

digitalhealth

AI + DATA

AI-powered decision support for clinicians

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FAVOM

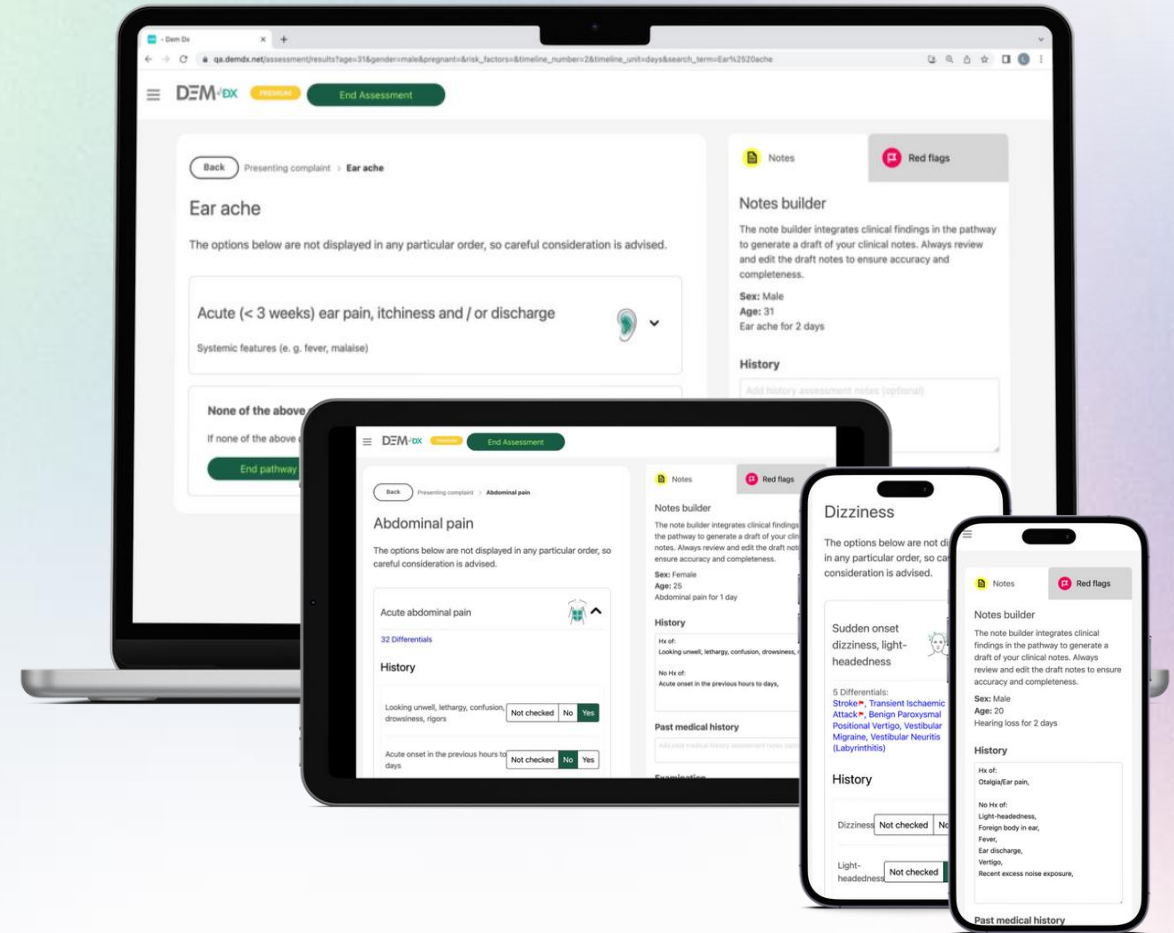
#AIDATA23





Clinical Reasoning Platform
Solving frontline workforce shortage

Dr Mariane Melo
Chief Medical Officer



DEM^{DX} Clinical Reasoning Platform

Designed to address the critical resource shortages by empowering frontline healthcare professionals to expand their capabilities in assessing patients in primary care.



Structured clinical assessment and red flag prompts

Step-by-step guide from symptoms, red flags examinations to potential conditions



Automated clinical notes

Builds the notes, editable at any time, saving valuable clinician time



Guides next steps

Customised actions to local pathways, access to NICE CKS, calculators and more

The screenshot displays the DEM DX Clinical Reasoning Platform interface. At the top, there is a green button labeled "End Assessment". Below this, a navigation bar shows a back arrow, an envelope icon, and the text "Clinically stable, no acute red flag clinical features". The main content area is titled "Deep Vein Thrombosis" with a red flag icon. Below the title, there is a description: "Unilateral localised throbbing pain | Skin changes (swelling, redness or warmth) | Immobility (bedridden more than 3 days, major surgery within 12 weeks, travel more than 4 hours) ...". A red-bordered box highlights the "Actions" section, which includes a red exclamation mark icon and the text "Consider one or more of the following actions. Check off if completed." Below this, there is a sub-section titled "These actions can be fully customisable to your local pathways" with three checkboxes: "Carry out Wells Score to exclude risk of DVT, refer to NICE CKS: Deep Vein Thrombosis for further information on diagnosis and management.", "If Wells score positive (2 or more points), refer immediately to the acute medical team.", and "If Wells score <2, discuss with AECU or med reg for further investigations." There is a "Guidelines" link with a document icon and an "End pathway" button. On the right side, there are two tabs: "Notes" (active) and "Red flags". Below the "Notes" tab is a "Notes builder" section with a description: "The note builder integrates clinical findings in the pathway to generate a draft of your clinical notes. Always review and edit the draft notes to ensure accuracy and completeness." Below this, there is patient information: "Sex: Female", "Age: 34", and "Unilateral lower leg swelling for 2 days". Below that is a "History" section with "Hx of:" followed by "Unilateral localised throbbing pain, Skin changes (swelling, redness or warmth)", and "No Hx of:" followed by "Immobility (bedridden more than 3 days, major surgery within 12 weeks, travel more than 4 hours)". At the bottom right, there is a "Past medical history" section.

Case study: collaboration with Moorfield's Eye Hospital



Ophthalmology is now the busiest outpatient specialty, with a predicted increase in demand of 30-40% over the next 20 years

Most attendances to A&E are low-risk, highlighting the need for a dedicated ophthalmic triage system to redirect cases to the most appropriate care.

A pilot in the pediatric A&E showed promising results. However, a faster triage system is required for the very busy adult A&E.



DOTS: DemDx Ophthalmology Triage System

Development and validation of a ML-driven ophthalmology triage tool

Objective:

Facilitate efficient ophthalmic case triage using structured data from triage nurses and provide potential differentials.

Anticipated outcomes:

Optimized resource utilization, reduced A&E patient numbers, streamlined patient referrals to GPs and Optometrists.

Elective
Treat or give advice at Triage - To GP or Optometrist as appropriate Copy To Clipboard

See below serious conditions to be considered

Most probable diagnoses (3)

Chalazion		2 Actions
Blepharitis		2 Actions
Stye		2 Actions

Also consider the following serious diagnoses (3)

Periorbital/Orbital Abscess Or Cellulitis		3 Actions
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Refine results
Does the patient present the following related clinical features?

- Red / pink spot on eye
- Red eyelid
- Eyelid nodule / tumour / lesion
- Conjunctival swelling / swollen / chemosis
- Eye condition (keratoconus)

Refine Results

Are you following the triage suggestion?
 Yes No

Funded by the NIHR AI in Health and Care Awards

ACCELERATED
ACCESS
COLLABORATIVE

NIHR | National Institute
for Health Research

NHS^x

DEM^{DX}

Moorfields
Eye Hospital
NHS Foundation Trust

Built on a unique dataset of 12K+ Cases from Moorfield's A&E Triage Nurses

Data collection form

DEM+DX PREMIUM

Clinical Presentation
Capture comprehensive clinical information to enhance risk stratification and diagnostic support

Affected eye *
 Left eye Right eye Both eyes

Duration of main complaint
 < 24h 2-3 days 4-7 days 1-4 weeks > 4 weeks

Review Red Flags
 Rapid change in VA Complete Visual Loss Diplopia Change in Pupils Systemically unwell Post-op Recent trauma
 Severe pain No Red Flags

Add clinical features *
Include observed signs and symptoms beyond the initial two, as more features enhance diagnostic accuracy and triage recommendations

Discharge from eye (white) ✓
Eye itchiness / itchy / pruritus ✓
Blurriness / blurred / blurry vision ✓

Select an option

Additional Information
Provide relevant additional information

Relevant patient history
Including selected comorbidities, selected previous eye conditions previous or recent eye surgeries, use of eyedrops and/or ointments in use, use of other relevant medications and if the patient is a Moorfields outpatient

Select an option

What is your triage decision?
 See in A&E Walk to speciality clinics Treated / advice given at triage only See in UCC To see GP To see Optometrist

Submit

Data components

Gender: 2 levels

Ethnicity: 4 levels

Age: 4 levels

IMD: 5 levels

Red Flags: 7 levels

Laterality: 2 levels

Duration: 5 levels

Signs & Symptoms: 89 levels

Hx: 55 levels

Outcome: 6 levels

DEM+DX

Datasets

Data:

12584 cases, 11733 patients

Train dataset:

8735 cases (69%)

Validation dataset:

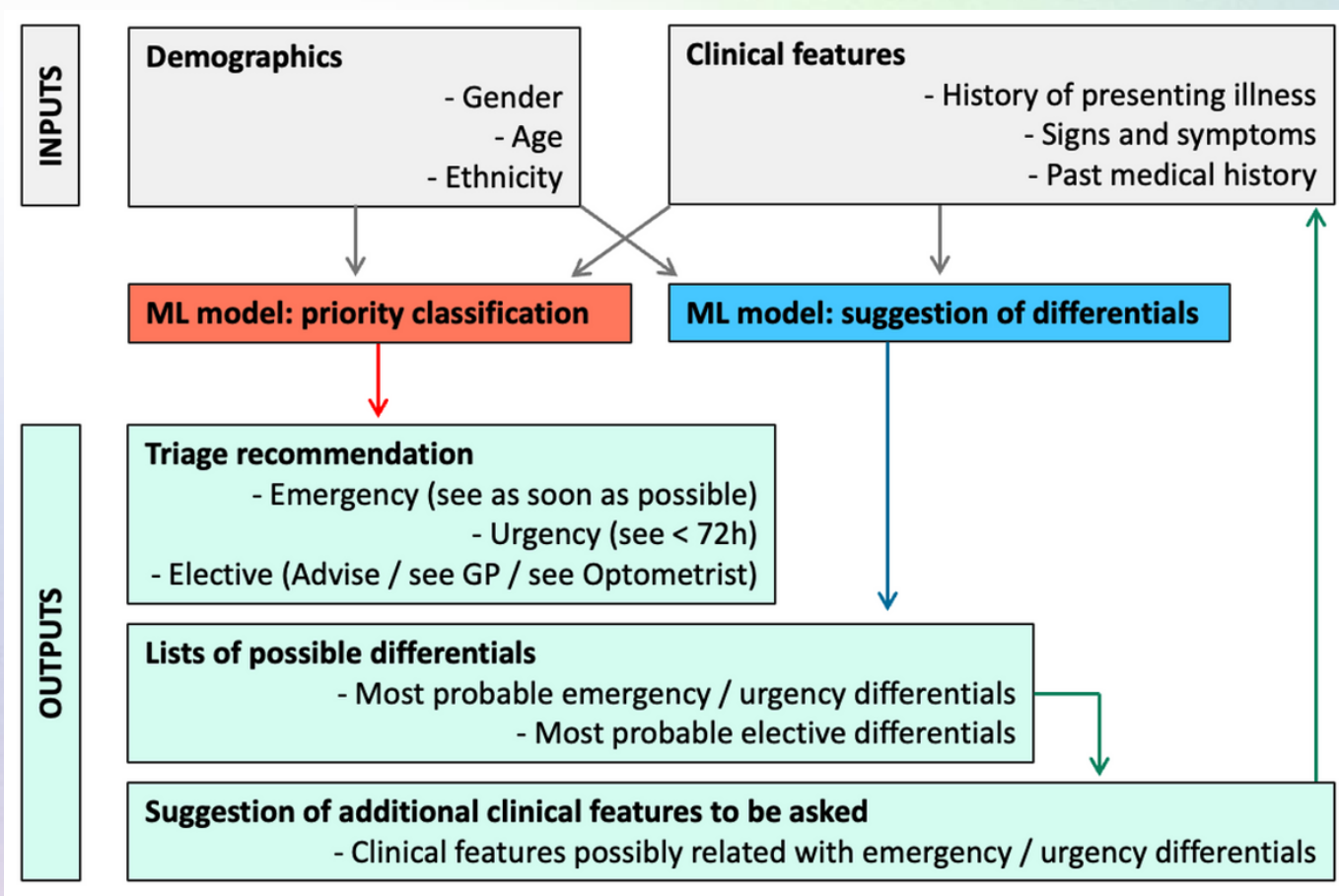
1827 cases (15%)

Test dataset:

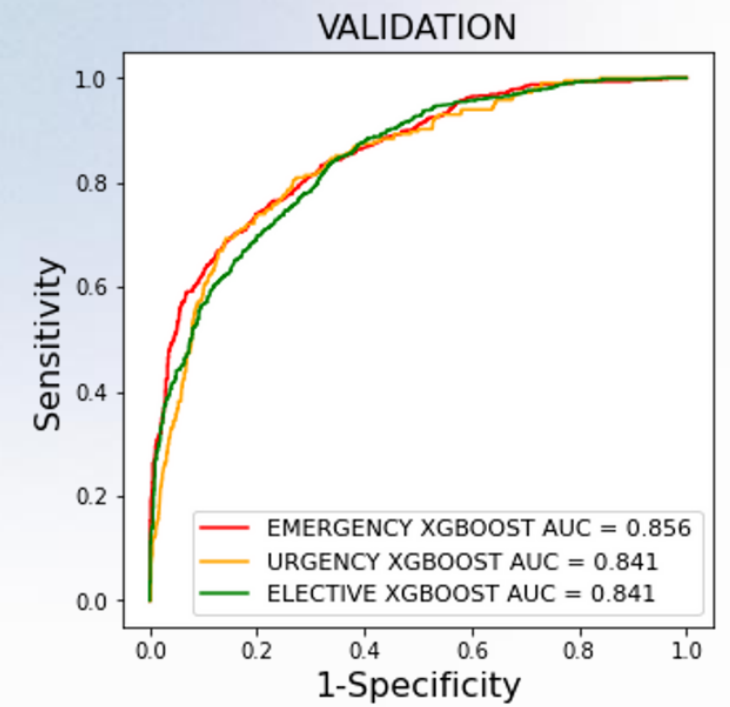
2022 cases (16%)

New patients between April
15th and June 15th 2022

Machine Learning Models for Ophthalmic Triage: Development and Validation



Optimal cutoffs XGBoost
 if prob emergency > 0.175 -> emergency
 if prob elective > 0.750 -> elective
 else-> urgency



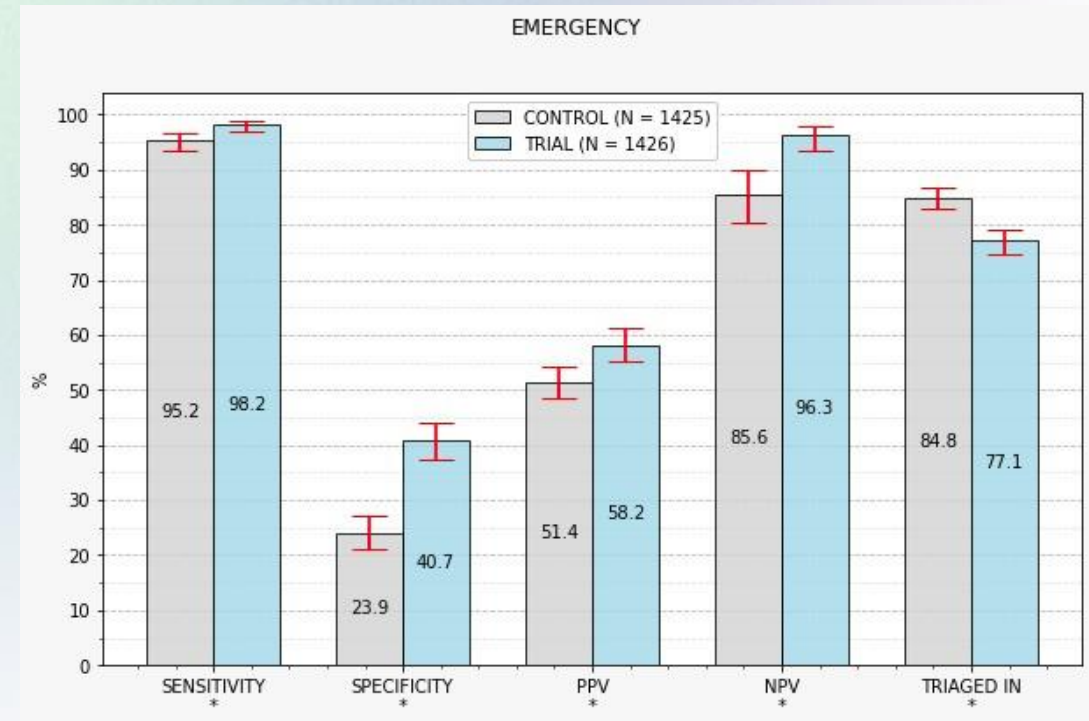
Pre-clinical testing: prospective data compared with expert triage nurses

	Nurses	Model
Emergency /See in A&E	Sens = 95.9 [94.4, 97.0] Spec = 25.5 [23.0, 28.2]	Sens = 94.3 [92.6, 95.7] Spec = 43.3 [40.8, 46.7]
Urgency/ See in UCC	Sens = 6.7 [4.1, 10.6] Spec = 96.7 [95.8, 97.5]	Sens = 19.3 [14.7, 24.6] Spec = 93.9 [93.9, 95.0]
Elective / Primary Care	Sens = 24.5 [21.7, 27.5] Spec = 96.9 [95.7, 97.8]	Sens = 37.1 [33.9, 40.4] Spec = 94.5 [93.0, 95.7]
Potential to reduce urgent referrals by 12.8% [10.0% - 15.6%]		

Insights from the usability assessment

- High ease of use (90%+)
- Safety perception (85%)
- Fast processing time (95%)
- Clinicians' willingness to incorporate DOTS (95%)

Clinical evaluation: Trial at Moorfield's A&E assessing human-computer interaction



Before and after the study implemented at Moorfield's City Road A&E

Potential savings: £900k/year

Next steps: submit technical file for medical device certification.

Acknowledgements

NIHR | National Institute
for Health Research

**ACCELERATED
ACCESS
COLLABORATIVE**



- Dr Alex Day
- Dr Gordon Hay
- Dr Anish Jindal
- Dr Johnson Neo
- Dr Priyanka Sanghi
- Dr Peter Thomas
- Triage nurses
- IT team
- Patients from the lay advisory board



- Dr Camilo Resende
- Chris Phillips
- Elsa Lee
- Jovin D'Costa
- Steve Varley
- Lorin Gresser
- Mark Johnson
- Marcus Stow
- Luke Smith

Thank you!

www.demdx.com

mariane@demdx.com



N-Tidal DiagnoseTM

Rapid, accurate, point-of-care diagnosis

Dr Gabriel Lambert
Head of Clinical Operations

TidalSense

TidalSense

COPD

63%

Precision of spirometry in diagnosing COPD in primary care (positive predictive value).¹

2nd

Leading cause of hospital admissions in England.²

3rd

COPD is the 3rd leading cause of death in the world.³

“We advocate for...disruptive approaches to diagnosis that are not solely based on spirometric airflow limitation”

COPD Lancet Commission
2022



N-Tidal Diagnose™

A fundamental shift in respiratory diagnostic management driven by machine intelligence



Relaxed breathing



Global 4G connectivity

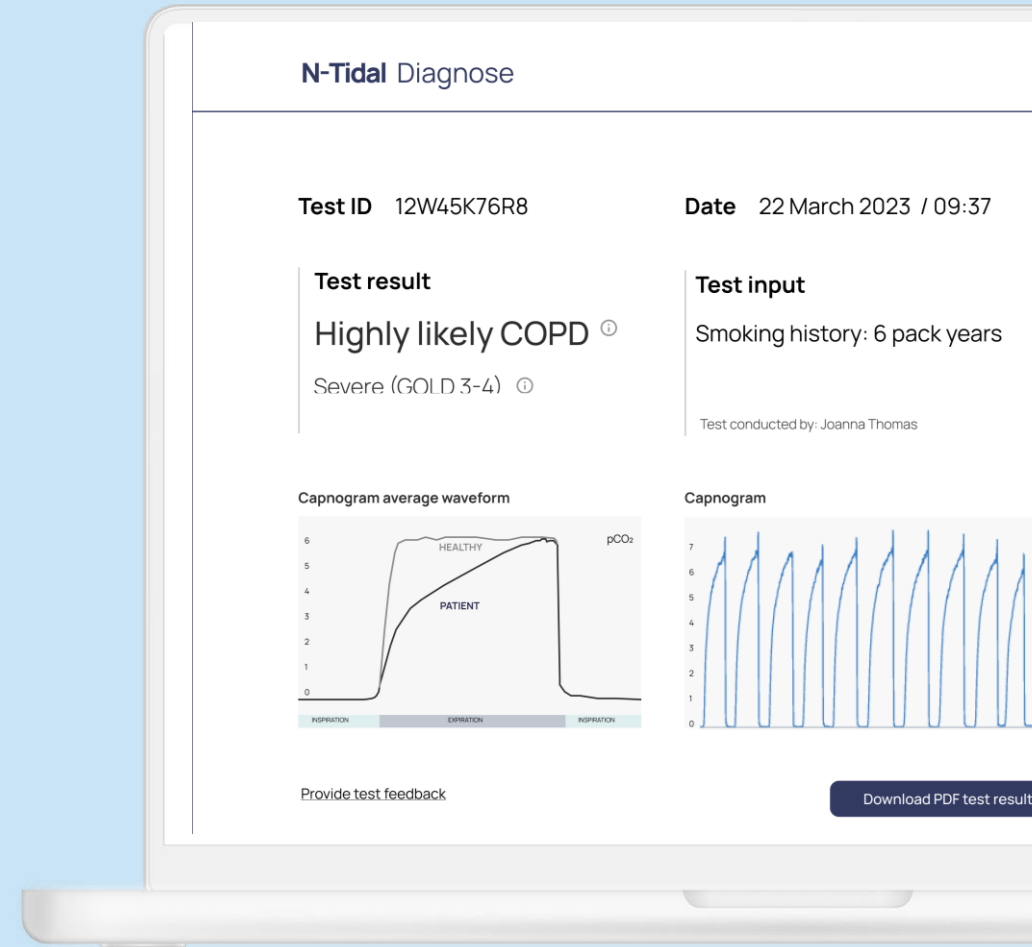


Clinician dashboard

Next-generation CO₂ sensor

TidalSense AI engine

Breath to result <5min



Thank you

Dr Gabriel Lambert

Head of Clinical Operations

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TidalSense

Sense

References

1. Schneider A, Gindner L, Tilemann L, Schermer T, Dinant GJ, Meyer FJ, Szecsenyi J. Diagnostic accuracy of spirometry in primary care. BMC pulmonary medicine. 2009 Dec;9(1):1-0.
2. Stone PW, Osen M, Ellis A, Coaker R, Quint JK. Prevalence of Chronic Obstructive Pulmonary Disease in England from 2000 to 2019. International Journal of Chronic Obstructive Pulmonary Disease. 2023 Dec 31:1565-74.
- 3 Organization WH. The top 10 causes of death. 2020. <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death> Accessed 12 May 2022

Our solution

Minuteful for Wound

A digital, AI-powered wound management solution

- ✓ **CE certified** and **NHS DTAC** compliant digital wound management technology
- ✓ Aligned with the **NWCSP** best practice pathways
- ✓ **Directly integrated** to EMIS and SystemOne EPRs



systemone

EMIS

What we are doing is transforming wound care ...

Analogue wound care



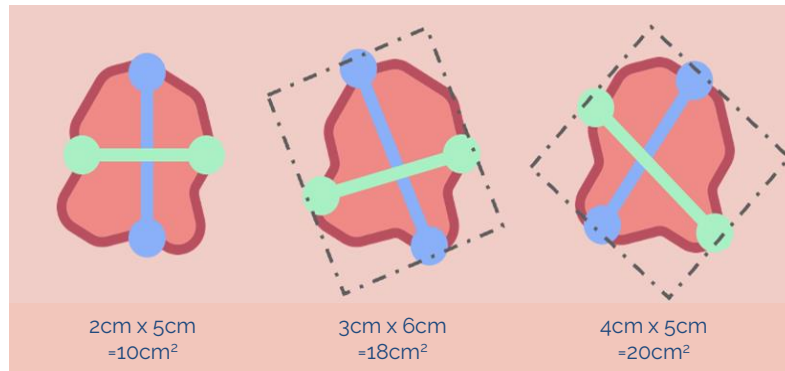
Digital wound care



Why AI?

Our technology enhances the accuracy, quality and consistency of wound measurements

Same wound, different measurements



MfW AI technology ensures **quality of imagery**: distance, orientation, blur, lighting conditions, colour recognition.

MfW AI technology detects the outline of a wound to give a **consistent** and **comparable** surface area measurements.

Consistent and comparable



These AI generated measurements are used to **identify and flag deteriorating and static wounds** focusing scarce specialist resources on the right people at the right time.

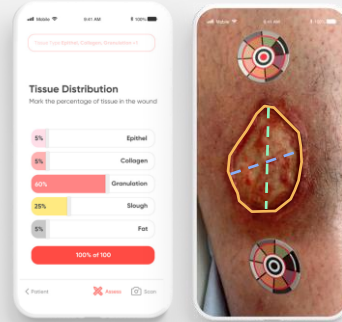
Our AI-powered digital solution focuses on the root causes across the care continuum



Capture

Clinician records wound images using smartphone, making it accessible at the point of care. App creates 3D model of wound using AI for **accurate, consistent** measurements

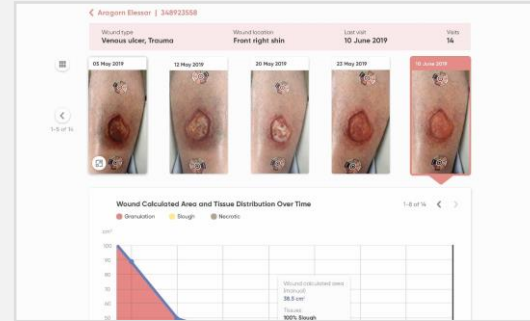
50%
reduction in
documenting time



Assess

Clinician adds notes using templates that are in-line with clinical guidelines (including measurement, location and tissue distribution), **standardising assessments**

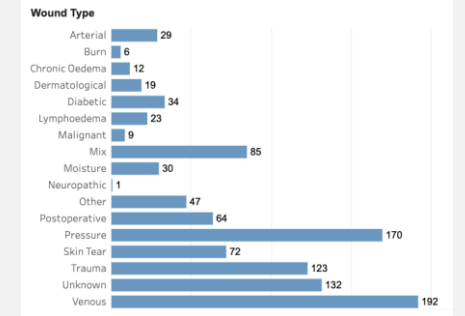
230%
more patients reviewed
by a senior nurse



Oversee

Information centralised to portal and synced with electronic patient record, so the whole team has visibility of all wounds and progress from anywhere

66%
reduction in visits due
to virtual oversight



Intervene

Clinical insights enable leadership to **intervene at the first sight** of complication or variation in care; identify operational efficiencies and skill/resource mix requirements

64%
reduction in wound
care incidents

Benefits to the system and patients

Healing patients faster

January 2022 - May 2023					May 2023 - June 2023			
16 Months					Less than 1 month			2 weeks



94 year old male with a lower limb ulceration referred by GP to our INT service



Weekly INT visits commenced

No assessment is conducted for compression therapy



Wound deteriorates due to suboptimal treatment plan



Twice weekly INT visits commenced

No assessment is conducted for compression therapy



Wound deteriorates due to suboptimal treatment plan



In May 2023 patient's wound is flagged as deteriorating by MfW



In May 2023 TVN reviews the patients due to the deteriorating flag and admits the patient to the wound service caseload



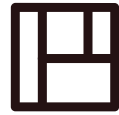
Patient has a doppler and lower limb assessment, wound is diagnosed and treatment is optimised to include gold standard compression therapy



Just **2 weeks later** the patient's wound **healed** and the patient is discharged

Lack of caseload visibility - meant the patient was not identified as being in sub-optimal treatment or that the wound was continuing to deteriorate

No specialist input - The Sirona wound care service relies on referrals from INT teams in the identification of patients that can benefit from the service. This patient was not referred



Thank you

For more information please contact

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debbie.foley@healthy.io

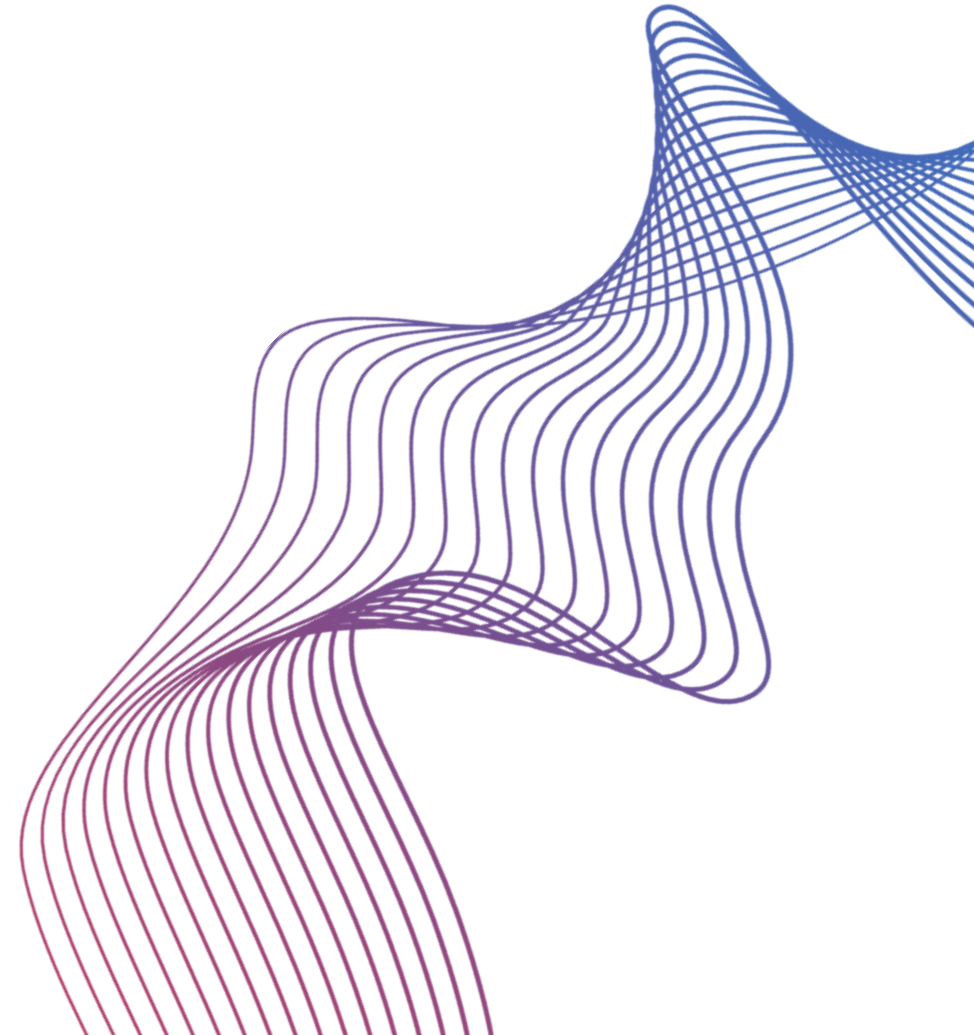


PSYRIN

At the DIGITAL HEALTH AI & DATA conference October 2023

Raheem Chaudhry MBBS
Co-Founder, Psyrin

raheem@psyrin.co.uk



0
2

What we do

Psyryn uses speech and AI to detect serious mental illness early, enabling preventive interventions

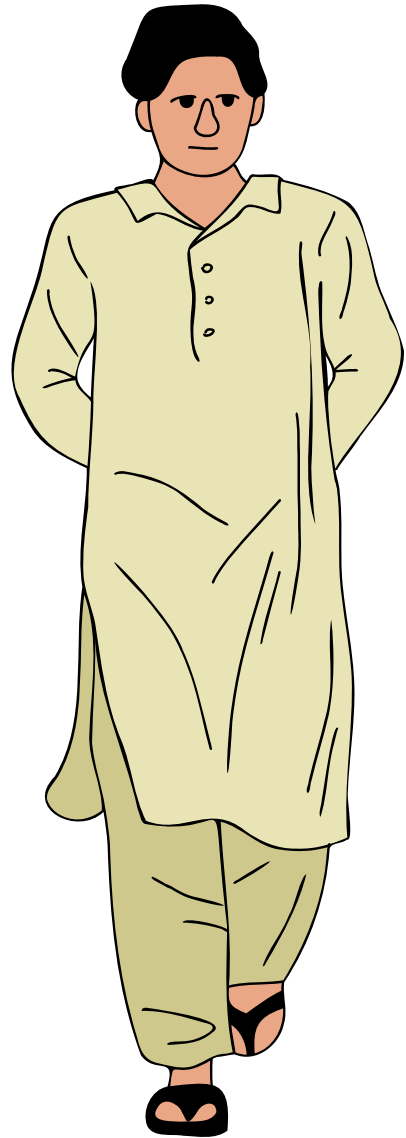
Imran*



Imran*



Imran's dad



“An odd man...

“He saw jinn...

“He refused food and water...

Died at 45



Fled to the UK as a refugee

Family history of psychosis

At Risk Mental State



Had a social worker

Help-seeking

Stuck on a waiting list with only a single
phone call



Eventually developed psychosis

Picked up by police, lost his job

Hospitalised and treated

Clinical care for serious mental illnesses (SMI) is broken...

145

MILLION

people globally suffer from an SMI



£398

BILLION

global societal spend on SMI care



£180

BILLION

global payor payout for SMI care





...because clinical diagnosis is lengthy, late & subjective



Gold-standard clinical interview takes 90 minutes

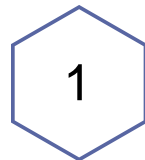
Leads to lengthy delays in care

Average 9.5 years to receive diagnosis of bipolar

Everything from initial phone call is subjective

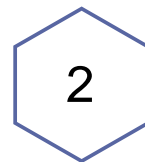
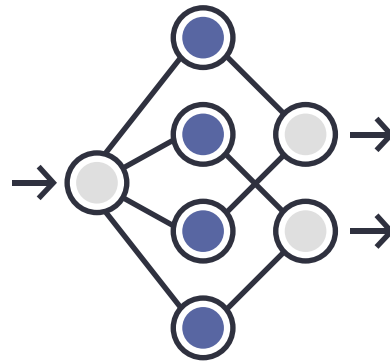
Accuracy of initial SMI diagnosis between 0% - 54%

Our tech lets clinicians make quick, early & objective diagnoses



VOICE RECORDED VIA APP

5-minutes of voice recordings (starting with prompted tasks)



PSYRIN ANALYSIS

Linguistic & acoustic analysis via proprietary ML models

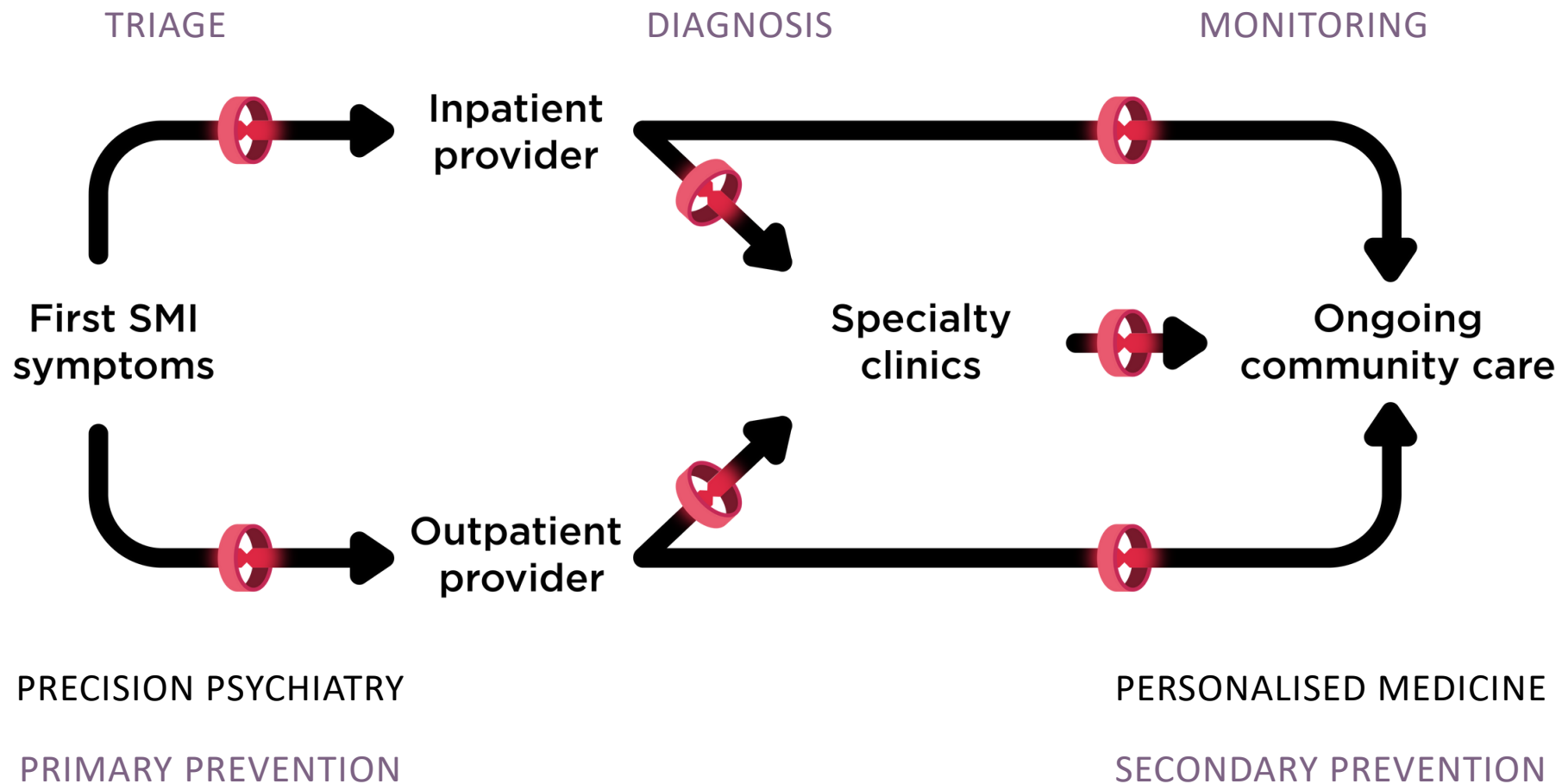


CASE REPORT FORM, DIAGNOSIS & SUGGESTIONS

Enables preventive & personalised interventions



...with multiple applications across the clinical workflow





In and out of facilities

On benefits and council care

Episodes of health and relapse

We've built the largest proprietary speech-SMI dataset

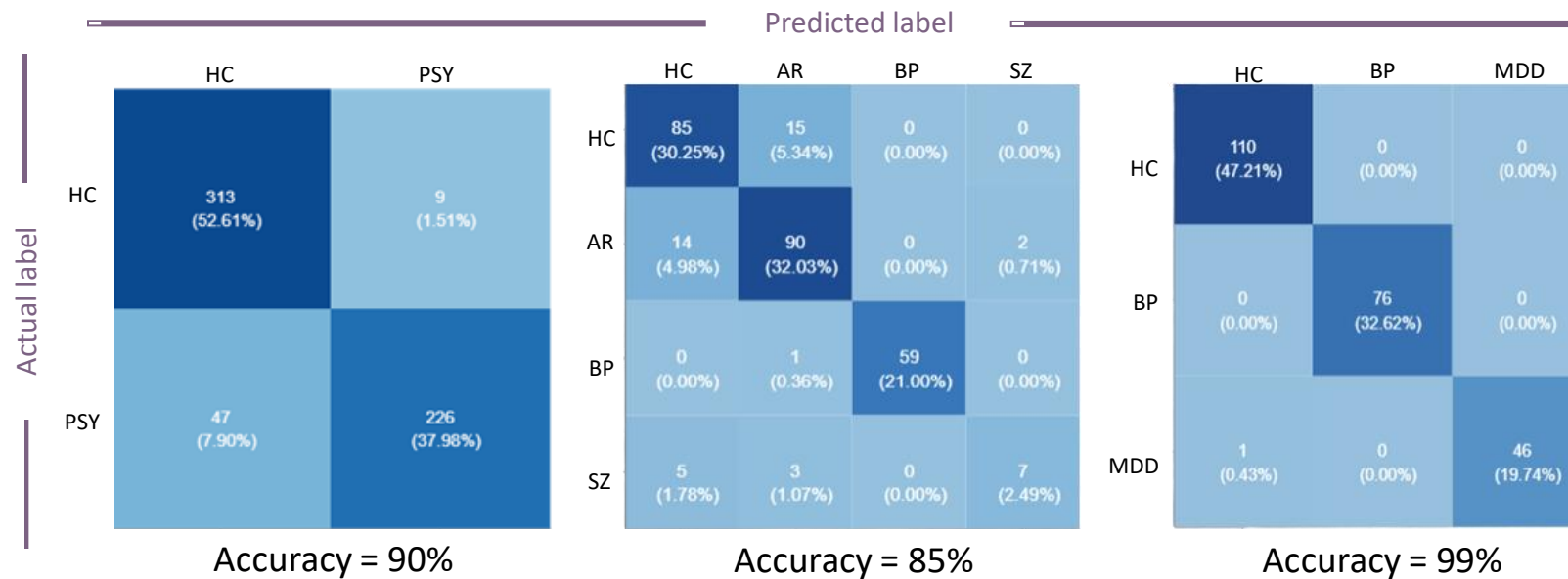
1150 individuals (> 22,000 mins of labelled speech)

160+ features extracted with just 5 minutes of speech

Across NLP (coherence, tangentiality, syntactic complexity, connectivity etc.) and signal processing (acoustic analysis)

The most accurate ML algorithms in psychiatry

No other group has achieved classification across >2 psychiatric categories



HC: healthy control | PSY: psychosis | AR: at-risk | BP: bipolar | SZ: schizophrenia | MDD: depression

leading to 9 partnerships to develop a deep research & product development portfolio

Clinical (FDA pivotal) & research partnerships



Collaborative partners for grant applications







BUILD THE FUTURE OF MENTAL HEALTH WITH

PSYRIN

the technology enabling preventive care for
serious mental illness

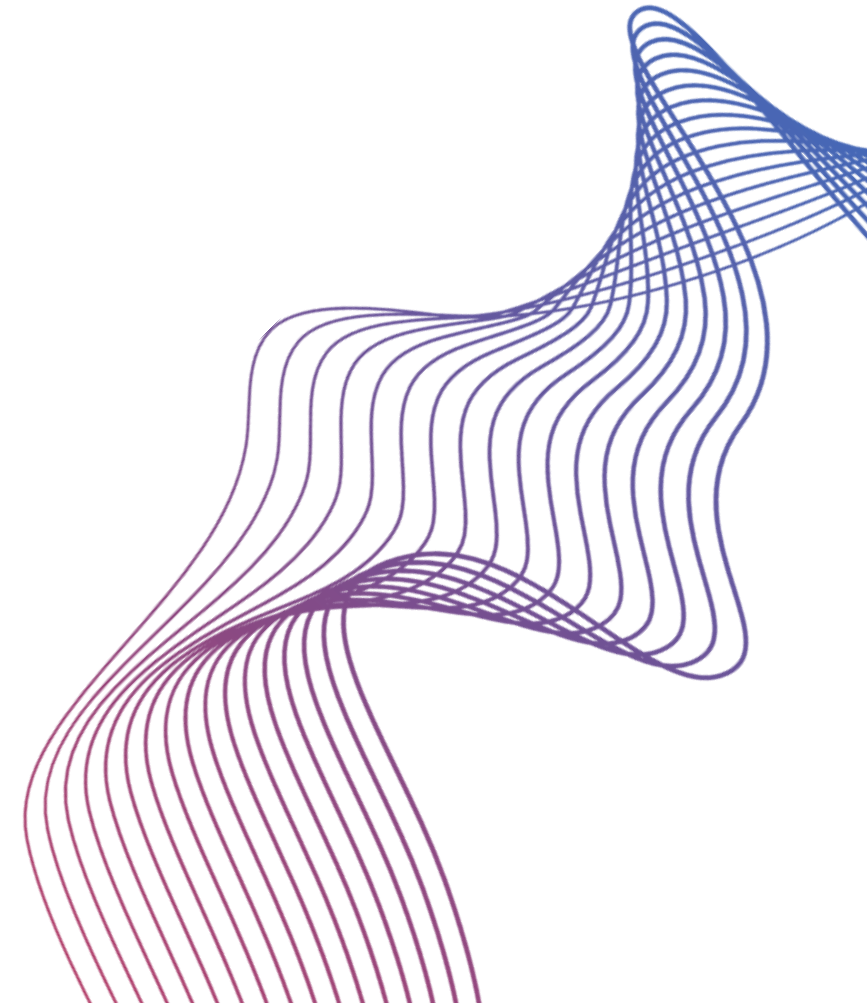
Supported by industry leaders in deeptech & AI

conceptionx [XTX]
VENTURES

Get in touch



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AI + DATA

AI-powered decision support for clinicians

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