

digitalhealth

AI + DATA

Utilising AI and data to provide effective mental health services

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CNIO
University Hospitals of Derby
and Burton FT

Headline sponsor

FAVOM

#AIDATA23



Utilising AI and data to provide effective mental health services

Section 136

October 2023



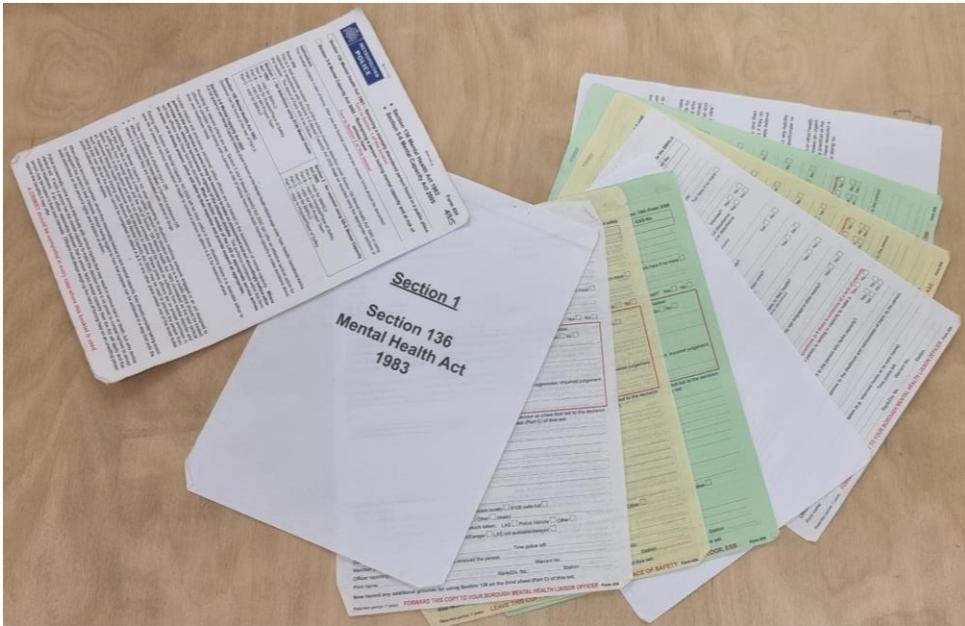
Section 136

Emergency police powers to take you from a public place to a place of safety – “Sectioned”

- c5000 Londoners / yr
- Highly restrictive pathway
- >20% already known to services



Status Quo



Poor data Quality



**Excessive
Patient wait times**



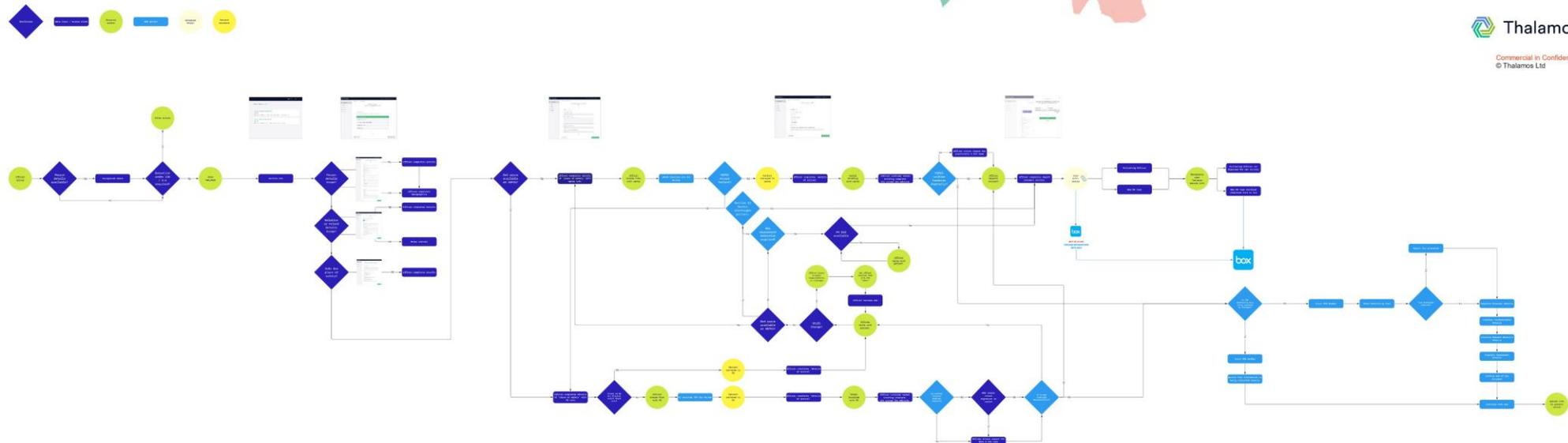
**Clinical & Administrative
Staff Burden**



Inconsistent pathways

Digitising “the form”

1. Realise “the form” was actually a pathway
2. Understanding the **detail and nuance** of that pathway
3. Create a consistent **workflow**

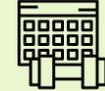


Project Outcomes

- Pathway workflow **NOT A PDF**
- **Cloud hosted** to facilitate access
- Easy to use >50,000 frontline users



High-quality, high-fidelity data



Reduced administrative burden



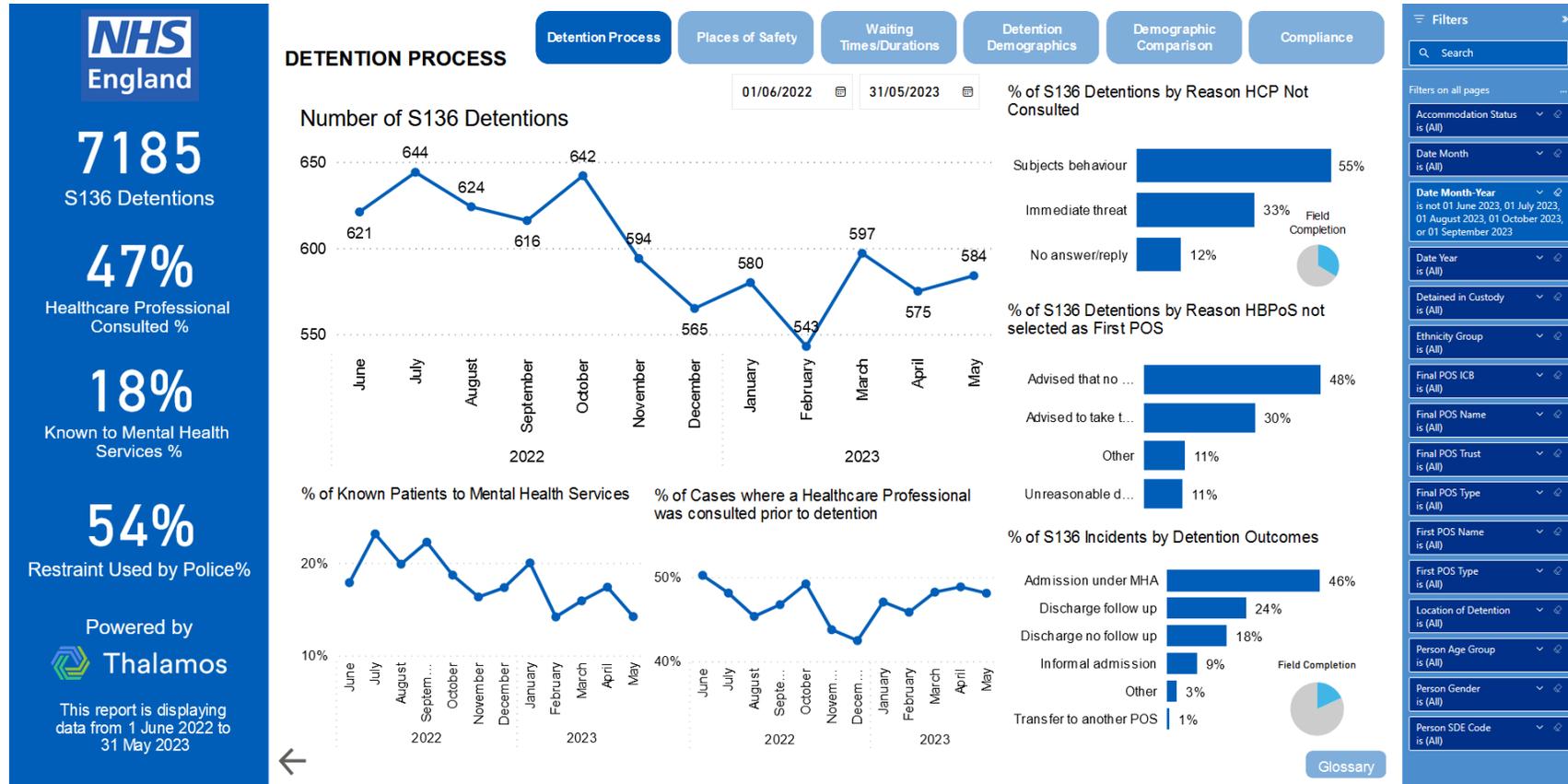
Partnership working



Integrated systems

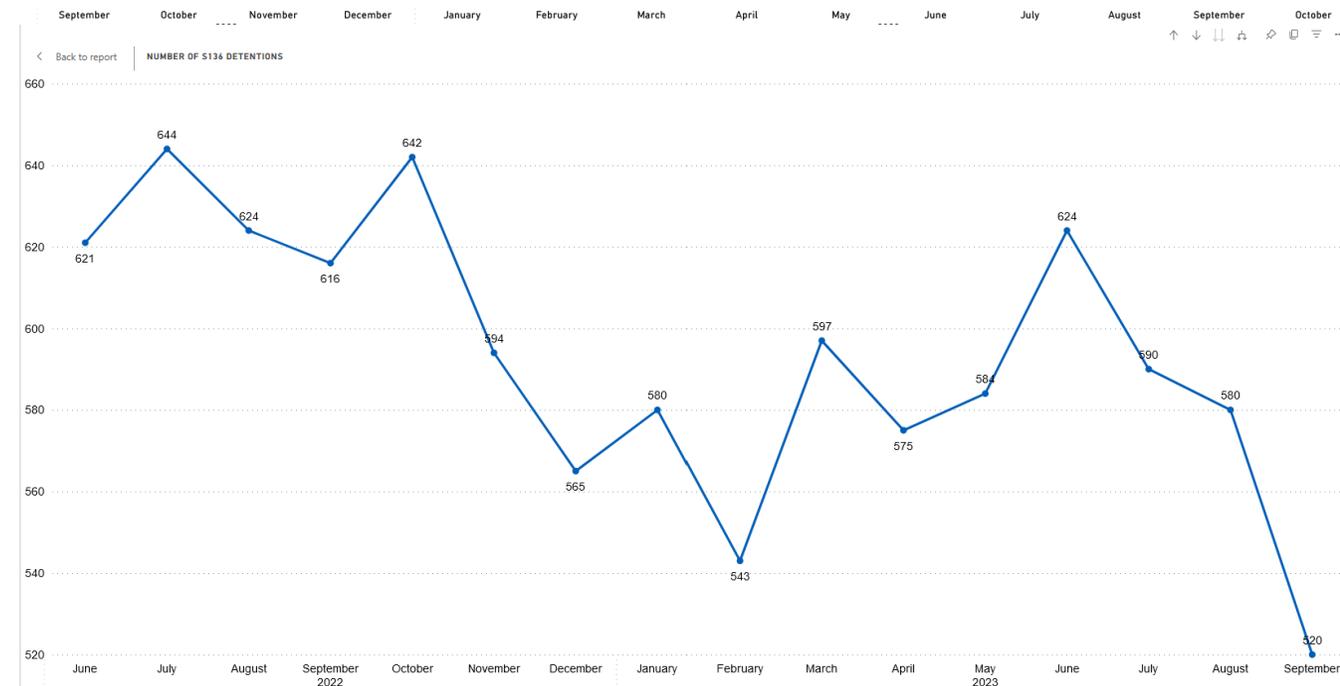
Data Outcomes

- It wasn't 5000 it was **7185**
- Shared view of the truth
- Data visualisation over anecdotes



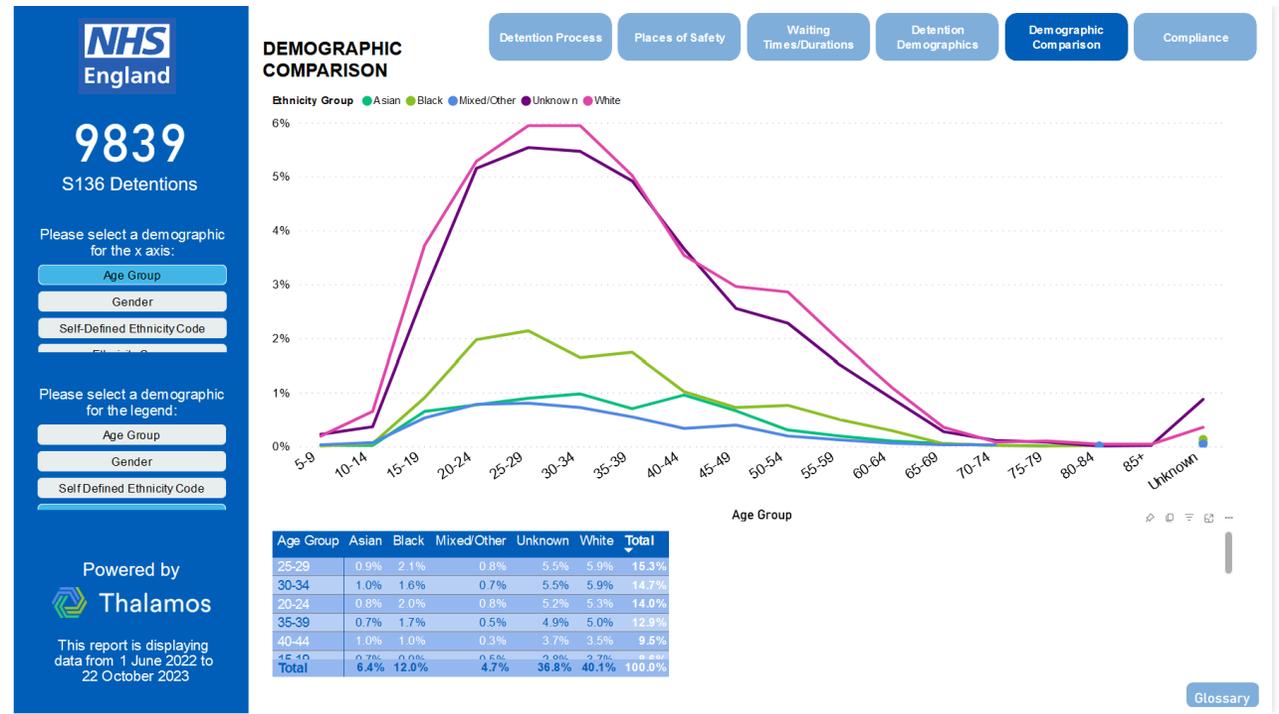
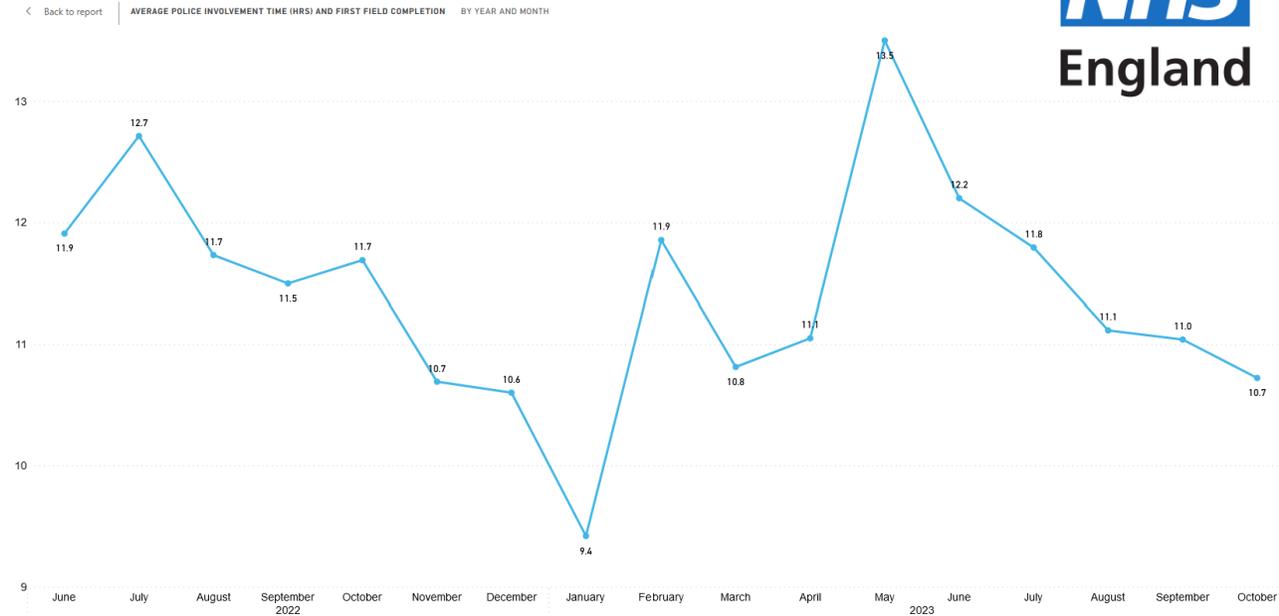
Data led decisions

- Consulting a Health Professional
- Reducing Admissions



Data led decisions

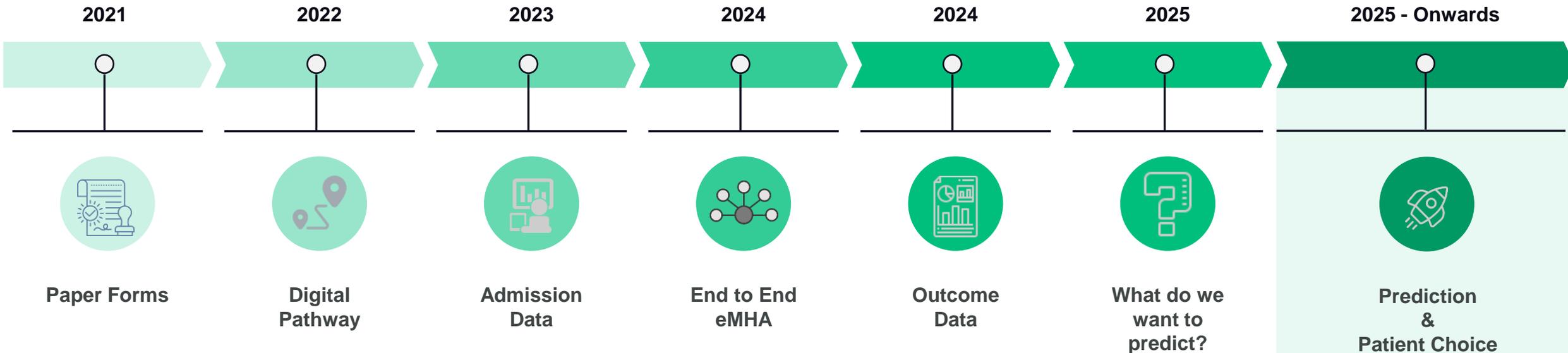
- Consulting a Health Professional
- Reducing Admissions
- Reducing waiting times – Progress but more to do
- Detailed Demographic insights



What's next?

A path to AI...

- 1st we need data
- Then we can predict





Thank you!

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October 2023





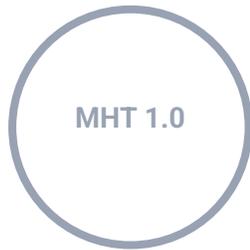
thymia

Digital Health AI & Data 2023

Stefano Gorla
CTO & co-founder

A - very - brief history of Mental Health Tech

Pre AI



Teleconf, Payments, EHR

Covid made it crucial, tech is now reliable and commoditized - **HIPAA, GDPR** are must have

Commoditised AI

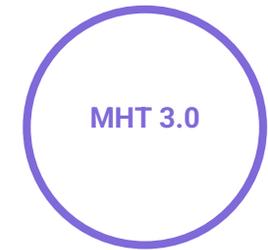


Automated Letters (SOAP etc), Chatbot enabled patient intake

We are currently witnessing the commoditization of 2.0 - transitioning from "product" to "feature"; big enabler begin the availability of **high quality LLMs**.

Current challenge is not technical or scientific, but risk management and pathway integration; **Medical Device certifications** needed

Frontier AI



Mental Health Biomarkers

Driving towards precision medicine; active scientific field. Promising non-obvious **biomarkers in speech and video** analysis making first strides into the market

Challenges: **scientific validation**, risk management

Mental Health Tech 3.0 - thymia's biomarkers

Voice

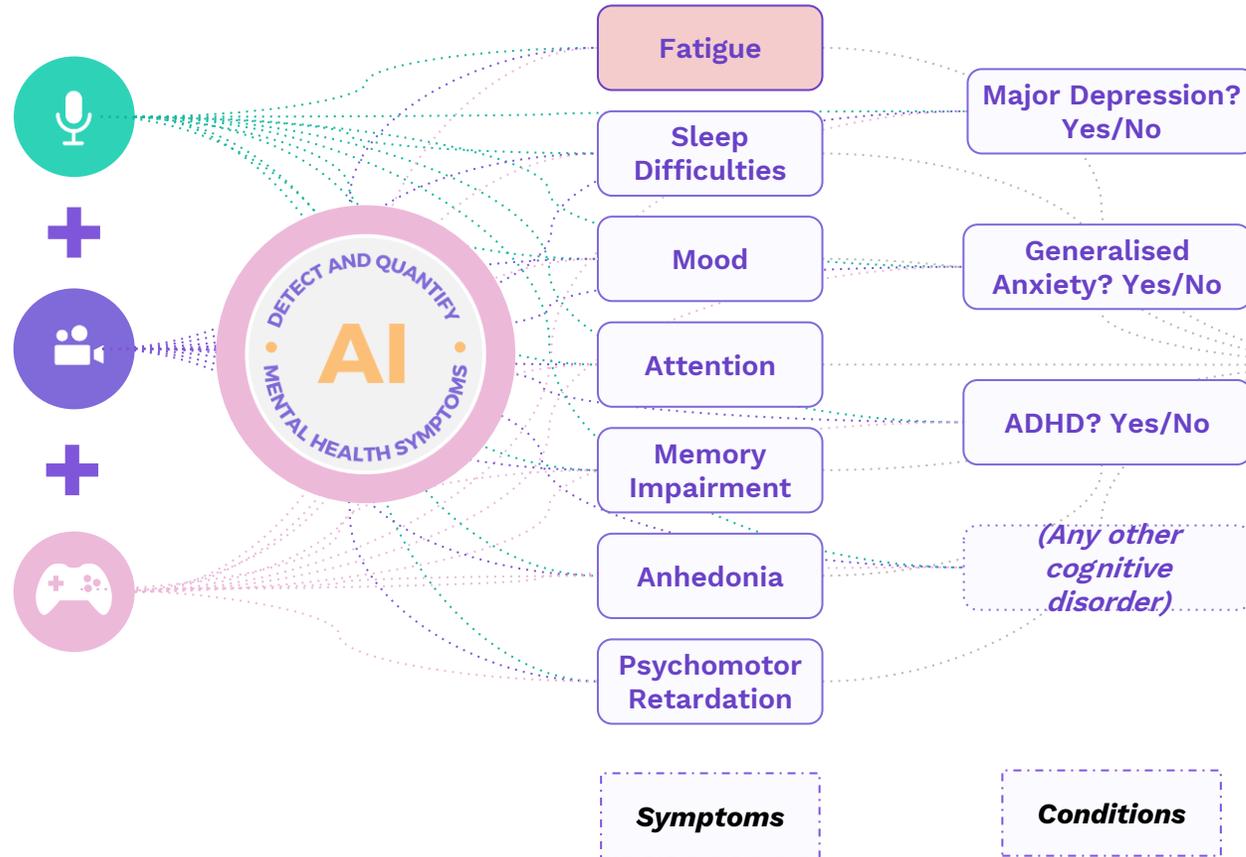
How someone sounds & what they are saying

Video

Everything we pick up from a smart device camera

Behaviour

Everything else: typing, tapping, swiping, reaction times, errors.



We deliver: objective outputs compared against patient & healthy distributions

Mental Health Tech 3.0 - a case study

Context: Laços - Brazil

Managing complete healthcare needs of employees and former employees in a per member per month model; large customers (e.g. Petrobras)

Problem

Mental health disorders with **older population** groups are often **undiagnosed** and have impacts on physical health and wellbeing e.g. failing to take medication, not keeping physically active etc. **Need for - cheap - early identification of mental health deterioration**

Solution - thymia remote monitoring activities & biomarkers

- thymia as an **investigational device** to support the programme of regular domiciliary care that these patients are receiving from nurses
- Patients are receiving activities 2 times per week and individuals with clinically significant scores are **'red flagged'** → nurse schedules appointment to assess and where necessary refers to specialist

A few Numbers

- **Largest multimodal mental health dataset in the world - 100Ks** sessions recorded
- Laços to run **1000s** of tests weekly; **>1000k** patients, **twice a week**; challenging population - **60+ age**

Thanks!

<https://thymia.ai>
info@thymia.ai
stefano@thymia.ai



Explainability is Essential

How mental healthcare services can make the most of AI



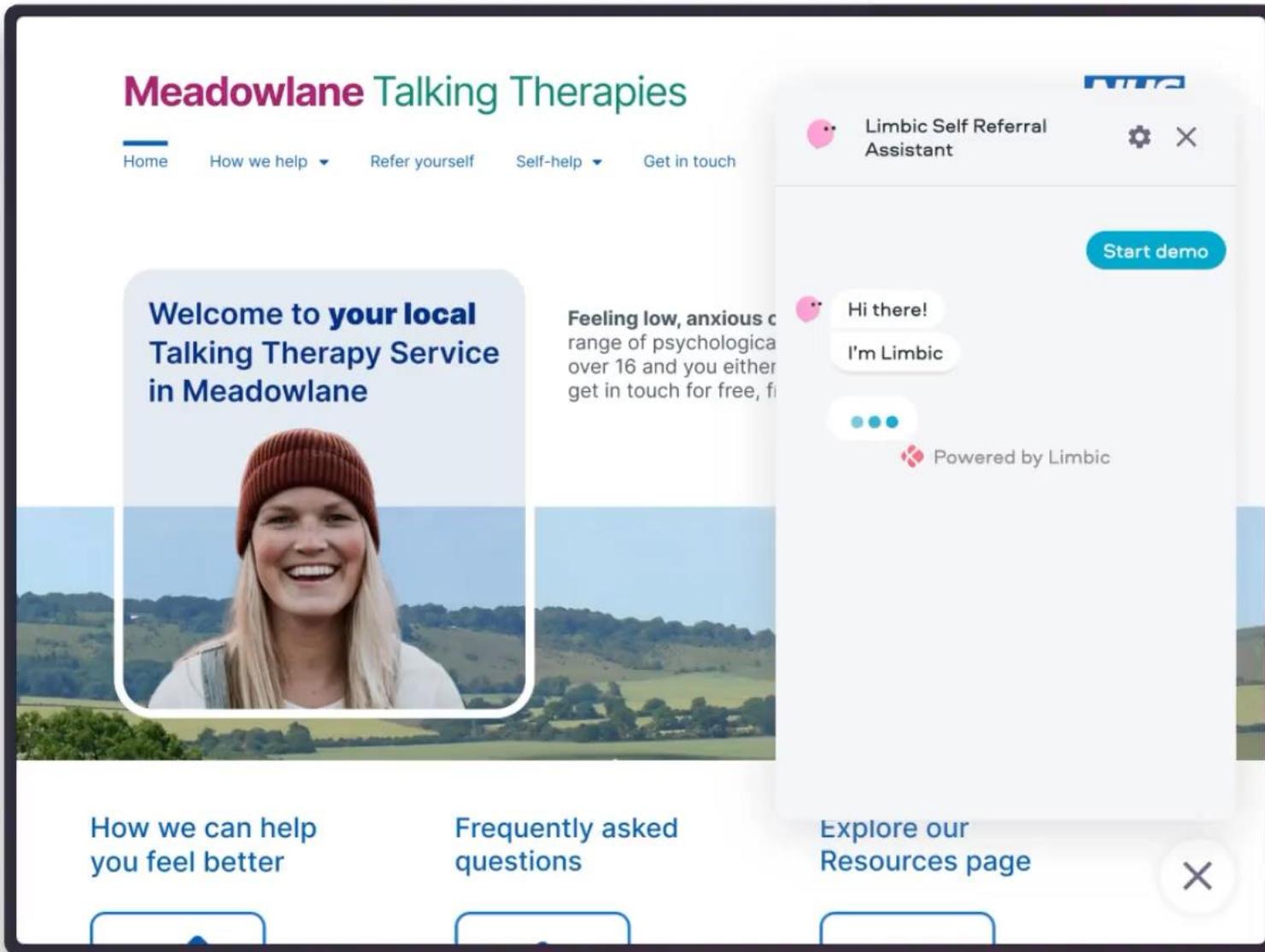
Research has shown that mental health practitioners are relatively good at good at detecting depression but often miss anxiety disorders.

IAPT Manual, page 25

Figure 2: Professional diagnosis of common mental health disorders

Professional diagnosed CMD, by CMD in past week (as identified by CIS-R)				
	CMD in past week, as identified by CIS-R			
	Depression	Phobias	OCD	Panic disorder
Ever diagnosed with CMD by professional (self-reported)	%	%	%	%
Depression	70.0	72.1	83.0	43.8
Phobia	5.9	7.2	6.0	–
OCD	7.1	7.9	13.2	–
Panic attacks	42.7	45.5	41.9	22.3
<i>Bases</i>	284	201	103	43 ^a

^a Note small base for panic disorder.



Limbic Access

Intelligent front door for self-referral and e-triage

Explainability is key

Main problem: "I struggle with low mood and lack of motivation"

PHQ-9= 25

GAD-7= 5

WSAS=15

IAPT-Phobia scales = 3

Main problem: "I am constantly on edge and worry about everything all the time"

PHQ-9= 7

GAD-7= 16

WSAS=12

IAPT-Phobia scales = 10

Main problem: "I just don't enjoy things I used to like and everything feels flat"

PHQ-9= 18

GAD-7= 9

WSAS=5

IAPT-Phobia scales = 8

Supervised learning:

Trained to match input patterns to predict output labels

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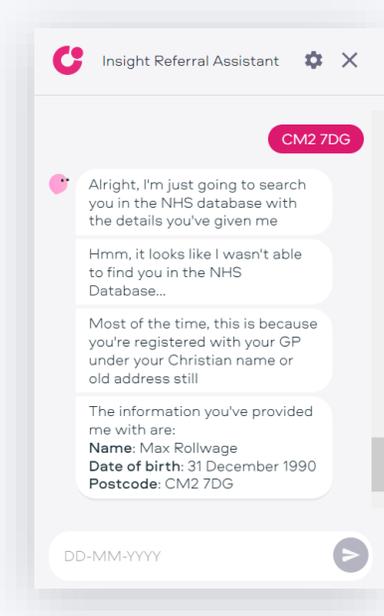
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Depression

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Quality data underpins useful models



Input

Main issue

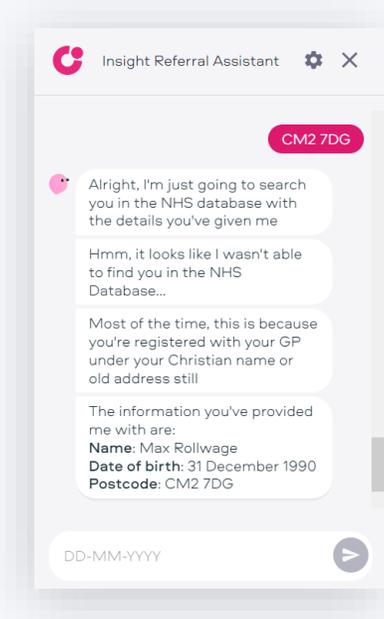
Questionnaire scores

Behavioral indicators

(e.g. reaction times, typing speed)

Demographics

Quality data underpins useful models



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Main issue

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Behavioral indicators

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Demographics

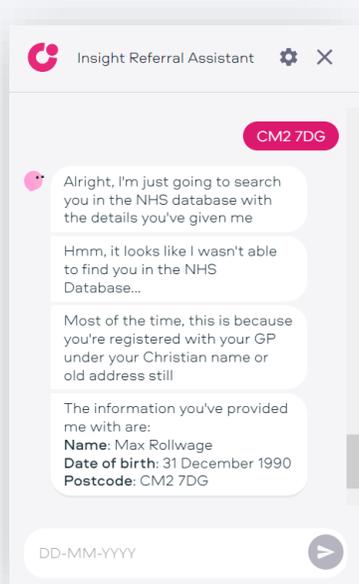


Label

Primary presenting problem (end of treatment)



Quality data underpins useful models



Input

Main issue

Questionnaire scores

Behavioral indicators

(e.g. reaction times, typing speed)

Demographics



Label

Primary presenting problem (end of treatment)



Data from > 18,000 IAPT Patients

Applying Machine Learning Models

Main problem:

"I feel very uncomfortable in social situations and avoid being the centre of attention at all costs"

PHQ-9= 7

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Applying Machine Learning Models

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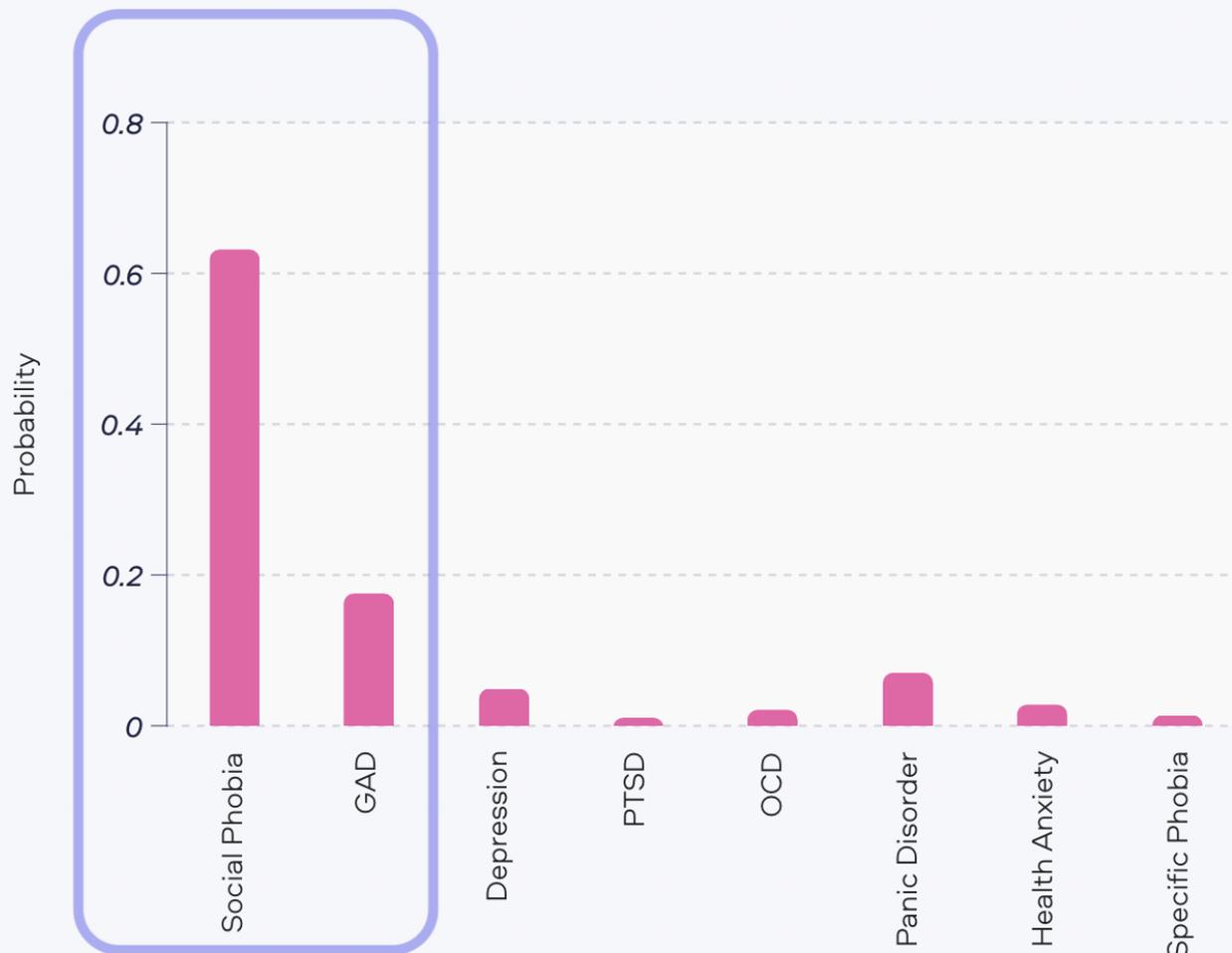
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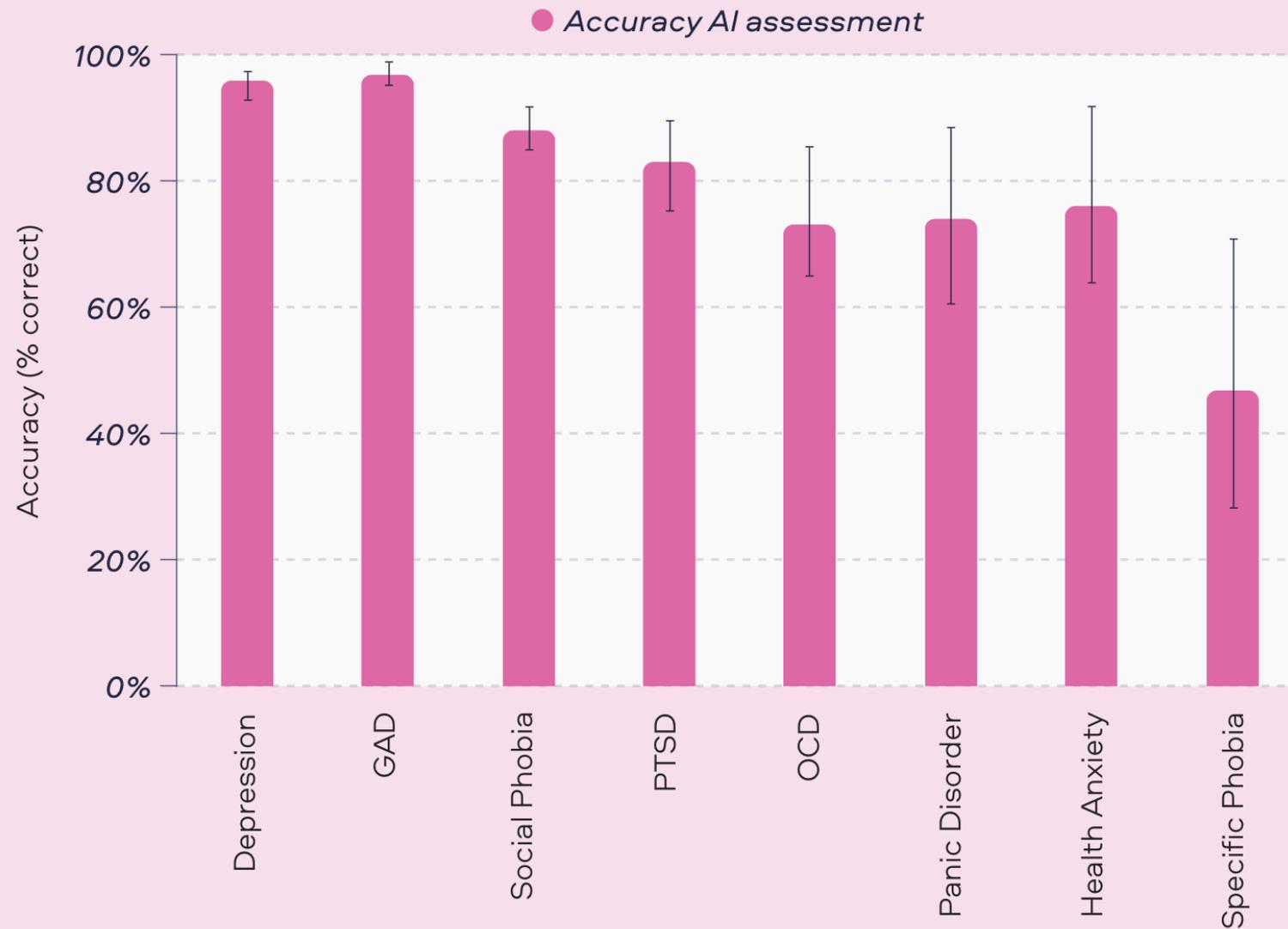
WSAS=10

IAPT-Phobia scales = 18



93.8% accuracy

Selecting the correct AD/SM





Medical
Class IIa



The **only ML-model regulated** as a
medical device for diagnostic
decision-support.



I complete most assessments in 30 minutes instead of 45 minutes. Limbic means I can focus on how best to support the client without worrying too much about missed information.

Limbic Access makes an impact

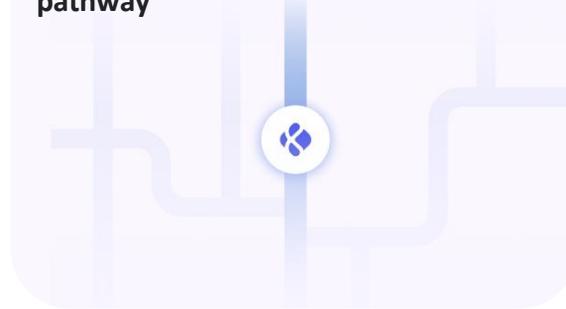
↑ 32%

increase in referrals



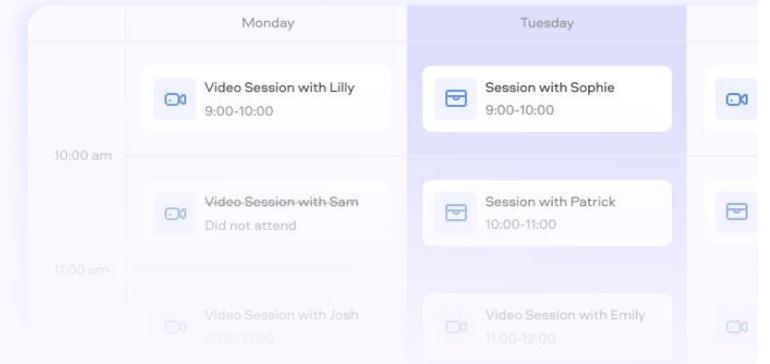
↓ 45%

reduction in changes to treatment pathway



↓ 18%

less likely to drop out



↓ 25%

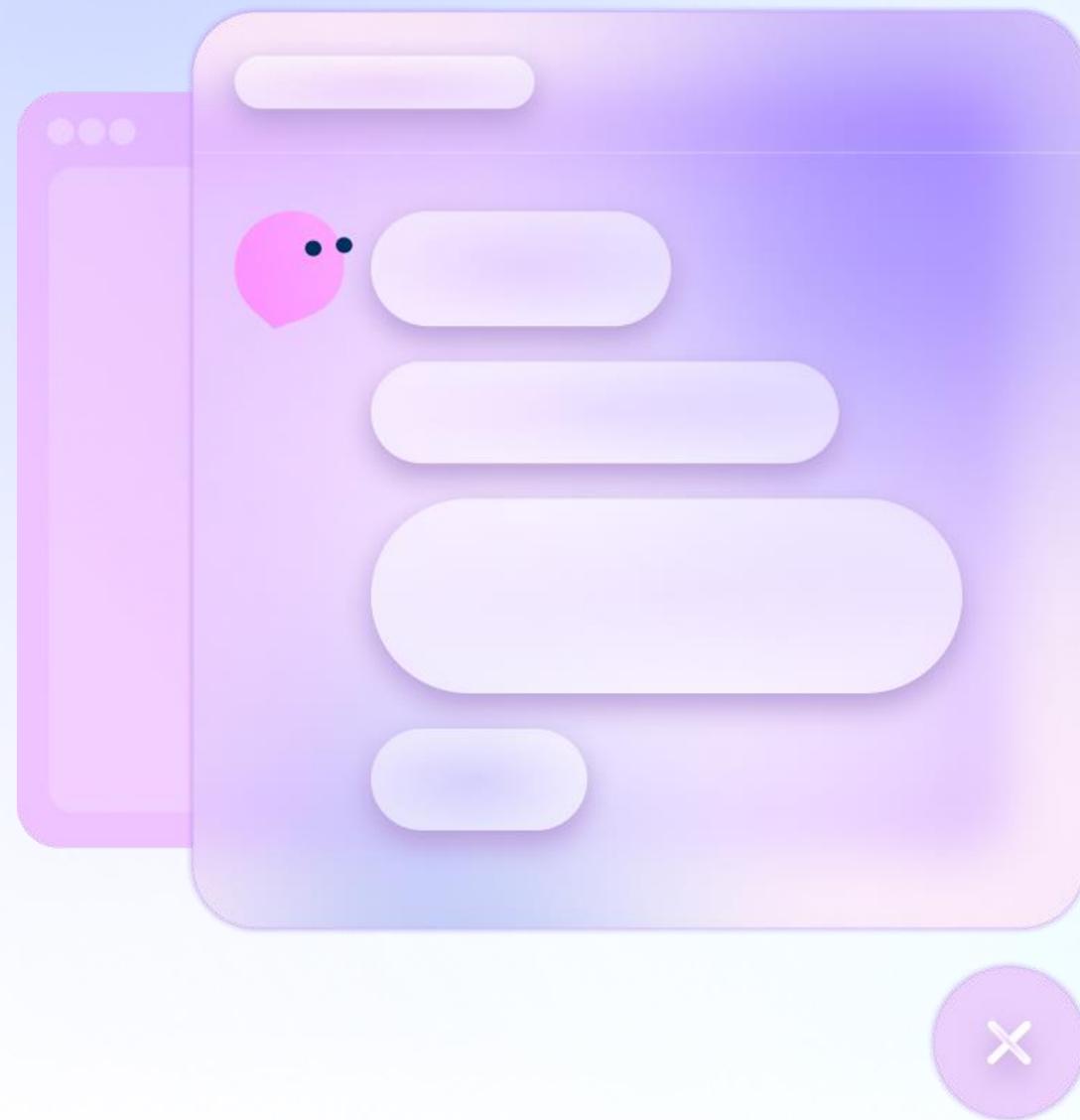
reduction in average assessment time

Patients referred using Limbic Access
220,000+



Trusted by 33% of NHS Talking Therapies

limbic.ai/nhs-talking-therapies



AI and data to provide effective mental healthcare

Umar Nizamani

This is a talk about AI, the
new tool in our utility belt

..

And like all tools, we need to put on our safety gear before we use it.

Hey, I'm Umar!



Umar Nizamani

umarniz.com

Slides: umarniz.com/2023-digital-health-ai-data

 Niceday

nicedaytherapy.com

AI is improving fast

"Maintain human relevance by cultivating education, adaptability, creativity, and emotional intelligence." 



via photoai.com

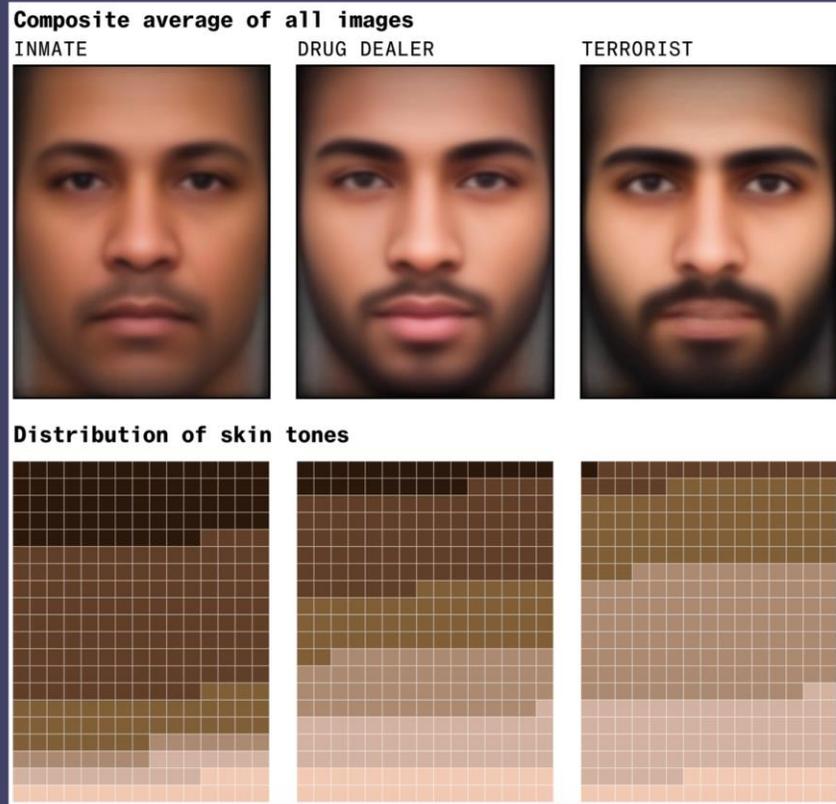
AI generated picture of me

No, AI is not going to
replace therapists

Therapists **using AI** will replace
Therapists **not using AI**

With great power comes
great responsibility

The bias in AI runs deep



of suicides caused by AI

0

Upto 2022

1

2023

How do we innovate and
implement AI responsibly?

Responsible AI in healthcare



Client Prioritisation using responsible AI

Explainable

Transparent

Accountable

Data check ⓘ ↻

Rank	Name	Top reasons to check client		
1	 <input type="checkbox"/> Eva Molen	<ul style="list-style-type: none">• Large increase in negative registrations• SMQ: decrease of 1.5• Reminder on, thought record not completed	<input type="button" value="Details"/>	<input type="button" value="Feedback"/>
2	 <input type="checkbox"/> Bora	<ul style="list-style-type: none">• 5 days since last registration• Reminder off, thought record not completed	<input type="button" value="Details"/>	✓ Feedback sent
3	 <input type="checkbox"/> Ralph Edwards	<ul style="list-style-type: none">• Small increase in negative registrations	<input type="button" value="Details"/>	✓ Feedback sent
4	 <input type="checkbox"/> Boris van den Burg	<ul style="list-style-type: none">• Decrease in positive registrations• Activities: 2 planned, 2 completed	<input type="button" value="Details"/>	<input type="button" value="Feedback"/>
5	 <input type="checkbox"/> Key Jong	<ul style="list-style-type: none">• Reminder off, diary completed• Positive registrations are stable	<input type="button" value="Details"/>	<input type="button" value="Feedback"/>

The self-driving car doesn't
go to jail, the driver does.

Thanks!



Umar Nizamani

umarniz.com

Slides: umarniz.com/2023-digital-health-ai-data

 NICEDAY

nicedaytherapy.com

digitalhealth

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