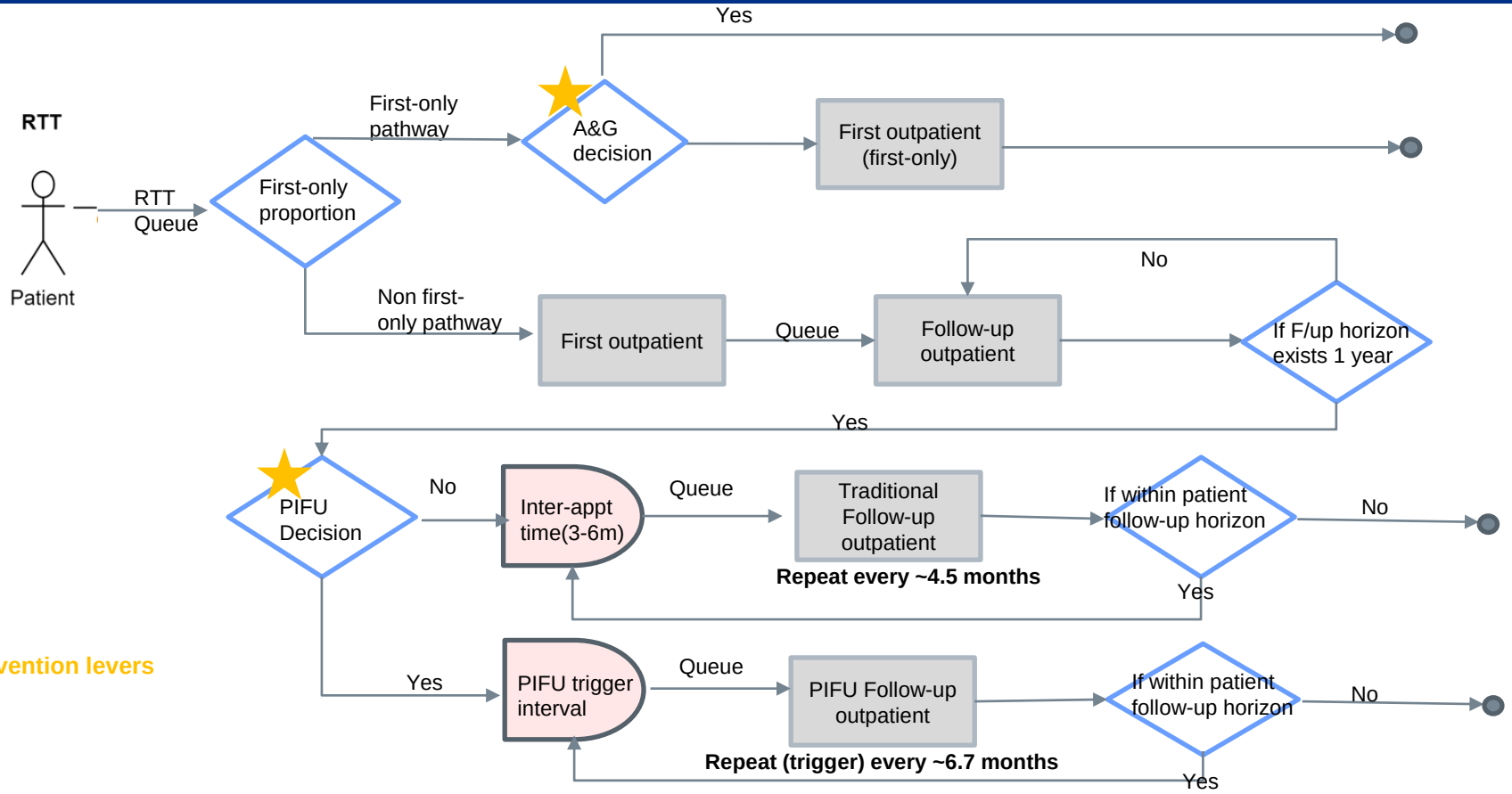
Focus on **rheumatology** :

- Rheumatology has a good clinical evidence base on PIFU
- Documented pathways
- PIFU actively endorsed
- **Mainly outpatient specialty with many chronic patients on long-term follow-up, meaning that the effect of PIFU may be amplified**



Rheumatology PIFU-Process Map

Simplified diagram of simpy implementation



Simulation Model

Objective:

To identify the impact of interventions on patient waiting times and waiting list size in Rheumatology.

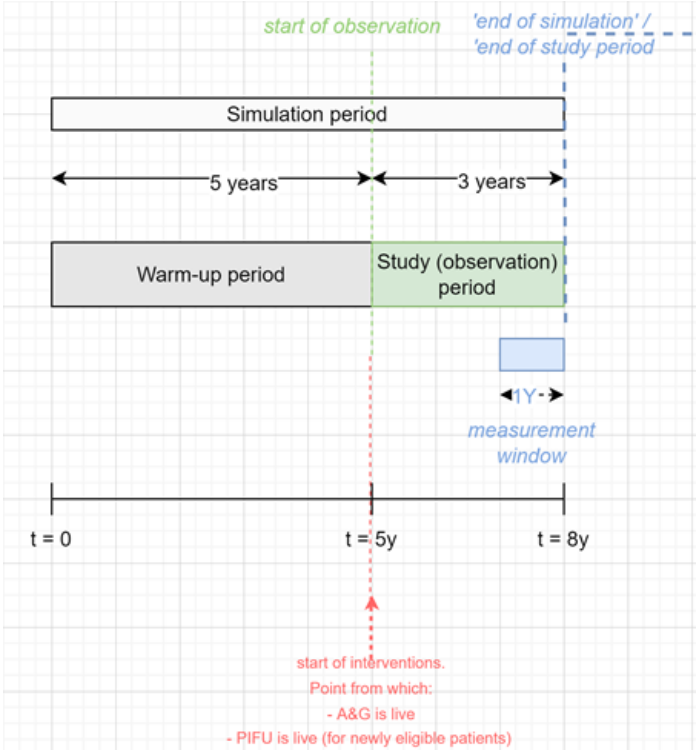
Key performance indicators (KPI):

- RTT median/mean waiting time
- RTT waiting list size
- Resources occupied

Method

- Illustrative baseline case – intervention is not implemented
- What-if test scenarios (vary by proportions of patients using A&G and PIFU)

Simulation period



Simulation Model

Parameters

High level formulation. Further details and rationale to be made available in report write-up and code repository.

- **Implementation:** Python Simpy
- **Time unit:** 1 day
- **Capacity**: Modelled as the available patient appointments (**slots** per day)
- **Replications:** 30
- **Scheduling**
  - Follow-up outpatient appointment (traditional) – priority 1 (highest, pre-booked)
  - Follow-up outpatient appointment (PIFU) – priority 2
  - First outpatient appointment - priority 3

Table 1 Summary of model parameters for baseline and illustrative use cases

Parameter	Value in baseline scenario	Distribution type	Data sources
Simulation warm-up period	5 years	n/a	NHSE RTT publication [1]
Simulation observation period	3 years	n/a	Delivery plan for tackling the COVID-19 backlog of elective care [5]
Referral rate	6 patients/day	Poisson	NHSE RTT publication
Clinic resources	slot units per working day (clinic)	n/a	Heuristic formula to have high-level slot supply match demand[2]. Effect assessed against NHSE RTT data
New (first) appointment length as slot units	2 (30 minutes)	Deterministic	Royal College of Physicians publication [18], [19]
F/Up appointment length as slot units	1 (15 minutes)	Deterministic	Royal college of Physicians publication [18], [19]
DNA routine appointments	7.7%	Bernoulli	NHS Digital publication [14]
DNA PIFU	7%	Bernoulli	Literature [17]
Pathway is first outpatient appointment only	35%	Bernoulli	Existing/clinical data (SUS-OPA)
Regularity of traditional appointment	137 days mean (4.5 months, 3-6 months)	Triangular	Hewlett et al 2005[9]
Regularity of PIFU appointment	206 days mean (6.75 months)	Exponential	Hewlett et al 2005[3] [9]
Patient follow-up period	3 years	n/a	Stylistic simplification. Informed from existing/clinical data - SUS

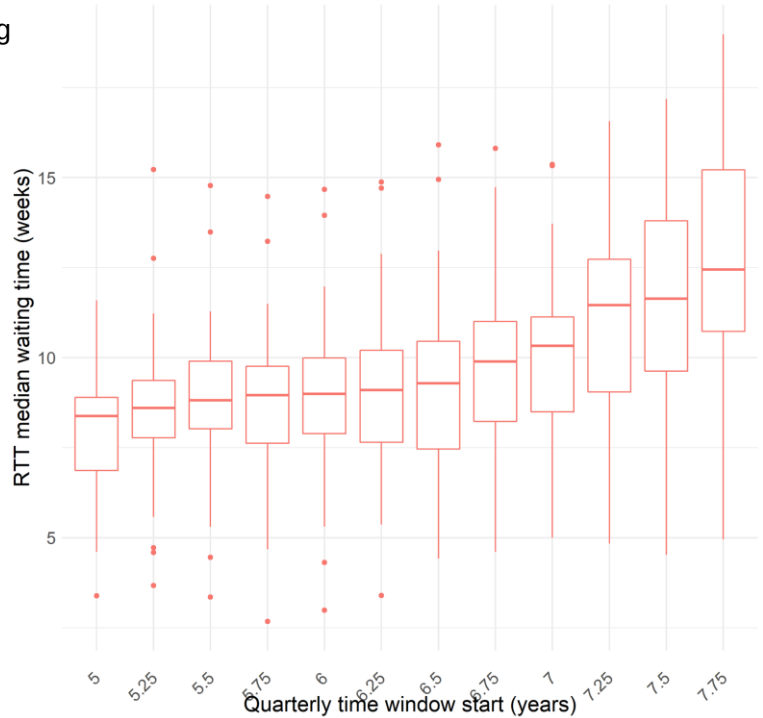
Results

Baseline scenario

Criteria:

- Leads to a waiting list aligned with real waiting list, e.g. circa 9-11 weeks.
- The waiting list can increase slowly over time, but should not be too unstable.
- Created with ‘reasonable’ and realistic input parameters around pathway and capacity.

Referral to treatment (RTT) median waiting time



Median waiting list of ~ 12 weeks at the end of observation period.

Historic England-level RTT statistics, rheumatology

	Average (median) waiting time (in weeks)
Feb-22	11.1

3 calendar years (forward) observation period

What-if scenarios tested

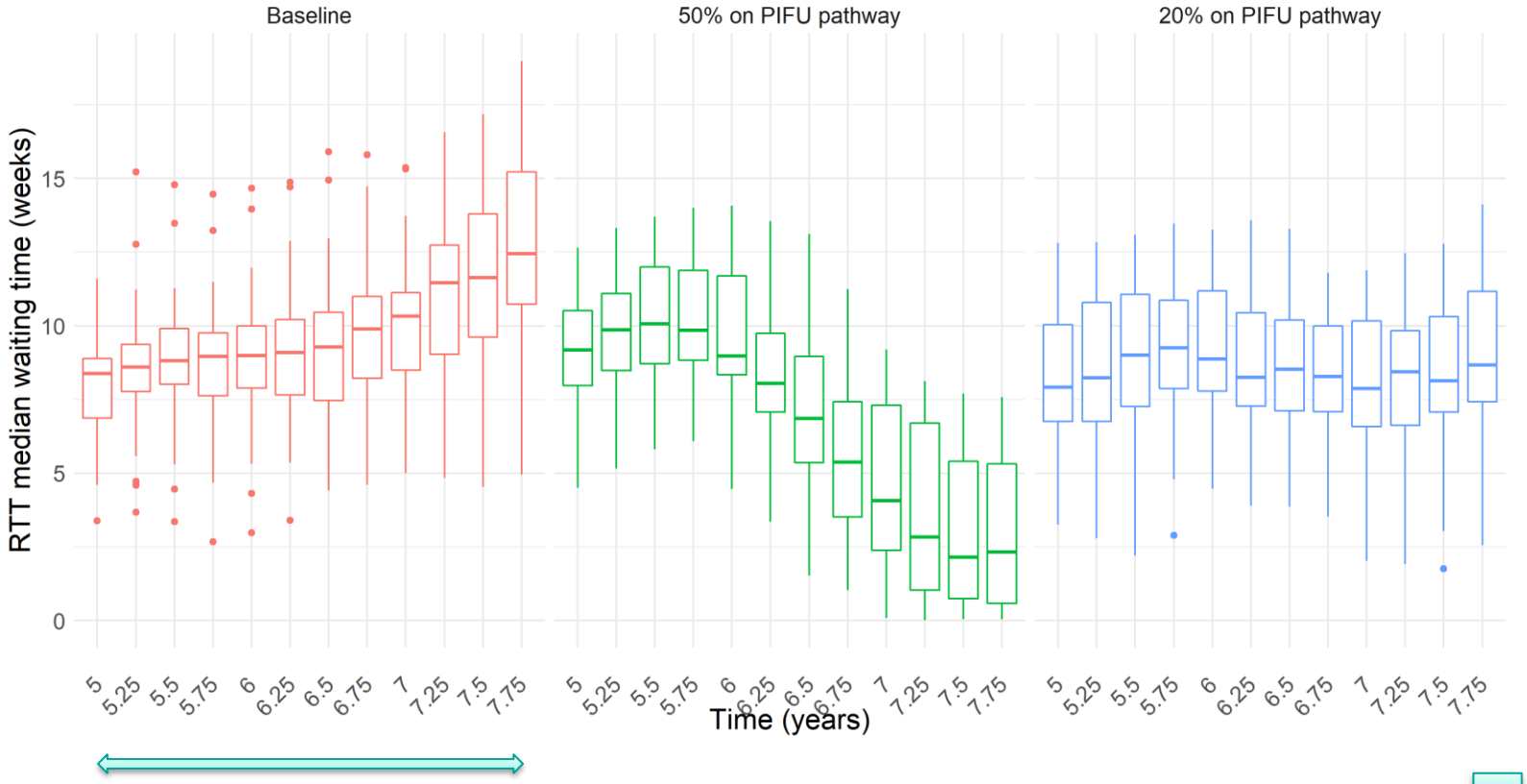
Illustrative what-if scenarios were chosen for testing, departing from the ‘baseline’.

Scenario id	Scenarios	PIFU Decision	A&G Decision
Baseline	Baseline		
A (central)	**“20% on PIFU pathway”**	★	
B0	“**50%** on PIFU pathway”	★	
B1	“**30%** on PIFU pathway”	★	
B2	**“10% on PIFU pathway”**	★	
C	**“20% on PIFU pathway, appointment request rate only decreases 16% (not 38%)**	★	
D	**“15% of first appointments avoided with A&G”**		★
E	“20% on **PIFU** pathway, 15% of first appointments avoided with **A&G**” (A + D)	★	★

Central
Favours greater backlog clearance than central (A)
Favours smaller backlog clearance than central (A)

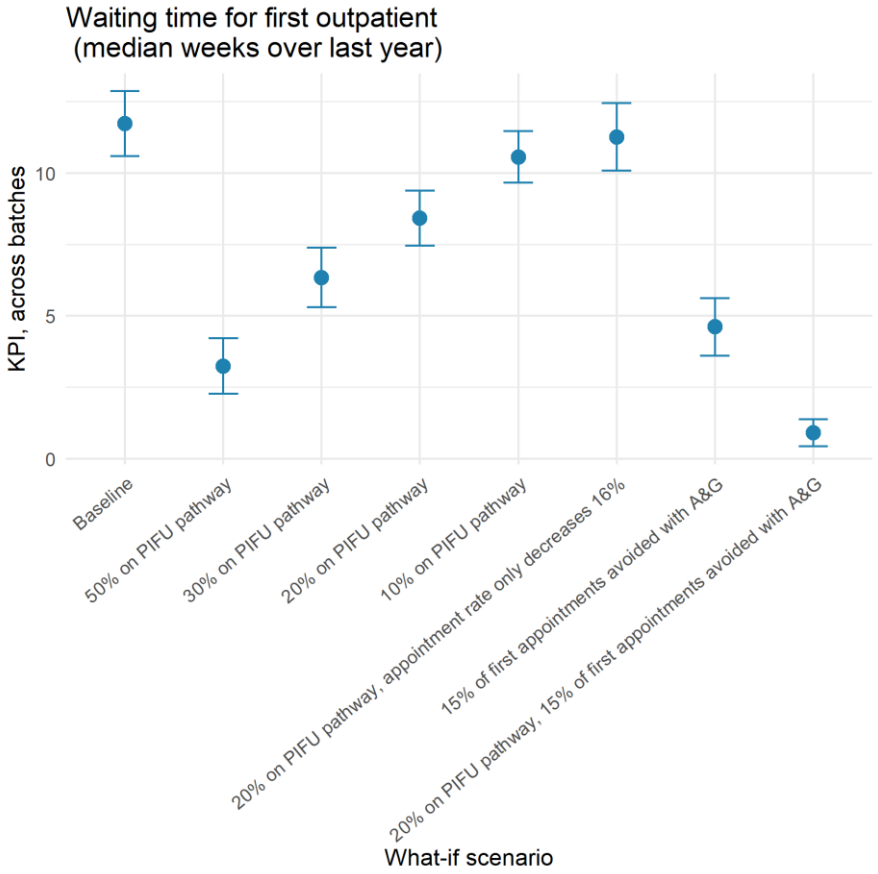
Result

Plot of RTT median waiting time – baseline vs scenarios



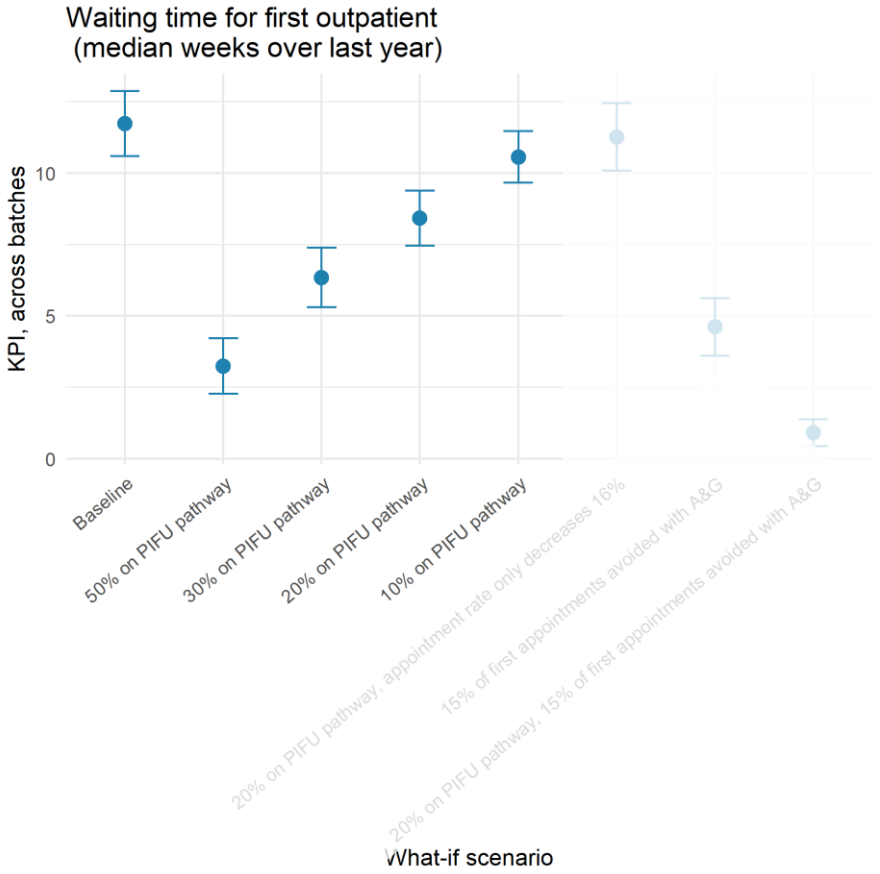
Results

Scenarios / interventions



Results

Scenarios / interventions



Results

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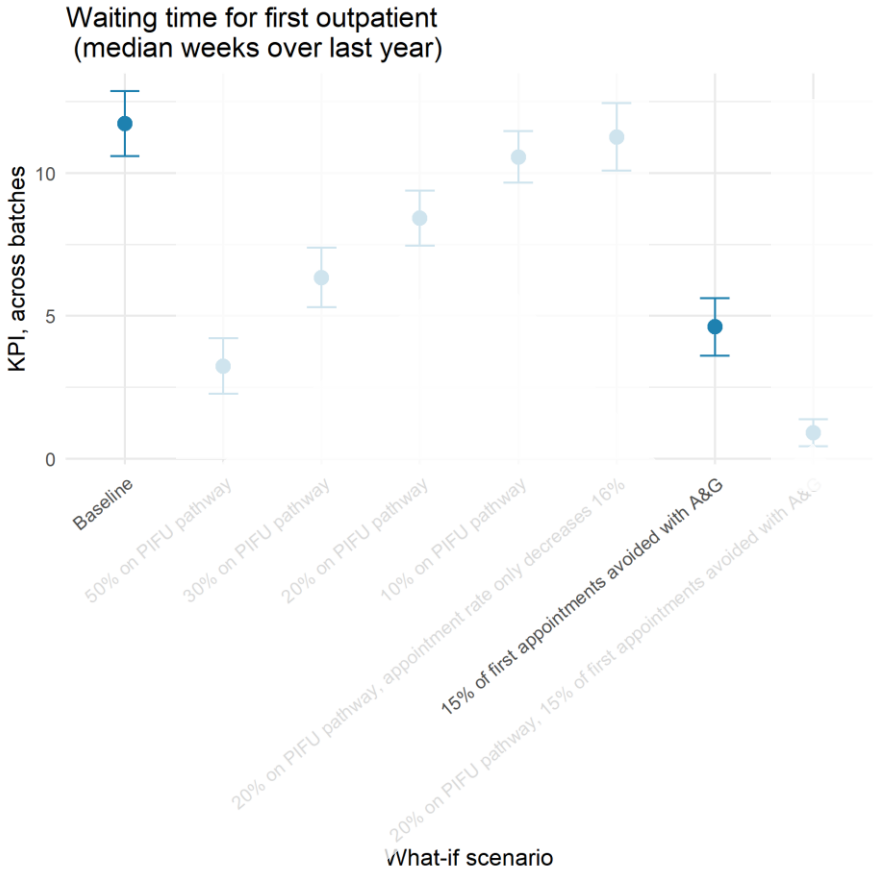


Impact and wider opportunities

Aspiration

Advocate and demonstrate the value of pathway and behavioural modelling in central and integrated care system (ICS) decision-making

for digital pathway redesign, the NHS Long Term Plan personalisation agenda, elective and non-elective recovery

to support better patient care, experience and system resilience.

Aiming to do so by continuing / starting engaging with:

- NHS England Transformation Directorate Digital Care Models team
- NHS England Outpatient Transformation programme
- NHS England Elective Recovery colleagues
- NHS England Analytical colleagues

Direct downstream opportunities

- Spin-off DES model - effect of other digital musculoskeletal peri-treatment interventions
- Proof-of-concept DES for other PIFU:
  PIFU expected to be made available across most elective specialties.
- Model operationalisation for direct use by service planners

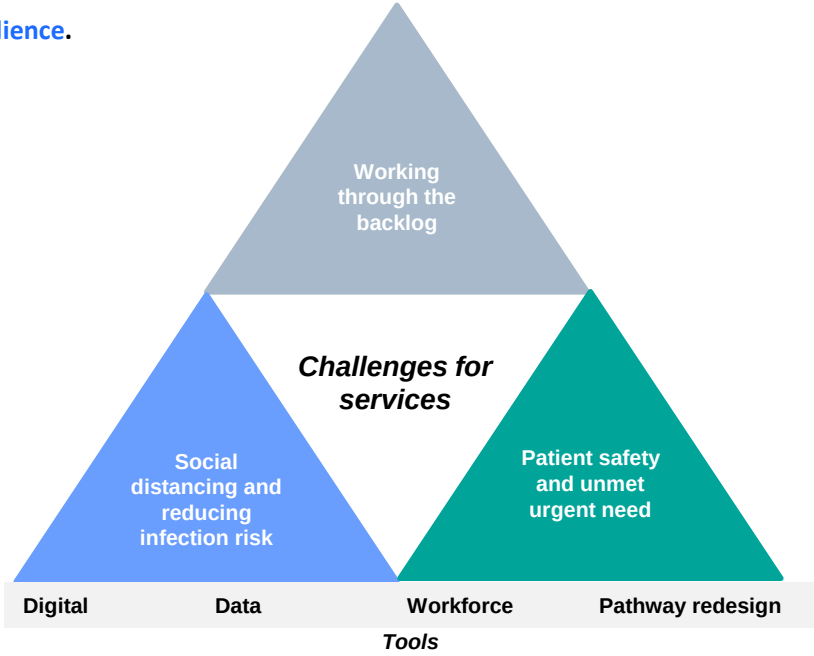
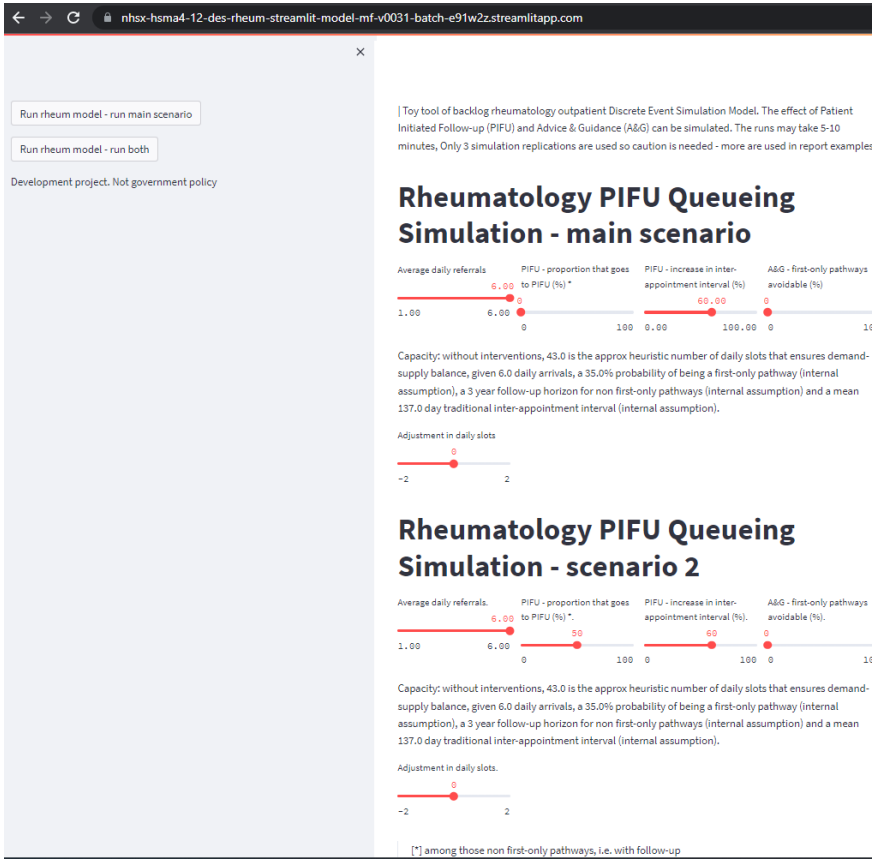


Diagram source: futureNHS Outpatient Transformation workspace. December 2021

Operationalisation and socialisation



- Ideation of user interface / tool *

Product questions:

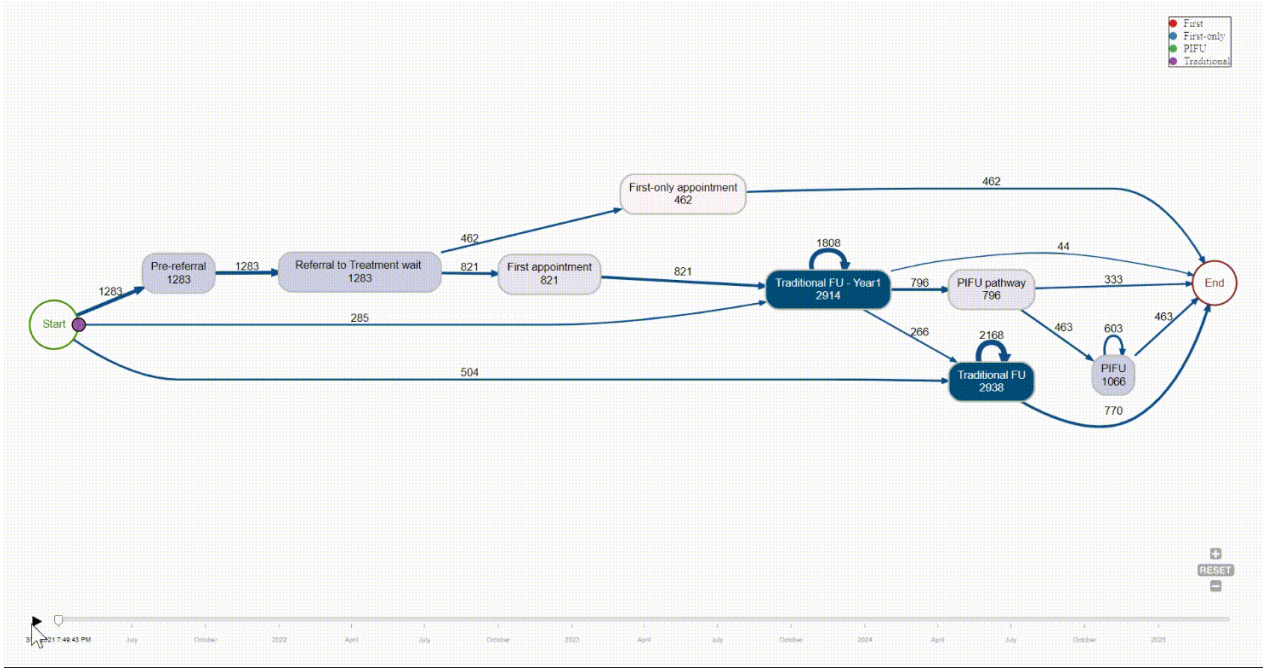
- Other scenarios or intervention levels of interest ?
- Sites (e.g. pilots) of interest and related data and insights?
- Operationalisation of such models? End-users , user stories (**"As a [persona], I [want to], [so that]."**)

Engaging with
NHS England Transformation Directorate Digital Care Models team

* It should be noted that simulation models can take a while to run. This should factor into design of tool to ensure balance between insight and user experience.

Thank you!

With special thanks to:
- HSMA mentors, students, presenters
- Dan Chalk
- Alison Harper
- Tineke Poot
- HSMA Deep Thought group
- NHSE TD Analytics Unit
- NHSE TD Digital Care Models team



https://github.com/hsma4-student/HSMA4-12-DES-rheumatology-backlog

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