

Mapping patient flow to reduce practice demand while improving patient experience

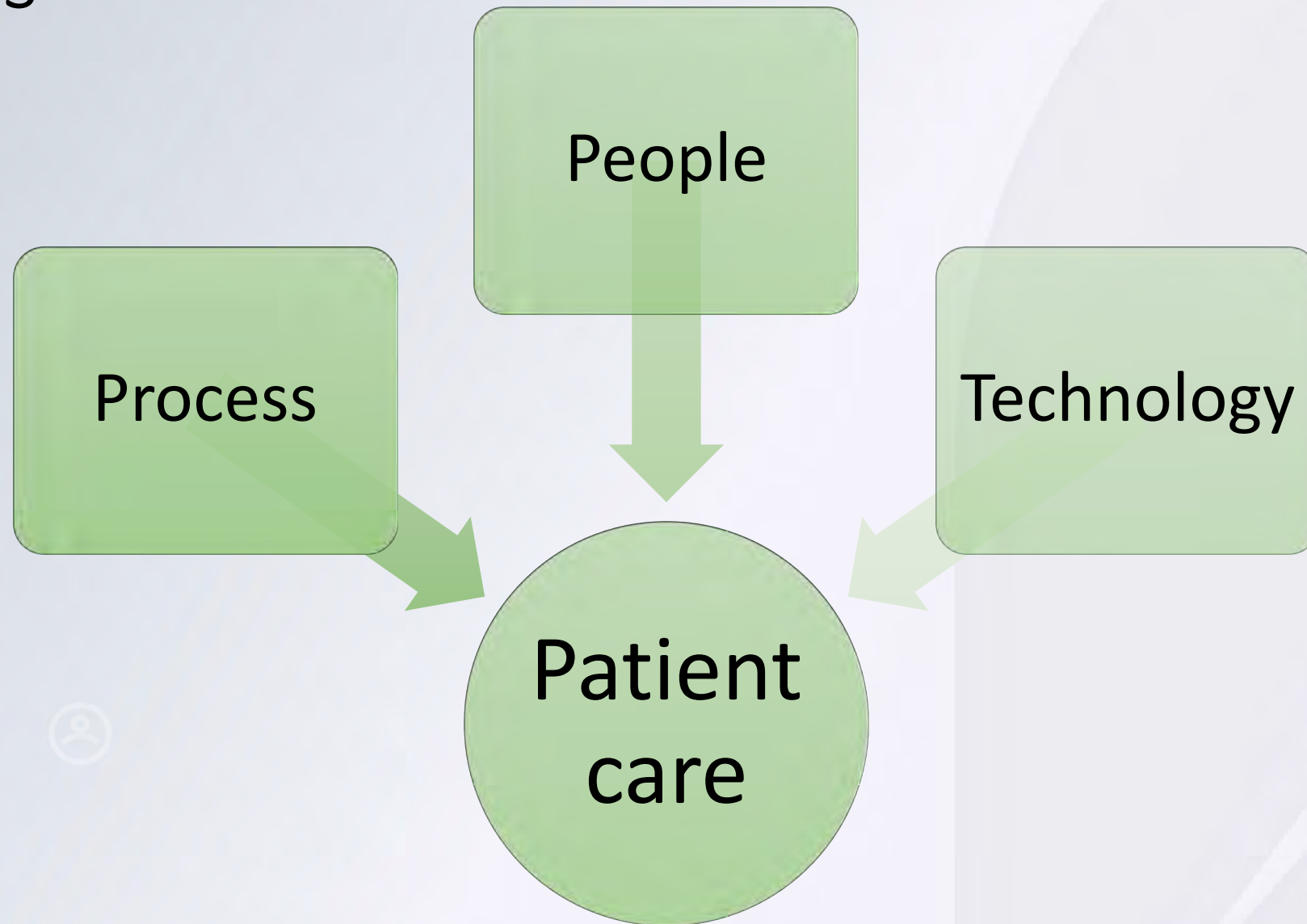
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About us



Surrounding organisations

medloop

 medicspot

 **EMIS**

 Microsoft

 **HEALTH SAMURAI**

 amazon
web services

 Microsoft
Azure

 pikselgroup

 ukcloud

 **hSo:**
Celebrating 20 Years of Service



NIHR | National Institute
for Health Research

NHS
Digital

 **The
Health
Foundation**

NHS ^x

 **Discovery
Data Service**

bcs
The
Chartered
Institute
for IT

NHS
The Hillingdon Hospitals
NHS Foundation Trust

 **NAPC** | National Association
of Primary Care

ico.
Information Commissioner's Office

NHS

North West London
Clinical Commissioning Group

 South West London
**Health & Care
Partnership**

 **Brunel
University
London**

**Imperial College
London**

Projects

"Trainers were very clear with lots of knowledge. They demonstrated the best ways to implement and when we receive our reports we will know exactly what to do."

"Very knowledgeable speaker. Glad I brought my report for my practice... can understand my report better now."

"Very helpful – explained scenarios, quick use of linked shortcuts and consultations for better use of codes."

STAFF MEMBER, BARNET FEDERATION



The team



Dr Jay Verma
Medical Director



Dr Sukin Natarajan
Chief Product Officer



Mr Darrell Clamp
Operations



Dr Thaarique Fazal
Chief Technology Officer



Dr Sascha Khakshouri
Data Scientist



Ms Bhuvana Dhruva
Machine Learning Engineer



Ms Sarah Rees
Patient Engagement



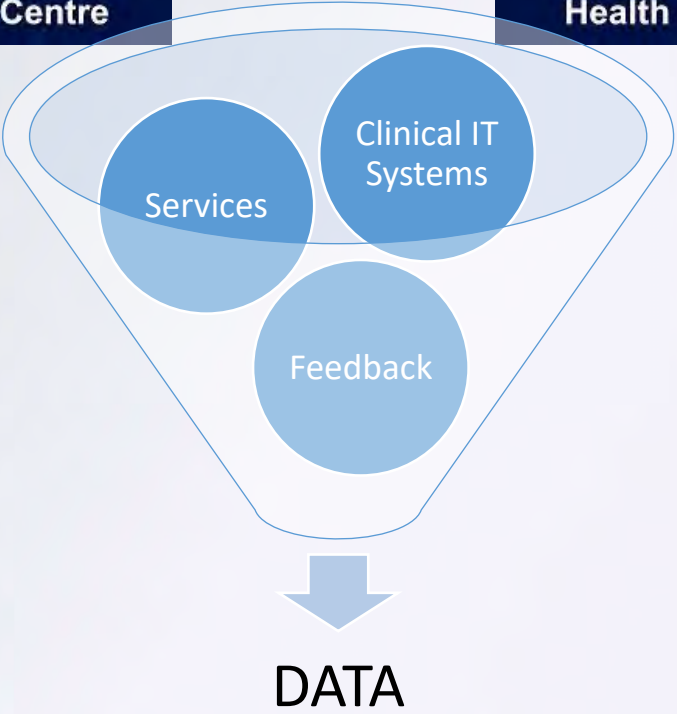
Mr Dylan Dhinsa
Data Analyst

Technology team in India consisting of six engineers

Control



Intervention

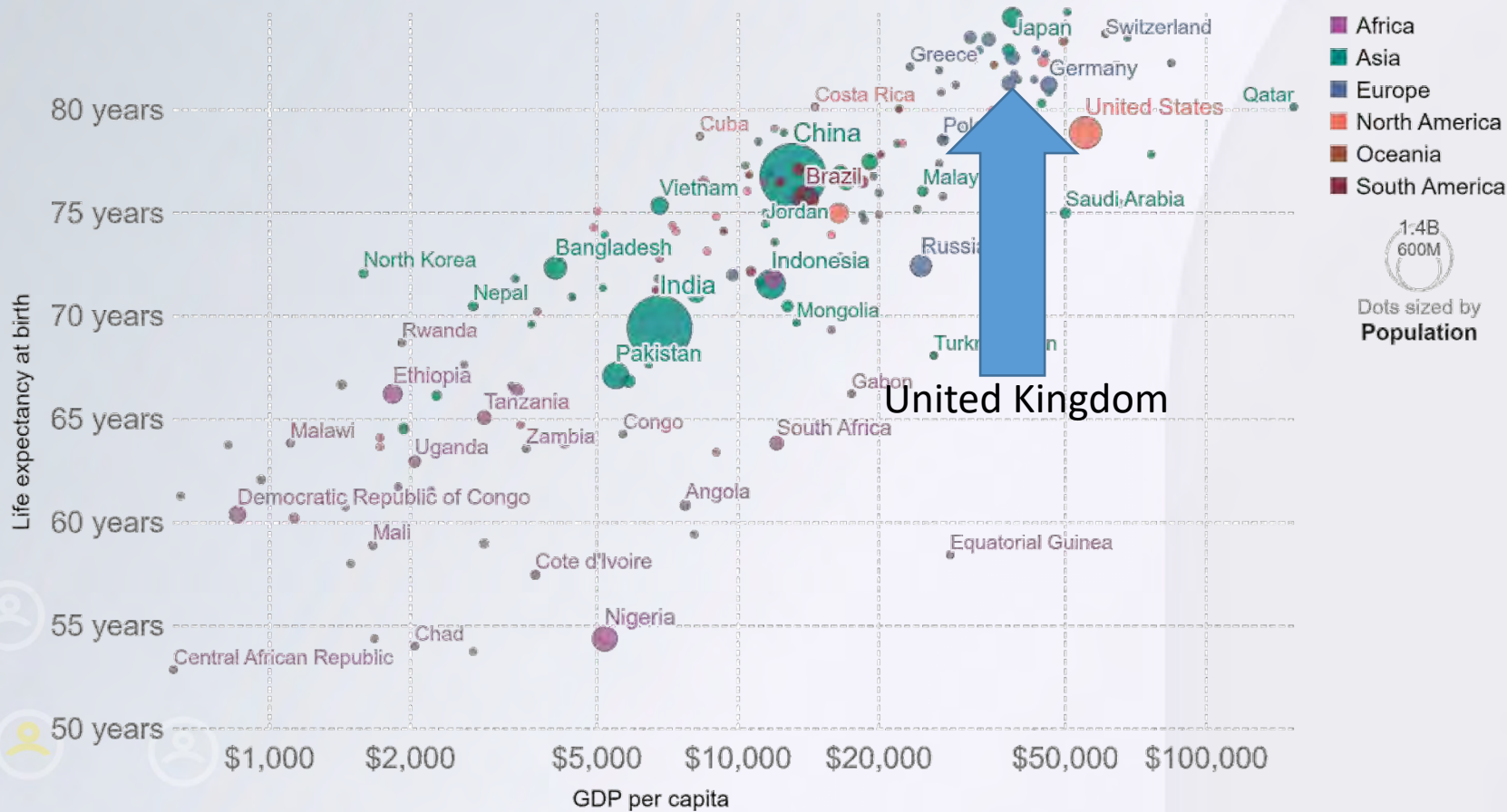




Life expectancy vs. GDP per capita, 2018

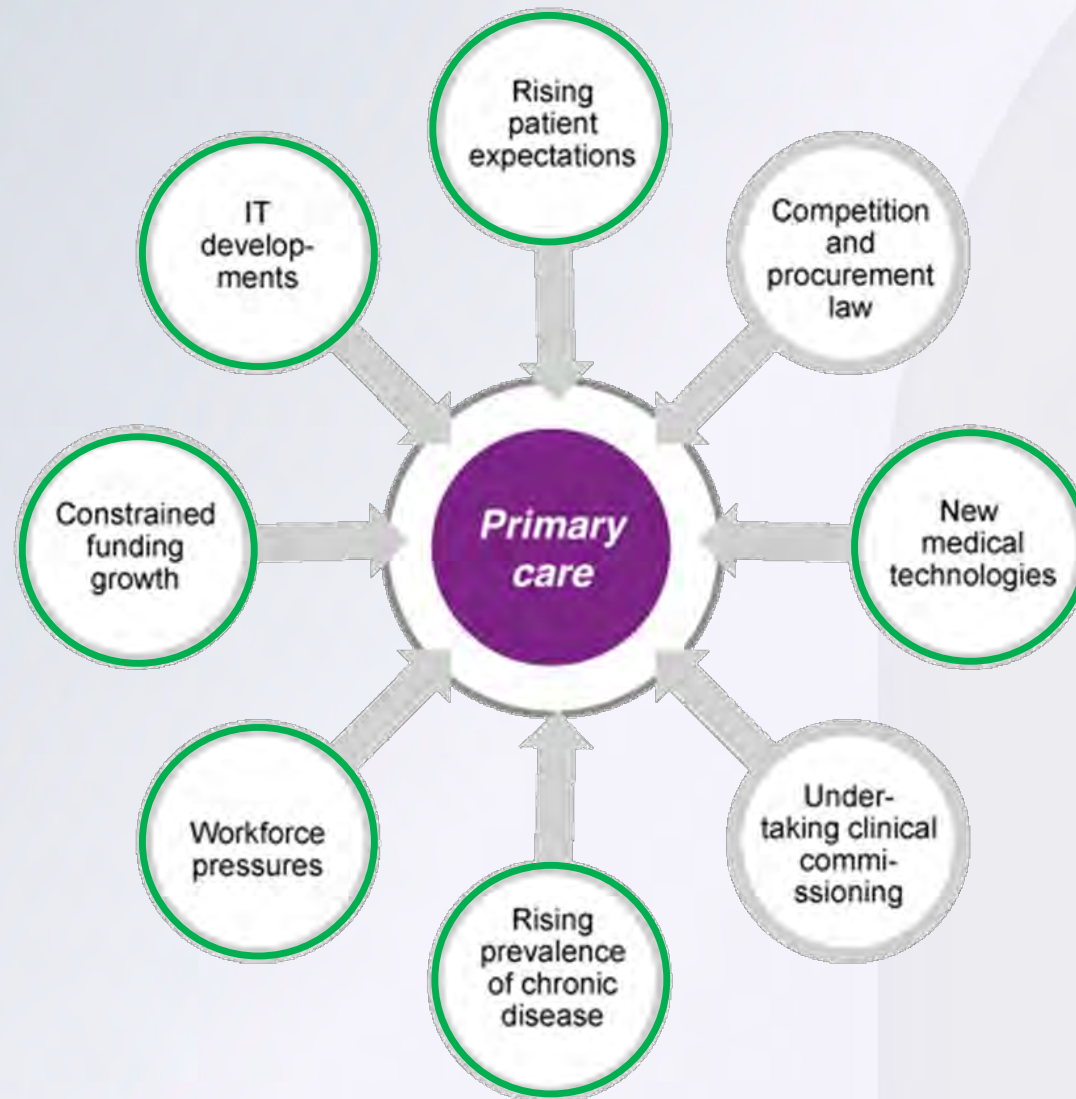
GDP per capita is measured in 2011 international dollars, which corrects for inflation and cross-country price differences.

Our World
in Data



Source: Clio-Infra & UN Population Division, Maddison Project Database 2020 (Bolt and van Zanden (2020))
OurWorldInData.org/life-expectancy • CC BY

Pressures on primary care in England

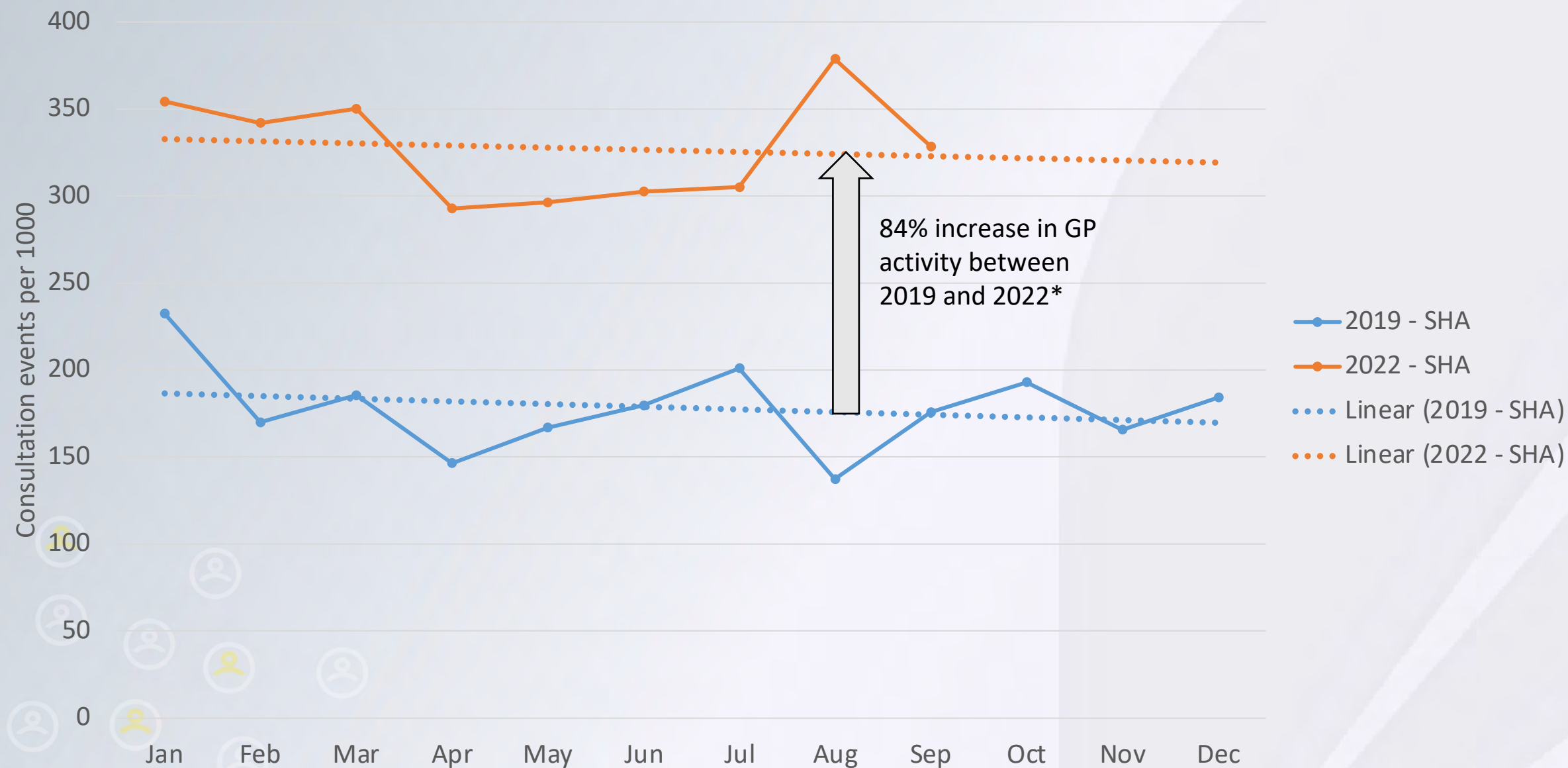


Source: Nuffield Trust & The King's Fund – Securing the Future of General Practice





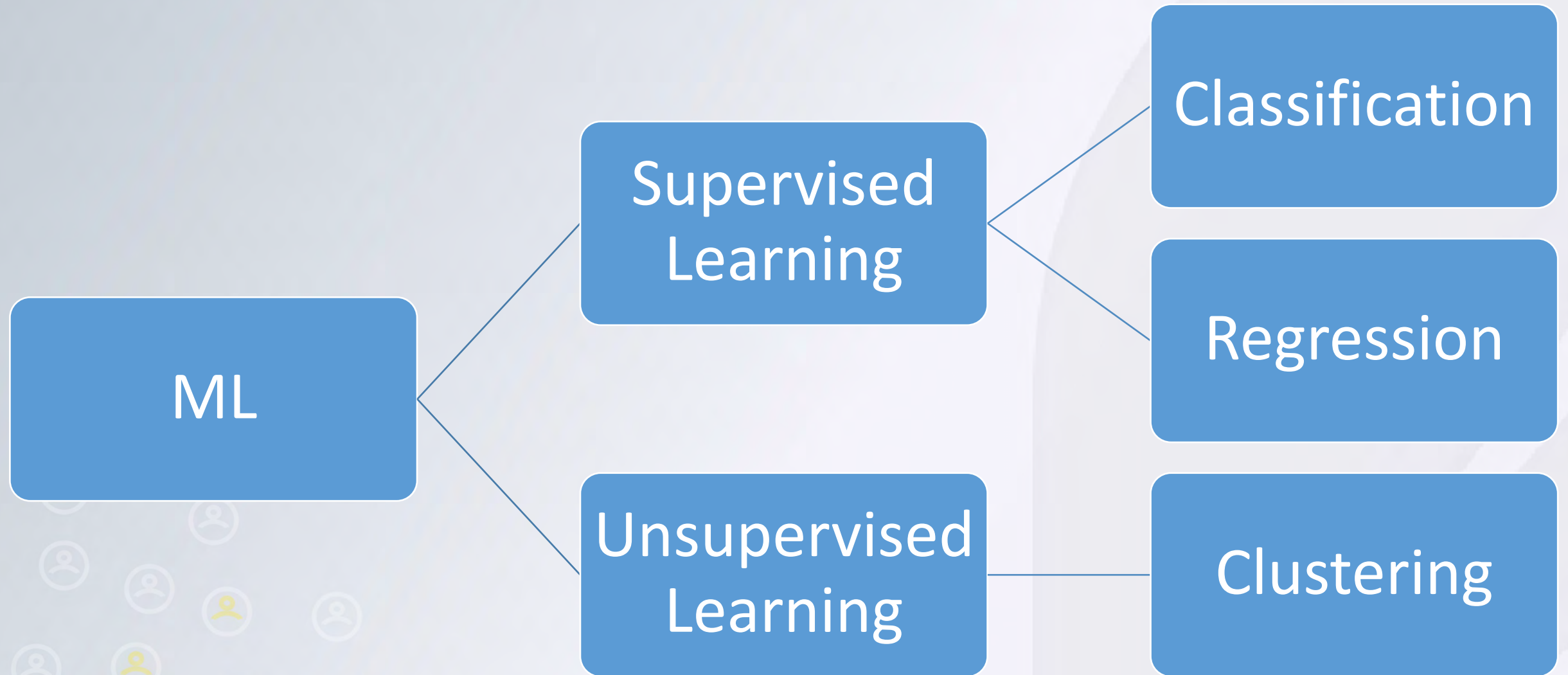
Weekly Consultation Trend



* Source: Shakespeare Health Centre. GP consultations types; face to face, telephone, admin, SMS, video, visit

Applying ML methods to predicting alternative clinicians






Why predict alternative clinicians?

Prospective

- Better triage
- Improved patient pathways
- Reduce variation

Retrospective


- Understand current efficiency
- Plan for optimum practice/PCN skill mix
- Target training needs (e.g. prescriber pharmacists to manage pain)




6 practices




860 consultations



138 Patients



90% frequent attenders*

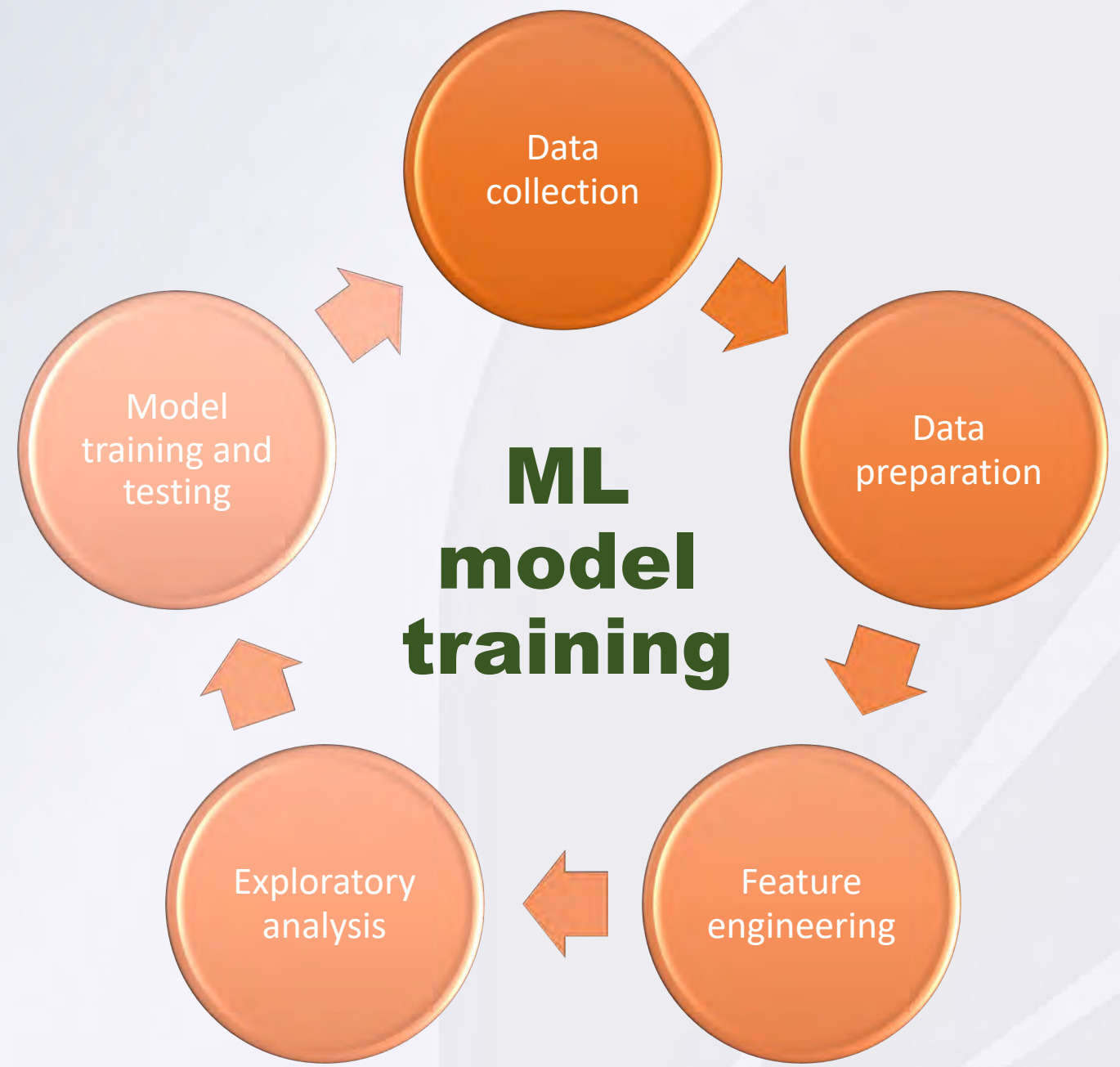


12 month EMIS history



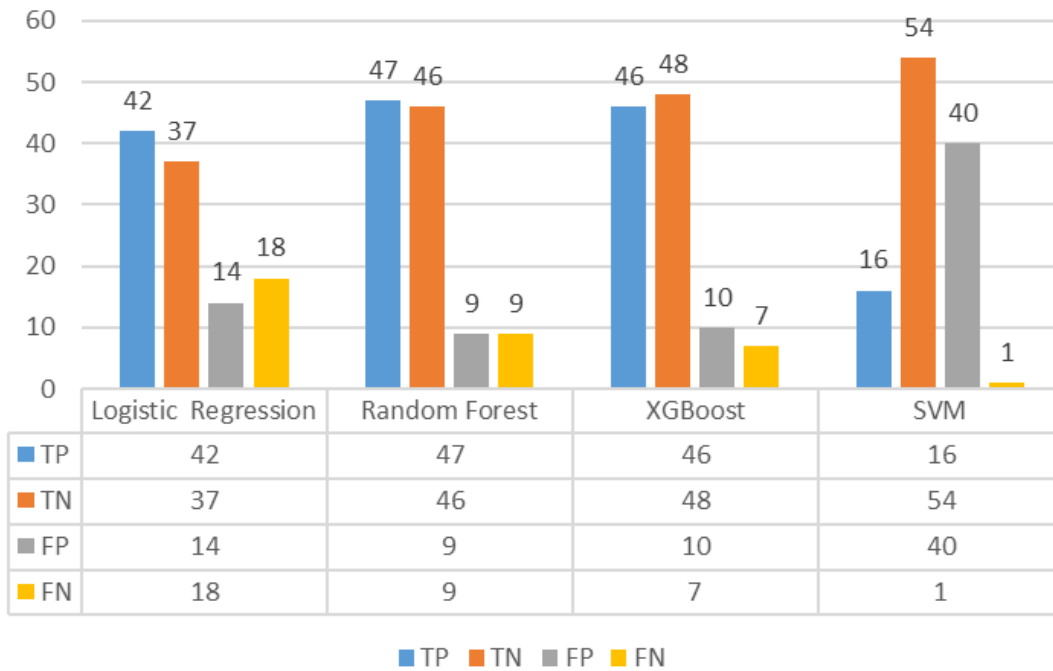
Audit by independent GP

*Top 10% frequent attenders

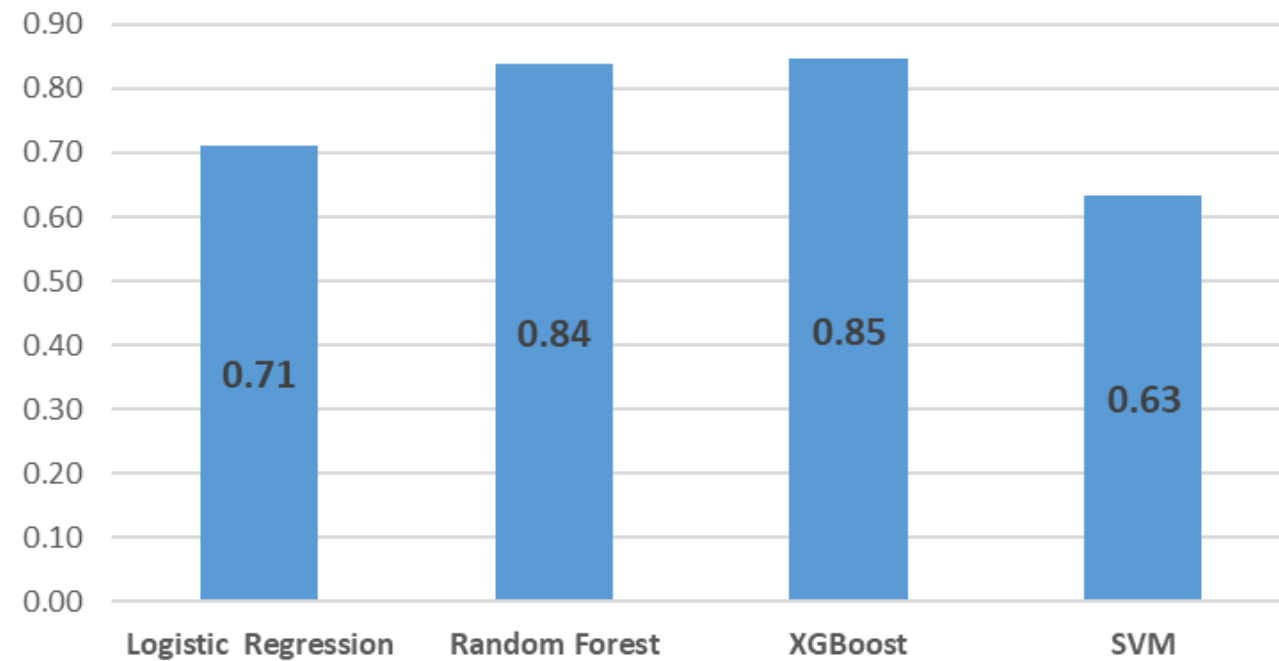


Results for feature models

Predictions by Models



Performance of features models: auc_roc



TP = True Positives (the model **correctly** predicts a **positive GP** result)

TN = True Negatives (the model **correctly** predicts a **negative non-GP** result)

FP = False positives (the model **incorrectly** predicts a **positive GP** result)

FN = False negatives (the model **incorrectly** predicts **negative non-GP** result)

Are the results generalisable?

- Alternative clinician predicted made for all GP consultations
- Scope: 1 month (Oct 22)
- Target: 1508 consultation identified and all predicted
- Validated: 151 (10%) audited to check the accuracy of predictions

Result		Gold standard	
		GP	Other
Prediction	GP	TP=9	FP=33
	Other	FN=19	TN=90

Model predicts GP, but non-GP was required

Model predicts non-GP, but GP was required

87% Safety
65% Accuracy (Efficiency)
32% Sensitivity
73% Specificity

Next steps for generalisability

- Challenges – Getting gold standard results at scale
- Improve the quality of features
 - Consider use of Deep Learning to identify potential new features
 - Consider semi-supervised learning:
 - Minor conditions that can be managed by "non-GP"
 - Use of red flags
- Use text data for improved features



Smart Care



Smart Searches



Smart Flow

A PCN Case Study



Demand

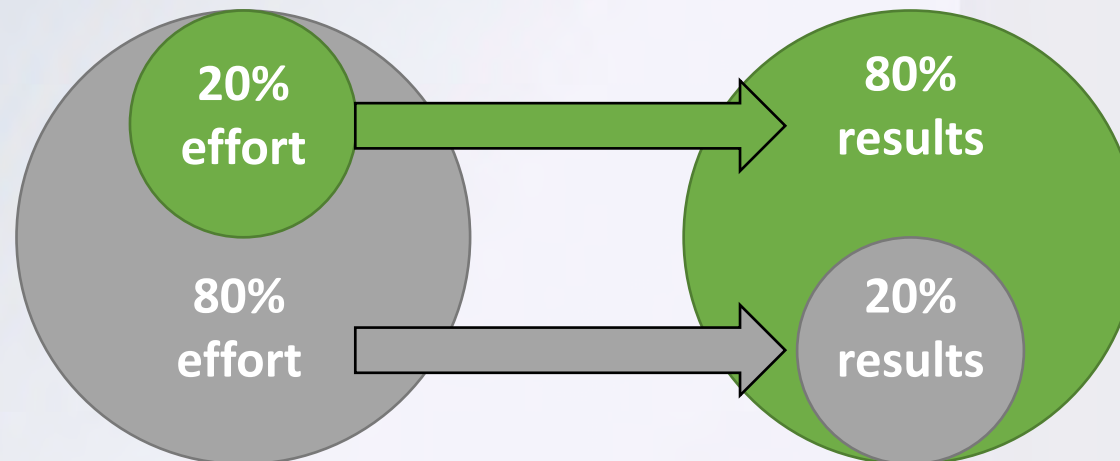
- Online access
- Incoming telephone calls
- Practice-led

Capacity

- Consultation workload
- Clinician efficiency
- Alternative pathways

80:20 Principle

- The Pareto principle states that for many outcomes, roughly 80% of consequences come from 20% of causes.
- Examples
 - 80% of a company's output is produced by 20% of its workers
 - 80% of the public uses 20% of their computers' features
 - 80% of crimes are committed by 20% of criminals





A PCN based in London



4 practices



50,976
population



460
consultations



40 frequent
attenders



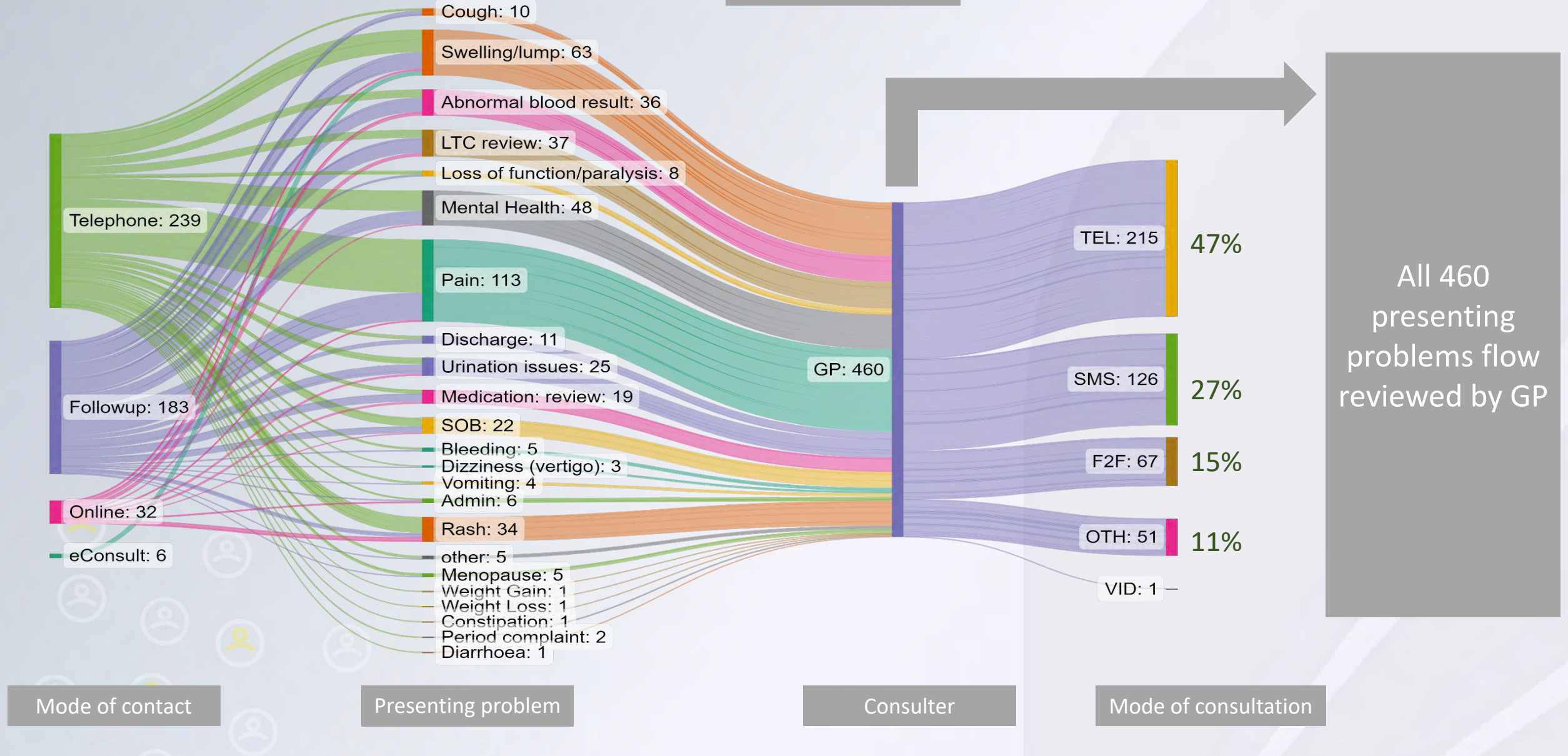
6 month
period



Audit by GP

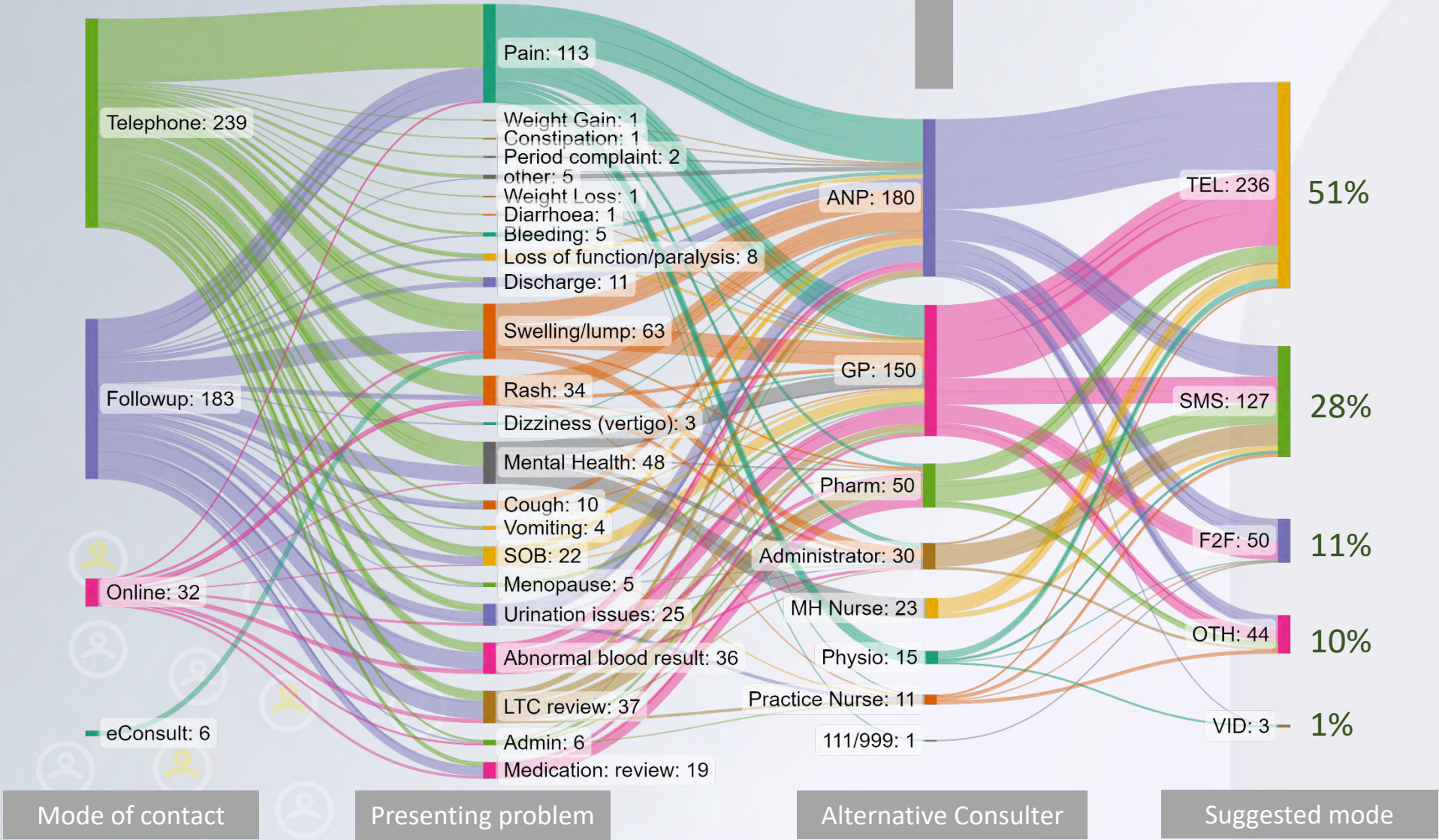


CURRENT



Source: Audit of 460 EMIS consultation entries from 40 frequent attenders selected from 400 random patients with at least one GP consultation between 31 May 2021 – 31 May 2022. Duplicate entries were excluded.

Practice Pathway – Audit Results (460 GP Consultations)



1 in 3
appropriate for GP

2 in 3
possible alternative



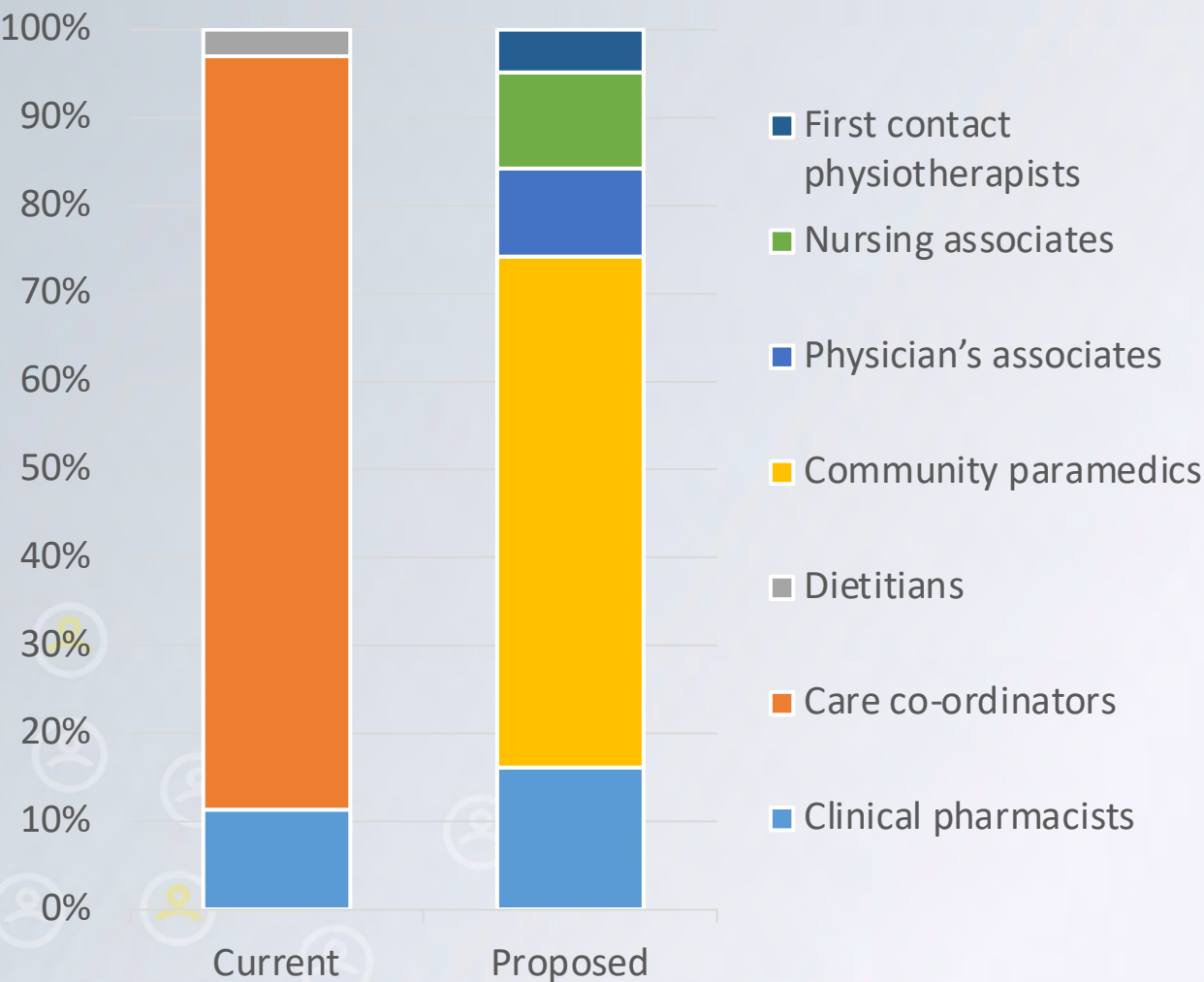
Estimated cost saving
£405k - £1.5m*
across the PCN

Source: Data Sources: Clinical consultation entries by GPs between 1 Dec 2021-31 May 2022. (EMIS Web report, duplicated consultation entries removed).
*Savings calculated according to the percentages in this audit scaled to total GP consultation activity in a year, see the assumptions page for more details.

80% of savings by
top 7 problems

Row Labels		Sum of Saving
Pain	£	580.92
Swelling/lump	£	228.50
Rash	£	222.00
Mental Health	£	216.83
LTC review	£	208.58
Urination issues	£	126.75
Abnormal blood result	£	98.17
Medication: review	£	97.83
SOB	£	71.42
Discharge	£	64.17
Cough	£	45.00
Loss of function/paralysis	£	41.67
Bleeding	£	21.67
Admin	£	13.92
Period complaint	£	10.83
Constipation	£	8.33
Weight Gain	£	8.33
Dizziness (vertigo)	£	8.33
Menopause	£	4.25
Vomiting	£	2.50
Weight Loss	£	-
Diarrhoea	£	-
Grand Total	£	2,080.00

SKILL MIX







Estimated remaining ARRS budget £475,000

AARS Role	Band	WTE	Max	Cost
Clinical pharmacists	7-8a	1	£ 59,312	£ 59,312
Pharmacy technicians				£ -
First contact physiotherapists				£ -
Physician's associates				£ -
Dietitians	7	0.25	£ 57,465	£ 14,366
Podiatrists				£ -
Occupational therapists				£ -
Community paramedics				£ -
Nursing associates				£ -
Social prescribing link workers				£ -
Care co-ordinators	4	8	£ 31,746	£ 253,968
Health and wellbeing coaches				£ -
Current Total				£ 327,646



Triage experiment

	Baseline	Intervention	Change
Workforce (clinical WTE)	1.7 GP + 1.5 HCPs	1.0 GP+ 1.5 HCPs + 0.5 ACP	 0.7 GP
Cost	N/A	20%	 Reduced**
Patient access (response time)	By the end of the <u>next</u> working day	24hrs	 Improved
Patient experience (Friends and Family recommendation)^	61%	83%	 Improved

Key notes:

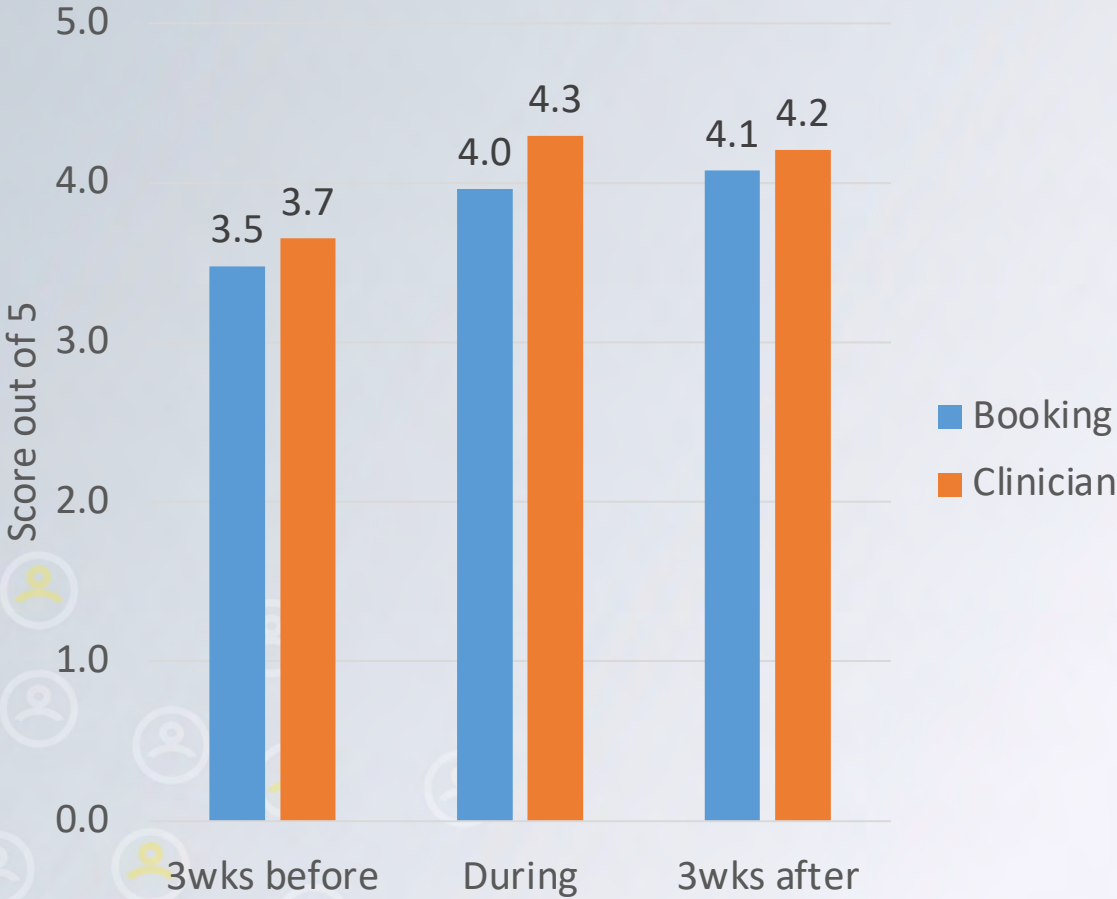
*Promised all eConsults reviewed by GP same day if they submitted before 2pm

** Assuming Band 8 ACP

^Brief survey sent by SMS to ALL patients with GP consultations



How you rate booking process & clinician?

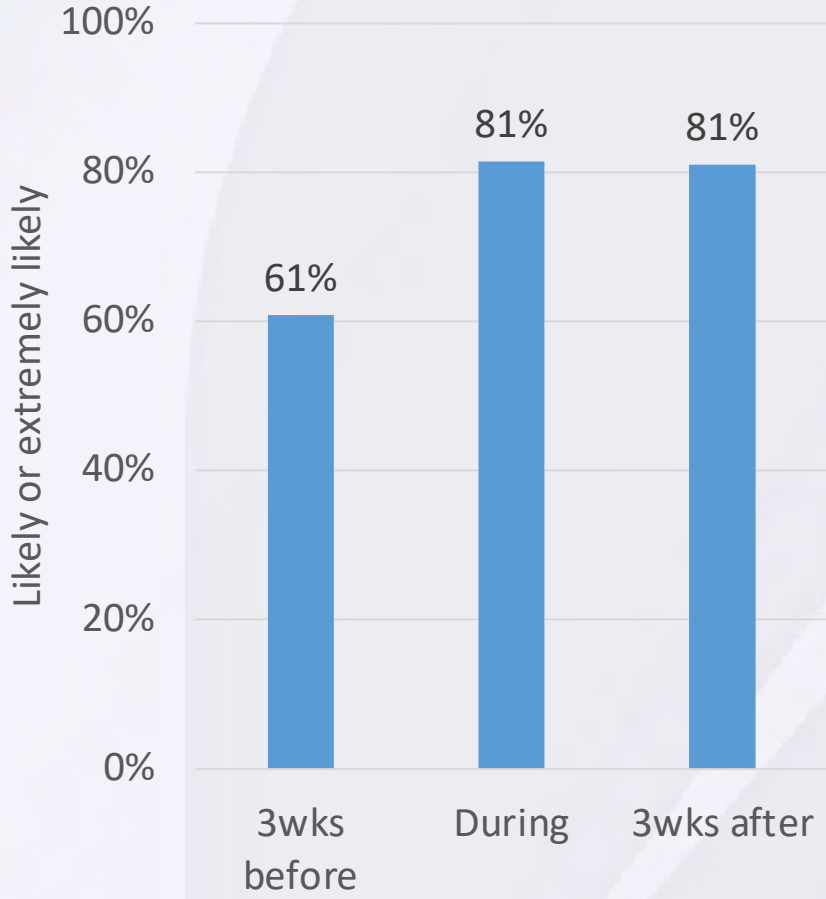


Question

- 1. How would you rate your booking experience
- 2. How would you rate the clinician who contacted you

Feedback from 87 patients

Would you recommend to friends and family



Question 3. How likely are you to recommend our GP surgery to friends and family if they needed similar care or treatment?

Patient journey (Bounce back)



1. Patient:

- a) Anxiety-led behaviour
- b) Miscommunication
- c) Misunderstanding of clinical information

2. Clinician:

- a) Confidence
- b) Risk averseness
- c) Lack of awareness of clinical guidance

3. Event:

- a) Practice processes
- b) Condition remains
- c) Deterioration of condition