

AI-guided prevention of unscheduled care: why and how

19th National Health Summit

February 8th, 2023

hn-company.co.uk

About HN

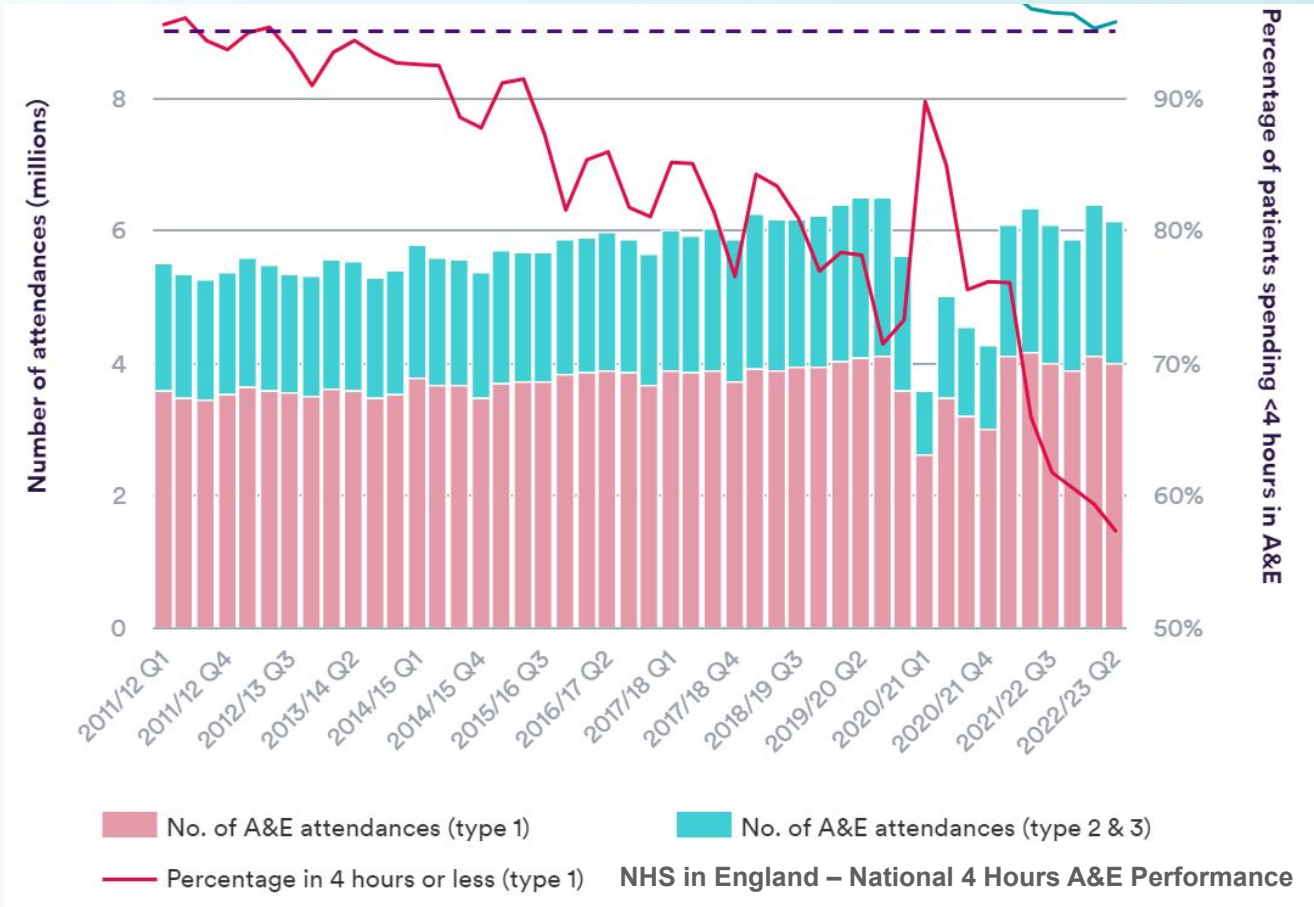
Data-driven (AI/ML-driven) case-finding using routinely collected healthcare/EPR data

Screen, find, triage and support patients *before* their exacerbation to save hospital resources and patients' lives

- **UK's largest RCT on clinical case management**
- Supported over 3,500 patients in 2022 with digitally-inclusive virtual care
- NHS Innovation Accelerator Fellows 2021 & 2022
- Supported by SBRI UEC Demand Reduction Competition



The UK's Unscheduled Care Pressures



Royal Liverpool Hospital: New A&E overcrowded and chaotic, medics say



'Unbelievable and terrible' Glasgow responds as NHS Greater Glasgow suspends all non-urgent operations amid pressure

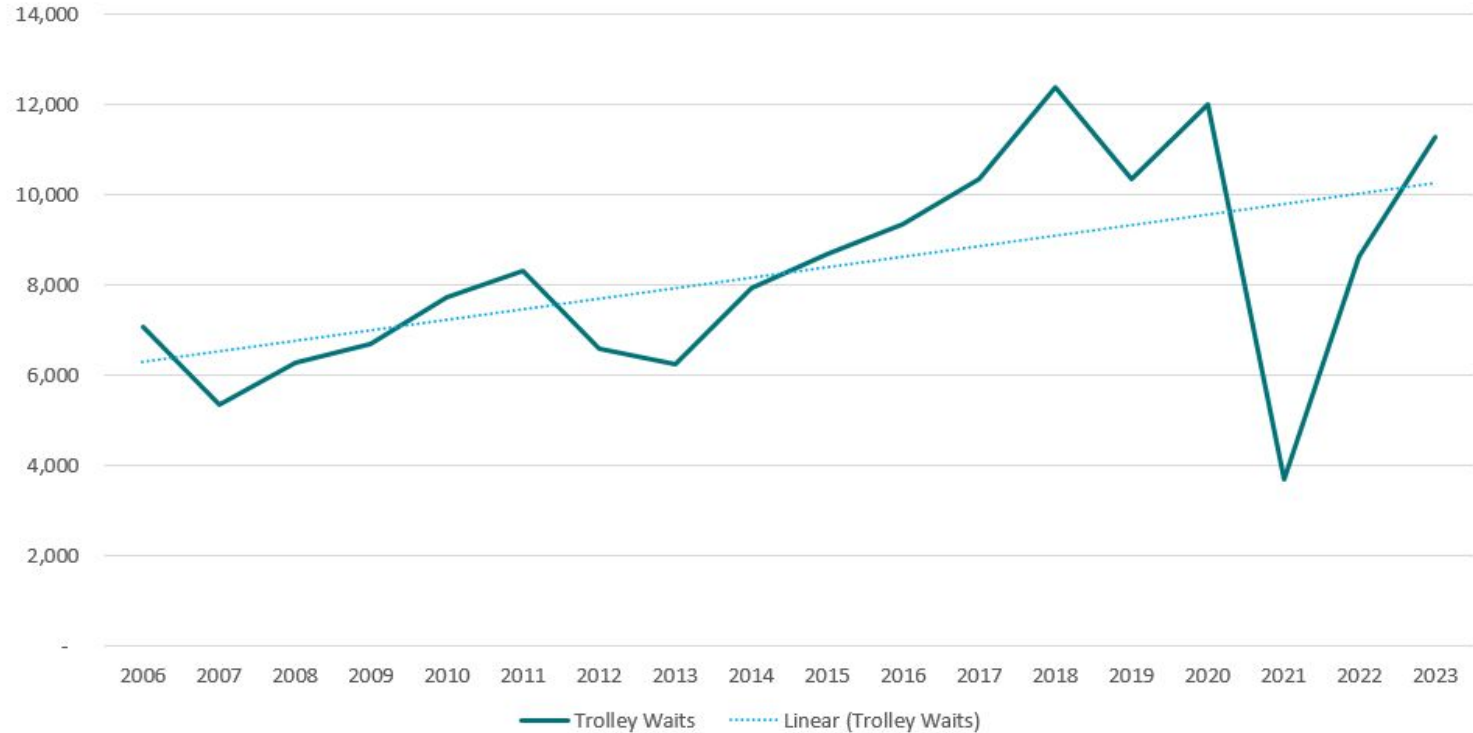


NHS pressure: Avoid A&E call as hospitals in Wales struggle

Source: <https://www.nuffieldtrust.org.uk/files/2017-01/election-briefing-urgent-care-in-crisis-web-final.pdf>

Ireland's Unscheduled Care Pressures

Irish Nurses and Midwives Organisation (INMO) - Irish Trolley Waits (monthly)



Ireland's overcrowded hospitals battle 'perfect storm' of respiratory infections

Crisis affects all country's hospitals, while 838 patients wait on trolleys in wards or emergency departments





Prof Matthew Cooke

Formerly the UEC 'tsar' for
UK Government



Sara Reis

Data Scientist. PhD in
Medical Imaging and
Computing



Mark England

CEO, Previously Deputy
National Director for Urgent and
Emergency Care at NHS
England

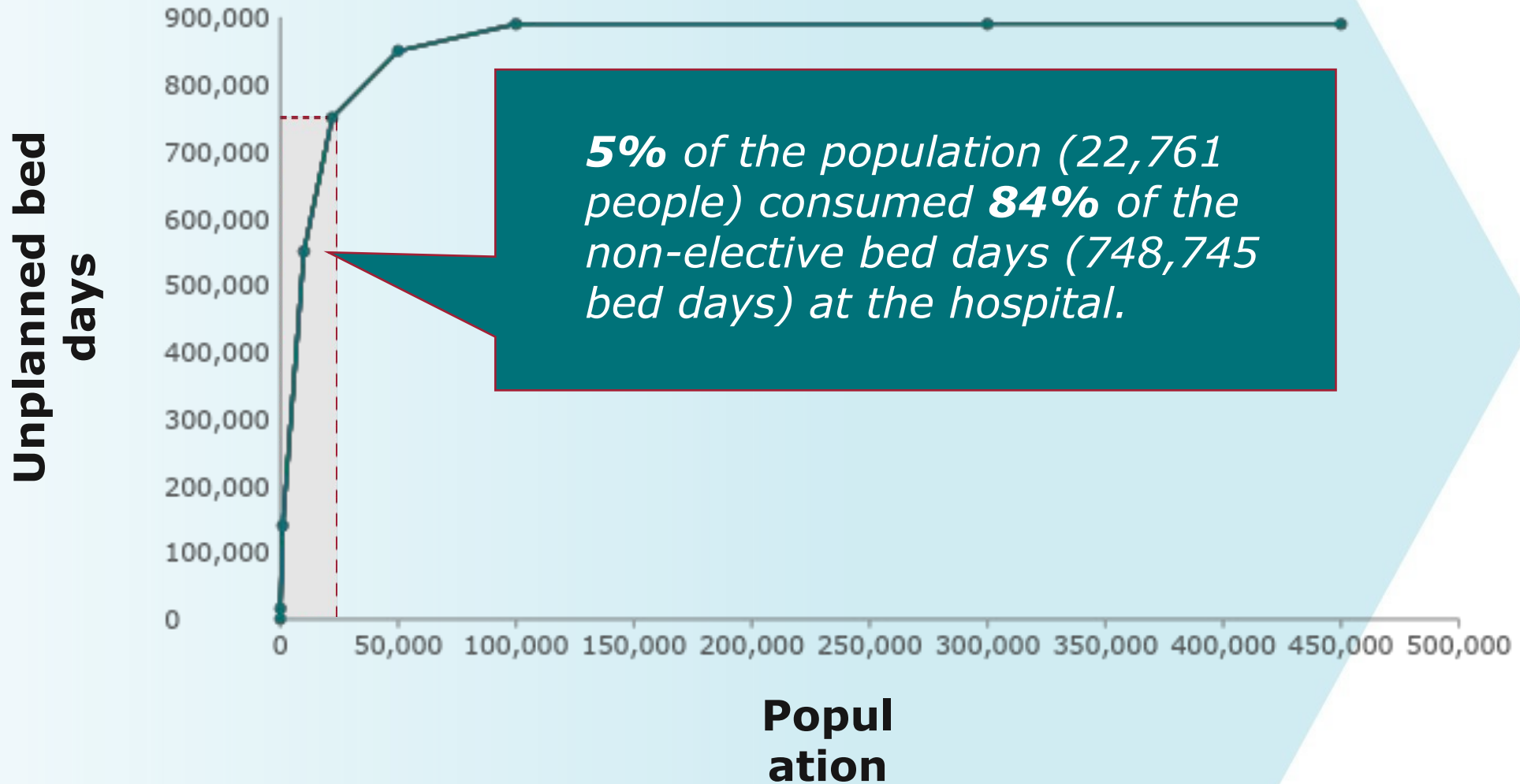
Today we will cover

What do we know about unscheduled care demand?

What does this mean for proactive care models?

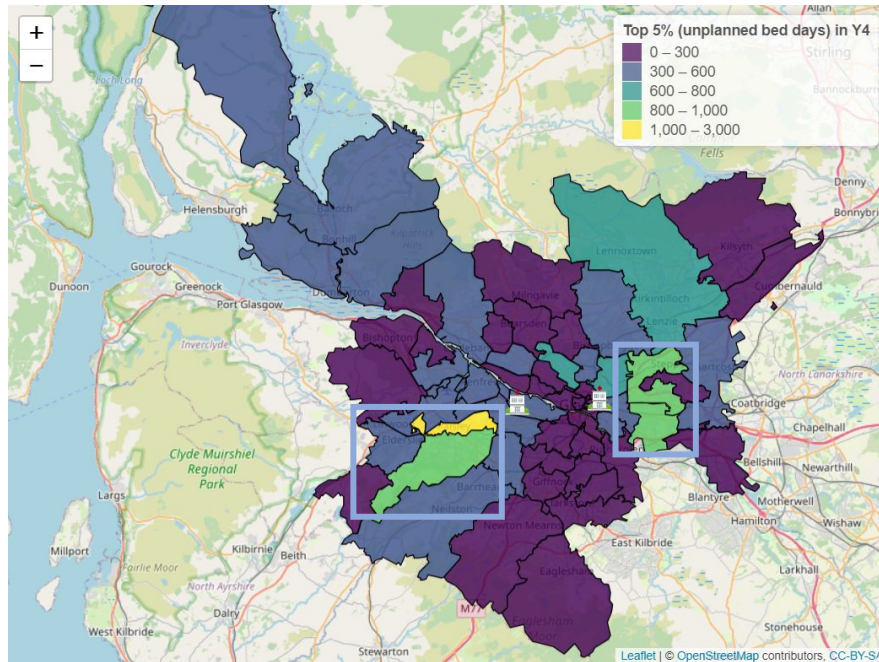
'A paradigm shift': an expert clinician's view on predictive care

Unscheduled hospital care demand is concentrated to a small population

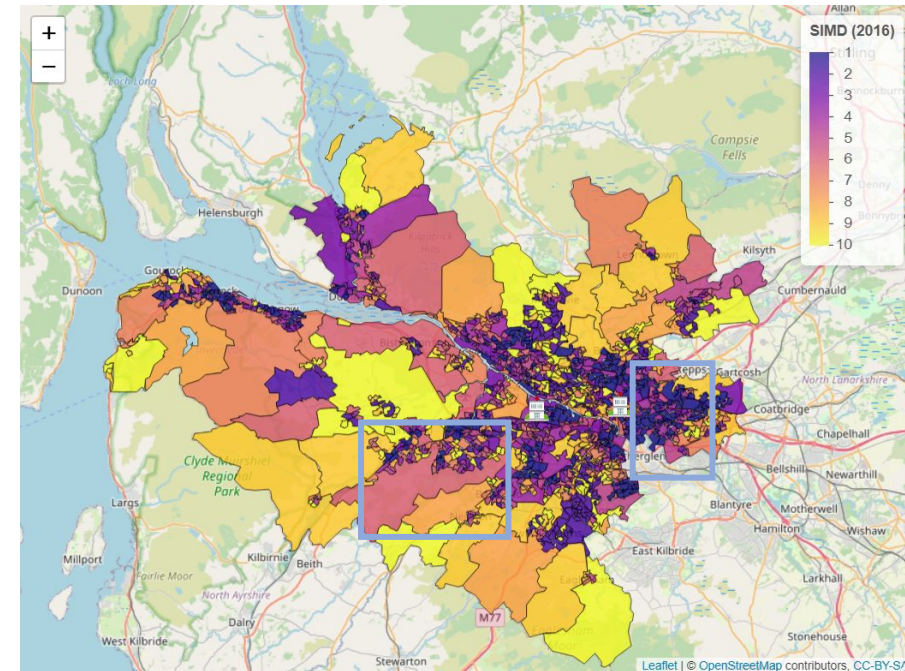


Clear link between deprivation, burden of chronic disease and unscheduled care needs

High users geographical distribution



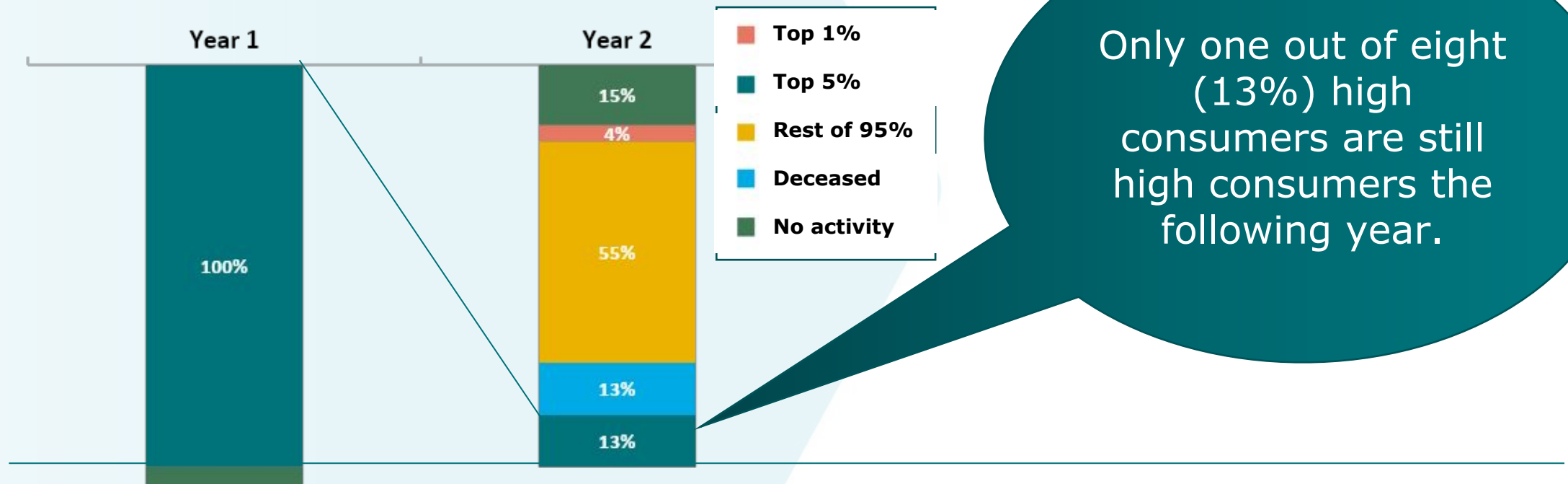
Scottish Index of Multiple Deprivation*



*Scottish Index of Multiple Deprivation - <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/>

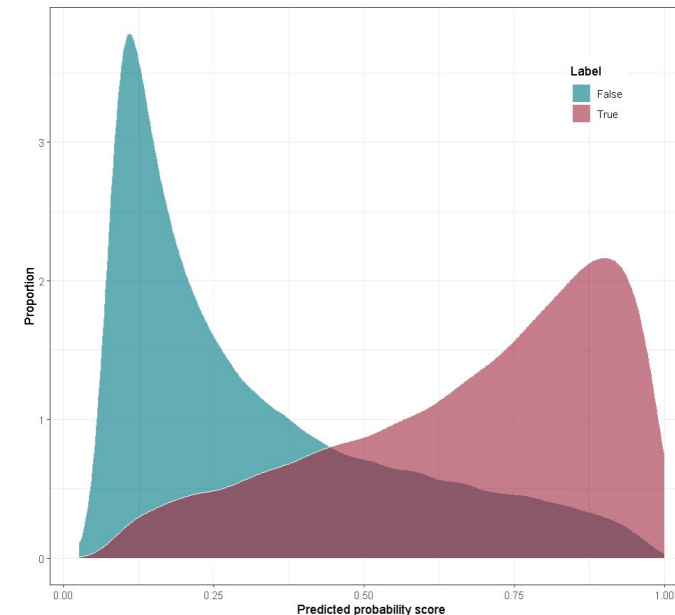
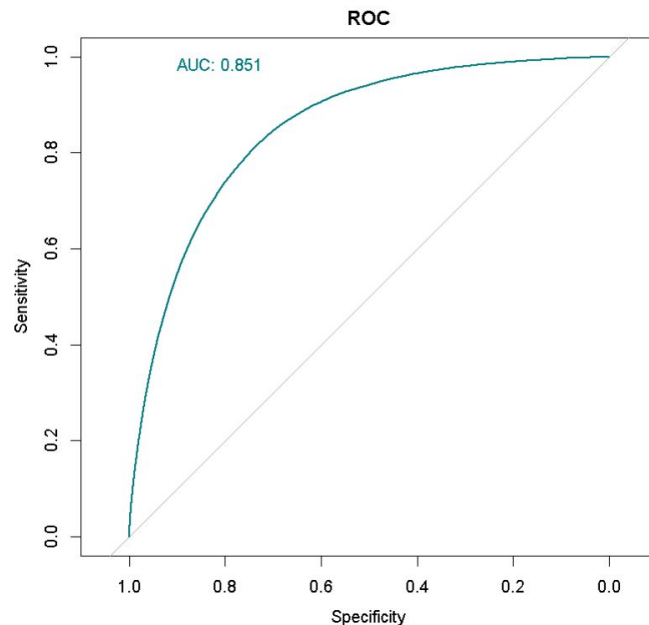
Unscheduled hospital care demand is transient

Top 5% consumers of unplanned bed days



Our AI model can identify 8 out of 10 high users - before they become high users

- Use of **routinely** collected **hospital data**
- **Validated** model performance
- Tested for **equality and fairness** for socioeconomically disadvantaged groups
- Securely cloud-operated, making it **scalable** and easy to re-train and re-validate



Today we will cover

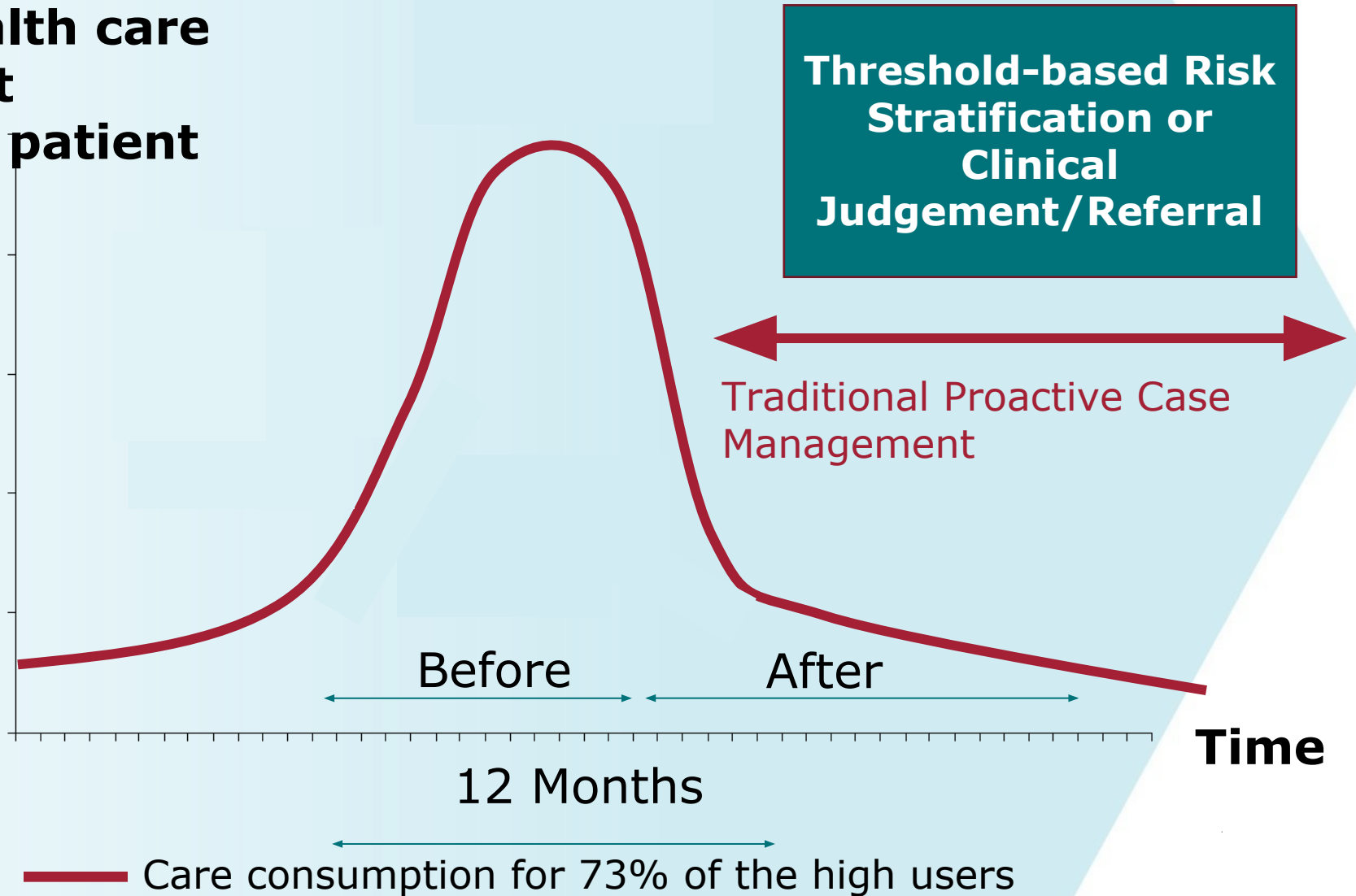
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What does this mean for proactive care models?

'A paradigm shift': an expert clinician's view on predictive care

Standard proactive interventions (a la Sláintecare) need careful evaluation

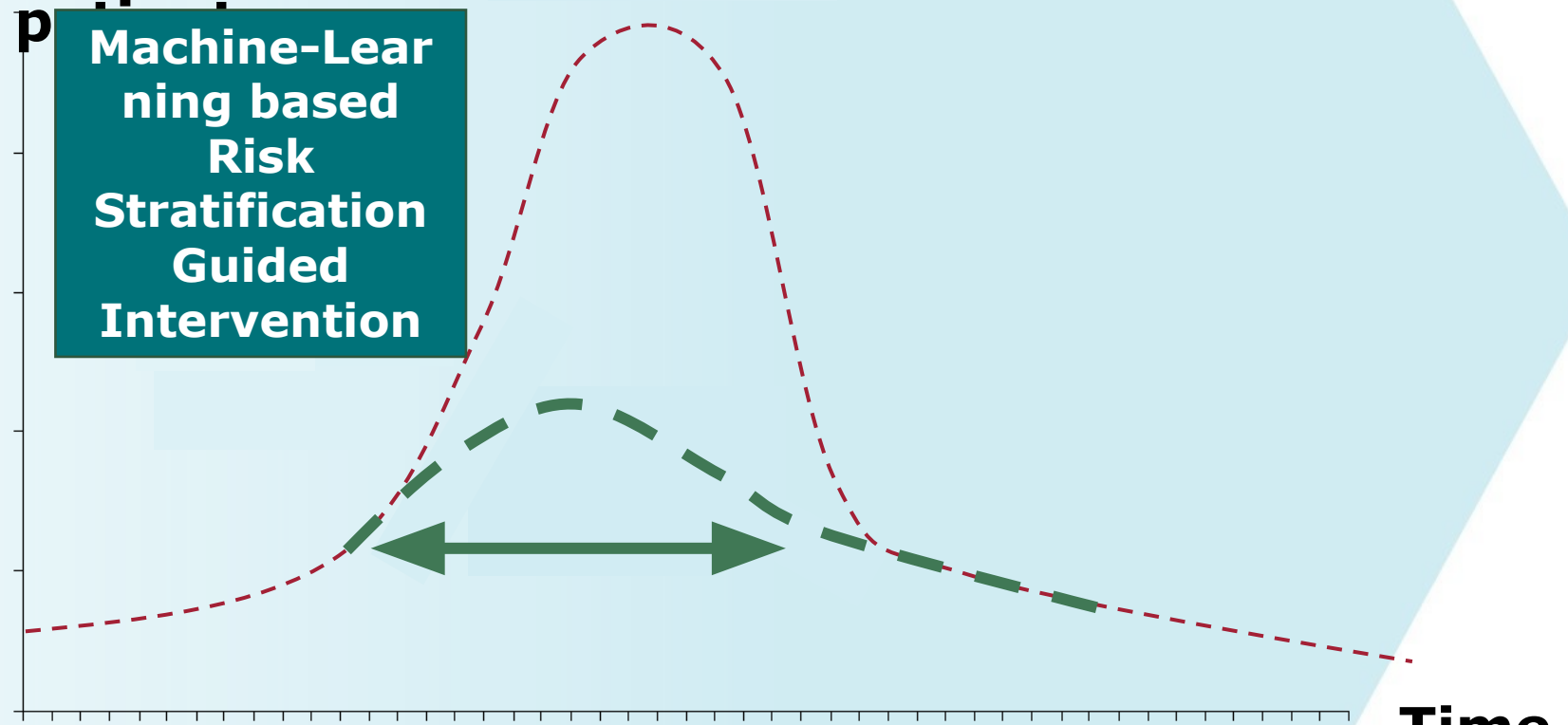
Health care cost per patient



The Implications for Proactive SlánteCare Care Model Design

Health care
cost
per p

Machine-Lear
ning based
Risk
Stratification
Guided
Intervention



12 Months

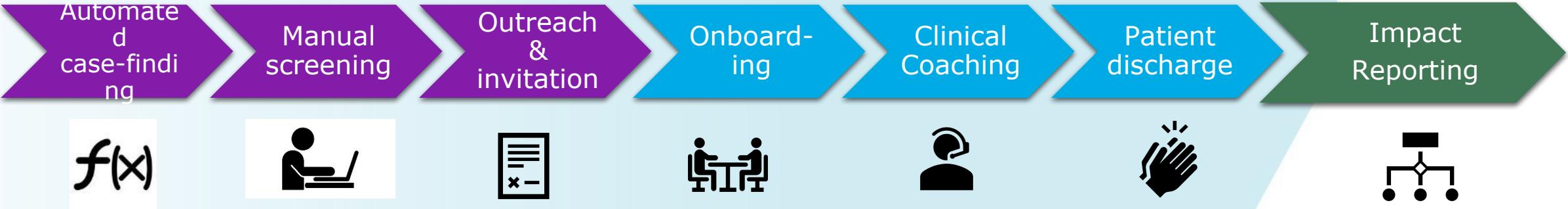
— Care consumption with early identification and intervention

AI-Guided Clinical Coaching (AICC): an example of Predictive Analytics

Prediction of high consumers

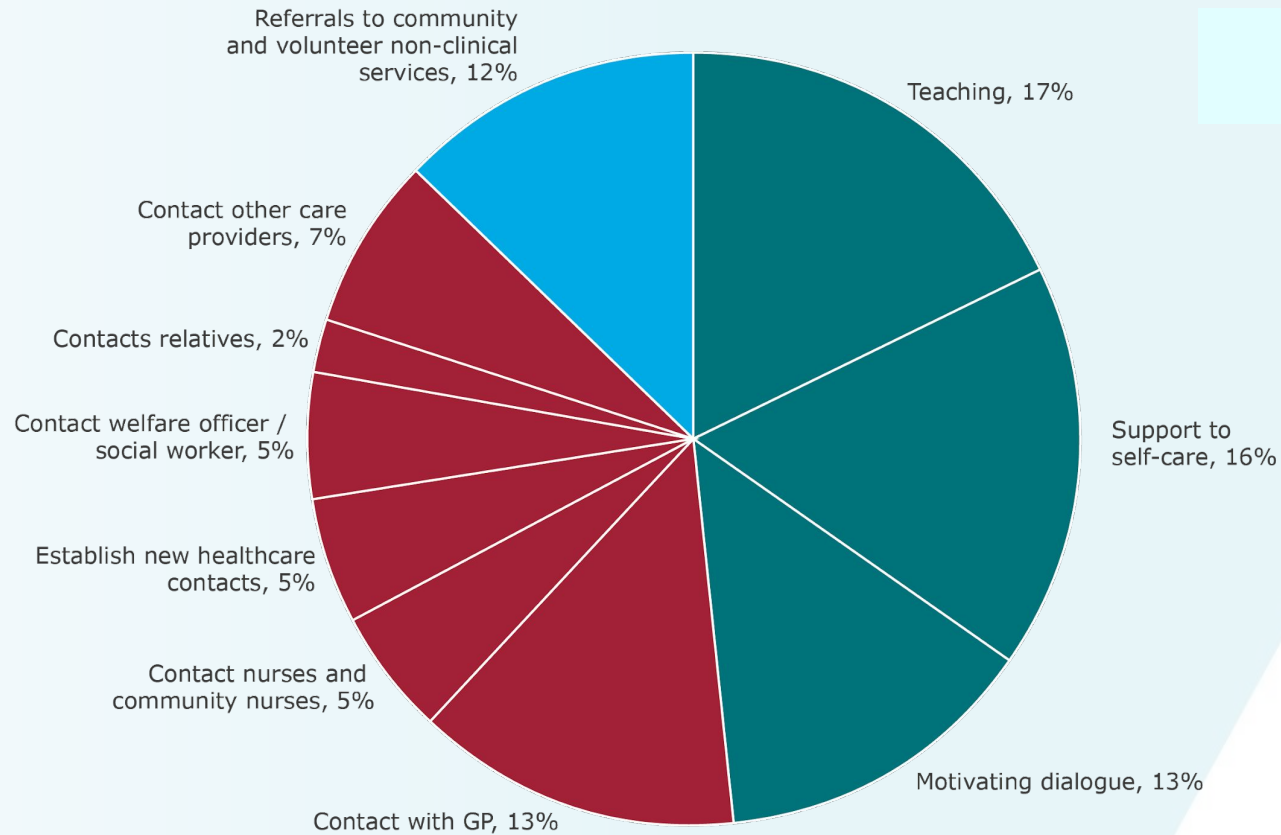
Nurse-led Telecoaching

Measurable system impacts



Nurse-led, remote clinical coaching – an alternative to unscheduled care

- **Motivational Coaching & Health Education**
- **Care Coordination**
- **Social Prescribing**



LI, Wan (Miss) Invited			
Preferred name Wan		Born 01-Jan-1963 (59y)	Gender Fem
Address Foundry Building, 2...	Phone & email 020 1234 5678	Contract Attenborough	GP Beech Tree

Care plan
Activities
Gaps & Risks
Tit

Latest risk score

Low Medium Critical

Latest gap analysis

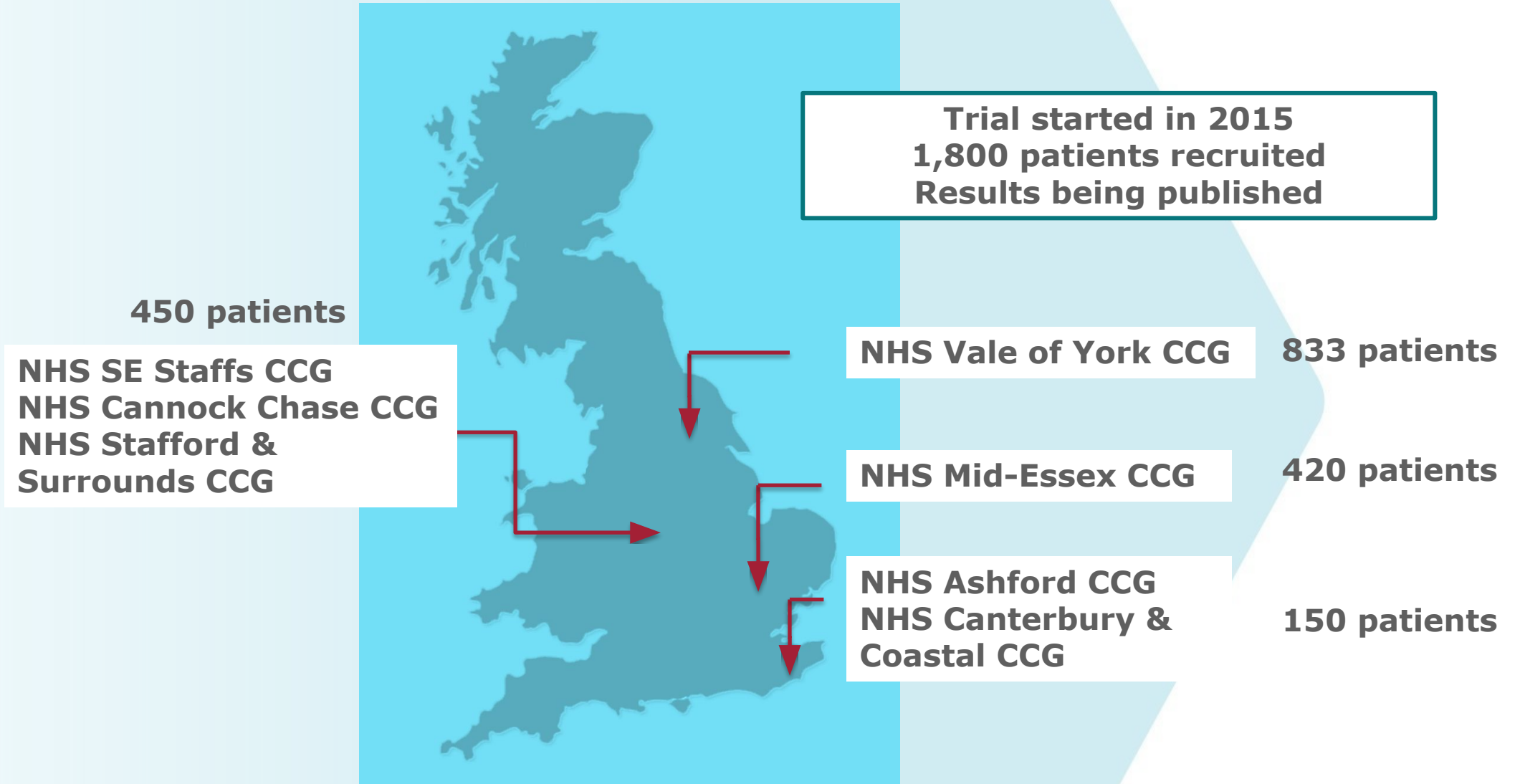
Category	Value
Knowledge	2
Support	3
Morbidity	4
Motivation	1

Risk over time

Week	Risk Level
Week 1	High
Week 2	High
Week 3	High
Week 4	Medium
Week 5	Medium
Week 6	Medium
Week 7	Medium
Week 8	Medium
Week 9	Medium



UK clinical validation trial



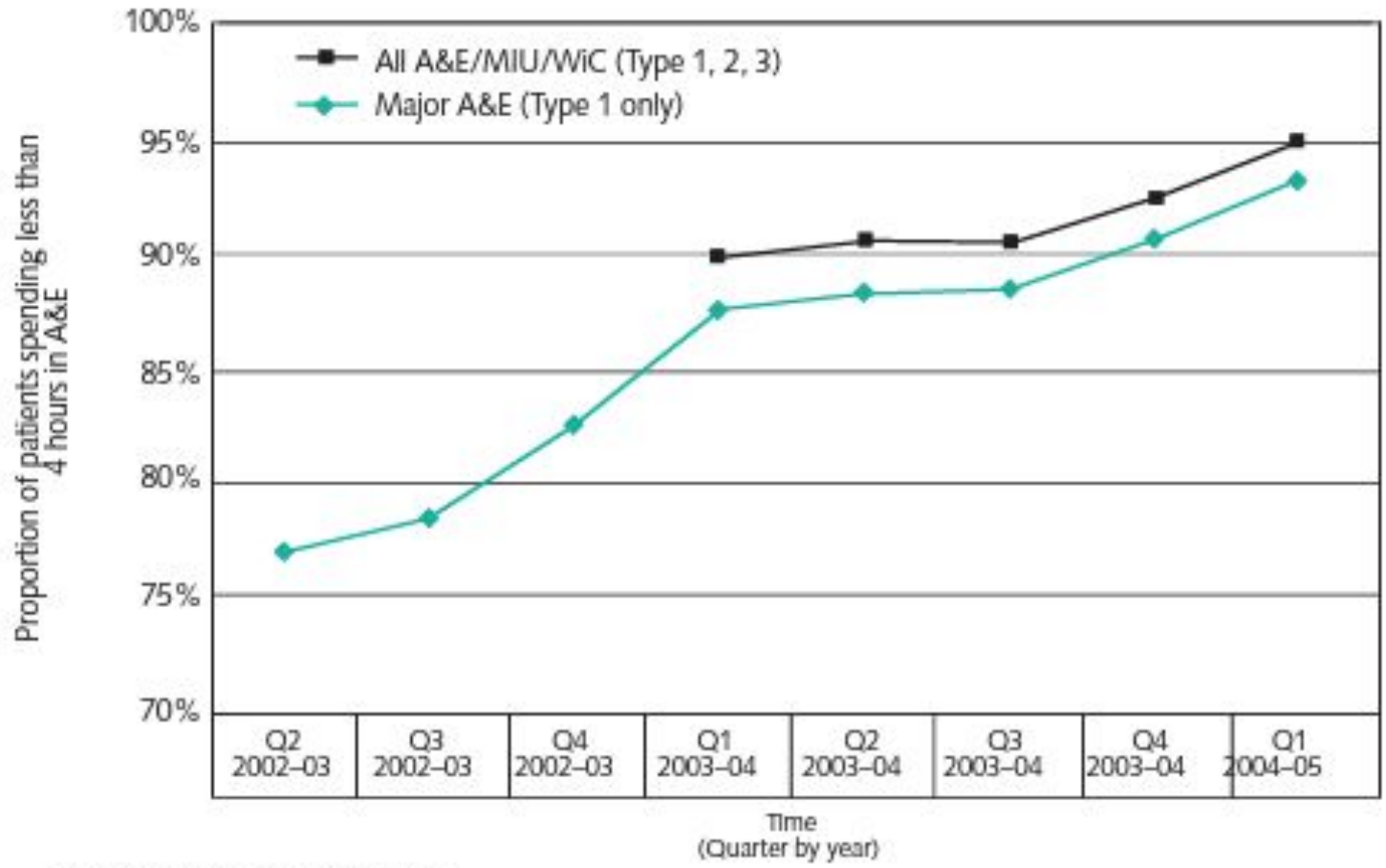
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Figure 2. Accident and Emergency performance



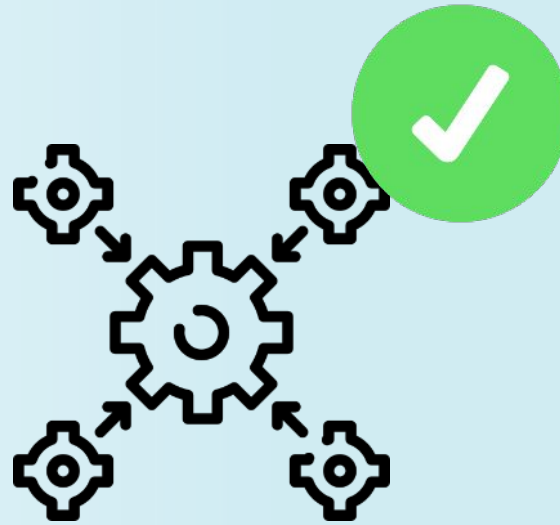
Source: Department of Health Dataset QMAE

<http://aace.org.uk/wp-content/uploads/2011/11/Transforming-Emergency-Care-in-England.pdf>

A clinician's view on predictive analytics



Real-world
evidence



Seamless
integration



Limitless
potential

AI-guided Clinical Coaching (AICC): an example of impactful predictive analytics

- 1 Impact on all-cause mortality of a case prediction and prevention intervention designed to reduce secondary care utilisation: findings from a randomised controlled trial
- 2
- 3

4 Correspondence: Lucy Bull, Data Scientist, Health Navigator Ltd, The... House, 163...
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7 ... Health Navigator Ltd, London, UK
8 ... and chair, Health Navigator Ltd, London, U
9 ... Senior Strategic Development Manager, Ea
10 ... K
11 ... P Partner, Stafford Health and Wellbe
12 ... ior Fellow, Nuffield Trust, London,

Demonstrable system and patient benefits

- Decreased UEC demand
- Better resource allocation
- Improved patient mortality
- Improved patient outcomes
- Self-care / shift left



High impact, low disruption: The power of Predictive Care



**Better utilisation
of staffing
resources**



**Timing is
critical**



Scalability



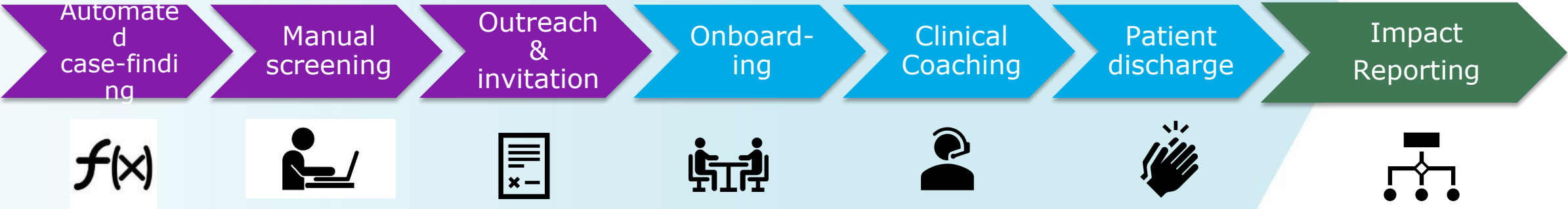
**Bringing
Sláintecare
policy to life**

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