CONVENZIS

10th July 2024 | Radisson Blu Hotel, Manchester Airport

Agenda for today:

Welcome to the 7th NHS Oncology Conference!

10th July 2024
9am – 5:30pm
Radisson Blu Hotel, Manchester Airport

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SCAN ME

Chair Opening Address

Dr Neil Bayman

Medical Director - The Christie NHS FT

Navigating Health Inequalities: Personalised Care in Oncology Services within the NHS Panel Discussion

Dr Anthony Cunliffe
National Lead Medical Adviser and the Clinical Adviser for London at Macmillan Cancer Support - Joint Clinical Director for the South East London Cancer Alliance

Dr Emma Hyde
Clinical Director - Personalised Care Institute

Naman Julka-Anderson
Research Radiographer and Allied Health Professional Clinical Advisor - The Royal Marsden NHS Foundation Trust, Institute of Cancer Research and Macmillan Cancer Support.

Leah Morgan
Personalised Care Lead & Cancer Improvement Facilitator - The Shrewsbury and Telford Hospitals NHS Trust

Fiona Cook
Macmillan Personalised Care & Health Inequalities Lead - North Tees and Hartlepool NHS Foundation Trust

Refreshments & Networking

Chair Opening Address

Dr Neil Bayman

Medical Director - The Christie NHS FT

Case Study…

THOR®
THE FUTURE OF MEDICINE

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SCAN ME

Speaking Now…

James Carroll

CEO - THOR Photomedicine Ltd


NHS ONCOLOGY
CONFERENCE
Exploring innovation and best practice

Case Study…

Slido

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SCAN ME

Speaking Now…

Aldo Rolfo

Executive Manager, Strategic Growth - Icon Group

7th NHS Oncology Conference: Exploring Innovation and Best Practice

Pathway Innovation & Improvement in Radiation Oncology Services

Icon Group UK

Aldo Rolfo, Claire Smith, Dr Penny Kechagioglou

July 2024

Icon Group: Headquartered in Australia, Present in 8 Countries Delivering High Quality Care Close to Home

An Integrated Platform: Radiation Oncology, Medical Oncology, Specialist Pharmacy and Aseptic Stable Drug Compounding

- Australia
- New Zealand
- Mainland China
- Singapore & Hong Kong
- Vietnam & Malaysia
- United Kingdom

Icon Group: Headquartered in Australia, Present in 8 Countries Delivering High Quality Care Close to Home

An Integrated Platform: Radiation Or … **Pharmacy and Aseptic Stable Drug Compounding**

Breaking News
Monday 8 July 2024

United Kingdom

Icon in deal to buy UK drugs manufacturer Pharmaxo

By GLEN NORRIS 12:00 AM JULY 9, 2024

Icon Group CEO Mark Middleton.

Brisbane-based cancer care group Icon has announced a big investment in the UK with the acquisition of pharmaceutical manufacturer Pharmaxo.

The owner of Bath ASU, Pharmaxo Healthcare and Pharmaxo Scientific also is a clinical homecare provider based in Wiltshire in southwest England. The price of the deal was not disclosed.

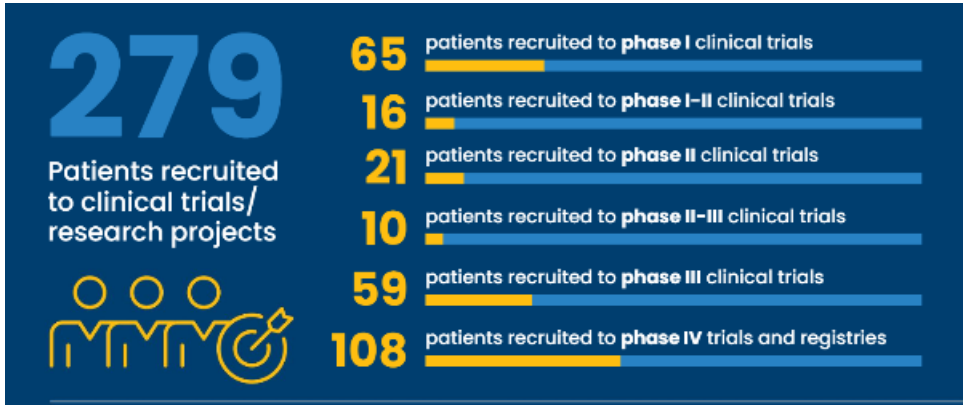
Icon says the acquisition is the next step in its growth strategy in the UK, complementing a strategic partnership with Nuffield Health to bring more cancer treatment capacity to underserved communities across the UK.

Icon Group: Headquartered in Australia, Present in 8 Countries Delivering High Quality Care Close to Home

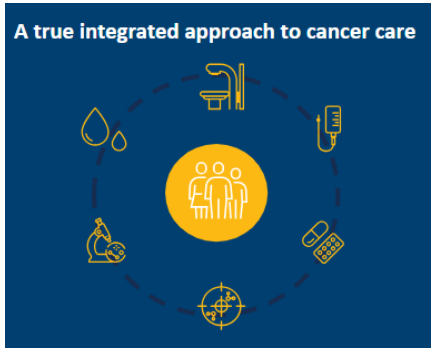
An Integrated Platform: Cancer Research and Trials is at the Heart of our Operational Model.

2023 Research Report

Across 2023 we recruited and enrolled….

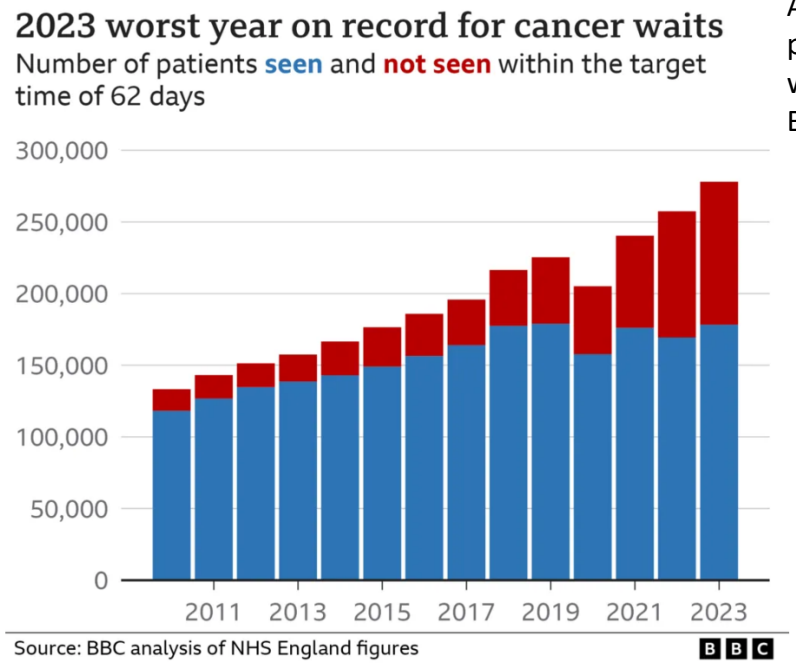


Research & Trials Integrated into all aspects of care



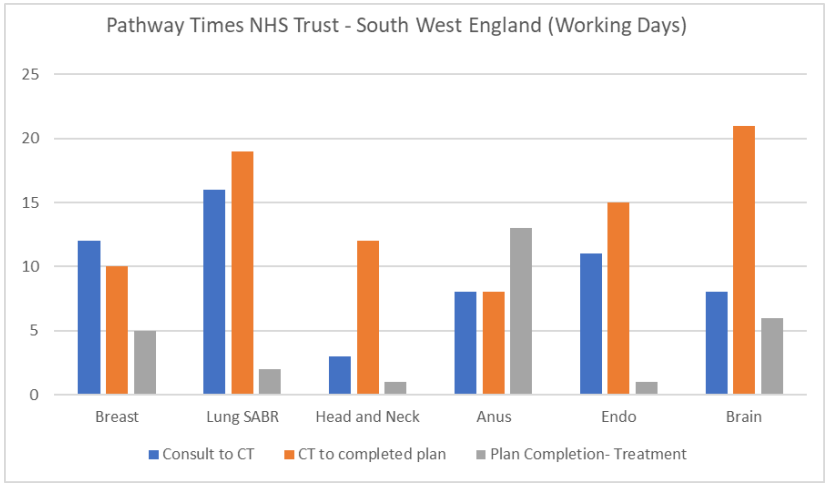
Pathway Innovation & Improvement in Radiation Oncology Services

The Case for Change - Cancer



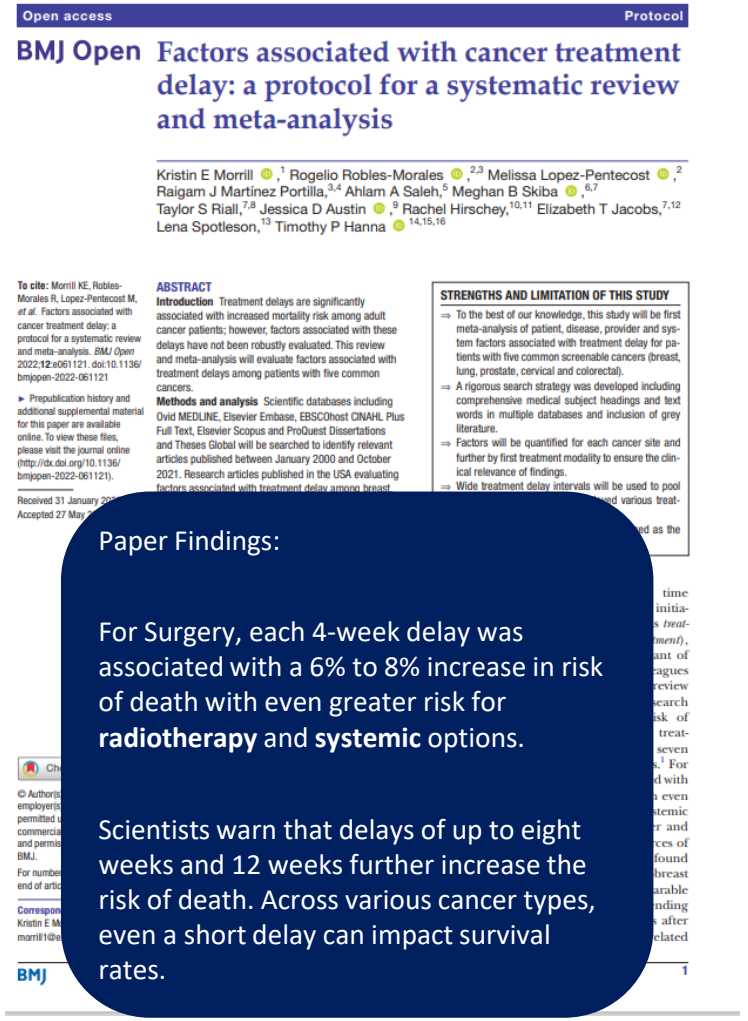
The Case for Change - Radiotherapy

At a sample NHS Trust – it takes on average 27 Days to get a patient with a newly diagnosed Breast Cancer from Consultation with a Clinical Oncologist to First Radiotherapy Treatment. For Brain Tumours, this can take 35 Days.



Source: Clinical Consultant Provided Data May 2024

The Case for Change – Why?


Open access Protocol

BMJ Open

Factors associated with cancer treatment delay: a protocol for a systematic review and meta-analysis

Kristin E Morrill ,[1] Rogelio Robles-Morales ,[2,3] Melissa Lopez-Pentecost ,[2] Raigam J Martínez Portilla,[3,4] Ahlam A Saleh,[5] Meghan B Skiba ,[6,7] Taylor S Riall,[7,8] Jessica D Austin ,[9] Rachel Hirschey,[10,11] Elizabeth T Jacobs,[7,12] Lena Spotleson,[13] Timothy P Hanna [14,15,16]

To cite: Morrill KE, Robles-Morales R, Lopez-Pentecost M, *et al*. Factors associated with cancer treatment delay: a protocol for a systematic review and meta-analysis. *BMJ Open* 2022;**12**:e061121. doi:10.1136/bmjopen-2022-061121

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2022-061121).

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Accepted 27 May 2

ABSTRACT

Introduction Treatment delays are significantly associated with increased mortality risk among adult cancer patients; however, factors associated with these delays have not been robustly evaluated. This review and meta-analysis will evaluate factors associated with treatment delays among patients with five common cancers.

Methods and analysis Scientific databases including Ovid MEDLINE, Elsevier Embase, EBSCOhost CINAHL Plus Full Text, Elsevier Scopus and ProQuest Dissertations and Theses Global will be searched to identify relevant articles published between January 2000 and October 2021. Research articles published in the USA evaluating

STRENGTHS AND LIMITATION OF THIS STUDY

⇒ To the best of our knowledge, this study will be first meta-analysis of patient, disease, provider and system factors associated with treatment delay for patients with five common screenable cancers (breast, lung, prostate, cervical and colorectal).
⇒ A rigorous search strategy was developed including comprehensive medical subject headings and text words in multiple databases and inclusion of grey literature.
⇒ Factors will be quantified for each cancer site and further by first treatment modality to ensure the clinical relevance of findings.
⇒ Wide treatment delay intervals will be used to pool

BMJ

Paper Findings:

For Surgery, each 4-week delay was associated with a 6% to 8% increase in risk of death with even greater risk for **radiotherapy** and **systemic** options.

Scientists warn that delays of up to eight weeks and 12 weeks further increase the risk of death. Across various cancer types, even a short delay can impact survival rates.

Pathway Innovation & Improvement in Radiation Oncology Services

Points for Discussion Today: Bringing Innovation & IP to the UK to Improve Performance and Reduce Cost in the delivery of Radiation Care

1. Radiation Treatment Services in Partnership with Nuffield Health
2. Remote Overnight Radiation Treatment Planning Services
3. Remote Radiation Equipment Commissioning Services
4. Case Study: Pathway Innovation Reducing Path Length by 20 Days

The impact of delayed cancer treatments

FEATURE STORIES | 09 Nov 2020

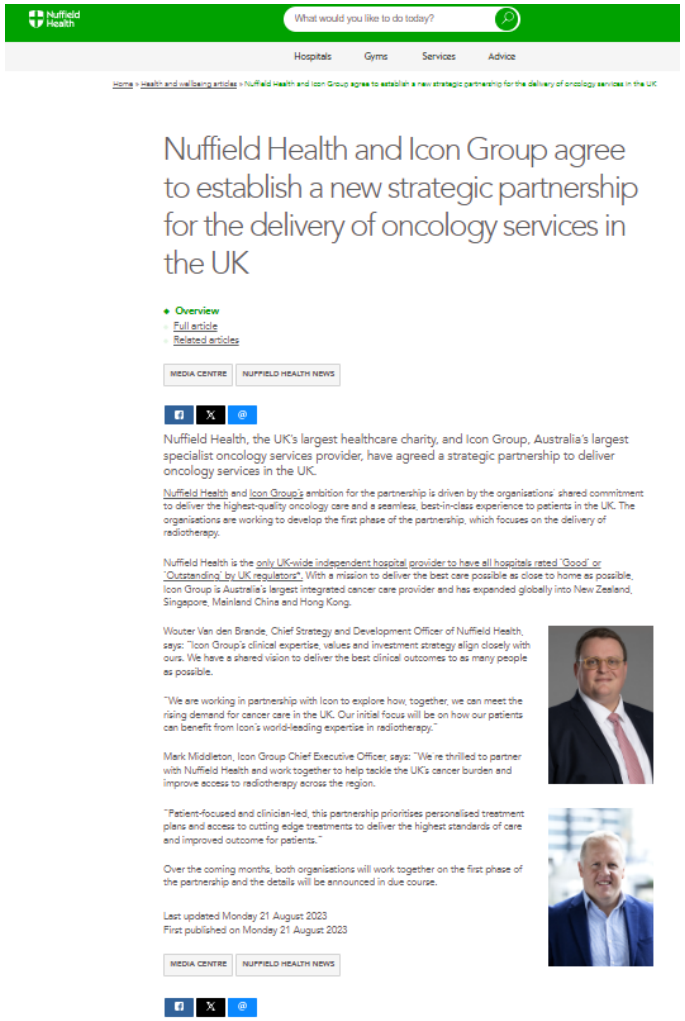
This story was originally published in the Queen's Gazette

New research shows minimizing treatment delays could improve cancer survival rates.

A new international study led by researchers from Queen's University and King's College London has found there is a significant impact on a person's mortality if their cancer treatment is delayed by even one month. The study published Nov. 6 in the British Medical Journal (BMJ) found in many cases, patients have a six to 13 per cent higher risk of dying from cancer if their treatment is delayed by four weeks. The risk keeps rising the longer their treatment does not begin. The study was led by Timothy Hanna, Associate Professor (Oncology) at the Cancer Research Institute at Queen's University, as well as Will King (Public Health Sciences) and Ajay Aggarwal (King's College London).

1 Radiation Treatment Services: Small Footprint/Rapid Build Services with Go-live in <8 months

The Icon Nuffield Partnership: 12 x National Hub & Spoke Network Centres delivering timely Radiotherapy. A Rapid Scale Opportunity



Nuffield Health

What would you like to do today?

Hospitals Gyms Services Advice

Home » Health and wellbeing articles » Nuffield Health and Icon Group agree to establish a new strategic partnership for the delivery of oncology services in the UK

Nuffield Health and Icon Group agree to establish a new strategic partnership for the delivery of oncology services in the UK

- Overview
- Full article
- Related articles

MEDIA CENTRE | NUFFIELD HEALTH NEWS

Nuffield Health, the UK's largest healthcare charity, and Icon Group, Australia's largest specialist oncology services provider, have agreed a strategic partnership to deliver oncology services in the UK.

Nuffield Health and Icon Group's ambition for the partnership is driven by the organisations' shared commitment to deliver the highest-quality oncology care and a seamless, best-in-class experience to patients in the UK. The organisations are working to develop the first phase of the partnership, which focuses on the delivery of radiotherapy.

Nuffield Health is the only UK-wide independent hospital provider to have all hospitals rated 'Good' or 'Outstanding' by UK regulators*. With a mission to deliver the best care possible as close to home as possible, Icon Group is Australia's largest integrated cancer care provider and has expanded globally into New Zealand, Singapore, Mainland China and Hong Kong.

Wouter Van den Brande, Chief Strategy and Development Officer of Nuffield Health, says: "Icon Group's clinical expertise, values and investment strategy align closely with ours. We have a shared vision to deliver the best clinical outcomes to as many people as possible.

"We are working in partnership with Icon to explore how, together, we can meet the rising demand for cancer care in the UK. Our initial focus will be on how our patients can benefit from Icon's world-leading expertise in radiotherapy."

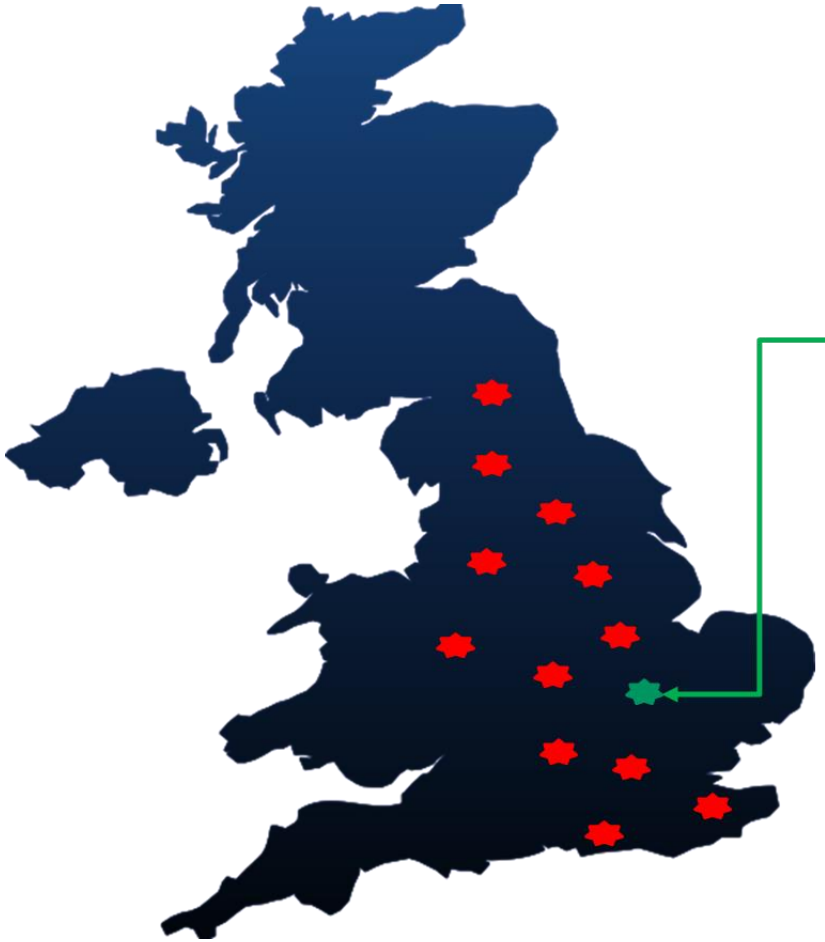
Mark Middleton, Icon Group Chief Executive Officer, says: "We're thrilled to partner with Nuffield Health and work together to help tackle the UK's cancer burden and improve access to radiotherapy across the region.

"Patient-focused and clinician-led, this partnership prioritises personalised treatment plans and access to cutting edge treatments to deliver the highest standards of care and improved outcome for patients."

Over the coming months, both organisations will work together on the first phase of the partnership and the details will be announced in due course.

Last updated Monday 21 August 2023
First published on Monday 21 August 2023

MEDIA CENTRE | NUFFIELD HEALTH NEWS



Cancer Centre London - Wimbledon UK

Small Footprint/Rapid Build Cancer Centre

1 Radiation Treatment Services: Small Footprint/Rapid Build Services with Go-live in <8 months

The Icon Nuffield Partnership: 12 x National Hub & Spoke Network Centres delivering timely Radiotherapy. A Rapid Scale Opportunity

Services

- Single Bunker/High End Linear Accelerator
- CT or PET/CT Imaging Platform
- Theranostics/Radionuclide Service Future Proofing
- Consulting Space
- Patient & Staff Amenities
- Flexible Clinical Trials, Research & Education Space

Construction Details

- Small footprint of 700SqM including services & plant
- Upper-level construction to support SACT
- Build time of c6months

Timelines

- Day 0 = Building, Planning and Construction Approval
- Day 20 = Foundations Completed
- Day 120 = Bunker Construction Completed
- Day 140 = Radiotherapy Equipment Installed
- Day 180 = Fit Out & Commissioning Completed
- Day 200 = Final Approvals
- Day 220 = First Patient Treatment

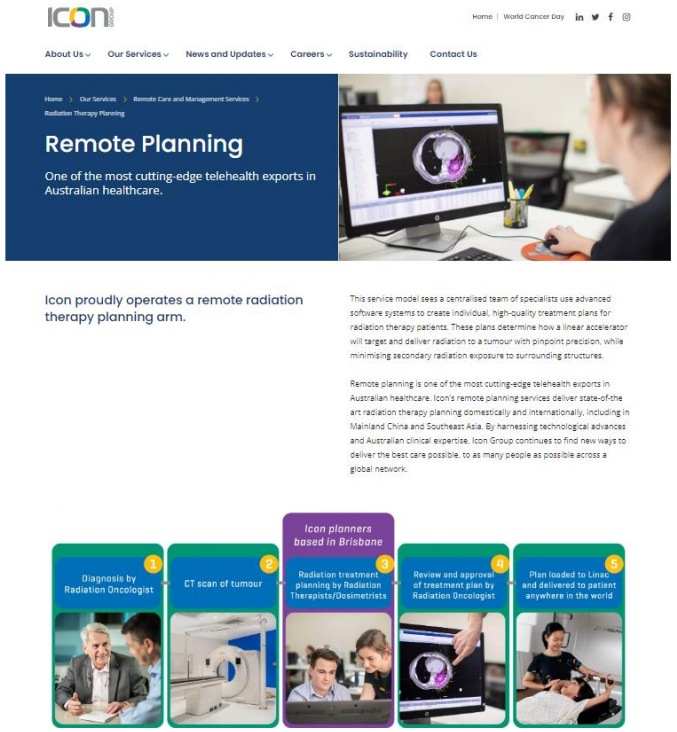
2 Remote Overnight Radiation Treatment Planning Services

Today in the UK, on average, the planning time is 2 to 4 weeks, best practice is less than 1 day.

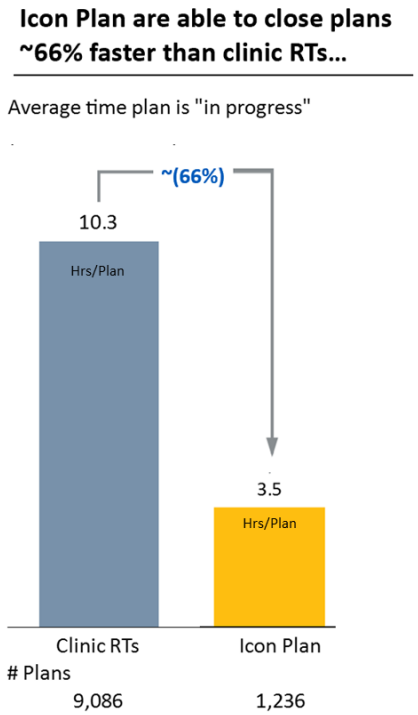
Icon uses its global network and its remote treatment planning capability (Icon Plan - Radiation Therapy Planning — Icon Group) to improve radiation treatment plan quality and timeliness, committing to deliver an overnight service. This resolves issues with time to treat and will significantly improve waiting times from Consultation to Simulation to Plan Delivery to Treatment commencement.

This service could be provided for all patients or select patients requiring high complex treatments such as Stereotactic Radiation Therapy – Services which are costly and difficult to implement, and which are generally only offered at key locations.

Remote Planning = Icon Plan



Automation, AI & Skill Investment



Icon Plan = State of the Art Plans, Highest Quality, Fixed Price

Icon Plan = Icon's Internal Remote Treatment Planning Service

- Data collected across 26 Radiation Oncology sites demonstrated that the reduction in time spent on production in plan development directly correlated to the overall lower number of days seen to elapse between simulation and treatment start
- Sites with average planning time of 10.5 hours/plan or above had a 75% longer time interval between simulation and treatment start compared with sites that develop plans in under 3.5 hours
- Sites outsourcing all planning to IconPlan were able to achieve consultation to simulation to treatment start time of <2 days
- All plans included in the data are modulated plans (IMRT or VMAT)
- Data includes stereotactic plans (50% of overall plans produced by IconPlan are modulated Stereotactic Plans)

*All plans are produced and then quality checked by an independent checker before returning to site

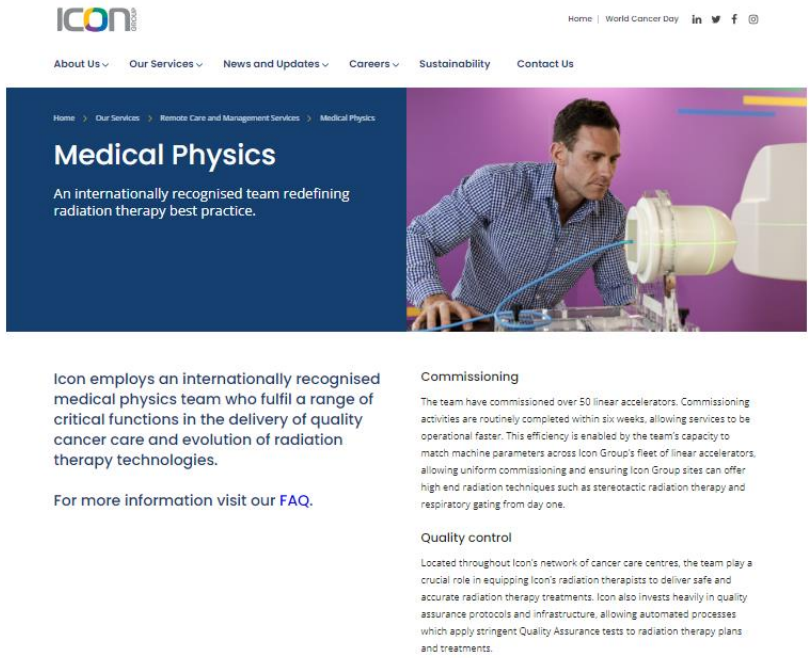
3 Remote Physics Commissioning Services

Today in the UK, on average, the time to commission a Linear Accelerator is 6 months, best practice is 4 weeks….

Icon uses its global network to support the commissioning of new or upgraded equipment to plan and deliver radiation treatments. This program delivers a significant time savings in terms of reducing downtime which contribute to waiting lists and timeline breaches. Often the UK based Physics teams take 6 months to complete this work, Icon can deliver a fully commissioned service in 4 weeks (depending on the scope and complexity of new or upgraded equipment).

More than 50 high end Linear Accelerators[1] across Australia, New Zealand, Singapore, Malaysia and Mainland China have been delivered on this timeline.

See [Medical Physics — Icon Group]



1. High end Linear Accelerators include Varian Truebeam including following functionality
   - Conformal, Static IMRT, RapidArc, HyperArc, HyperSight, 4D CT, KV and MV IGRT
   - SGRT (Identify, VisionRT, CRAD)

4 Case Study: Pathway Innovation Reducing Length by 21 Days and taking the 62 Day Target from 49% to 85%

Today in the UK, on average, the time take a patient from Consult to Treatment is 30 days, best practice is < 5 days (but could be next day).

The Icon Partnership Proposal Scoped for a NHS Trust

Optimise existing Pathways to reduce overall radiation timeline by net 20 days enabling 62-Day clinical targets to move from a threshold of 49% to >85%.

Utilising a combined data mining and lean methodology establish pathway optimisation and improved efficiency to deliver the following outcomes

- Improve CT Simulation access within 48 hours of referral by creating dedicated appointments and service commitments reducing pathway by 5 days.
- Implement remote overnight Radiotherapy surge planning & quality assurance capacity as an overflow and complexity management strategy reducing overall pathway by 10 days
- Improve efficiency on the Radiotherapy Linac by reducing treatment times from 20 minutes per appointment to 15 minutes immediately and 12 minutes subsequently to ensure patients move from planning to treatment within an overall 5 Day contracted pathway moving 62 Day performance to >85%.
- Net savings across Pathway review based on focussed activity on Breast and Prostate Treatments but applicable to the entire service demand with identified pathway improvement of 21 Days.

1

Referral/Consultation

Current Pathway = 7 Days

5 Day Saving

Proposed Pathway = 2 Days

CT Simulation

Net Pathway Saving = 5 Days

Create 6 Breast CT Appts/Day

Create 6 Prostate Appts/Day

All available within 48Hrs

Reduce scanning time from 40 mins to 25 mins

Implement AI driven Normal Tissue contouring

CT Scans delivered to Consultant within 3 hrs of scan

2

Planning CT Scan

Current Pathway = 12 Days

11 Day Saving

Proposed Pathway = 1 Day

Completed Plan/QA*

Net Pathway Saving = 11 Days

Use IconPlan to reduce overflow with next day plan

Reduce load on local team to enable next day plan

Implement more Planning Licences

Enable remote QA for all plans

Ensure plans approved by Clinical Oncologist <24hrs

3

Approved Treat Plan

Current Pathway = Up to 2 Weeks

5 Day Saving

Proposed Pathway = Up to 1 Week

1st Treatment

Net Pathway Saving = 5 Days

Create more efficiency on linear accelerator by

Phase 1 = Reduce Breast and Prostate Treatment Appointments from 20 mins to 15 mins creating up to 20 more appts per day across 3 existing linacs

Phase 2 = Reduce Breast & Prostate Treatment Appointments from 15 mins to 12 mins creating an additional 10 appts per day across 3 existing linacs.

Implement Remote Quality Assurance for all patient specific plans on an Icon network matched Linac reducing load on existing linacs

*Cost of IconPlan's remote planning service c50% lower than cost for locally developed plans – no requirement to backfill vacancies or cover the cost of overtime associated with managing delays or surge planning

*Cost of Remote Quality Assurance c50% lower than cost for local quality Assurance activities – no requirement to provide cover by highly remunerated Medical Physicists


What we do, matters. We are values-driven and purpose-led. We nurture and empower teams to deliver the best possible patient care.

Speaking Now…

Prof Lesley Anderson
Chair in Health Data Science
University of Aberdeen

GO BEYOND BOUNDARIES

Say Aye to AI: How could artificial intelligence applications aid breast cancer screening?

Professor Lesley Ann Anderson PhD MPHe BSc(Hons) PGCHET FHEA

1495 UNIVERSITY OF ABERDEEN

Chair in Health Data Science, University of Aberdeen.

lesley.anderson@abdn.ac.uk

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Who are we?

- Health Sciences
- Computing Sciences
- Bioimaging
- Bioengineering
- DaSH
- Clinical specialties
- eHealth

Health Intelligence

- Innovation Hub

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iCAIRD

Industrial Centre for Artificial Intelligence Research in Digital Diagnostics

The Industrial Centre for Artificial Intelligence Research in Digital Diagnostics

iCAIRD

50 Projects

40 Partners

20+ Publications

2 Platforms

7 Awards

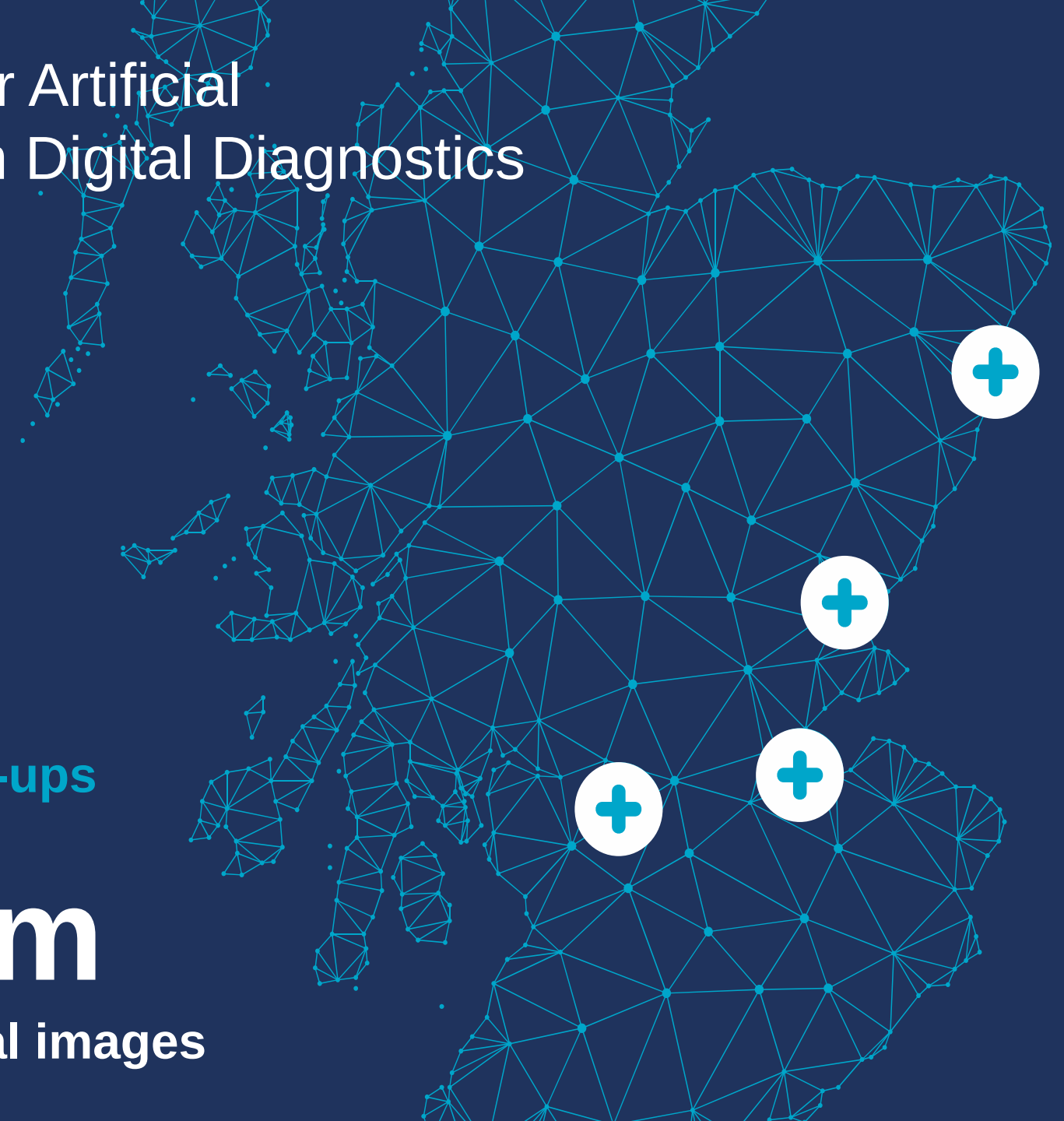
3 Products

4 Scale-ups

£25m Investment

400+ Staff

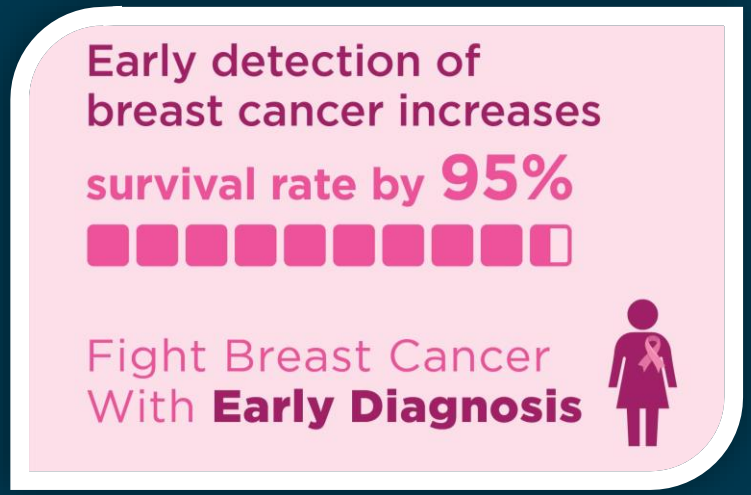
75m Medical images



Why do we need AI to support breast screening?

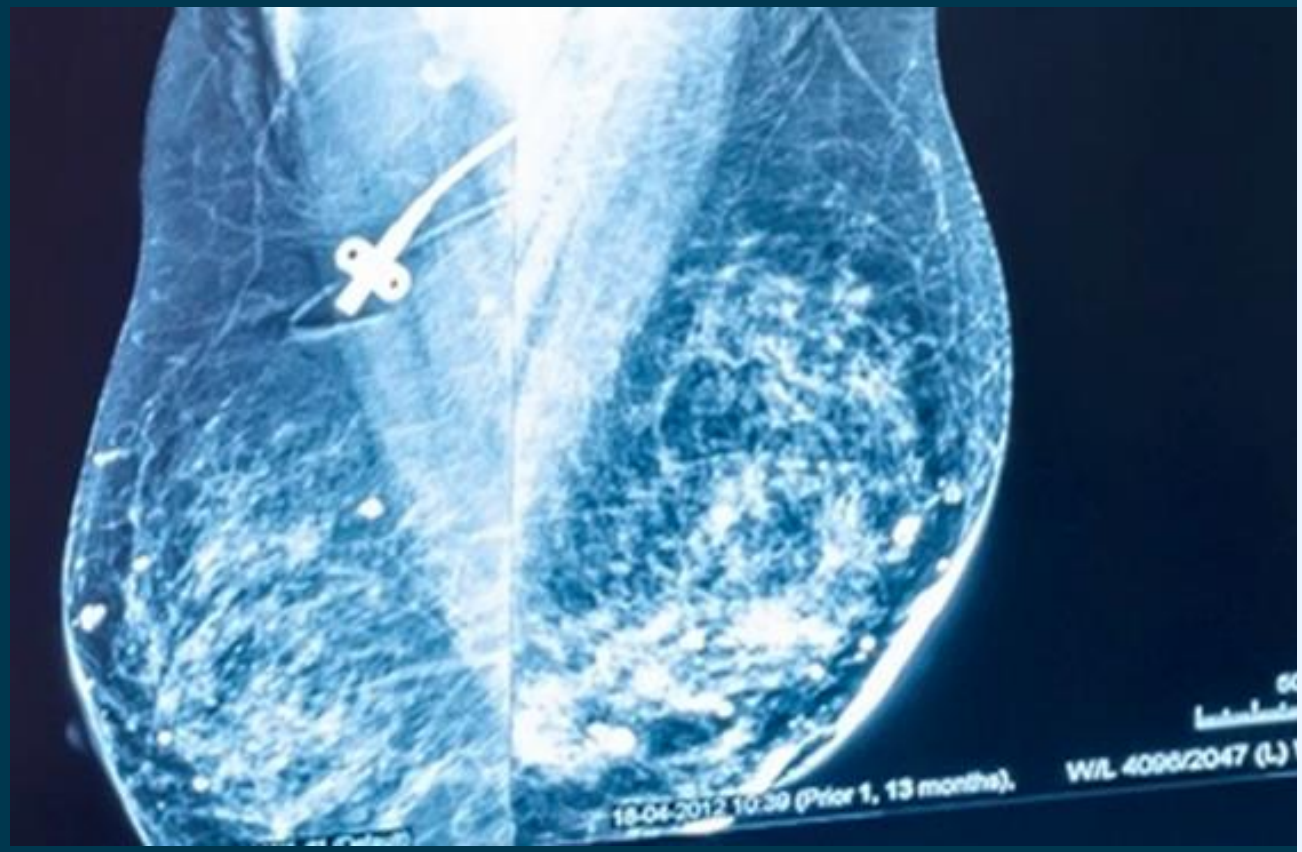
Radiologist Shortages

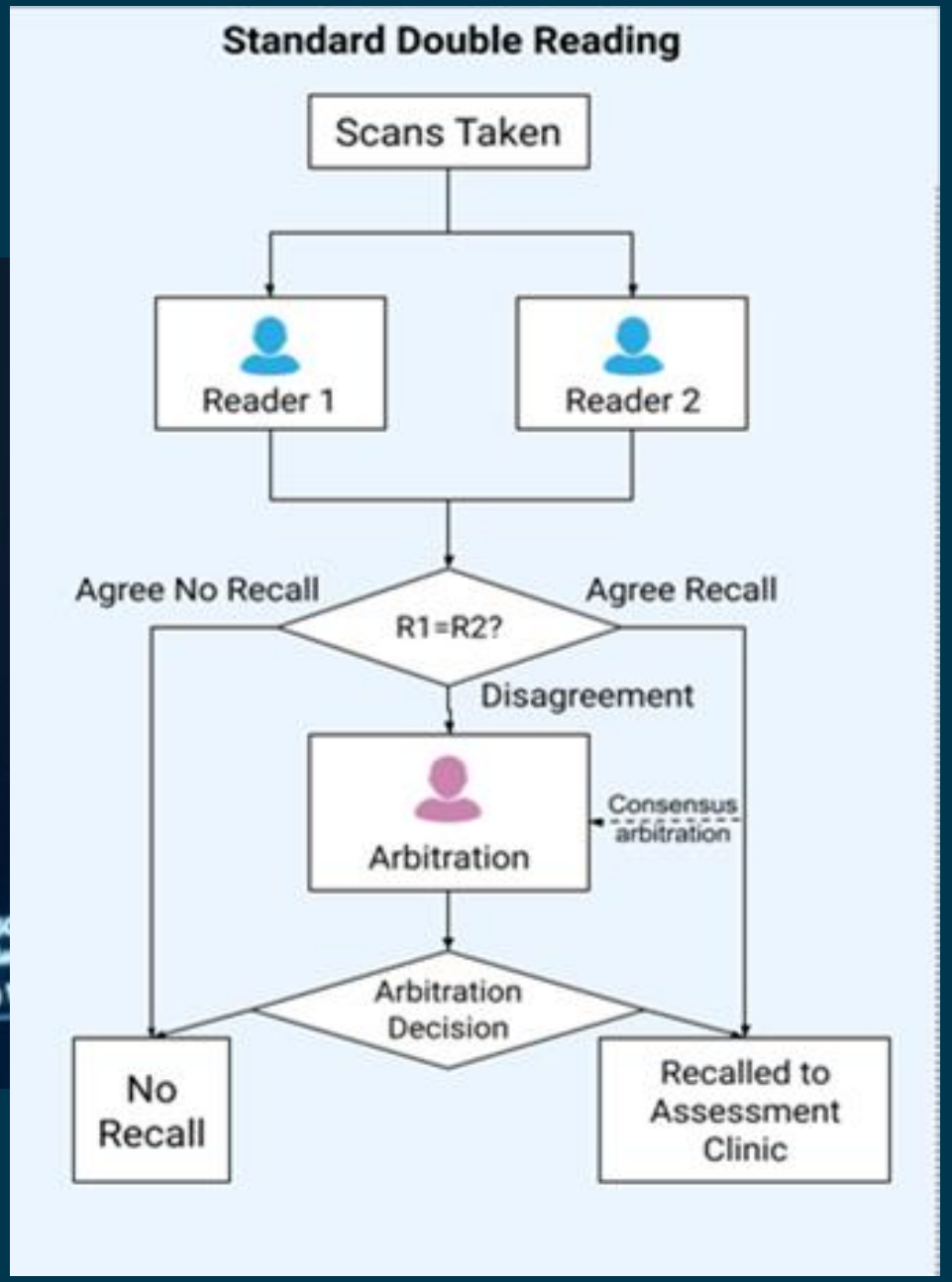
Aging population
More breast cancers



Improves survival

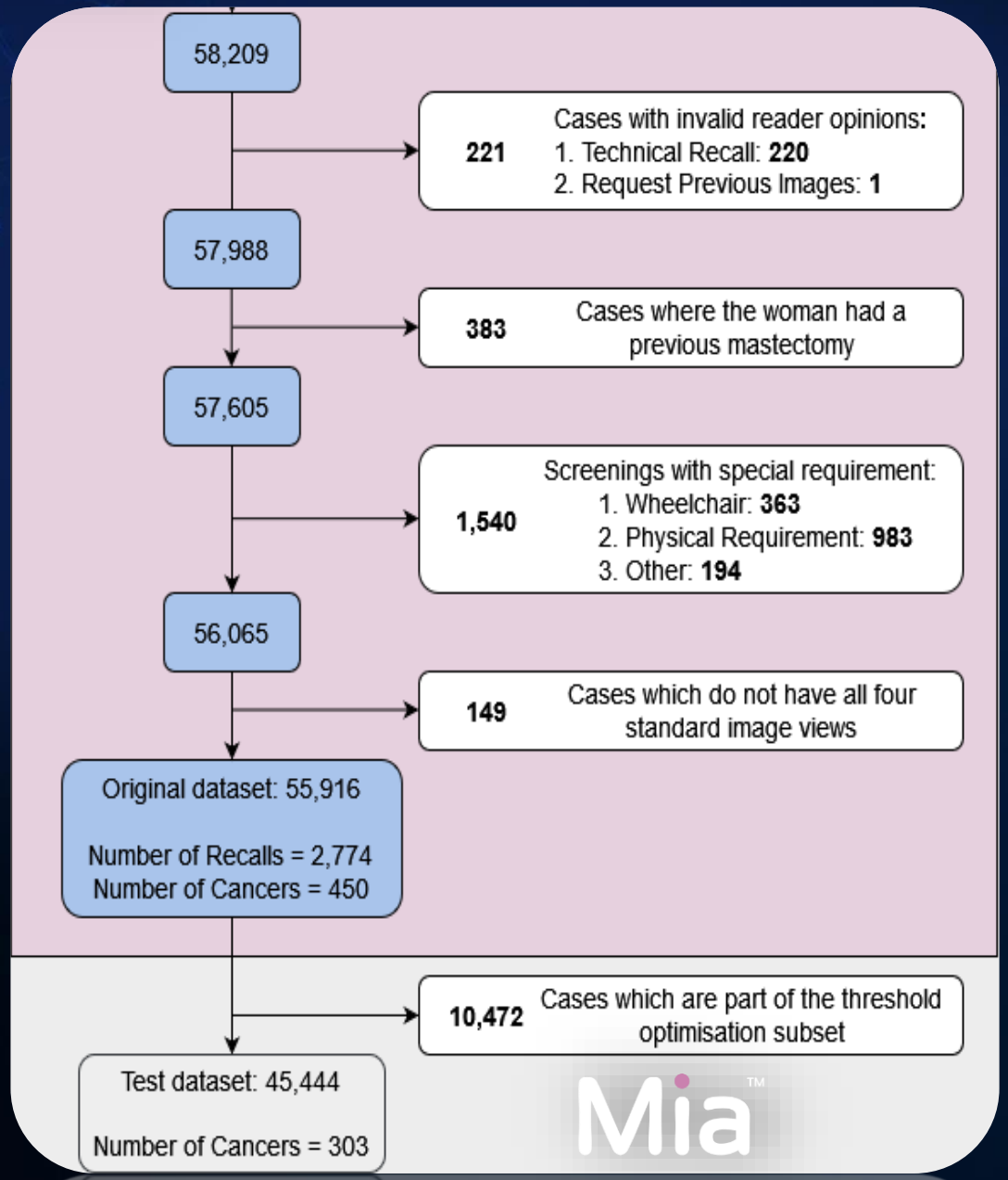
Routine Breast Screening





KHEIRON MEDICAL TECHNOLOGIES

AI in Breast Screening



de Vries *et al. Radiology AI* 2023;5(3)

KHEIRON MEDICAL TECHNOLOGIES Mia™

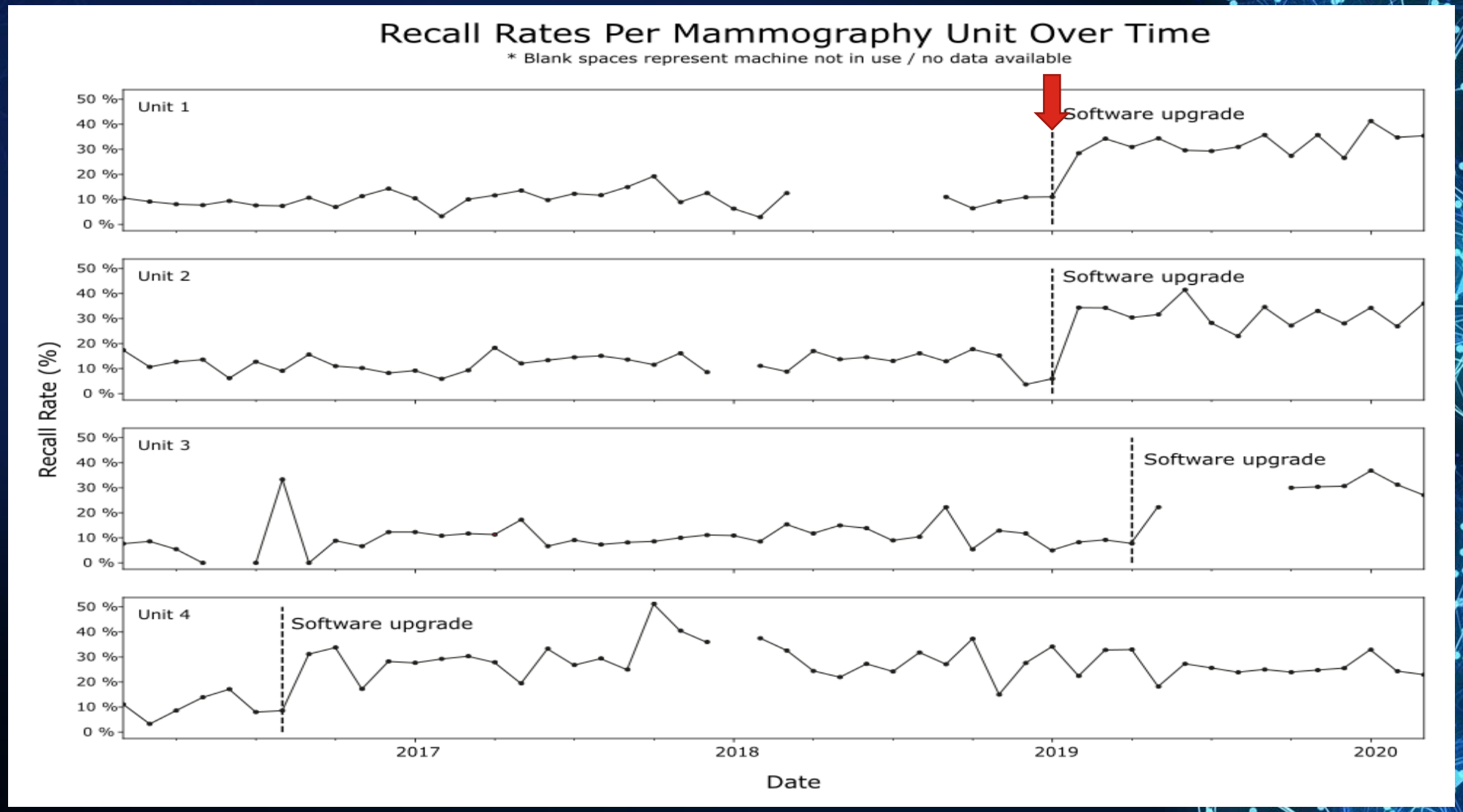
AI in Breast Screening

Mia™ and Reader 1 performance. Numbers in brackets indicate confidence intervals

	% Sensitivity	% Specificity	% Recall rate	Cancer detection rate (per 1,000)
Reader 1 - test dataset (N=45,444)	86.1 (81.7-89.8)	95.2 (95.0-95.4)	**5.4 (5.2-5.6)**	**5.7 (5.1-6.5)**
Mia™ - original dataset (N=55,916)				
Pre-specified threshold	97.3 (95.4-98.6)	47.7 (47.3-48.1)	**47.7 (47.3-48.1)**	**7.8 (7.1-8.6)**
Mia™ - test dataset (N=45,444)				
Pre-specified threshold	98.4 (96.2-99.5)	52.1 (51.6-52.5)	48.3 (47.8-48.7)	6.6 (5.8-7.3)
Updated thresholds	91.4 (87.7-94.3)	87.6 (87.2-87.9)	**13.0 (12.7-13.3)**	**6.1 (5.4-6.9)**

de Vries *et al. Radiology AI* 2023;5(3)

KHEIRON MEDICAL TECHNOLOGIES Mia™

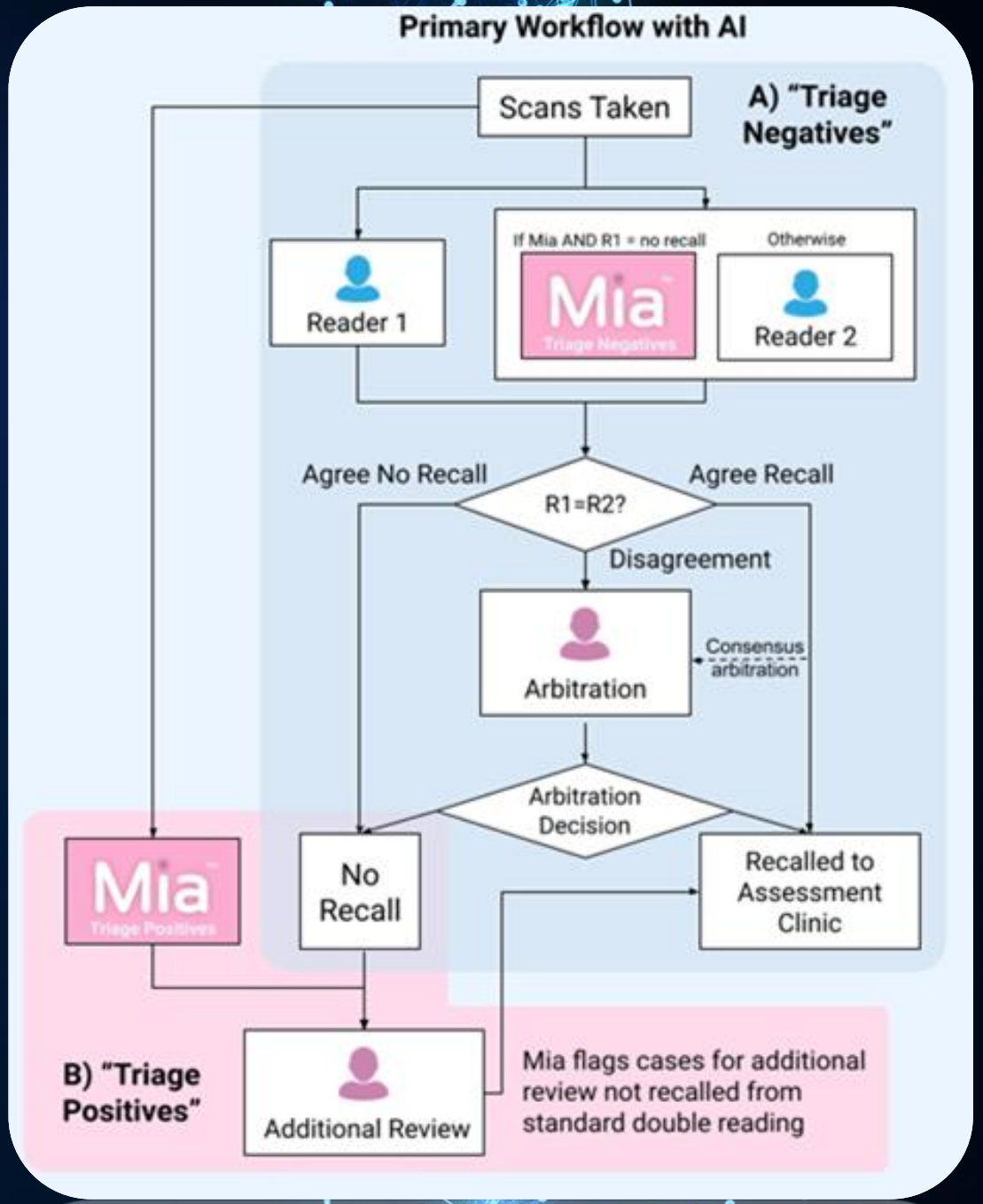


de Vries *et al. Radiology AI* 2023;5(3)

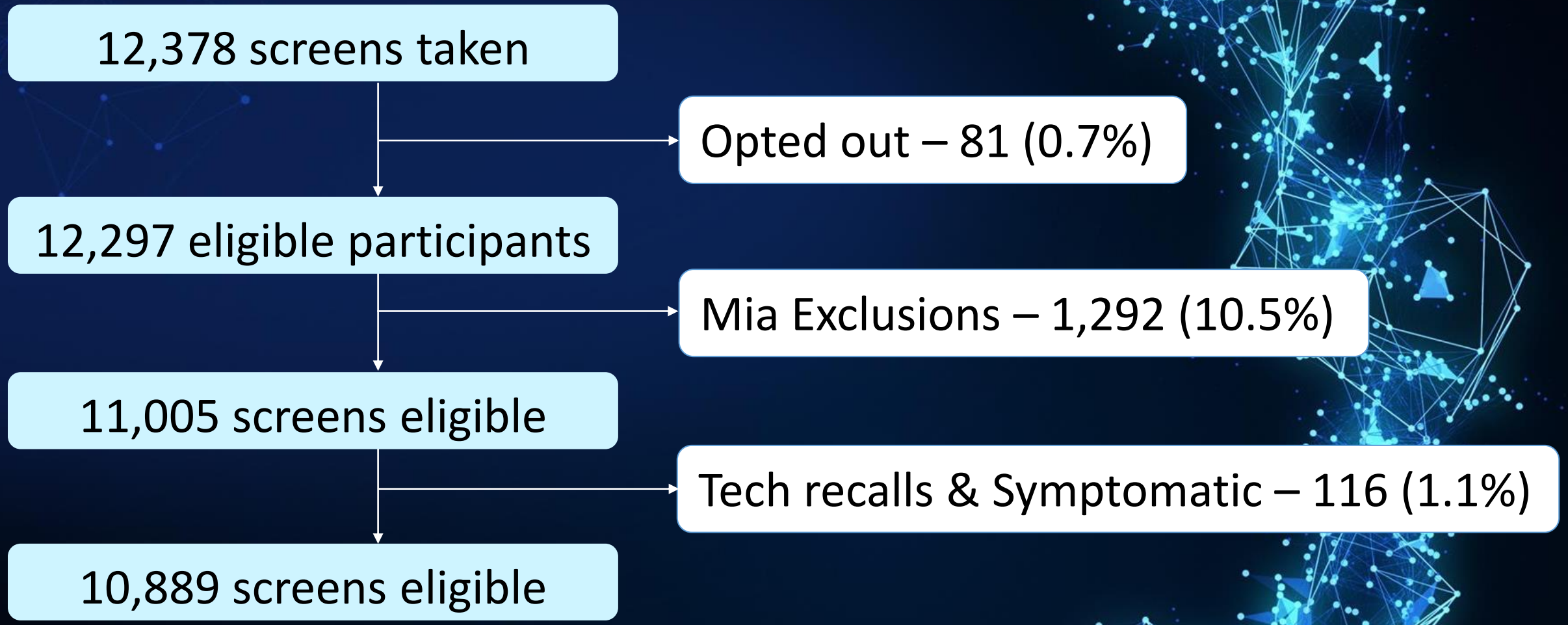
KHEIRON
MEDICAL TECHNOLOGIES

Gemini
AI-assisted Breast Screening

Grampian's Evaluation of Mia an Innovative National Breast Screening Initiative



Study Eligibility



Gemini
AI-assisted Breast Screening

Double Reading Results

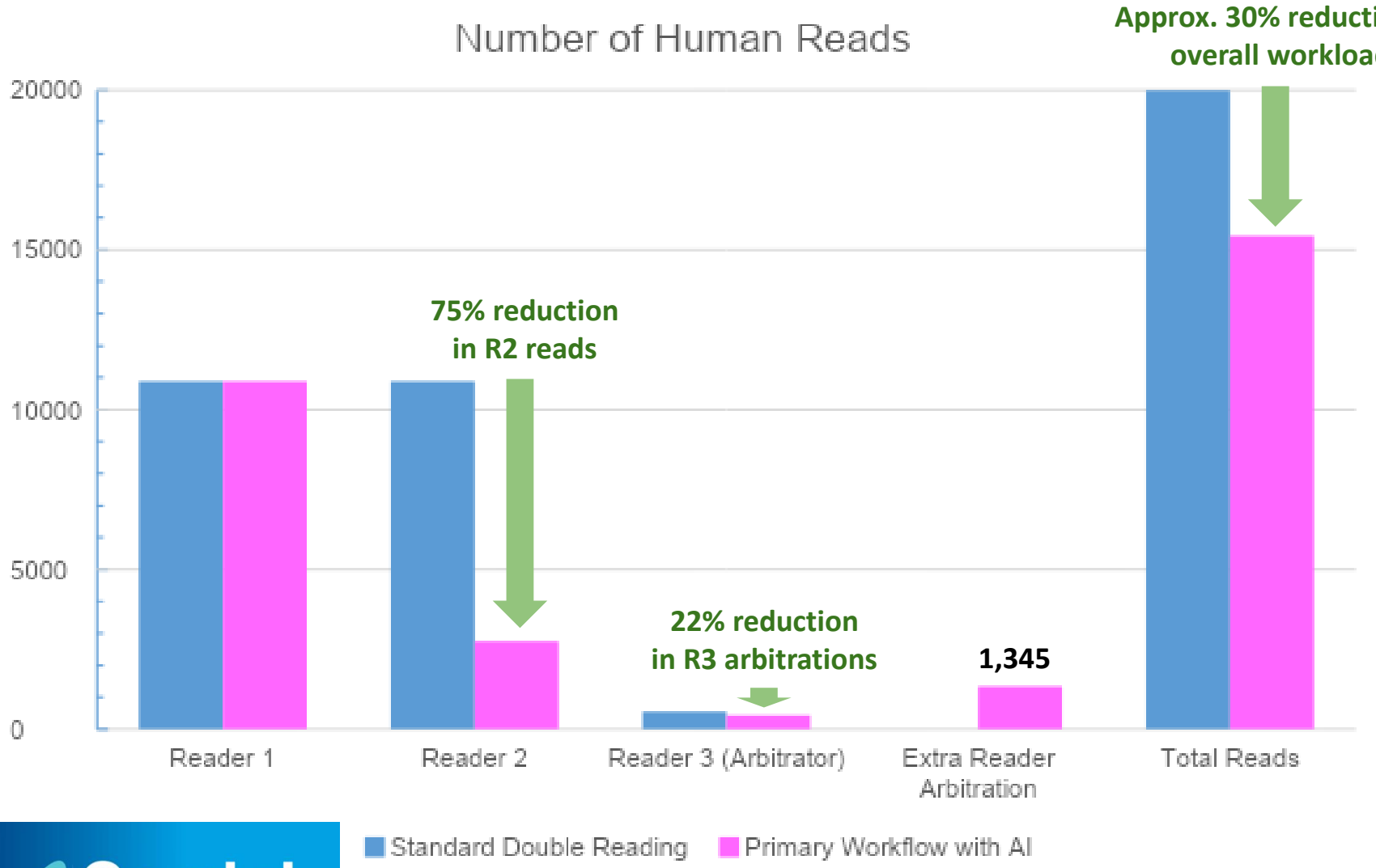
Performance Metric	Standard Double Reading (comparator)	Primary Workflow with AI	Outcome with AI
Cancer Detection Rate (per 1,000)	8.4 (92/10,889)	9.5 (103/10,889)	**Superior**
Recall Rate (%)	4.5 (485/10,889)	4.4 (481/10,889)	**Non-inferior**
Sensitivity (%)	89.3 (92/103)	100.0 (103/103)	**Superior**
Specificity (%)	96.4 (10,393/10,786)	96.5 (10,408/10,786)	**Non-inferior**
Positive Predictive Value (%)	19.0 (92/485)	21.4 (103/481)	**Superior**

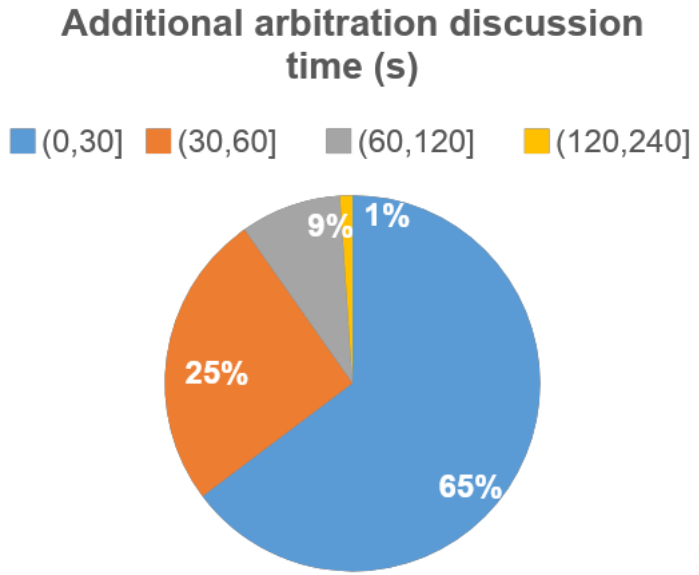
Extra reader cancers:

- 7 invasive tumours Grade 2 or 3
- 3 high grade DCIS
- 1 intermediate grade DCIS

Gemini
AI-assisted Breast Screening

Workload Savings





Gemini
AI-assisted Breast Screening

Strengths and Limitations

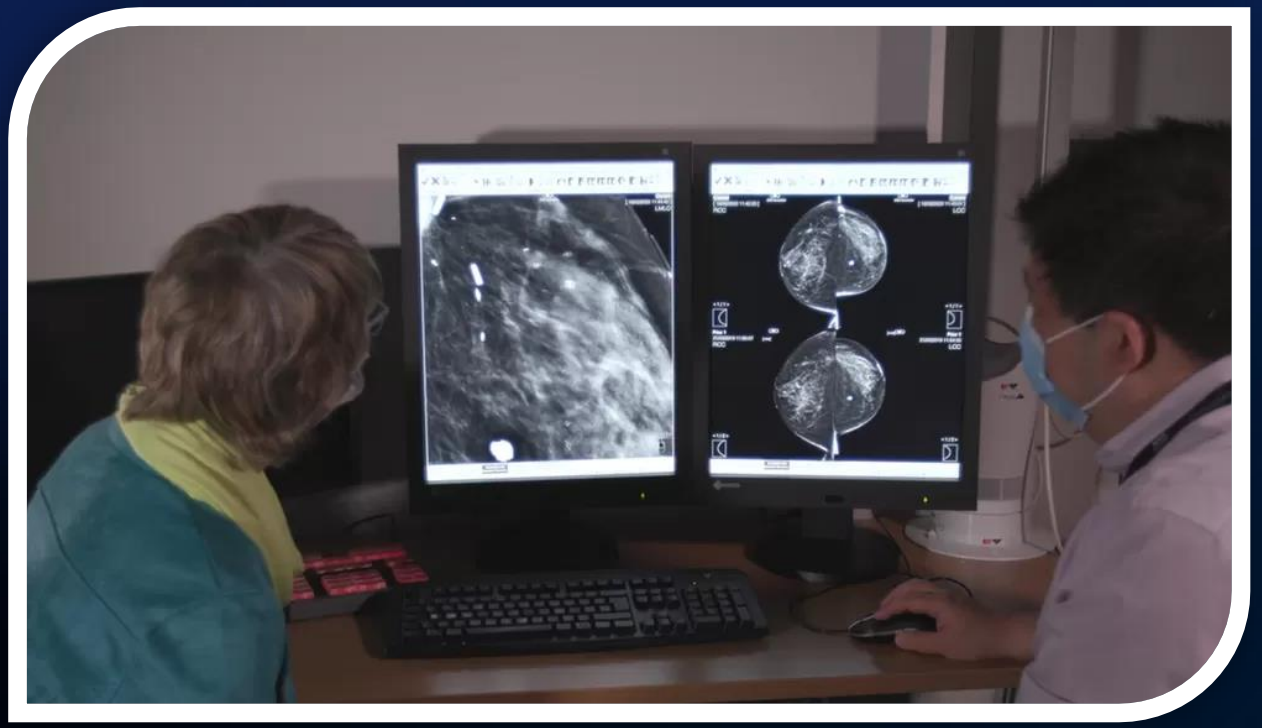
Strengths

- Prospective
- Fixed AI
- Low opt-out rate
- Real-world data
- Integrated into current screening pathway

Limitations

- Single site
- No long-term follow-up
- Mammography machine changes and software updates paused for the study period
- Partially simulated
- 10.5% exclusions

11 additional cancers detected



"It's a lifesaver, it's a life changer" says one of the first women in the UK to have her breast cancer picked up by AI software, Mia.

GEMINI Prospective study results

10.4% increase in cancer detection rate using AI

No increase (minor decrease) in recall rate

AI-assisted detected cancers were mostly invasive and high grade (**7 of the 11 detected**)

Modelled **workload savings** of up to **31%** using AI-augmented workflow

Acknowledgements

Appreciation and thanks are due to multiple partners:

- **PPI groups & screening participants involved in the GEMINI study**
- **University of Aberdeen –** Lesley Anderson, Clarisse de Vries, Jaroslaw Dymiter, **DaSH**, Graham Scotland, Charlotte Kennedy, Rumana Newlands, Ruoyu Bian, Regina Sumarlie, Prasantha Arumapperuma, Ferdian Jovan, Milan Markovic, Rosana Ducato.
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- **Canon Medical Technologies Ltd.**
- **iCAIRD – especially Moragh Boyle & James Blackwood**

Any Questions?

Case Study…

EXACT SCIENCES

Slido

Please scan the QR Code on the screen. This will take you through to Slido, where you can interact with us.

SCAN ME

Speaking Now…

Mr Henry Cain

Consultant Oncoplastic Breast Surgeon

Optimising Genomic testing using the Oncotype DX® test in the adjuvant breast cancer pathway.

Henry Cain

Consultant Surgeon.

The NHS Oncology Conference North 10th July 2024

The Newcastle upon Tyne Hospitals NHS

NHS Foundation Trust

Disclosures

- Roche Medical. Ad Board, support with Travel, Honorarium for speaking, Research Grant.
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- Exact Health . Honorarium for speaking Ad board, Research grant
- Pfizer. Honorarium for speaking
- Baxter. Honorarium for speaking, Ad Board.
- Lilly. Ad Board.
- Veracyte. Ad board
- Allergan. Speaking and meeting support.
- MSD. Ad Board and Honorarium for speaking.

Adjuvant decision making in ER positive breast cancer: the impact of the Oncotype DX® test

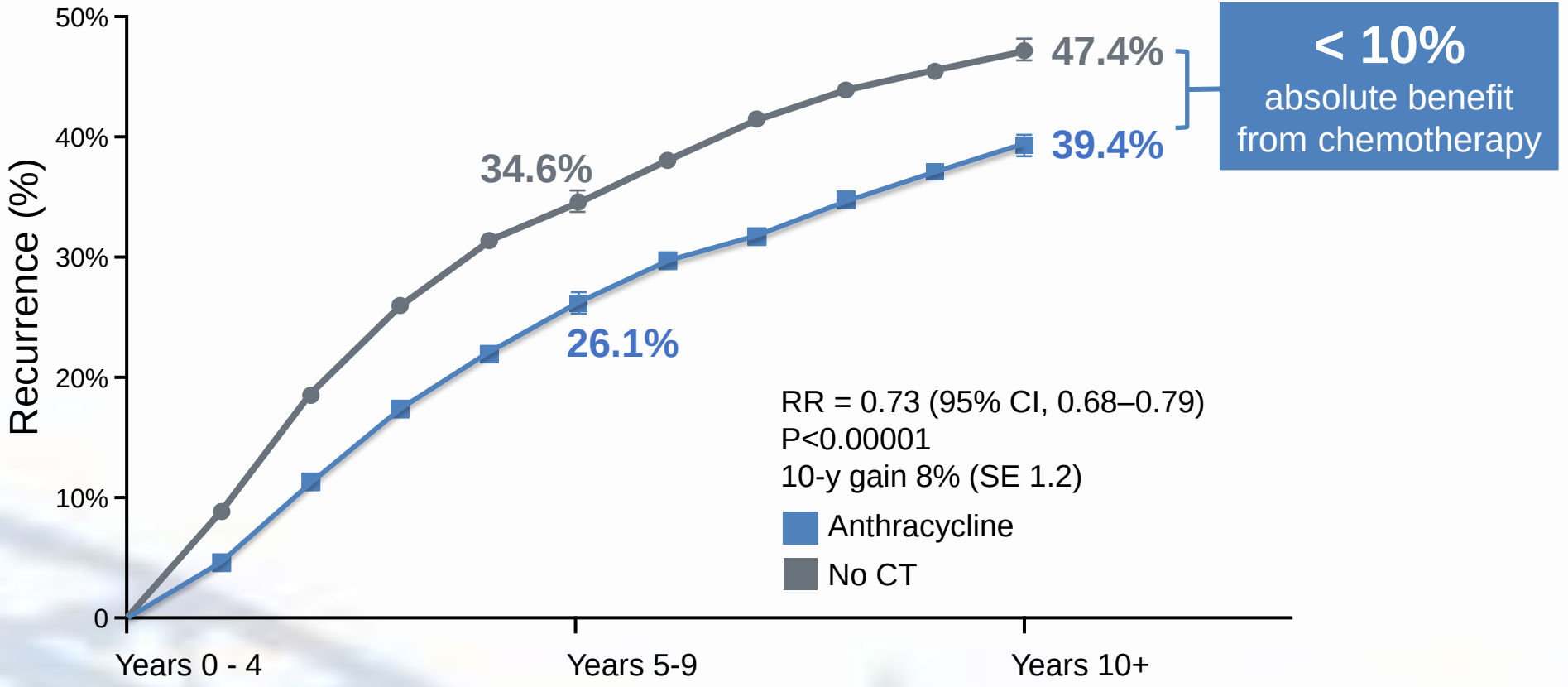
- How do we make decisions in EBC?
- What is the Oncotype DX test?
- Evidence and guidelines.
- What is the impact of its use?
  - On the Patient.
  - On the Pathway.
  - On the service.

EBC = Early breast cancer

EBCTCG meta-analysis of randomised studies in trials of anthracycline-based regimen vs no chemotherapy

N0/N+ | EBCTCG 2012

N=8575 (18% N0, 82% N+)



The majority of patients with early breast cancer do not benefit from adjuvant chemotherapy

1. Early Breast Cancer Trialists' Collaborative Group (EBCTCG), Peto R, et al. Lancet. 2012;379(9814):432-44.

RBCTCG, Early Breast Cancer Trialists' Collaborative Group; CT, chemotherapy; N, node-negative; N+, node-positive; RR, relative risk; CI, confidence interval; SE, standard error

Without access to genomic testing, there is potential for over-use of adjuvant chemotherapy in patients with early breast cancer (EBC)[1-3]

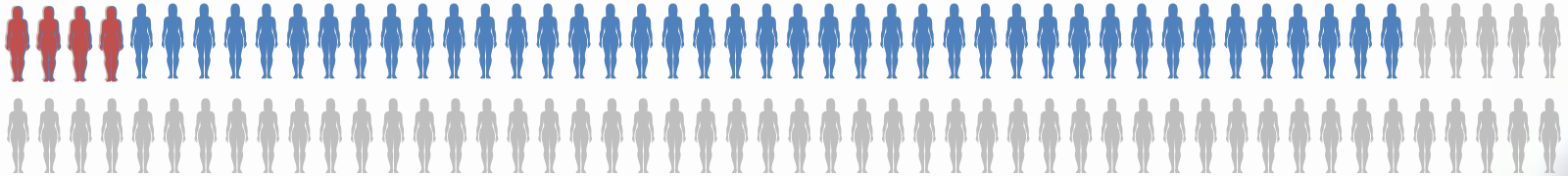
**HR+, HER2-, invasive early breast cancer (N0/N1)*

Out of 100 EBC patients in the N0 population:

43% receive CT[2]

4% likely benefit from CT[1,4]

N0

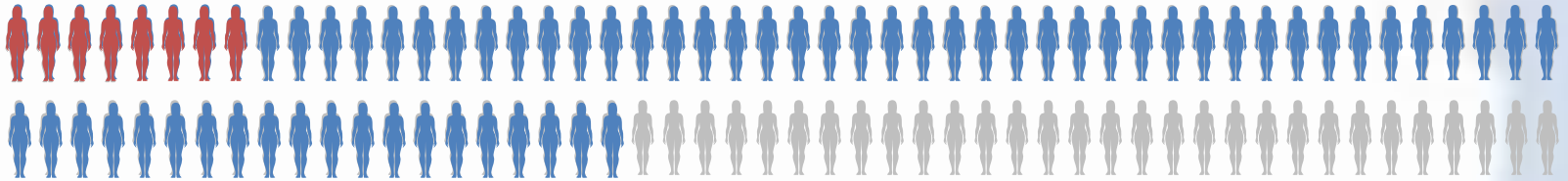


Out of 100 EBC patients in the N1 population:

70% receive CT[3]

8% likely benefit from CT[1,5]

N1



Many EBC patients (43–70%) *receive* adjuvant chemotherapy[2,3]

However, only a small minority (<10%) of patients* potentially *benefit* from adjuvant chemotherapy[1]

This is an indirect comparison for N0 and N1 data as comparing study & metanalyses data to other sources.

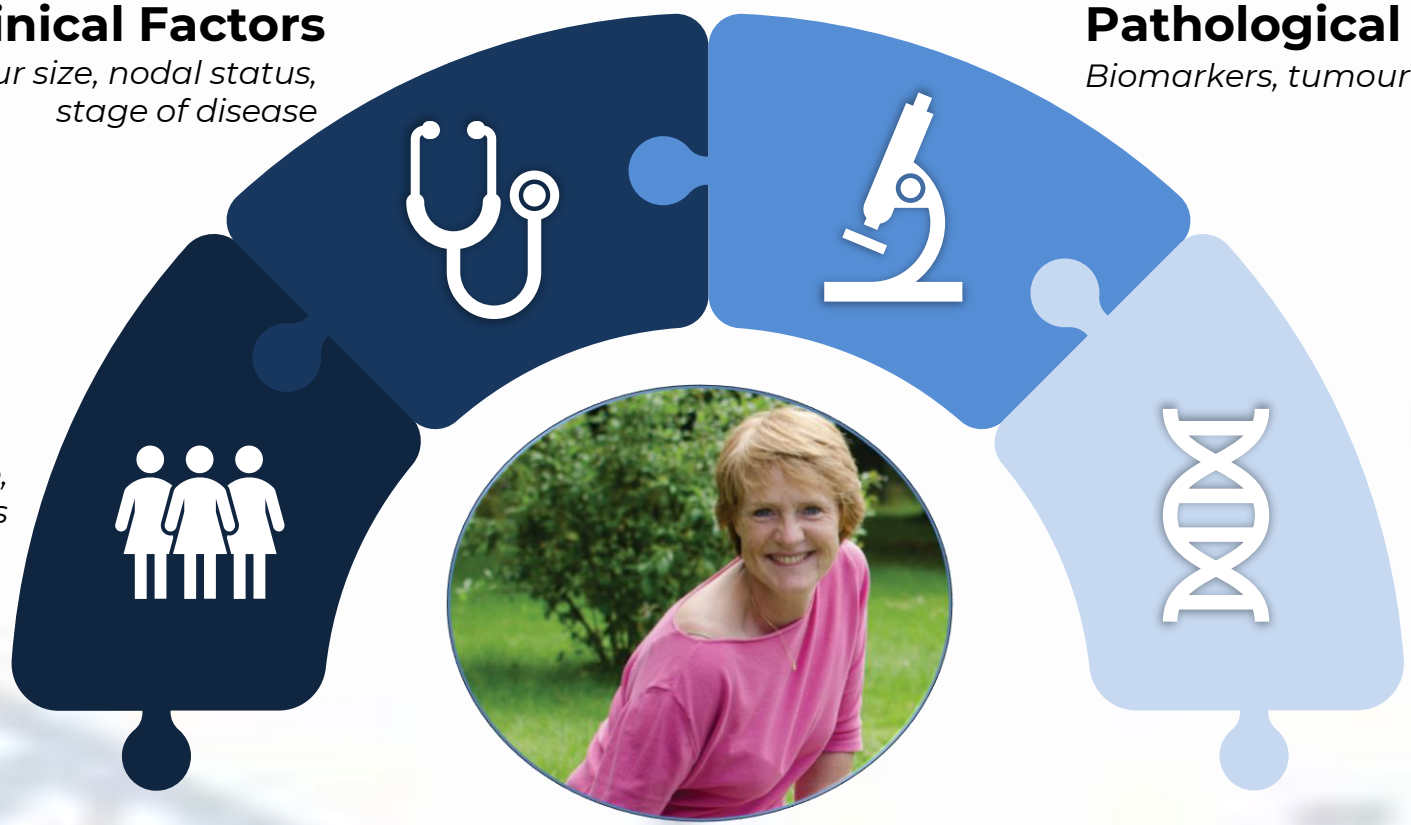
1. EBCTCG. *Lancet*. 2012; 2. National Institute for Health and Care Excellence (NICE) Diagnostics Guidance DG34, December 2018. www.nice.org.uk/guidance/dg34 (accessed 10 Jan 2024). All rights reserved. Subject to Notice of rights NICE guidance is prepared for the National Health Service in England. All NICE guidance is subject to regular review and may be updated or withdrawn. NICE accepts no responsibility for the use of its content in this product/publication; 3. Battisti et al. *St Gallen International Breast Cancer Conference* 2019, P007 (node-positive patient population); 4. Paik et al. *J Clin Oncol*. 2006; 5. Albain et al. *Lancet Oncol*. 2010

N0 = node-negative; N1 = node-positive (1 to 3 nodes); HR = hormone receptor; HER2 = human epidermal growth factor receptor 2; EBC = early breast cancer; CT = chemotherapy

Breast cancer management is evolving towards biomarkers that can more precisely guide treatment decisions[1,2]

Clinical Factors
Tumour size, nodal status, stage of disease

Pathological Factors
Biomarkers, tumour grade



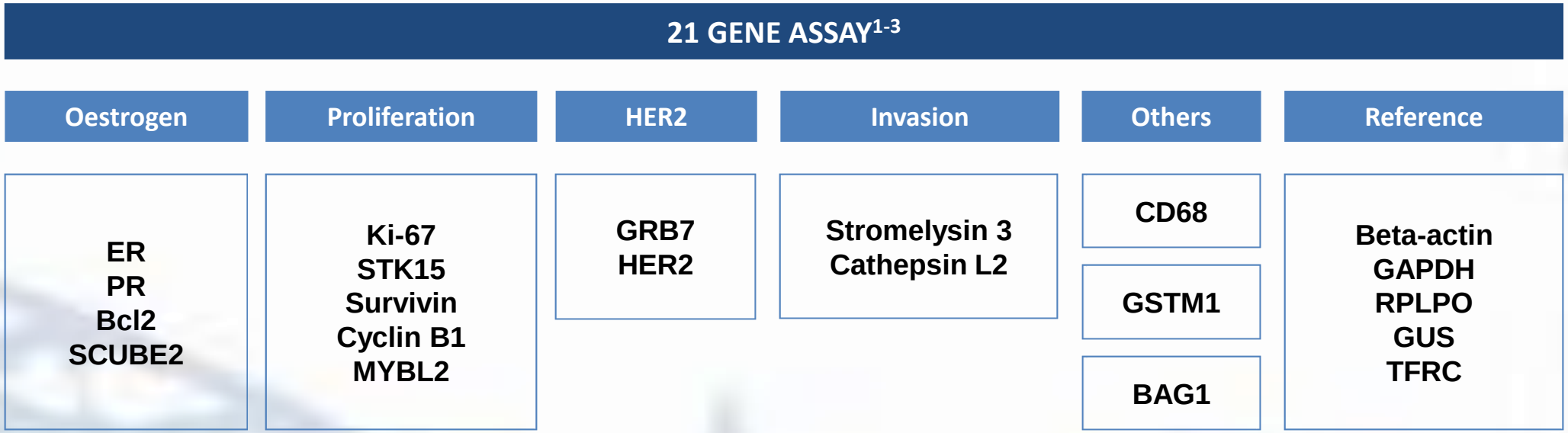
Patient Factors
Patient age, patient preference, performance status

Molecular Biology
Gene expression

1. Vieira et al *Front. Med* 2018; 2. Han & Magliocco *Clinical Breast Cancer* 2016

The Oncotype DX Recurrence Score® result includes key cancer genes linked to critical molecular pathways[1-3]

A panel of 250 candidate genes with known prognostic value were used to identify the 21-gene test, including 16-cancer related genes and 5 reference genes, each linked to critical molecular pathways in HR+, HER2- breast cancer[1]



1. Paik S, et al. SABCS 2003; 2. Esteban J, et al. *Proc Am Soc Clin Oncol.* 2003; 3. Cobleigh MA, et al. *Clin Cancer Res.* 2005

Patient report delivery:

automated output and delivery

Genomic Health

oncotypeDX Breast Recurrence Score

Oncotype DX Breast Recurrence Score® Report

Node Negative

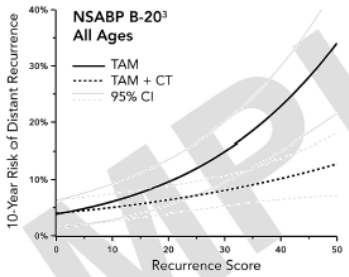
PATIENT, SAMPLE

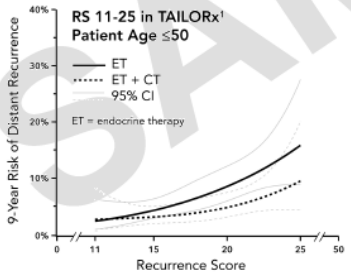
Date of Birth: **01-Jan-1950** Gender: **Female** Report Number: **OR000123456-3021** Report Date: **14-Jun-2019**

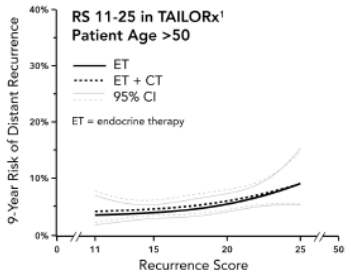
Specimen Source/ID: **Breast/SP-16_0123456**

Ordering Physician: **Dr. First-Name I. Ordering-Physician-Last-Name**

Estimated Chemotherapy Benefit for Individual Recurrence Score Results







Recurrence Score ranges shown above reflect randomized patients in NSABP B-20 and TAILORx.

The Evolution of the Oncotype DX® Test data in HR+, HER2-, Node Positive Early Breast Cancer

2006

The Oncotype DX Breast Recurrence Score® Test becomes **available in the UK**[4]

Node-Negative Validation study: Paik et al. 2006[1]

2010

SWOG-8814: Node-Positive Validation Study: Albain et al. 2010[2]

2012

The Oxford overview Target chemotherapy to chemo-sensitive patients only[3]

2018

NSABP B-20: node-negative validation study: Geyer et al. 2018[1]

TAILORx reports 9-year outcomes where chemotherapy benefit exploratory analysis was based on age[6]

2020

RxPONDER first results for node-positive patients – 5-year outcomes[8]

2022

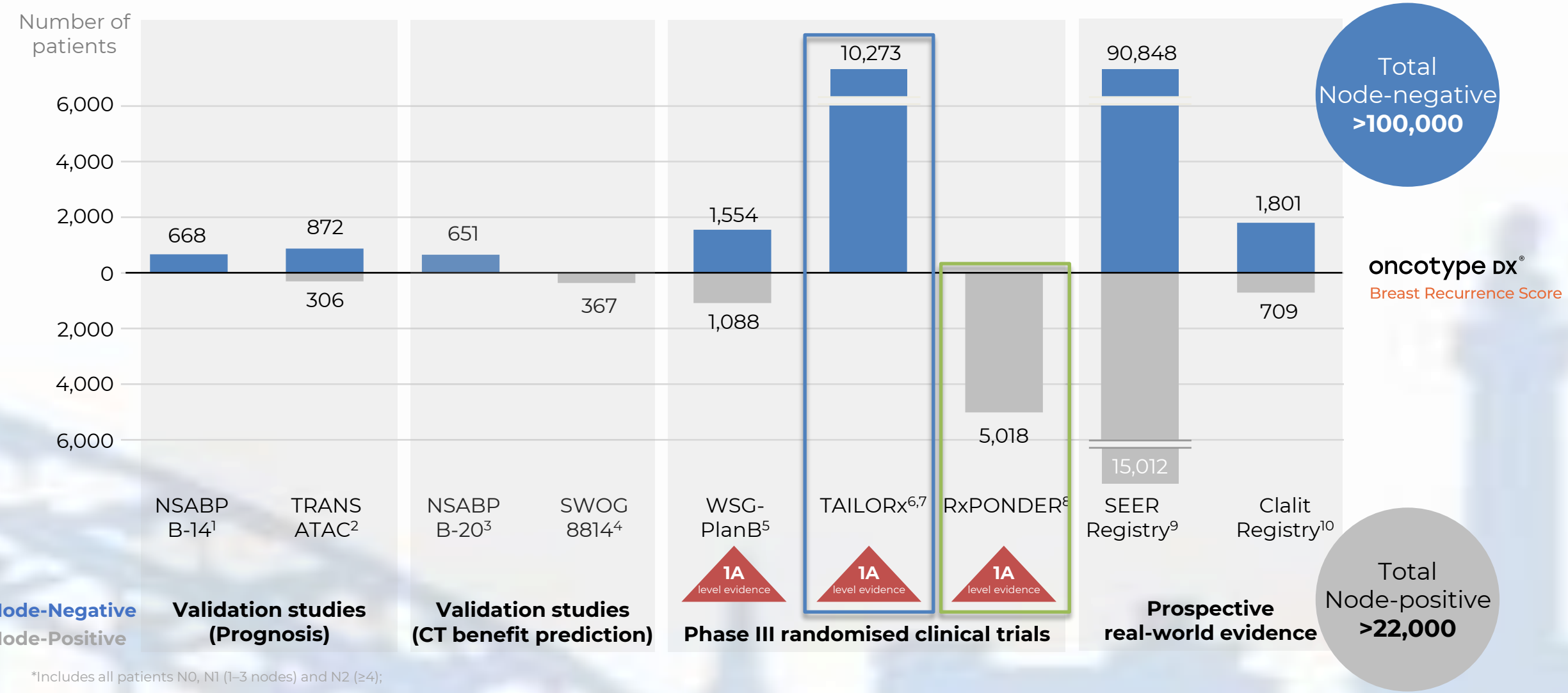
TAILORx reports 12-year outcomes focusing on the risk of late recurrence[10]

Node Positive

Node Negative

1. Paik et al. J Clin Oncol. 2006; 2. Albain et al. Lancet Oncol. 2010; 3. Peto et al Lancet 2012; 4. Exact Sciences data on file; 5. Geyer et al. 2018; 6. Hortobagyi et al. SABCS 2018. Poster P3-11-05; 7. Stemmer et al. npj Breast Cancer, 2017; 8. Sparano et al. N Engl J Med; 9. Kalinsky et al. SABCS 2020; Sparano JA, et al. SABCS Dec 2022;Abstract GS1-05 ; 10. Sparano JA, et al. SABCS Dec 2022. Abstract GS1-05

Studies and registries enrolling over 100,000 patients provide a wealth of data and evidence behind the Oncotype DX Breast Recurrence Score® test[1-10]



*Includes all patients N0, N1 (1–3 nodes) and N2 (≥4);

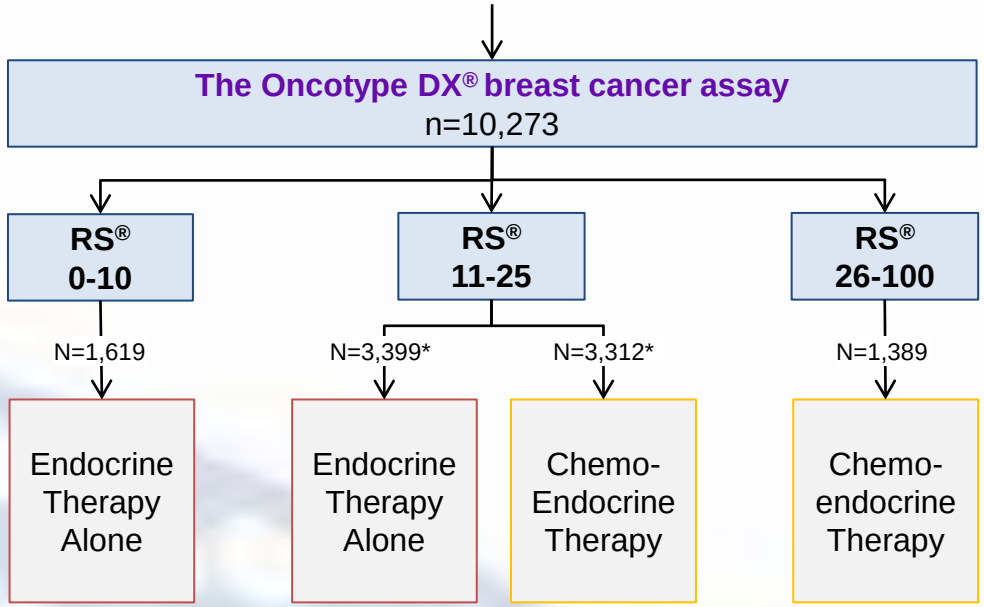
1. Paik et al. *N Engl J Med.* 2004. 2. Dowsett et al. *J Clin Oncol.* 2010. 3. Paik et al. *J Clin Oncol.* 2006. 4. Albain et al. *Lancet Oncol.* 2010. 5. Nitz et al. *Breast Cancer Res Treat.* 2017. 6. Sparano et al. *N Engl J Med.* 2015. 7. Sparano et al. *N Engl J Med.* 2018. 8. Kalinsky et al. *New Engl J Med.* 2021. 9.. Zhang et al. Breast Can Res Treat. 2020 . 10. Stemmer et al. *npj Breast Cancer.* 2017;3:32 and 2017;3:33.

RCT = randomised clinical trial

Two RCTs Provide Prospective Outcomes Evidence Confirmatory of Chemotherapy Benefit

TAILORx[1,2]

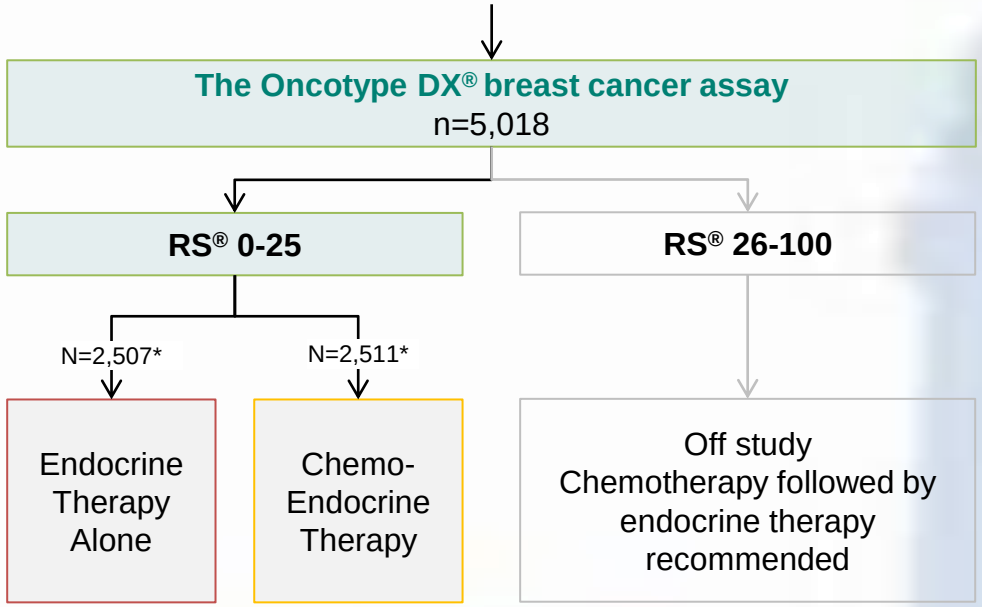
Invasive breast cancer, 18-75 years, HR+, HER2-, **node-negative**, tumour size 1.1–5.0cm (or 0.5-1.0 cm and int-high grade)



* Stratification Factors: age, Planned Chemotherapy, Planned Radiation, and RS 11-15, 16-20, 21-25

RxPONDER[3]

Invasive breast cancer, 18-75 years, HR+, HER2-, **node-positive** (1-3 nodes)



* Stratification Factors: RS® result 0-13 vs 14-25, menopausal status: pre vs. post, nodal surgery: ALND vs. SLNB

EXACT SCIENCES

1. Sparano et al. *N Engl J Med* 2015. 2. Sparano et al. *N Engl J Med* 2018 3. Kalinsky et al, *N Eng J Med 2021*

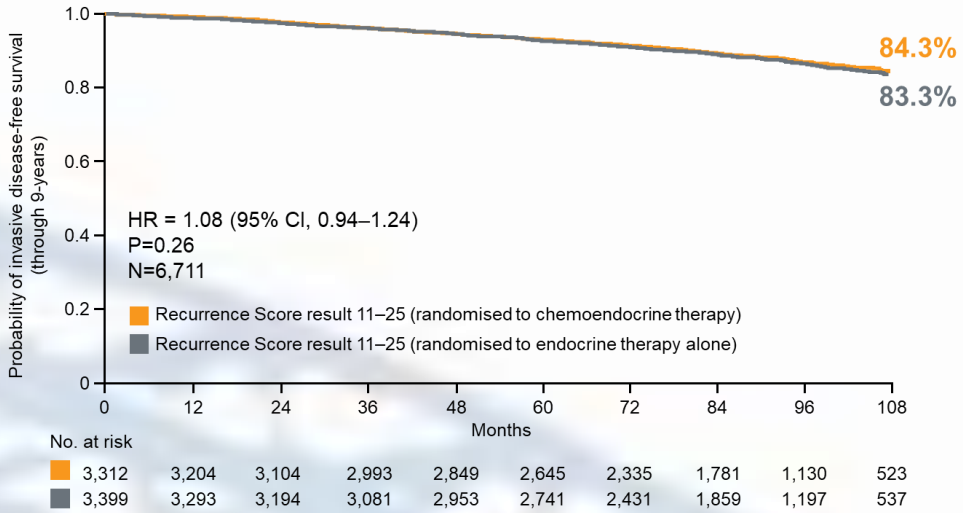
RS: Recurrence Score® result, HR+: hormone receptor, HER2: human epidermal growth factor receptor, ALND: axillary node dissection, SLNB: sentinel lymph node biopsy
RCT: Randomized controlled trials

TAILORx primary endpoint and secondary endpoints were met demonstrating that endocrine therapy alone is non-inferior to chemoendocrine therapy in patients with Recurrence Score® results 11–25[1].

N0 TAILORx (Level 1A evidence)

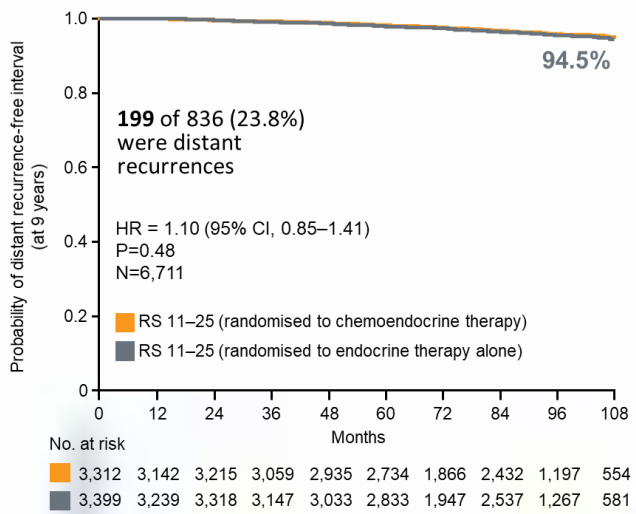
Primary Endpoint

Invasive disease-free survival

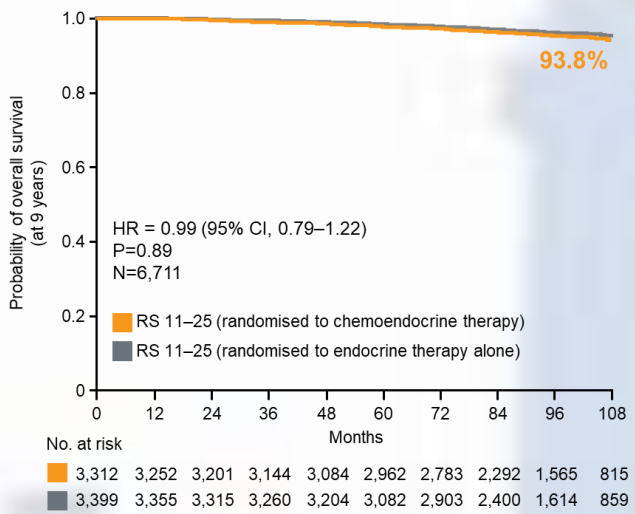


Secondary Endpoints

Distant recurrence-free interval



Overall survival



EXACT SCIENCES

1. Sparano et al. *N Engl J Med.* 2018.

HR: hazard ratio, RS: recurrence score® result

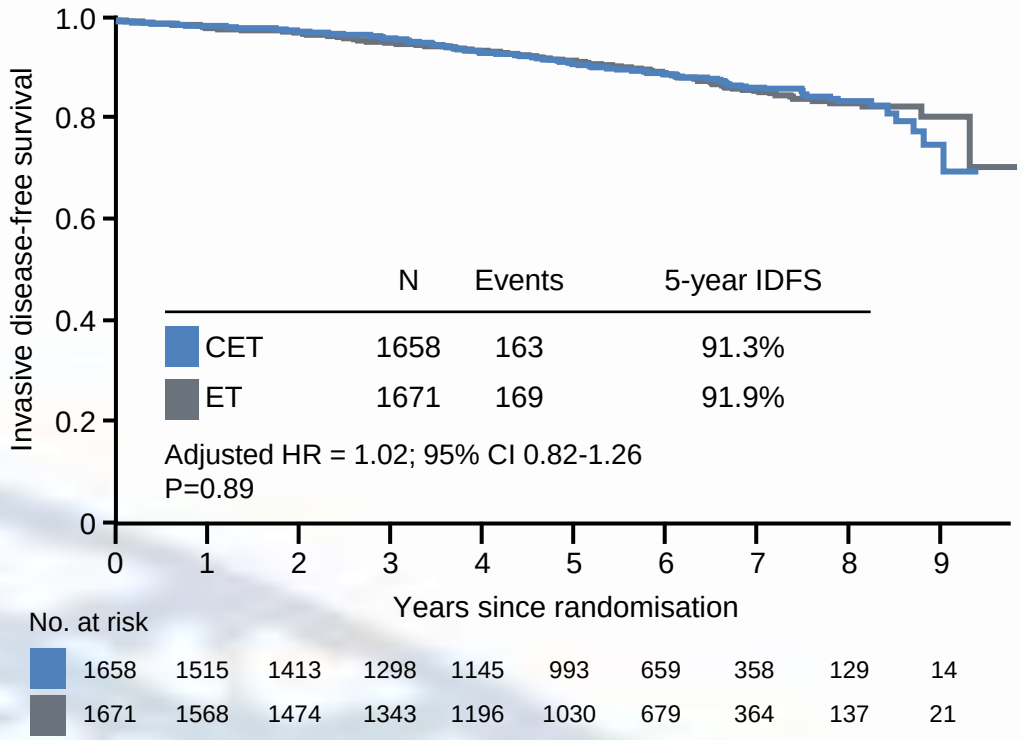
N1 postmenopausal patients with Recurrence Score® results 0-25 did not benefit from CET, while premenopausal patients derived a benefit

N1 RxPONDER

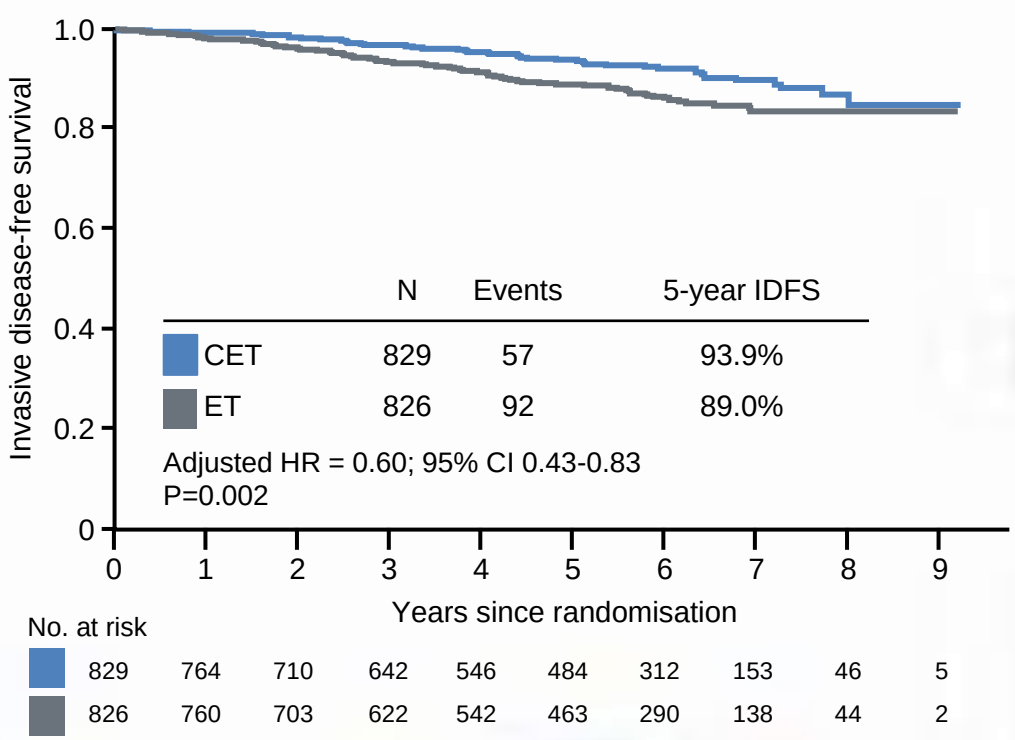
Median follow up 5.3 yrs

Invasive Disease-Free Survival

Postmenopausal RS® results 0-25



Premenopausal RS® results 0-25



No statistically significant IDFS difference

5-year IDFS absolute difference 4.9%

Kalinsky et al, *N Engl J Med* 2021

ET: endocrine therapy
CET: chemoendocrine therapy

The Oncotype DX Breast Recurrence Score® result adds additional information to support chemotherapy treatment decisions[1-2]

Pathological Factors
Biomarkers, tumour grade

Clinical Factors
Tumour size, nodal status, stage of disease

Molecular Biology
Gene expression

Patient Factors
Patient age, patient preference, Performance status

The Oncotype DX Breast Recurrence Score® test

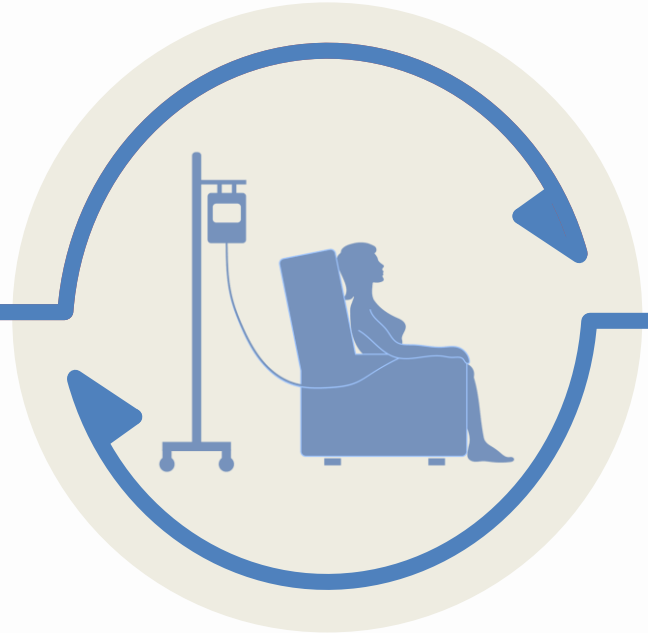
1. Vieira et al. *Front. Med* 2018; 2. Han & Magliocco *Clinical Breast Cancer* 2016

The Oncotype DX Breast Recurrence Score® test can help guide chemotherapy treatment decisions in early breast cancer[1-9]

**HR+, HER2-, invasive early breast cancer (N0, N1)*

Reducing over-treatment[1-9]

Avoiding unnecessary chemotherapy-related **side-effects**



Reducing under-treatment[1-5,9]

Not missing patients for whom chemotherapy **may be life-saving**

Whether or not a patient receives chemotherapy can have significant implications for the cancer care pathway[6]

1. Sparano et al. *N Engl J Med*. 2018; 2. Albain et al. *Lancet Oncol*. 2010; 3. Hortobagyi et al. *Cancer Res.* 2019; 4. Paik et al. *J Clin Oncol.* 2006; 5. Geyer et al. *npj Breast Cancer* 2018; 6. Friese et al. *Cancer.* 2017; 7. Groenvold. *Dan Med Bull.* 2010; 8. Kuderer et al. *Cancer.* 2006; 9. Kalinsky et al. *New Engl J Med*. 2021

N0 = node-negative;
N1 = 1 to 3 positive nodes;
CT = chemotherapy

Tumour profiling tests to guide adjuvant chemotherapy decisions in early breast cancer

Diagnostics guidance [DG58] Published:

Thursday 09 May 2024

NICE National Institute for Health and Care Excellence

Lymph node-positive early breast cancer

Can be used

1.1 Use EndoPredict, Oncotype DX or Prosigna as options alongside consideration of clinical risk factors to guide adjuvant chemotherapy decisions for treating oestrogen receptor (ER)- or progesterone receptor (PR)-positive, human epidermal growth factor receptor 2 (HER2)-negative early breast cancer with 1 to 3 positive lymph nodes for:

- women who have been through the menopause
- men
- trans, non-binary or intersex people, depending on their hormonal profile.

Use clinical judgement to determine if testing is suitable for men, trans or non-binary or intersex people.

Should not be used

1.2 For women who have not been through the menopause, EndoPredict, Oncotype DX and Prosigna should not be used to guide adjuvant chemotherapy decisions for ER- or PR-positive, HER2-negative early breast cancer with 1 to 3 positive lymph nodes.

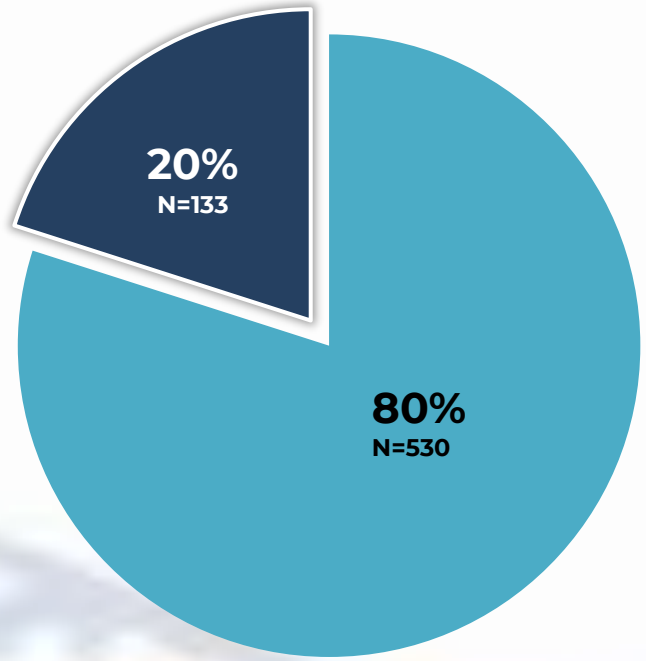
1.3 MammaPrint should not be used to guide adjuvant chemotherapy decisions for people with ER- or PR-positive, HER2-negative early breast cancer with 1 to 3 positive lymph nodes.

What is the impact of the Oncotype DX® test on the oncological management of EBC?

UK Investigator Led Study: Impact of **Oncotype DX® testing in node-positive, HR+, HER2- early breast cancer patients in clinical practice**

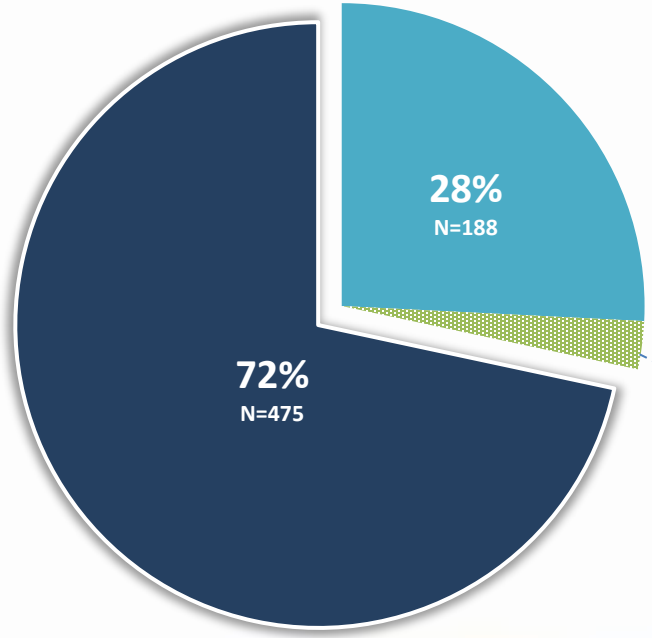
N1 Investigator Led Study

CHEMOTHERAPY RECOMMENDATION
WITHOUT THE RECURRENCE SCORE® RESULT



CHEMOTHERAPY RECOMMENDATION
WITH THE RECURRENCE SCORE® RESULT

N = 664*



N=17
This cohort of patients would have previously received HT only, potentially resulting in undertreatment

CT-HT HT

There was a relative reduction in chemotherapy usage of 65% in N1 disease with the use of the Oncotype DX® test. Overall, 342 patients (51.5%) were spared chemotherapy[1]

N1 = 1–3 positive nodes; RS = The Recurrence Score result; CT = Chemotherapy; HT = Hormone Therapy
*664 women with receptor positive (HR+), HER2 negative early breast cancer with 1 to 3 lymph nodes positive (LN+) in the UK National Health Service (5 teaching and 9 district general hospitals) between 2017 and 2022 were analysed
± RS cut-offs of 0-17, 18-30, 31-100 were used for this analysis

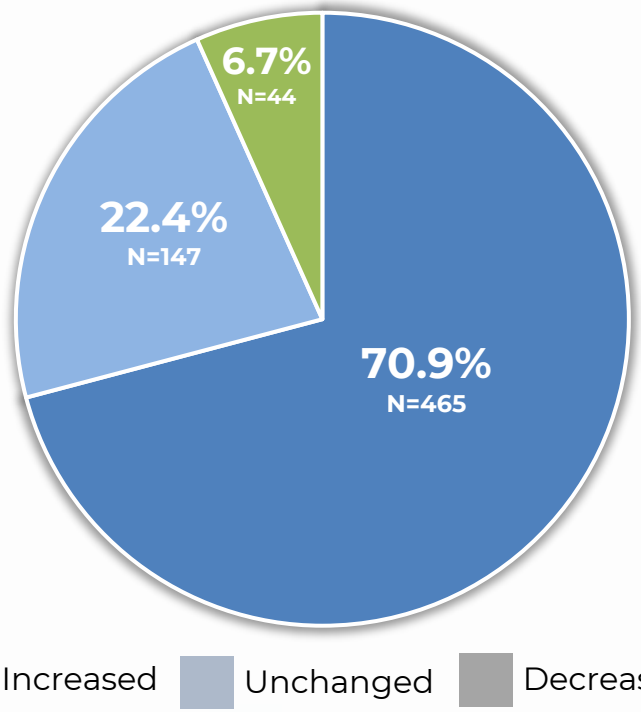
1. Holt et al. *Br J Cancer*. 2024

UK Investigator Led Study: Confidence analysis in Patients PRE- and POST- the Oncotype DX Breast Recurrence Score® test in node-positive, HR+, HER2- early breast cancer patients[1]

N1 Investigator Led Study

N = 664*

CHANGE IN PATIENTS' LEVEL OF CONFIDENCE



The average increase in patients' confidence score was +2.43[1]

The average increase in patient confidence score was +2.43, with 70.9% of patients becoming more confident in their chemotherapy treatment decision[1]

Confidence score was calculated using a scale from +5 (CT) and -5 (HT)

N1 = 1–3 positive nodes; RS = The Recurrence Score® result; CT = Chemotherapy; HT = Hormone Therapy
*664 women with receptor positive (HR+), HER2 negative early breast cancer with 1 to 3 lymph nodes positive (LN+) in the UK National Health Service (5 teaching and 9 district general hospitals) between 2017 and 2022 were analysed
± RS cut-offs of 0-17, 18-30, 31-100 were used for this analysis

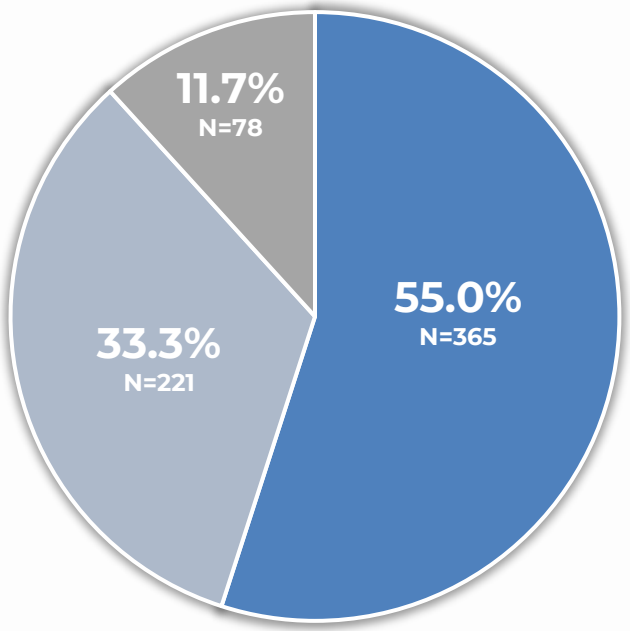
1. Holt et al. *Br J Cancer*. 2024

UK Investigator Led Study: **Confidence analysis** in Clinicians **PRE- and POST- the Oncotype DX Breast Recurrence Score® test** in node-positive, HR+, HER2- early breast cancer patients

N1 Investigator Led Study

N = 664*

CHANGE IN CLINICIANS' LEVEL OF CONFIDENCE



The average increase in clinicians' confidence score was +0.75[1]

The average increase in clinicians' confidence score was +0.75, with 55% of clinicians becoming more confident on their chemotherapy treatment decision[1]

Confidence score was calculated using a scale from +5 (CT) and -5 (HT)

N1 = 1–3 positive nodes; RS = The Recurrence Score® result; CT = Chemotherapy; HT = Hormone Therapy
*664 women with receptor positive (HR+), HER2 negative early breast cancer with 1 to 3 lymph nodes positive (LN+) in the UK National Health Service (5 teaching and 9 district general hospitals) between 2017 and 2022 were analysed ± RS cut-offs of 0-17, 18-30, 31-100 were used for this analysis

1. Holt et al. *Br J Cancer*. 2024

What is the impact of the Oncotype DX® test on the health care system?

Real-world analysis of the clinical and economic impact of the Oncotype DX Breast Recurrence Score® test in early-stage breast cancer in Ireland[1-3]

**HR+, HER2-, early breast cancer (node negative and 1-3 node positive)*

Node-Negative[1-2]

- TAILORx suggests up to 70% of HR+ N0 ESBC patients may avoid chemotherapy with the Recurrence Score® result ≤ 25.[1]

- This study assessed **clinical and economic impacts** of the Recurrence Score result on treatment **using real-world data**[1].
- A retrospective, cross-sectional observational study was conducted of **HR+ N0 EBC patients** who had the Recurrence Score result in Ireland[1].

Node-Positive[3-4]

- RxPONDER demonstrates that post-menopausal patients with HR+, HER2- disease and 1-3 positive lymph nodes and a Recurrence Score result 0 - 25 are not likely to benefit from the addition of chemotherapy[4-5].
- The study indicates adjuvant chemotherapy benefit in some pre-menopausal women with 1-3 positive lymph nodes and a Recurrence Score result < 25 with the same[4-5].

- A retrospective, cross-sectional multi-centre observational study was performed of **HR+, HER2-, 1-3 N1 patients** who had the Recurrence Score result testing[3,6].

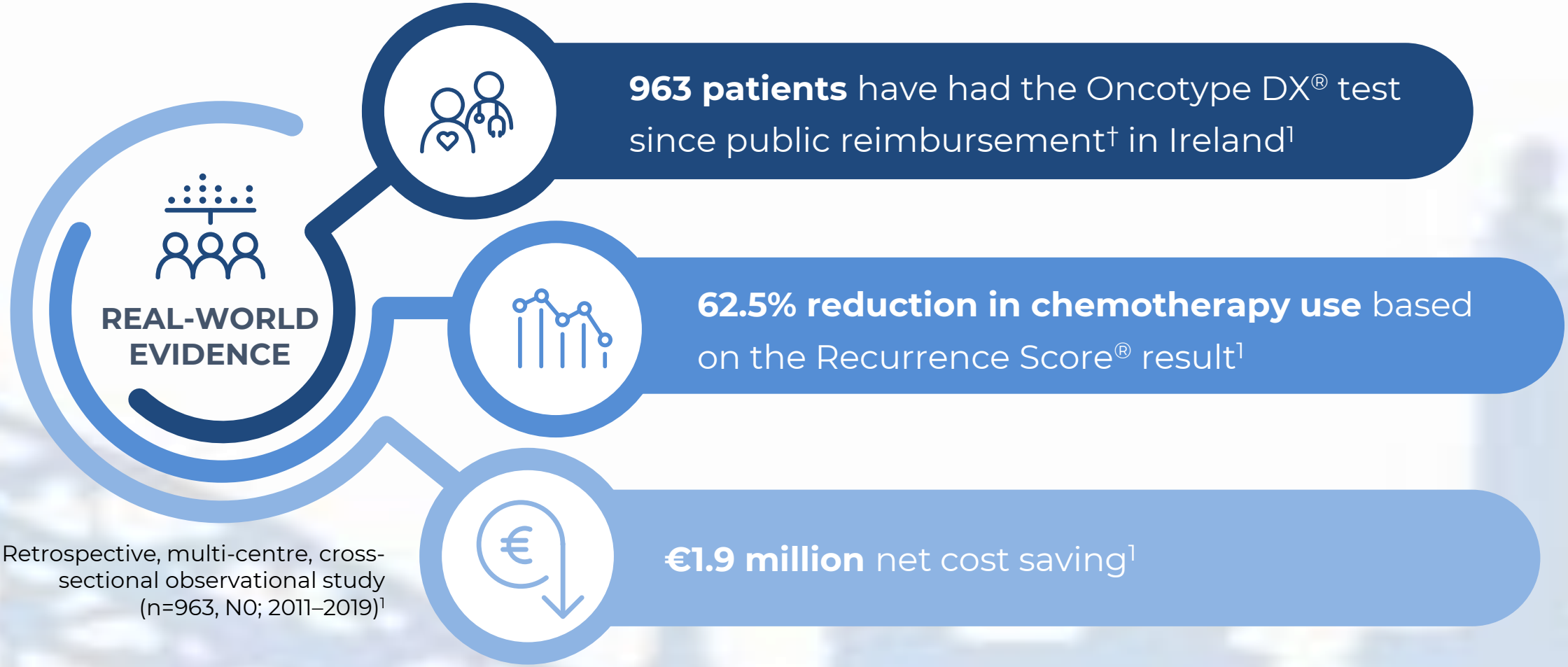
1. McSorley et al. *Breast Cancer Res Treat.* 2021; 2. Sparano et al. *N Engl J Med.* 2018 3. Browne et al. *St Gallen* 2023; 4. Kalinsky et al. *N Engl J Med.* 2021; 5. Kalinsky et al. SABCS 2021 GS2-07; 6. Browne et al. *SABCS* 2023, PO5-02-04

† The N1 analysis period was from Nov 2011 – October 2022 and the N0 analysis period was from Oct 2011 – Feb 2019

N1 = node-positive; N0 = node-negative;
HER2= human epidermal growth factor receptor 2;
HR = hormone receptor;
EBC = early breast cancer

Recent real-world analysis estimated substantial savings by utilising the Oncotype DX Breast Recurrence Score® test in N0 patients[1]

**HR+, HER2-, invasive early breast cancer (N0)*



Retrospective, multi-centre, cross-sectional observational study (n=963, N0; 2011–2019)[1]

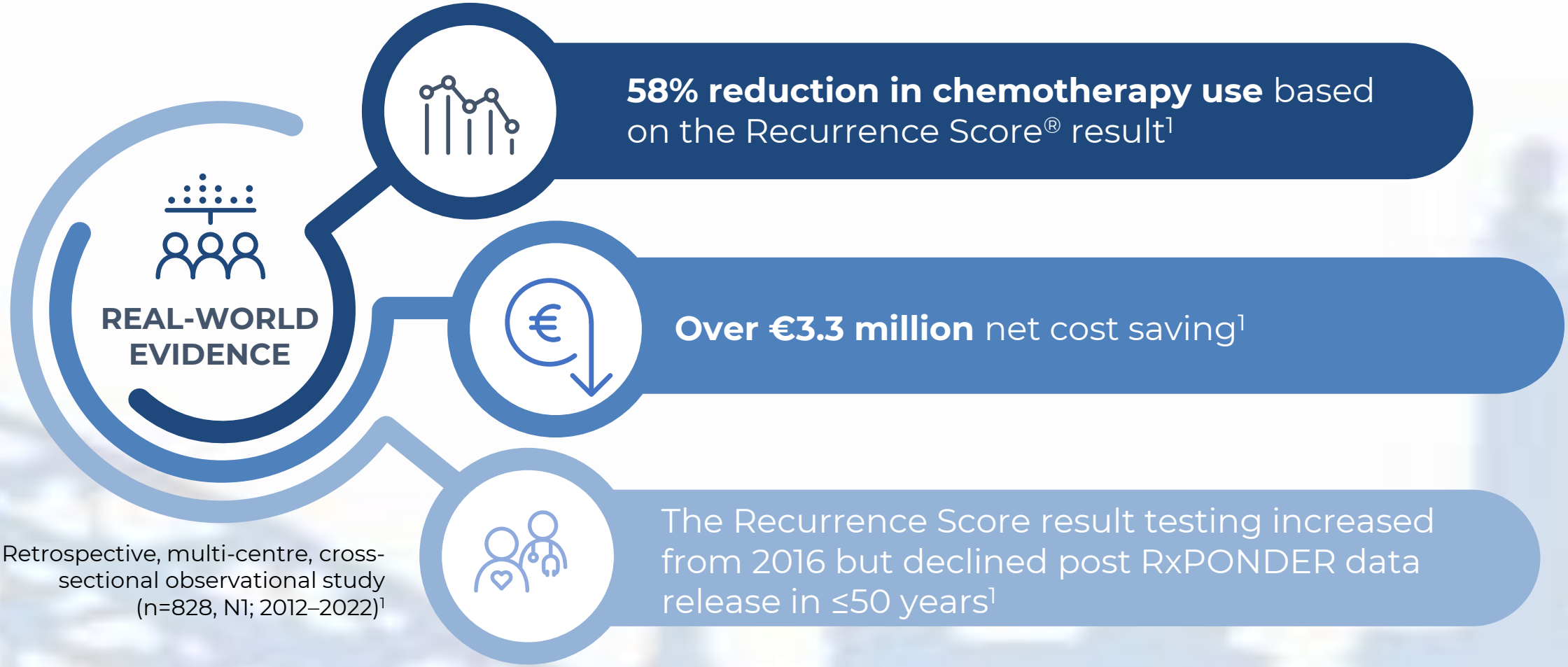
1. McSorley et al. *Breast Cancer Res Treat.* 2021

† The analysis period was from Oct 2011–Feb 2019

N0 = node-negative;
HER2= human epidermal growth factor receptor 2;
HR = hormone receptor

A recent real-world analysis estimated substantial savings by utilising the Oncotype DX Breast Recurrence Score® test in N1 patients[1]

**HR+, HER2-, 1-3 node positive early breast cancer*



Retrospective, multi-centre, cross-sectional observational study (n=828, N1; 2012–2022)[1]

1. Browne et al. *SABCS* 2023, PO5-02-04

† The analysis period was from Nov 2011–Oct 2022

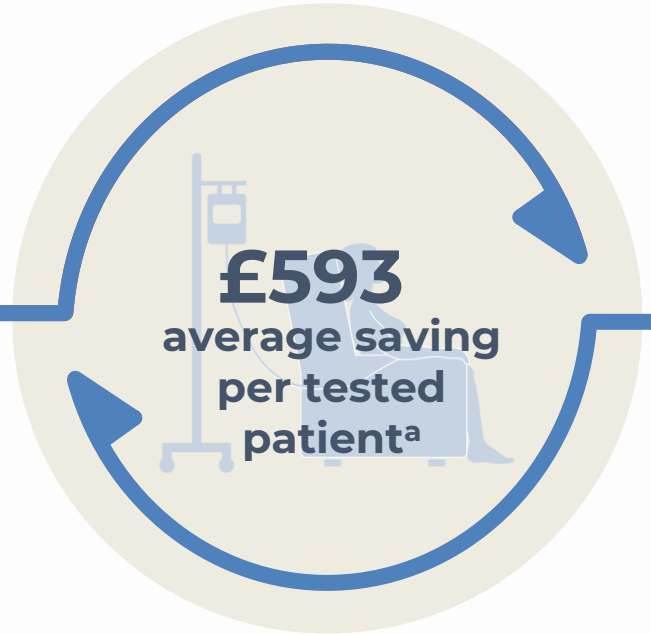
N1 = node-positive;
HER2= human epidermal growth factor receptor;
HR = hormone receptor

Health-economic modelling has shown savings with the Oncotype DX Breast Recurrence Score® test across all HR+, HER2- breast cancer patients[1,2]

**HR+, HER2-, invasive early breast cancer (N0, N1)*

£989 **saving per N1 patient tested*[1]**

Savings primarily driven by a **reduction in the use of chemotherapy**[1]



£519 **saving per N0 patient tested*[2]**

Savings driven by a **reduction in distant recurrence and patients receiving chemo-endocrine therapy**[2]

Analyses were based on the NHS list price for the Oncotype DX® test[3] thus greater overall savings could be expected at the discounted NHS price†

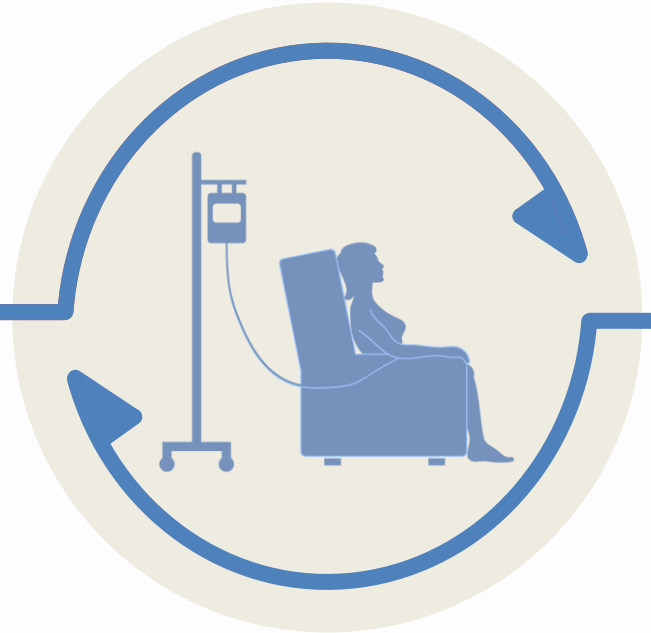
a Estimated weighted average saving across N0 and N1 patients
*Modelled savings based on health economic analyses.
†The discounted price offered to the NHS is commercial in confidence and can be disclosed under NDA.

1. Berdunov et al. *J Med Econ.* 2022; 2. Berdunov et al. *Clinicoecon Outcomes Res.* 2022; 3. © NICE Diagnostics Guidance DG58 May 2024. https://www.nice.org.uk/guidance/dg58. Accessed July 2024. Available from www.nice.org.uk/guidance/dg58 All rights reserved. Subject to Notice of rights NICE guidance is prepared for the National Health Service in England. All NICE guidance is subject to regular review and may be updated or withdrawn. NICE accepts no responsibility for the use of its content in this product/publication

N0 = node-negative;
N1 = node-positive (1 to 3 nodes);
NDA = none disclosure agreement;
HER2= human epidermal growth factor receptor 2;
HR = hormone receptor

Efficiencies generated from using the Oncotype DX Breast Recurrence Score® test are substantially greater than the cost of the test itself[1-12]

**HR+, HER2-, invasive early breast cancer N1 & N0*



Reducing over-treatment[1-9]

For every patient spared unnecessary chemotherapy treatment, £5,780 to £7,055 adjuvant chemotherapy-related costs are saved[10]

- Cost of chemotherapy & supportive treatments (e.g., G-CSF)
- Administration & monitoring costs
- Costs of managing short- and long-term side effects (unplanned care)

Reducing under-treatment[1-5,9]

For every patient who avoids a distant recurrence, £57,767 metastatic treatment-related costs are saved[10]

- Costs for multiple lines of treatment
- Including costly CDK4/6 inhibitors

**Following NICE appraisal of CDK6i (abemaciclib), metastatic treatment-related cost savings may be greater*

a Calculation based on confidential NHS price

1. Sparano et al. *N Engl J Med*. 2018; 2. Albain et al. *Lancet Oncol*. 2010; 3. Hortobagyi et al. *SABCS* 2019; 4. Paik et al. *J Clin Oncol*. 2006; 5. Geyer et al. *npj Breast Cancer* 2018; 6. Friese et al. *Cancer*. 2017; 7. Groenvold. *Dan Med Bull*. 2010; 8. Kuderer et al. *Cancer*. 2006; 9. Kalinsky et al. *New Engl J Med*. 2021; 10. Berdunov et al. *J Clin Oncol*. 2021; 11. Berdunov et al. *J Med Econ*. 2022; 12. Berdunov et al. *Clinicoecon Outcomes Res*. 2022

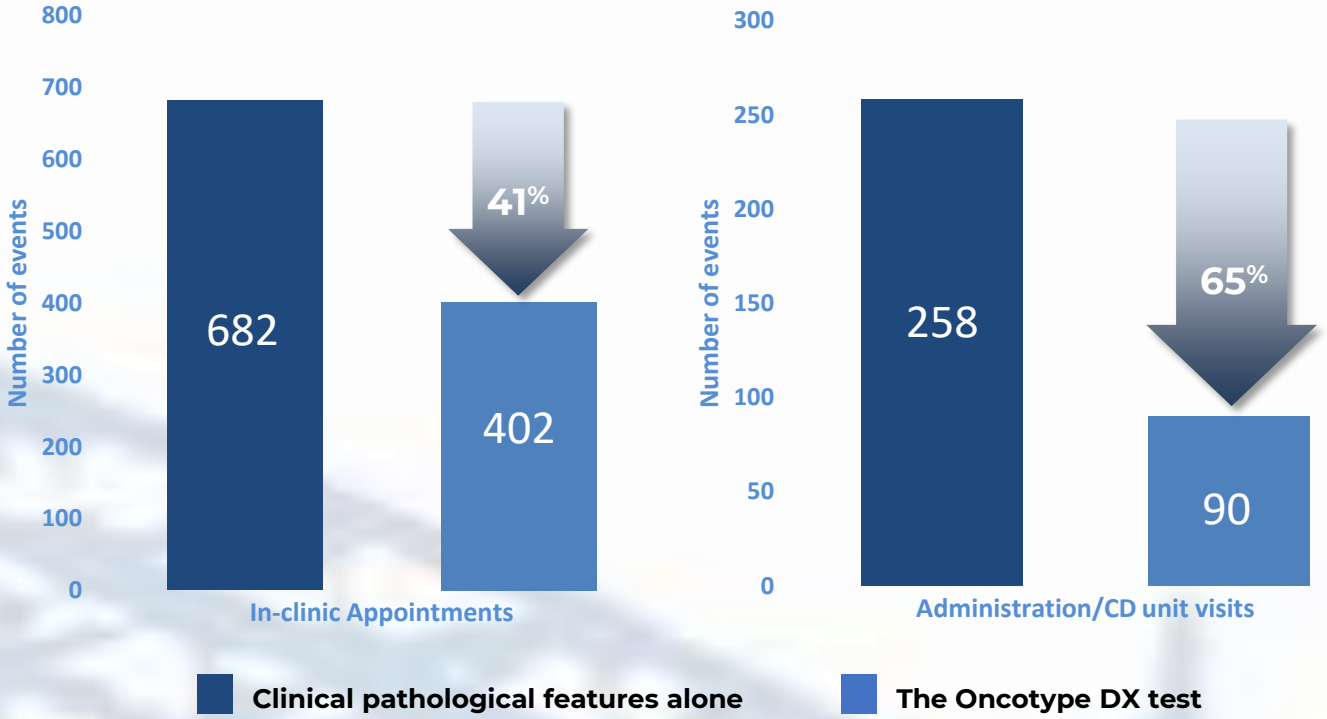
N0 = node-negative;
N1 = node-positive;
CDK = cyclin-dependent kinase;
G-CSF = granulocyte-colony stimulating factor;
ICB = integrated care board.

The Oncotype DX Breast Recurrence Score® test can help to free up resources and reduce unnecessary chemotherapy treatment[1]

In an Exact Sciences simulation of 63 N1 EBC patients* tested at a **representative mid-sized NHS trust** (450 new EBC patients/year) the **Oncotype DX® test reduced the number of appointments and administration/CD unit visits** vs. using clinical pathological features alone[1]

** HR+, HER2-, invasive early breast cancer (N1)*

Impact on in-clinic appointments & administration/chemotherapy delivery unit visits



280 fewer in-clinic appointments[1]

168 fewer administrations/CD unit visits

£989 saving per N1 patient tested[†2]

£62,307 total saving for example trust (based on list price)

Disclaimer: The data presented are from modelling the impact of genomic testing from the Exact Sciences UK, Ltd. Simulation tool. The simulation tool is fully referenced with the opportunity to amend real clinical practice of the breast cancer pathway, and how treatment decisions are made both with and without genomic testing. This data is for information only and is relevant at 19 Jan 2023. The data shown are based on the assumptions made from the tool, including any changes made by someone from your Trust, to reflect local practice. This tool has been through user acceptance but has not been formally validated. It is not contractual, as the differences shown may not reflect true savings seen by the Trust in actual clinical practice.

†Modelled savings based on health economic analyses

EBC = early breast cancer;
N1 = node-positive (1 to 3 nodes);
CD units = chemotherapy delivery units

1. EXACT Sciences Patient Pathway Simulation Tool 2022; 2. Berdunov et al. *J Med Econ.* 2022

See appendix for regional level analysis

The Socio-Economic Cost of Chemotherapy for Early Breast Cancer in the UK

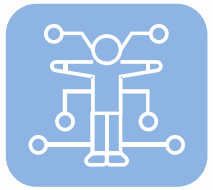
Patient and Caregiver Costs

Out-of-pocket expenses for CT: **~£4.2 million** each year.

Average patient faces up to **£1,100** per year in CT related OOP expenses

Each carer requires a **£74,000** income to compensate the loss of emotional wellbeing due to caregiving **(~£82 million).**

Productivity Losses



Chemotherapy costs the UK economy **£140 million** in lost productivity each year.

320,000 workdays are lost each year during treatment. Average patients take **39-51 days** off work due to CT.

Total lost productivity from providing informal care was estimated at **~£1.1 million.**

Premature mortality due to CT costs **£3.2 million** in lost productivity.

Mortality losses from secondary malignancies due to adjuvant CT are **~£3.4 million** (£50K/per patient).

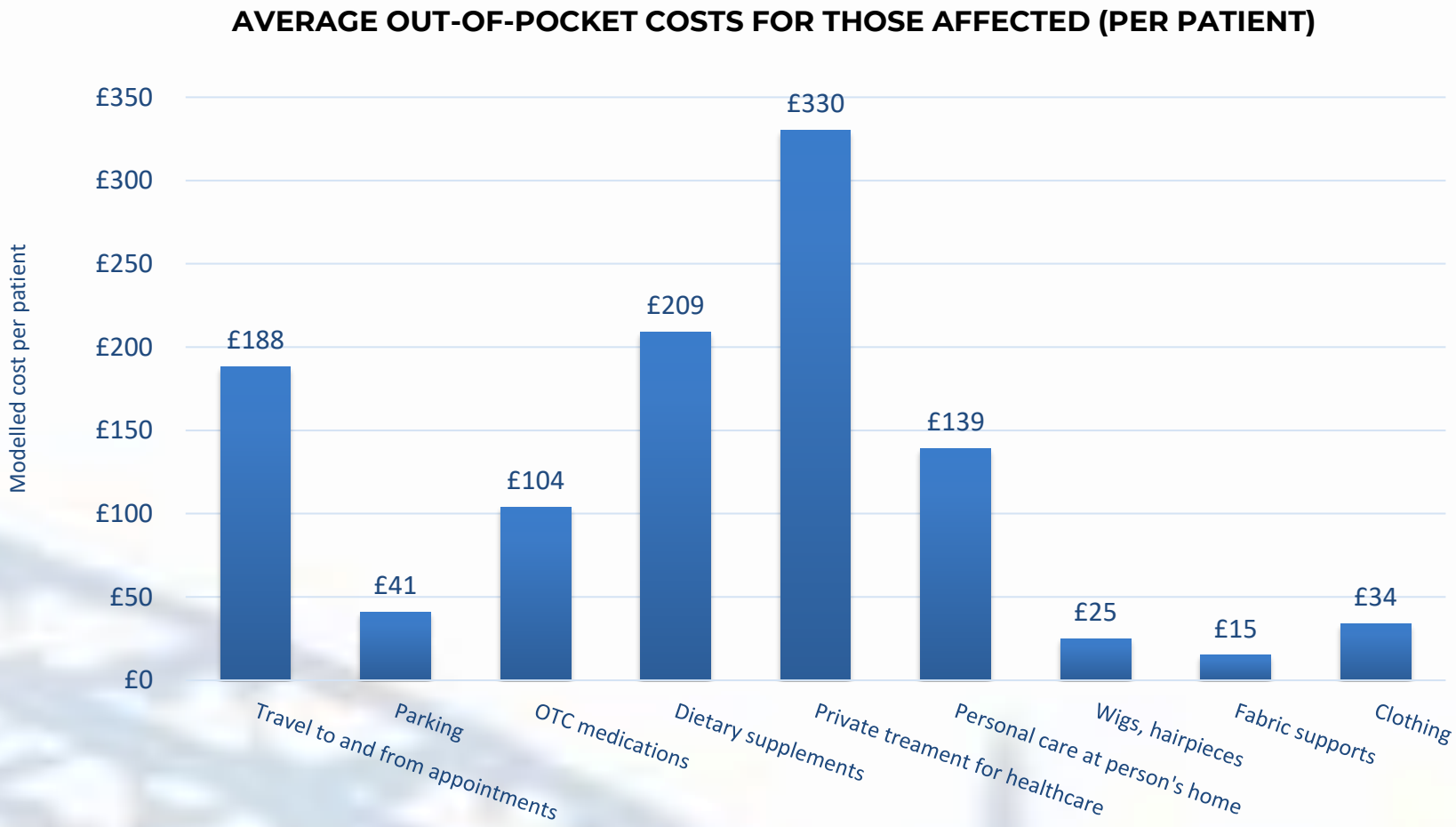
Disclaimer: A UK wide study with data collected from relevant national data sources covering general population statistics, UK cancer registries, clinical guidelines and published literature, and patient survey data.

1. Parsekar et al., Societal costs of chemotherapy in the UK: an incidence-based cost-of-illness model for early breast cancer, *BMJ Open* 2021. https://bmjopen.bmj.com/content/11/1/e039412 (accessed 25 January 2024)

OOP = out-of-pocket;
CT = chemotherapy

The average patient faces up to £1,100 per year in out-of-pocket expenses

Modelled from Clinical Database[1]



> *I had to **buy headscarves and new bra's (£15 each).** I had to buy **new clothes**....I was recommended to use a cream ....when I was having chemo to use it like twice a day and obviously when radiotherapy and that's like **£8 a bottle** and I was getting through **one of them probably every two weeks**...You have to **change everything** really **(shampoo, body wash, toothpaste, toothbrushes).....**so it does affect most places really.*
>
> *-Patient B, Case Study, published 2020*[1]

† The analysis included all patients in the UK aged 20 and older with ICD-10 diagnosis codes (WHO): C50 (malignant neoplasm of breast) and D05 (breast cancer in situ).

1. Parsekar et al., Societal costs of chemotherapy in the UK: an incidence-based cost-of-illness model for early breast cancer, *BMJ Open* 2021. https://bmjopen.bmj.com/content/11/1/e039412 (accessed 25 January 2024)

ICD = International Statistical Classification of Diseases and Related Health Problems – 10th Revision;
OTC = over-the-counter;
WHO = world health organisation

Impact on the Healthcare System Overview

Health-economic Analysis

Real-world analysis show that the Oncotype DX Breast Recurrence Score® test can **reduce chemotherapy by 55% in N1 and 62.5% in N0 breast cancer.** Generating, savings of **€1 million in N1 and €1.9 million in N0 early breast cancer setting[1-3].**

Efficiencies generated from using the Oncotype DX® test are **substantially greater** than the cost of the test itself[4-9].

Health-economic modelling has shown savings with the Oncotype DX test across **all HR+, HER2- breast cancer patients**[8-9].

Wider System Impact: **Time & Resources**

The Patient Pathway Simulation Tool© highlights the **cost-savings associated with introduction of the Oncotype DX test into the breast cancer pathway[10].**

The Oncotype DX test can help to **free up resources and reduce unnecessary CT** treatment (reducing the number of appointments and administration / chemotherapy delivery unit visits vs. using clinical pathological features alone)[8, 10].

Disclaimer: The Patient Pathway Simulation Tool© has been developed by Exact Sciences UK, Ltd.

1. McSorley et al. *Breast Cancer Res Treat.* 2021; 2. Browne et al. *SABCS* 2023, PO5-02-04; 3. Holt et al. *Br J Cancer*, 2024; 4. Friese et al. *Cancer.* 2017; 5. Groenvold. *Dan Med Bull.* 2010; 6. Kuderer et al. *Cancer.* 2006; 7. Berdunov et al. *J Clin Oncol.* 2021; 8. Berdunov et al. *J Med Econ.* 2022; 9. Berdunov et al. *Clinicoecon Outcomes Res.* 2022; 10. EXACT Sciences Patient Pathway Simulation Tool 2022 11. McSorley et al. Breast Cancer Res Treat. 2021;12. Browne et al. SABCS 2023, PO5-02-04; 13. Holt et al. Br J Cancer, 2024; 14. Friese et al. Cancer. 2017; 15. Groenvold. Dan Med Bull. 2010; 16. Kuderer et al. Cancer. 2006; 17. Berdunov et al. J Clin Oncol. 2021;18. Berdunov et al. J Med Econ. 2022; 19. Berdunov et al. Clinicoecon Outcomes Res. 2022; 20. EXACT Sciences Patient Pathway Simulation Tool 2022

CT = Chemotherapy,
HR = hormone receptive

What does the Oncotype DX® test give us?

- Reduction in Overtreatment of patients who don’t need chemotherapy.
- Reduction in undertreatment of patients that will benefit from chemotherapy.
- Huge related benefits for patients, local health care systems and overall socio-economic costs.

Thanks!

1. Paik et al. *N Engl J Med.* 2004. 2. Dowsett et al. *J Clin Oncol.* 2010. 3. Paik et al. *J Clin Oncol.* 2006. 4. Albain et al. *Lancet Oncol.* 2010. 5. Nitz et al. *Breast Cancer Res Treat.* 2017. 6. Sparano et al. *N Engl J Med.* 2015. 7. Sparano et al. *N Engl J Med.* 2018. 8. Kalinsky et al. *New Engl J Med.* 2021. 9.. Zhang et al. Breast Can Res Treat. 2020 . 10. Stemmer et al. *npj Breast Cancer*. 2017;3:32 and 2017;3:33.

Lunch & Networking

Chair Opening Address

Dr Neil Bayman

Medical Director - The Christie NHS FT

Speaking Now…

Mike Ryan
Head of the East Midlands Cancer Alliance
Chair of the East Midlands Radiotherapy Network

East Midlands cancer alliance

NHS
East Midlands Cancer Alliance

Oncology Forum UK

The Impact of Cancer Transformation Programmes

10th July 2024

"We aim to make the right thing to do for patients the easiest thing to do for the clinicians."

Mike Ryan, Head of Service, EMCA
Chair, East Midlands Radiotherapy Network
Michael.Ryan@nhs.net
england.emca@nhs.net
www.eastmidlandscanceralliance@nhs.uk

Introduction and Declaration of Interest/s

East Midlands Cancer Alliance

1. Person with lived experience of cancer, as both a patient and a carer, UK and USA.

2. Head of the East Midlands Cancer Alliance (EMCA)
   a) 5.2million population
   b) 5 Integrated Care systems
   c) 8 Acute Trusts
   d) 8 Local Authorities
   e) 16 Tumour Site Specific Expert Clinical Advisory Groups (ECAGs)
   f) 98 Primary Care Networks (PCNs) and 400 GP Practices
   g) Multiple Networks and Academia

3. Chair of the East Midlands Radiotherapy Network

4. 50% of people >age 50 will experience cancer at some point in their lives

5. **Cancer is personal to us all** - it requires a personalised approach to care

Key Facts/Statistics - Did You Know?

50% of people aged 50+ will be diagnosed with cancer in their lives.

NHS
East Midlands Cancer Alliance

Key Facts on Cancer

- There are 200 different types of cancer.
- c3 million people 4.4% of the UK population living with or affected by cancer.
- c390,000 new diagnoses every year.
- £8 billion + is est. cost to the NHS each year.

"Genomics helps us understand what makes us different and also what makes us the same."

Fast diagnosis doesn't mean we will be treated faster, if capacity isn't there.

What matters to patients? To you?

- 24.1% of the UK population is >age 60
- 52.3% of the UK population is >age 40
- 4 in 10 cases could be largely prevented through lifestyle choice
- 25.9% est. of adults in England are obese a further 37.9%est are overweight.
- 90% of patients referred as an urgent suspected cancer referral from primary care will not receive a cancer diagnosis.
- The number one cause of death for diabetic patients is cancer.

- Workforce - 23% of General Practitioners in primary care are employed full time five days/week.
- Workforce – 12.5% avg Secondary Care NHS Trust staff leaver/attrition rate each year.
- 40 years ago there was a 25% survival rate, and today there is a 58% survival rate.
- The NHS Long Term plan aims to increase survival by +55,000 people/year by 2028 will (survive for five years or more following their diagnosis).
- That is another 15-20% in 5 years…while the UK is facing a 20% increase in cancer incidence by 2030…
- Significant variation in treatment and workforce capacity across the UK for cancer services – particularly non surgical oncology services
- Cancer is in the top 3 for 'threat' to our personal longevity (1. Arteriorsclerosis, 2. Cancer, 3. Neurodegenerative)

What are Cancer Alliances?

East Midlands Cancer Alliance

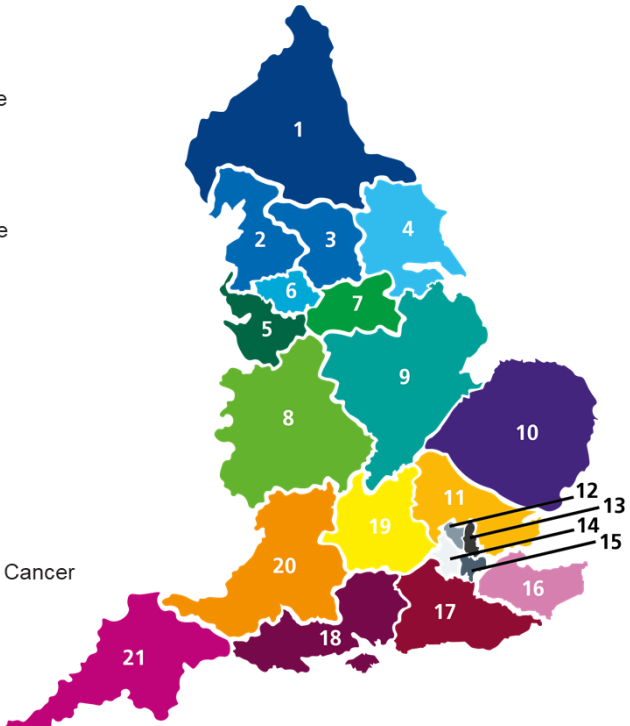
Purpose and Objectives

1. **Improve outcomes and increase survivorship for cancer patients. The NHS Long Term Plan ambition: From 2028,**
   a) At least 75% of patients diagnosed at Stage 1 and 2; and
   b) An extra 55,000 people each year will survive for five years or more following their cancer diagnosis.
2. Deliver the National Long Term Plan ambitions for cancer for early / faster diagnosis of cancer.
3. Plan for and lead delivery of the ambitions for cancer, ensuring variation in outcomes is addressed and that improvements are made across whole pathways from prevention and diagnosis through to treatment and support for people living with cancer.
4. Provide oversight and coordination to support delivery of the constitutional waiting times standards for cancer.
5. Utilise opportunity of 'at scale geography' to reduce health inequalities.

Functions

1. Foster productive partnerships.
2. Establish/enable robust governance mechanisms.
3. Develop strategic transformation plan for cancer, ensuring alignment with wider STP/ICS-level plans.
4. Align and deploy designated funding.
5. Harness data to analyse and improve operational performance and longer-term outcomes.
6. Work closely and collaboratively with the regional NHSE/I teams
7. Maintain an expertise and overview of cancer services, and broker interventions to improve performance.
8. Clinical expertise and leadership

1. Northern Cancer Alliance
2. Lancashire and South Cumbria Cancer Alliance
3. West Yorkshire and Harrogate Cancer Alliance
4. Humber, Coast and Vale Cancer Alliance
5. Cheshire and Merseyside Cancer Alliance
6. Greater Manchester Cancer Alliance
7. South Yorkshire and Bassetlaw Cancer Alliance
8. West Midlands Cancer Alliance
9. **East Midlands Cancer alliance**
10. East of England – North Cancer Alliance
11. East of England – South Cancer Alliance
12. North Central London Cancer Alliance
13. North East London Cancer Alliance
14. West London Cancer Alliance
15. South East London Cancer Alliance
16. Kent and Medway Cancer Alliance
17. Surrey and Sussex Cancer Alliance
18. Wessex Cancer Alliance
19. Thames Valley Cancer Alliance
20. Somerset, Wiltshire, Avon and Gloucestershire Cancer Alliance
21. Peninsula Cancer Alliance



Cancer Alliance Focus

East Midlands Cancer Alliance

- Connecting networks, organisations, people, process, labs, pathways… vision.
- Clinical Leadership and Expert Clinical Advisory Group (ECAG) – multi-professional, and dedicated clinical leadership.
- Early Diagnosis, Faster Diagnosis, Operational Performance Improvement, Cross Cutting, Innovations
- Enabling smart infrastructure and investment.
- Workforce education and training in both primary care and secondary care, via primary care hubs and EMCA cancer training and education academy; clinical and nonclinical
- Enabling tailored treatment and constant innovation.

Understanding and Managing Risk in Cancer

East Midlands Cancer Alliance

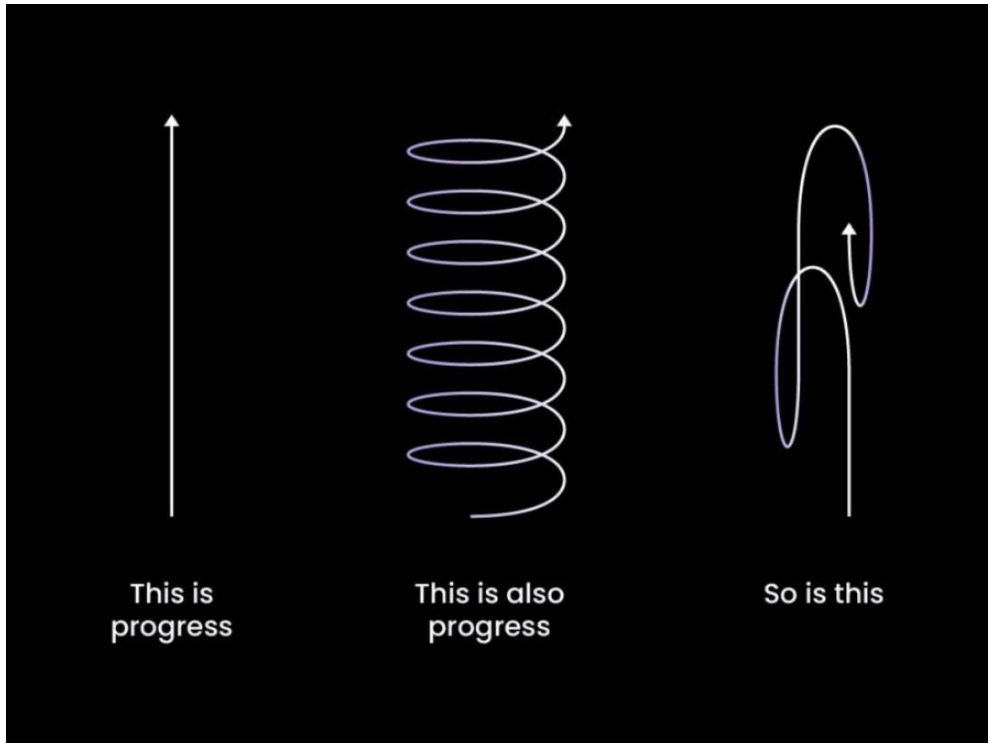
- Following referral for investigation of urgent suspected cancer within the English National Health Service referral system, 7% of referred individuals are diagnosed with cancer.

- Statistically, 1-3% of all diagnosed cancers will be missed via pathways (NICE). However, we utilise resources on the premise of a 0% aim which consumes considerable resource at the expense of waiting times and resource availability for those whom have a diagnosis.

- The following differentials are directly constraining progress and overcomplicating the management of pathways and patients:

    - *The definition and management of risk between primary and secondary care colleagues differ.*

    - *The concept and acceptance of risk between clinicians and managers within a hospital environment differ.*



How could we REIMAGINE RISK?

Connecting Primary Care and Secondary Care Clinicians

East Midlands Cancer Alliance

- Traditional training and education of clinicians (and our system) separates responsibilities for patients which creates constraints, different processes, and stifles pathway solutions…for managing and improving cancer service and treatment.
- “Anticipatory actions”
- Constraints to ‘flow’ creates delays.
- Cancer is typically planned care; design the flow
- Make the right thing for patients the easiest thing for (all) clinicians!

Early Detection

Understanding the Impact of Genomics in Cancer

East Midlands Cancer Alliance

SUMMARY - Impact of Genomics

Prevention

Chemoprevention
- Lynch – aspirin
- BRCA – Tamoxifen / Raloxifene
- Aromatase Inhibitors

Risk reducing Surgery
- bilateral mastectomy (RRBM), risk-reducing bilateral salpingo-oophorectomy (RRSO)

Removal of precancerous lesions
- Colonoscopy

Early Diagnosis

Risk modelling (Phenotips)
- Based on family history, lifestyle & constitutional mutations
- Enables stratified surveillance and cancer prevention
- Feed into family history clinics (secondary care)

Incorporation of diagnostic constitutional testing
* Mainstreaming within cancer pathways
* Focus on breast, pancreatic & prostate cancers
* Embedding colorectal / endometrial pathways for Lynch Syndrome

Cascade testing for families with known pathogenic variants
*Removal of barriers such as GP referrals
* Self referral

Treatment

Targeted chemotherapies (constitutional & somatic)
* PARPi for BRCA
*Pembrolizumab for Lynch Syndrome

Optimised surgery (constitutional & somatic)
*Prostatectomy for BRCA carriers with cancer, RRBM for BRCA1/ BRCA2/ PALB2 carriers reducing risk of future cancers
*Subtotal colectomy for Lynch reducing risk of future cancers

Pharmacogenomics
* Constitutional & Somatic
* Drug receptors - Tamoxifen - somatic
Targeted drugs - PARPi (somatic)
Metabolism – DYPD & 5FU toxicity (constitutional)

Living with Cancer

Stratified Surveillance following discharge from cancer treatment
* High risk cancers
* Constitutional mutation

Include in Holistic Needs Assessment
* Consideration of constitutional testing if not done
* Genetic counselling support to discuss cascade testing in families

Glossary:
Constitutional = inherited
Somatic = in the tumour

Early Diagnosis

Alignment of a Complex Field of Development

East Midlands Cancer Alliance

- National strategy and programmes across multiple bodies; Genomics England, NICE, GRAIL, CVLP.
- Alignment for local connection, interpretation, application and multi-year action.
- Genomics Expert Clinical Advisory Group (ECAG) work plan.

EMCA Early Detection and Diagnosis Strategy

Vision: EMCA is the East Midlands Leaders and Centre for Excellence for Early Detection and Diagnosis in Cancer securing the best outcomes and survivorship for our population

75% Cancers detected at Stage 1 & 2 by 2028
Measurable Aim nationally: 50,000 extra people living for 5 years or more beyond their diagnosis

Prevention	Screening	Timely Presentation	Research & Innovation	Genomics	Workforce & Education
• Healthy Lifestyle programme pilot (Derby) • Diabetes /cancer pilot (LLR)	*(NB: Excludes national screening programme work)* • Cervical video texting • Bowel screening videotext pilot (LLR) • Lung symptomatic pilot (LLR) • Pancreatic (Europac study) • Liver Surveillance	• Cancer waiting times updated guidance • Cancer Maps – Public & Professional • Prostate case finding pilot (Derby city) • Cancer Awareness Measure • Cancer Diagnosis Audit • Awareness Campaigns	• Cancer Awareness Pilot – GP system for flagging (Lynch syndrome) • Diabetes and Cancer Risks Project • CCE and Cytosponge • NHS Galleri trial	• High volume & less survivable cancers • Mainstream Lynch Syndrome testing • Mainstream BRCA testing • Cancer Vaccine Launchpad – (Colorectal - NUH) • Expand ctDNA Lung pilot	• Primary Care Training and Education Academy • Primary Care Training Hubs • GP Train The Trainer • Spiral Cancer Curriculum • Promoting and developing CCR's educational resources • Identify PCN level roles, train to support patients living with cancer e.g.: Cancer Care Co-ordinators

6 | Early Detection & Diagnosis programme

GMSA & EMCA Joint strategy: 2024-26

Primary Care Audit
- Consolidation of identification of people with Lynch Syndrome
- Standardise coding
- Offer of cancer prevention measures

Trust Audits
- Mainstreaming services
  - Breast/ Ovarian/ Prostate/ Lynch
- Family History clinics
- Surveillance
- DYPD *(GMSA/Local GLH)*
- PIK3CA *(GMSA/Local GLH)*

NHS East Genomic Medicine Service Alliance ⟷ East Midlands cancer alliance

Risk modelling & Screening
- Primary Care – standardise screening re family history
- Secondary Care
- Establish Triage service, clinical genetics
- Family history clinics

Clinical genetic services
Fit for the Future

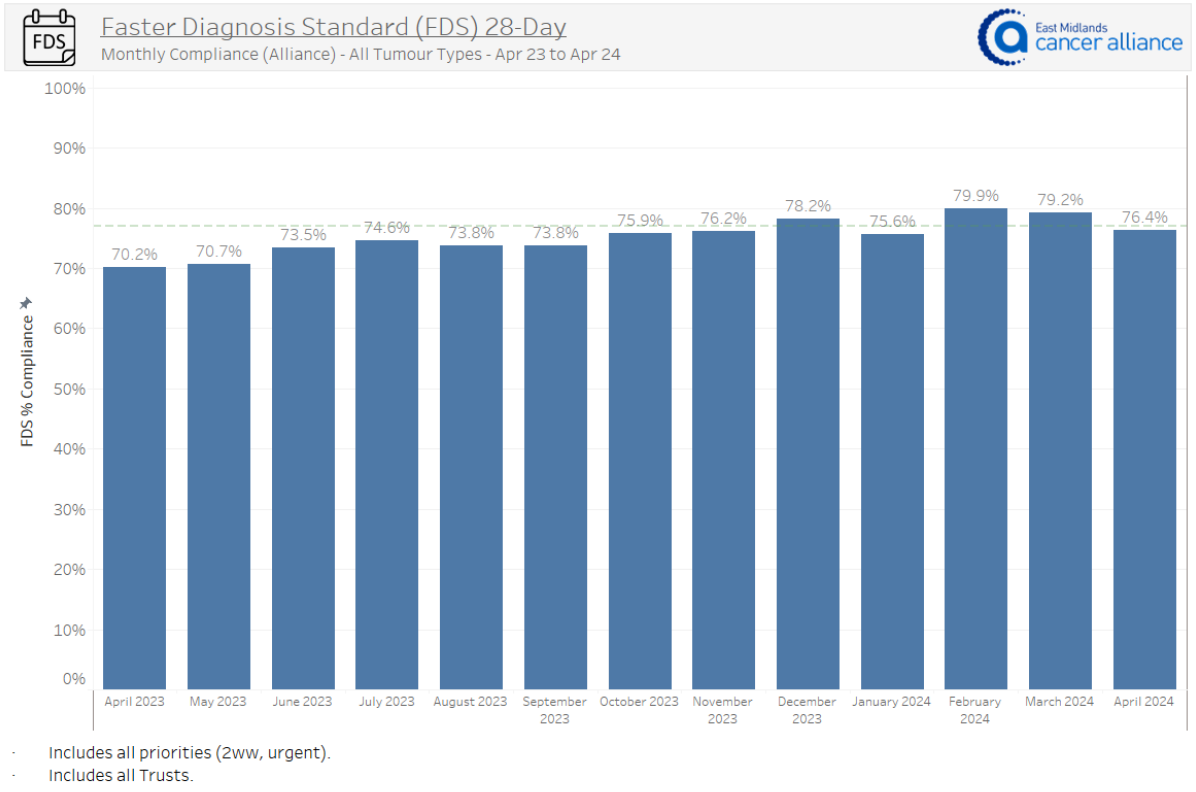
Research
Pancreatic Cancer
ctDNA pilots
-PIK3CA/ESR
-Ovarian Cancer

IT/Genomic Digital Health Record (national)
- Result placement *(LGLH)*
- Result ordering *(LGLH)*
- Data analytics
- NOTIS alerts
- Screening recall system

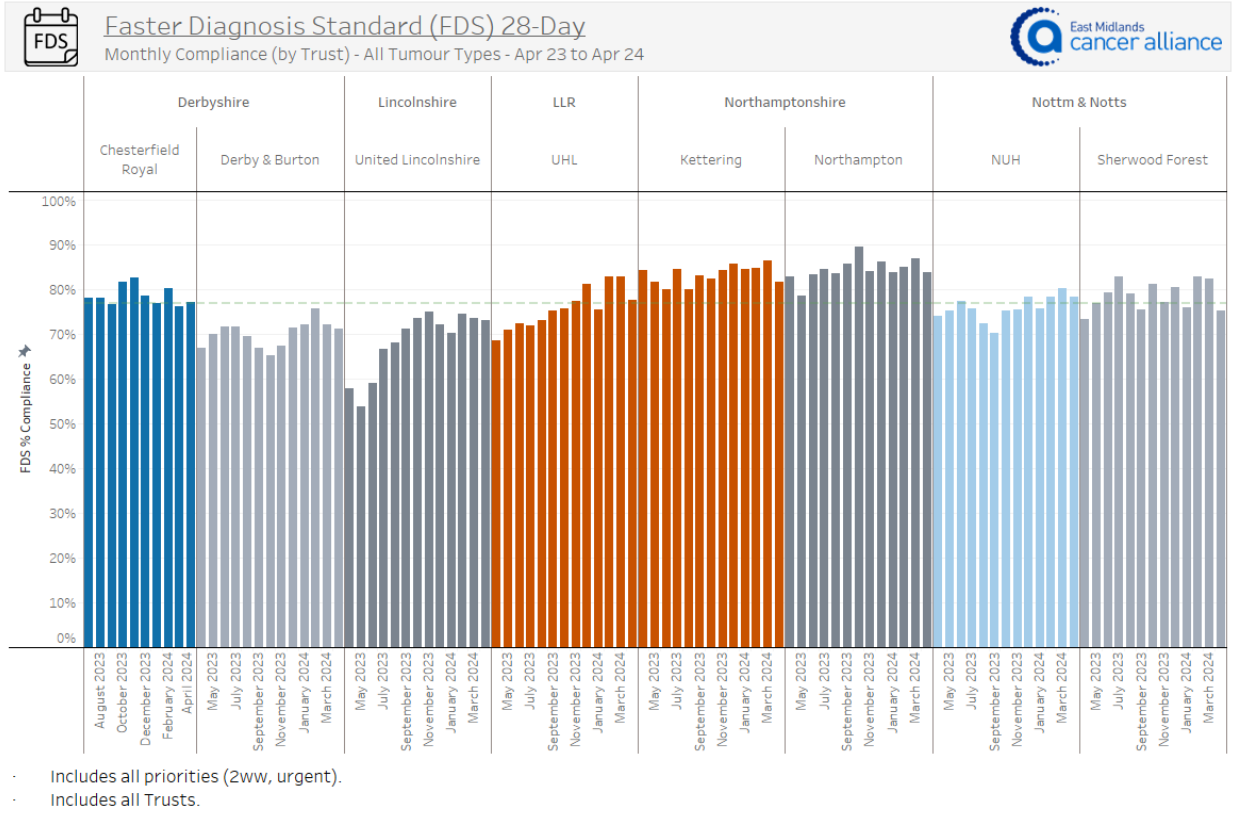
Education (GMSA / EMCA)
- Mainstreaming genomic testing.
- Awareness campaigns
  Educational meetings
  GP forums

Faster Diagnosis Standard (FDS) - Segmentation

East Midlands Cancer Alliance



- Includes all priorities (2ww, urgent).
- Includes all Trusts.



- Includes all priorities (2ww, urgent).
- Includes all Trusts.

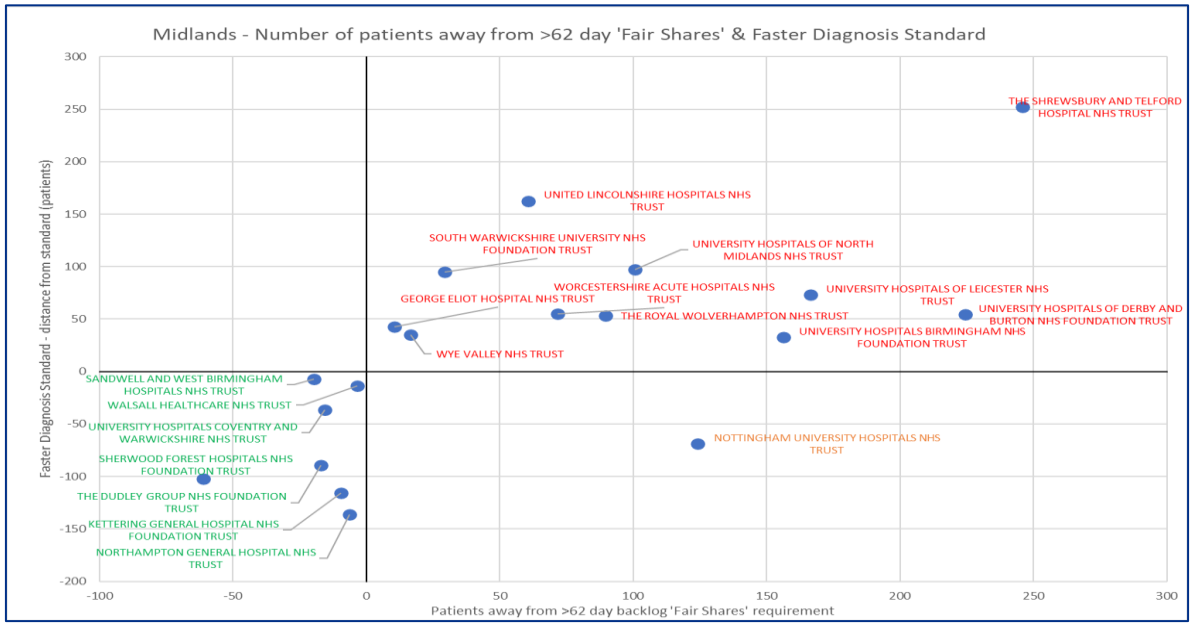
1. Segmentation by Trust, by Tumour Site, Status By Week, By Cancer Waiting Time
   a) Faster Diagnosis Standard + 31day + 62day

2. *Enabling MDT coordinators, Cancer Centres, Service Managers, Pathway Navigators, Clinical Leads, PCN business managers and GP practice managers…to “know their numbers” and the impact of their actions

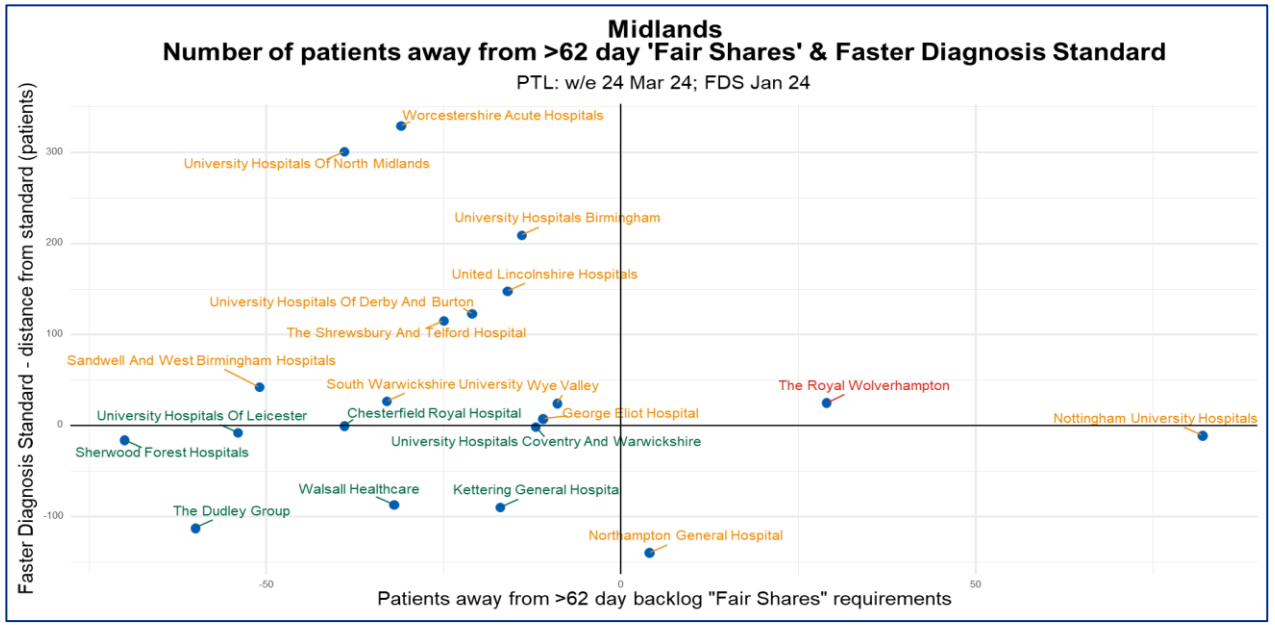
Impact on Cancer Waiting Times

East Midlands Cancer Alliance

CWT Performance 2023:



CWT PerformanceToday

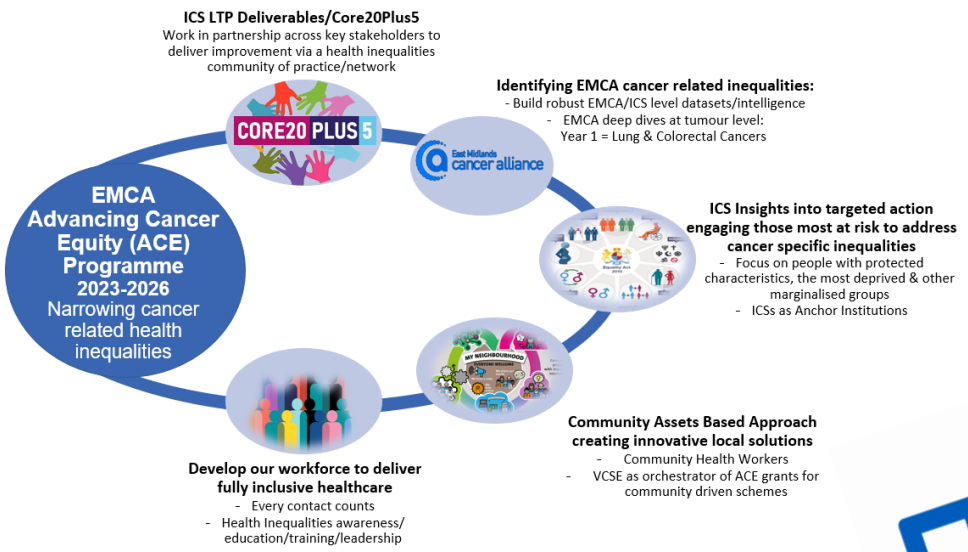


- Significant improvement over the past 12 months with concerted effort.
- Faster Diagnosis Standard (FDS) now at 80% + vs standard of 77% by Mar25 vs 70% a year ago.
- 31day is static the past 12 months (absorbed more demand at 118%).
- 62days is static but fragile capacity limits resilience to be more productive and major risk we will not improve to the degree necessary without added equipment/capacity. “Disruptive variables”

National Deliverables…And numerous other enabler projects

East Midlands Cancer Alliance

The EMCA Advancing Cancer Equity Programme 2023-2026

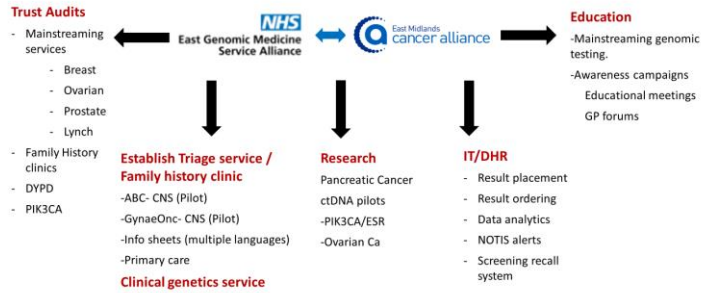


Regional ovarian MDT

Oncology Development Programme

East Midlands Radiotherapy Network

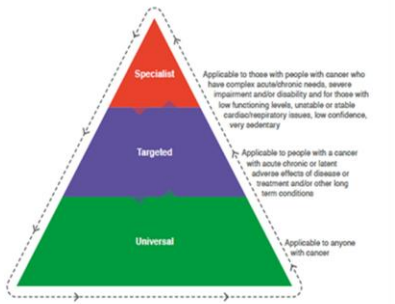
GMSA & EMCA Joint strategy: 2024-25



EAST MIDLANDS CANCER ALLIANCE
CENTRE FOR PSYCHOSOCIAL HEALTH

EMCA Gold Standard Framework for Prehabilitation

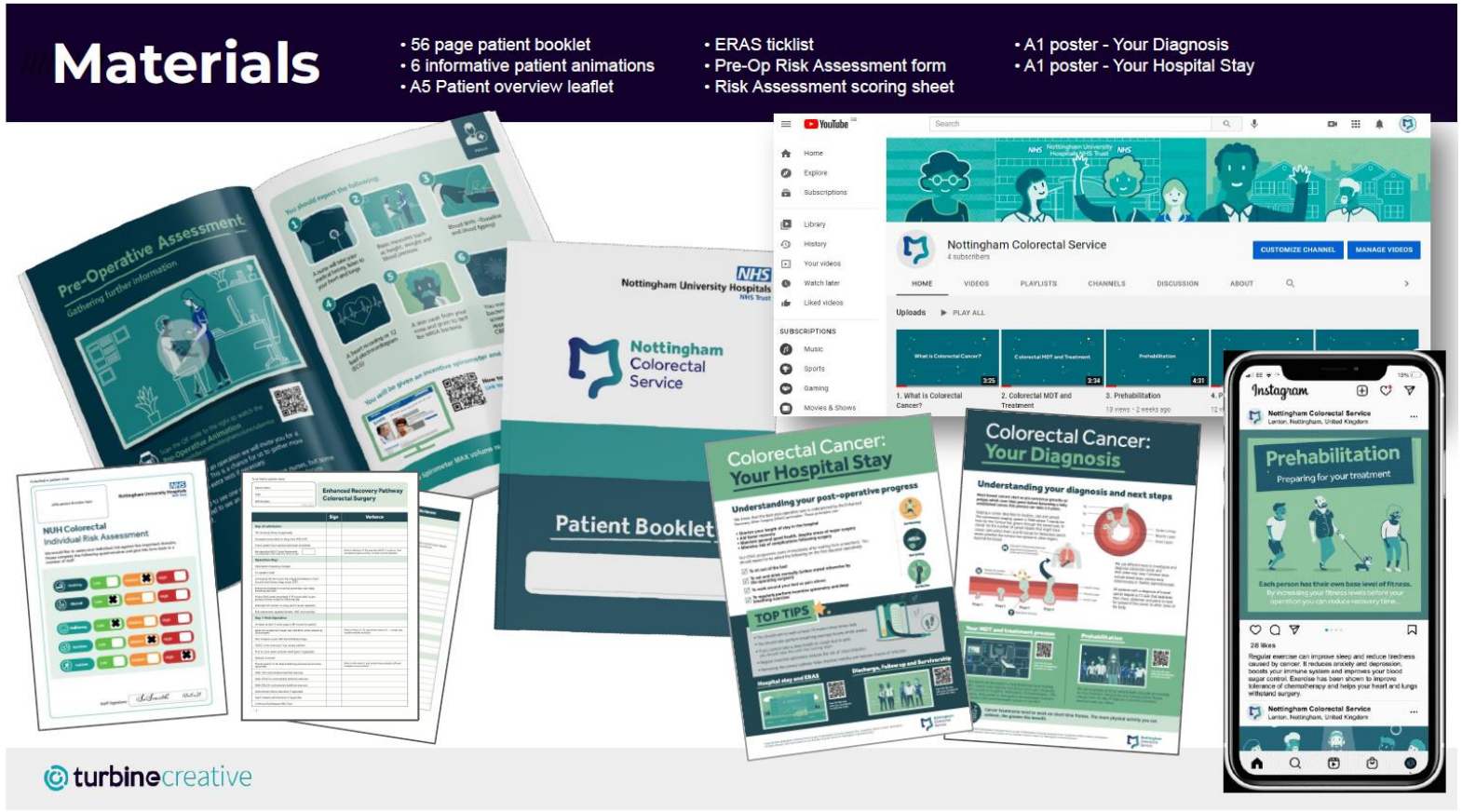
- Guidance document
- Provision of Services
- Screening
- Assessment
- Interventions
- Liaison
- Outcome Measures



LUNG CANCER ODN
LUNG CANCER ODN
East Midlands

Upgrading Patient Communication and Materials

East Midlands Cancer Alliance



Working with experts to redesign pathway materials for patients.

- Animated videos
- Hard copy/White Copy
- Applications
- Multiple languages
- User Friendly
- Simplified
- Designed by the experts with patients.
- Enabling for *all

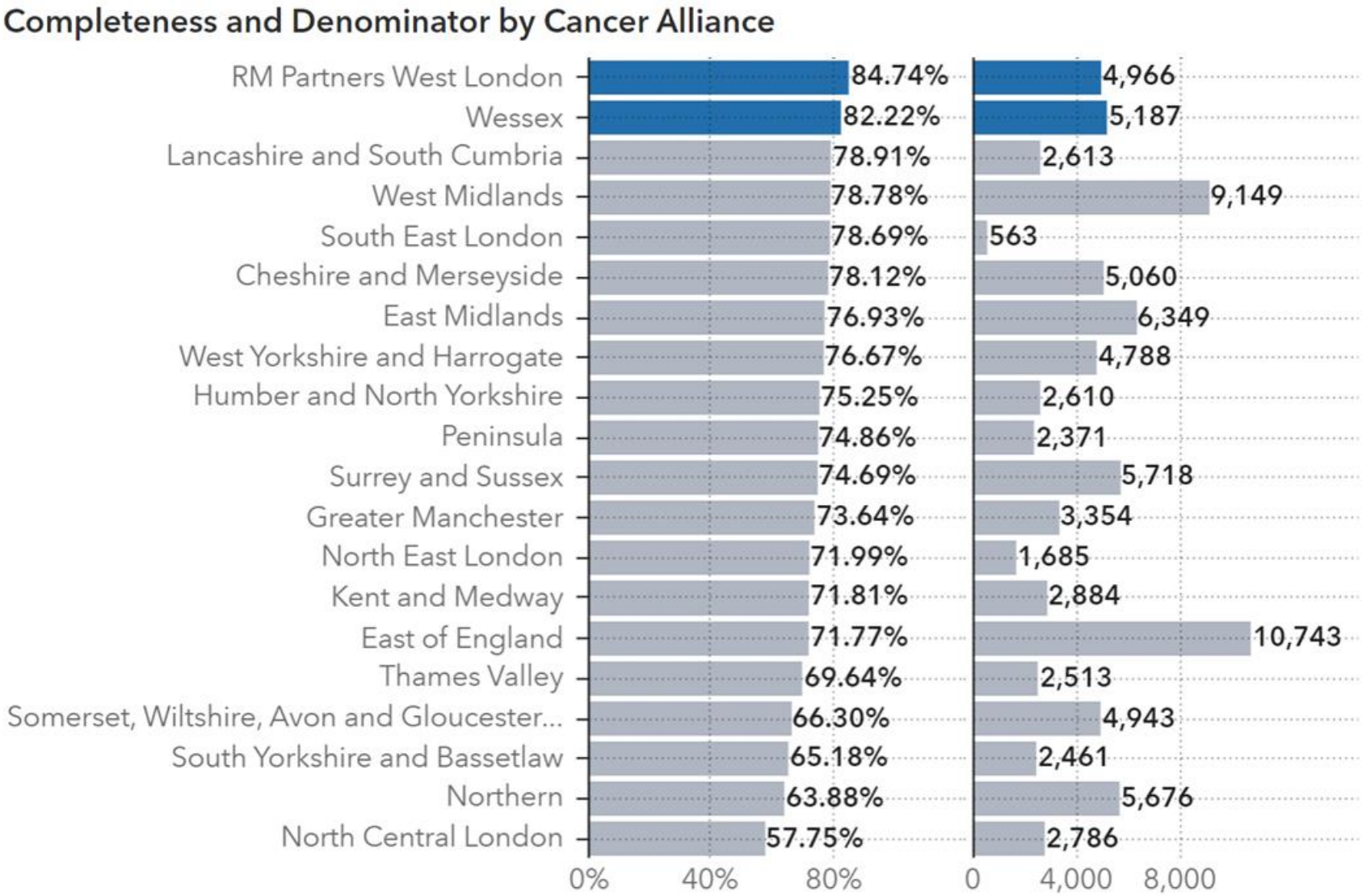
LGI/Colorectal
Lung
…UGI
…Gynae

Cancer Outcomes Data

East Midlands Cancer Alliance

1. Recording Staging Data via MDT.

2. Alignment of professions and MDT coordination.

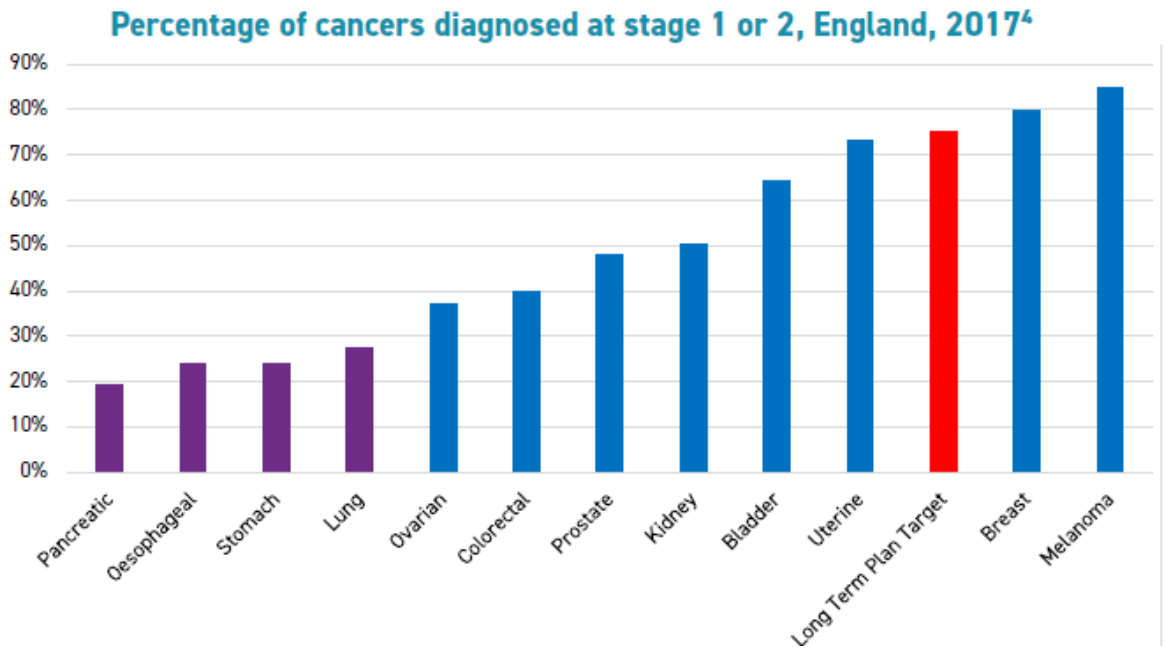


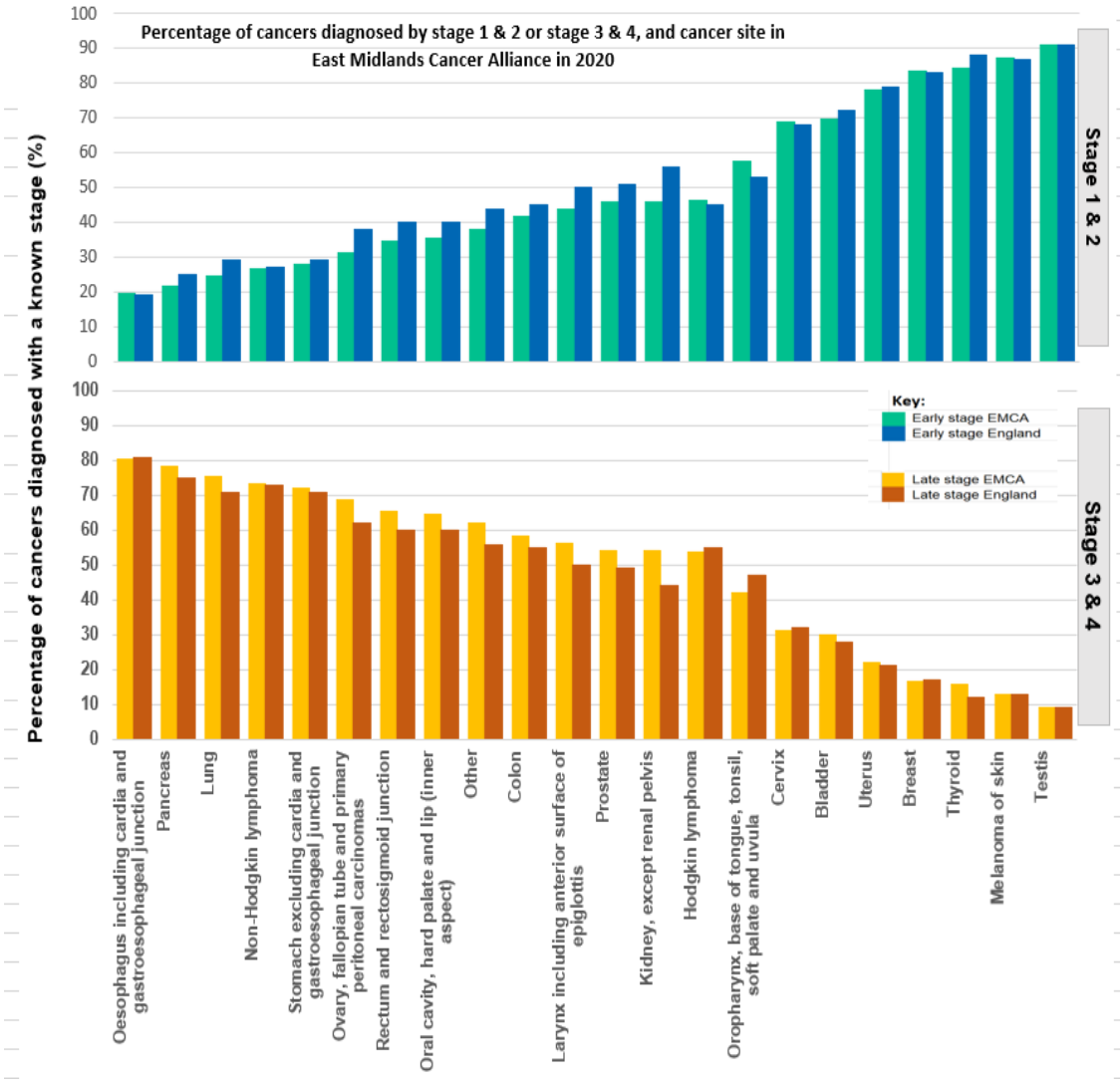
Outcomes and “Less Survivable Cancers”

East Midlands Cancer Alliance

- If we are to improve outcomes and increase early detection rates to increase survivorship and enable early and fast diagnosis, we must enable people and processes to work more fluidly.

- Cancer Alliances are key, neutral connectors” enabling .





Summary and Thank You.

East Midlands Cancer Alliance

- Two national NHS targets were achieved in 23/24, and both were cancer targets.
- There are dozens of strategic and operational initiatives focused on cancer transformation to improve outcomes and increase survivorship for current and future patients.
- The scale of improvements to date and still necessary are significant and attract high level of £ resources and expertise.
- Cancer Alliances work with multiple parties to coordinate these efforts for equity, consistency and to help address health inequalities.

Mike Ryan, Head of Service, EMCA
Chair, East Midlands Radiotherapy Network
Michael.Ryan@nhs.net
england.emca@nhs.net
www.eastmidlandscanceralliance@nhs.uk

Speaking Now…

Dr Muhammad Babar Aslam
Consultant pathologist and clinical lead digital pathology Wales - Betsi Cadwaladr University Health Board

HOW AI REVOLUTIONISING CELLULAR PATHOLOGY!

DR M B ASLAM

CONSULTANT PATHOLOGIST

CLINICAL LEAD ALL WALES DIGITAL PATHOLOGY

THE ROLE OF AI IN CELLULAR PATHOLOGY

REVOLUTIONIZING DIAGNOSTIC MEDICINE

AI HAS A POTENTIAL TO TRANSFORM HEALTHCARE

- KEY AREAS OF IMPACT:
  - DIAGNOSIS
  - TREATMENT PLANNING
  - DRUG DISCOVERY
  - PERSONALIZED MEDICINE

AI APPLICATIONS IN CELLULAR PATHOLOGY

IMAGE ANALYSIS

- CELL DETECTION AND COUNTING
- TISSUE CLASSIFICATION
- MORPHOLOGICAL ANALYSIS

DIAGNOSTIC SUPPORT

- AUTOMATED SCREENING
- SECOND OPINION SYSTEMS
- RARE DISEASE IDENTIFICATION

THE CHALLENGE…

PROSTATIC PATHOLOGY:

- SCREENING A LOT OF TISSUE; FROM 5-8 CORES ROUTINE PER SLIDE
- RISK OF MISSING TINY CANCERS
- DIAGNOSTIC ACCURACY & REPRODUCIBILITY
- REPEAT BIOPSIES PUTTING ADDITIONAL PRESSURES ON THE NHS & UNDUE HARM TO PATIENTS

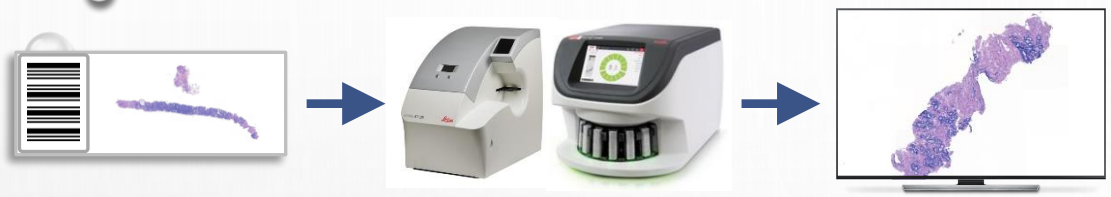
THE WAY FORWARD…

TRANSFORMATION OF PATHOLOGY:

- TO IMPROVE THE DIAGNOSTIC ACCURACY WITH THE HELP OF ALGORITHMS / COMPUTATIONAL PATHOLOGY / AI
- PROJECT STARTED USING IBEX AI GALEN PLATFORM FUNDED BY SMALL BUSINESS RESEARCH INITIATIVE (SBRI)

AI SOLUTION

AUTOMATED PRE-SCREENING & CLASSIFICATIONS



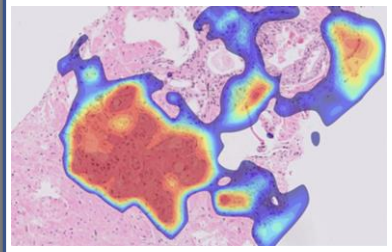
Alogrithm Results

IBEX

AI Findings

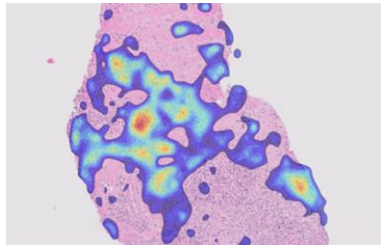
Cancer

(High likelihood)



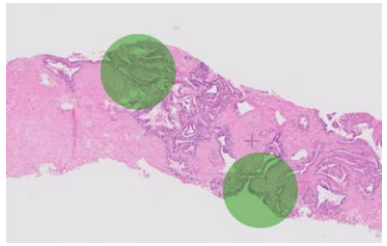
Suspicious Cancer

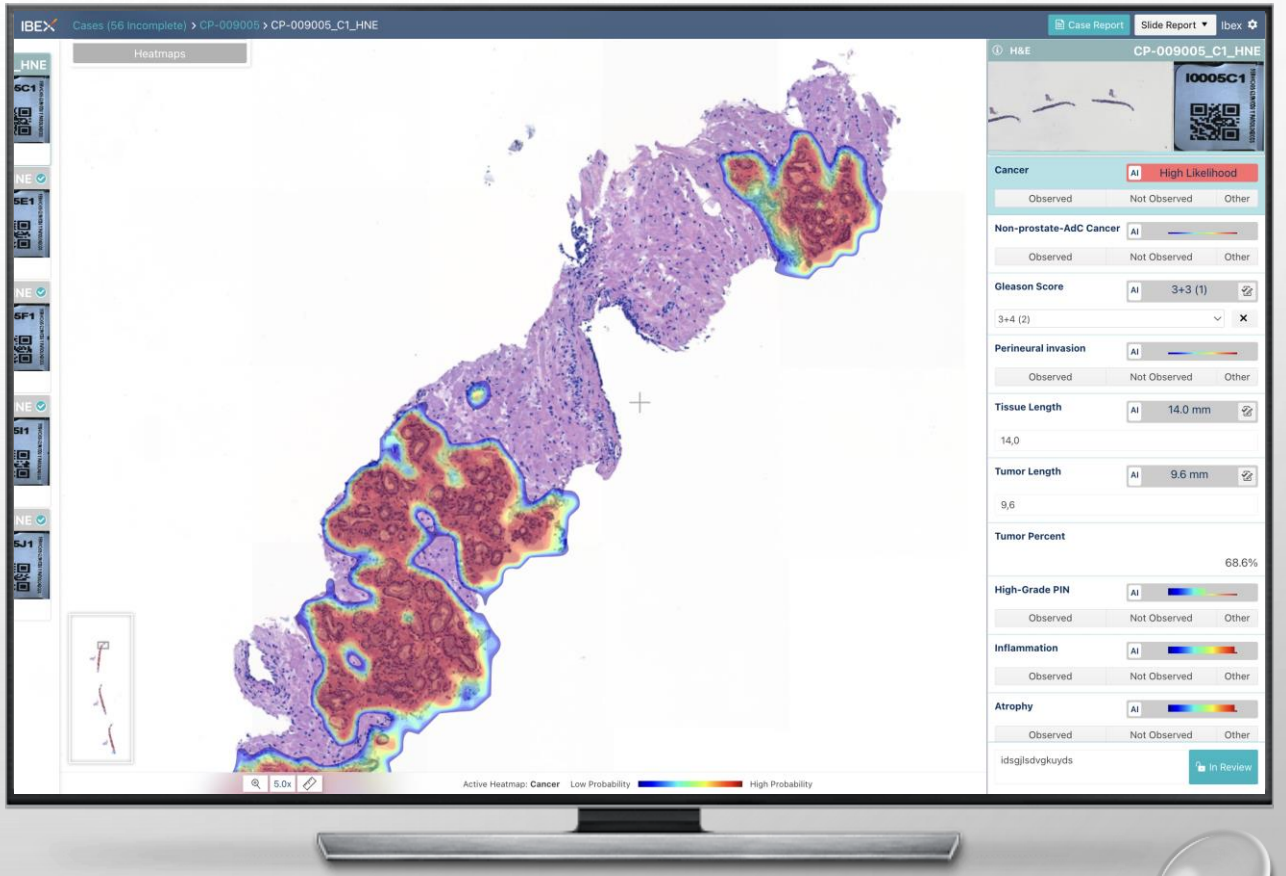
(Med. likelihood)



Benign (w/ POIs)

(Low likelihood)



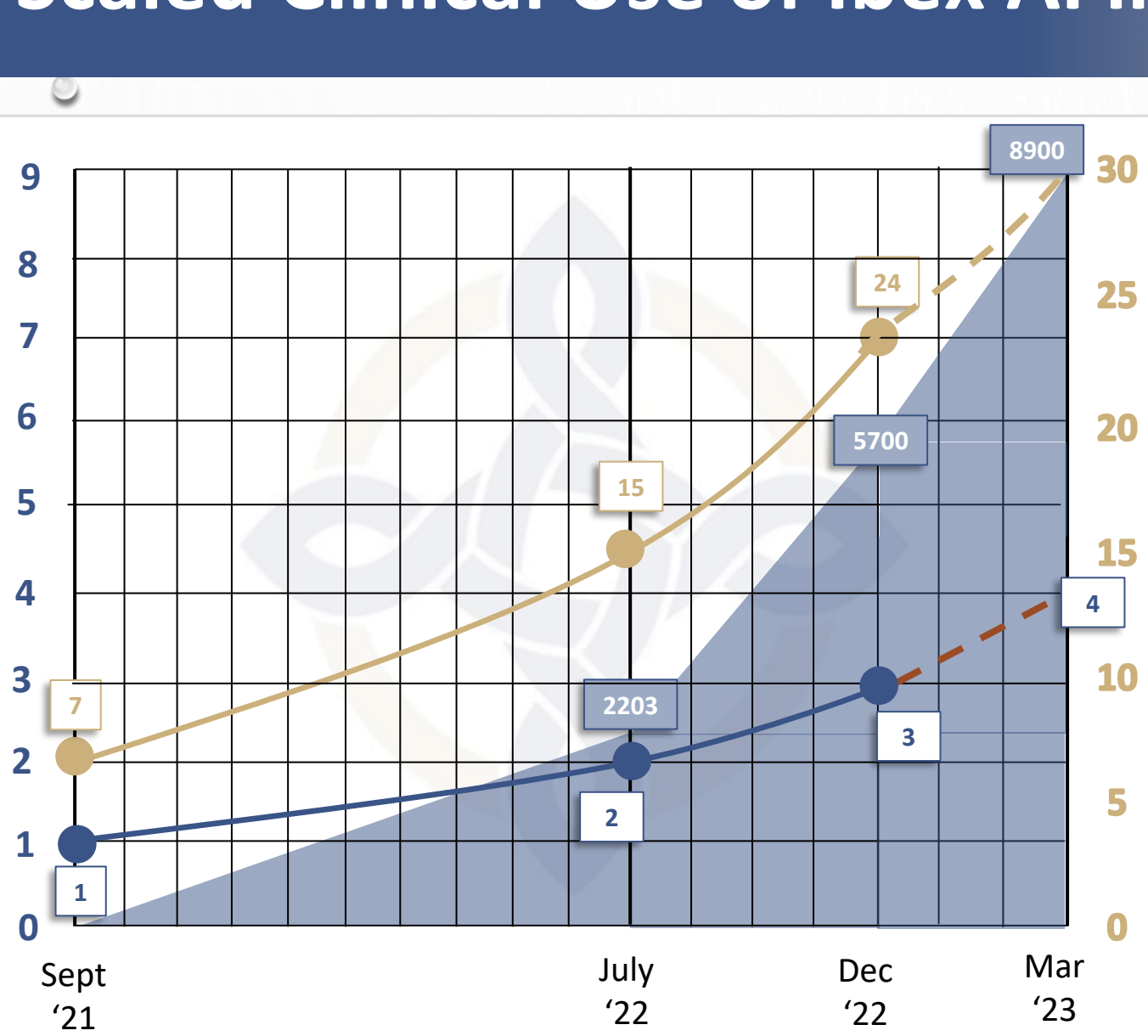


PROGRESS SO FAR…

PROGRESS OF OUR AI DEPLOYMENT:

- **MORE THAN 4500 PATIENTS** BIOPSIED IN WALES HAD THEIR SAMPLES **DOUBLE REPORTED BY AI** & HUMAN PATHOLOGIST
- SIGNIFICANT **REDUCTION IN MISSING TINY TUMOR** FOCI
- **INCREASED CONFIDENCE** OVER TISSUE DIAGNOSIS BY PATHOLOGISTS & UROLOGISTS
- GETTING IT RIGHT FIRST TIME
- DEVELOPING **STANDARDIZATION** ON THE PROGNOSTIC MARKERS: GLEASON'S SCORING, PERINEURAL INVASION, HIGH GRADE PIN & SO ON...
- INTERESTINGLY **REDUCTION IN IHC** IS ALSO NOTED

Scaled Clinical Use of Ibex AI in Wales

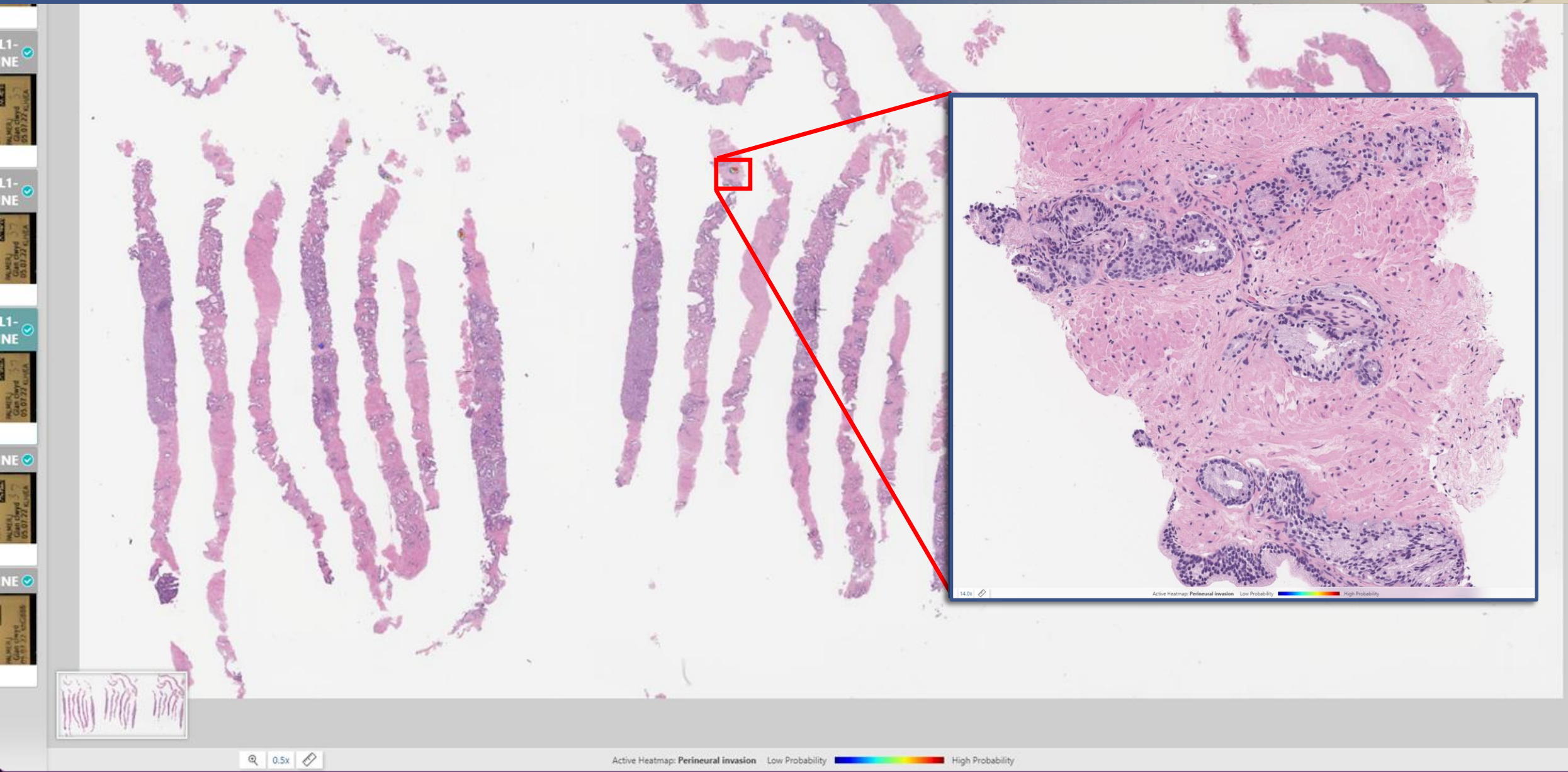


- By now, 5 **of 6 labs** in Wales moved to double report all Prostate with Ibex AI (*LAST 1 in process of validation*)
- **More than 30 pathologists** read their prostate cases with support of Ibex AI
- In total, >10K **slides analysed** to date with consistently high NPV/PPV
  - **NPV = 0.999**
  - **PPV = 0.998**

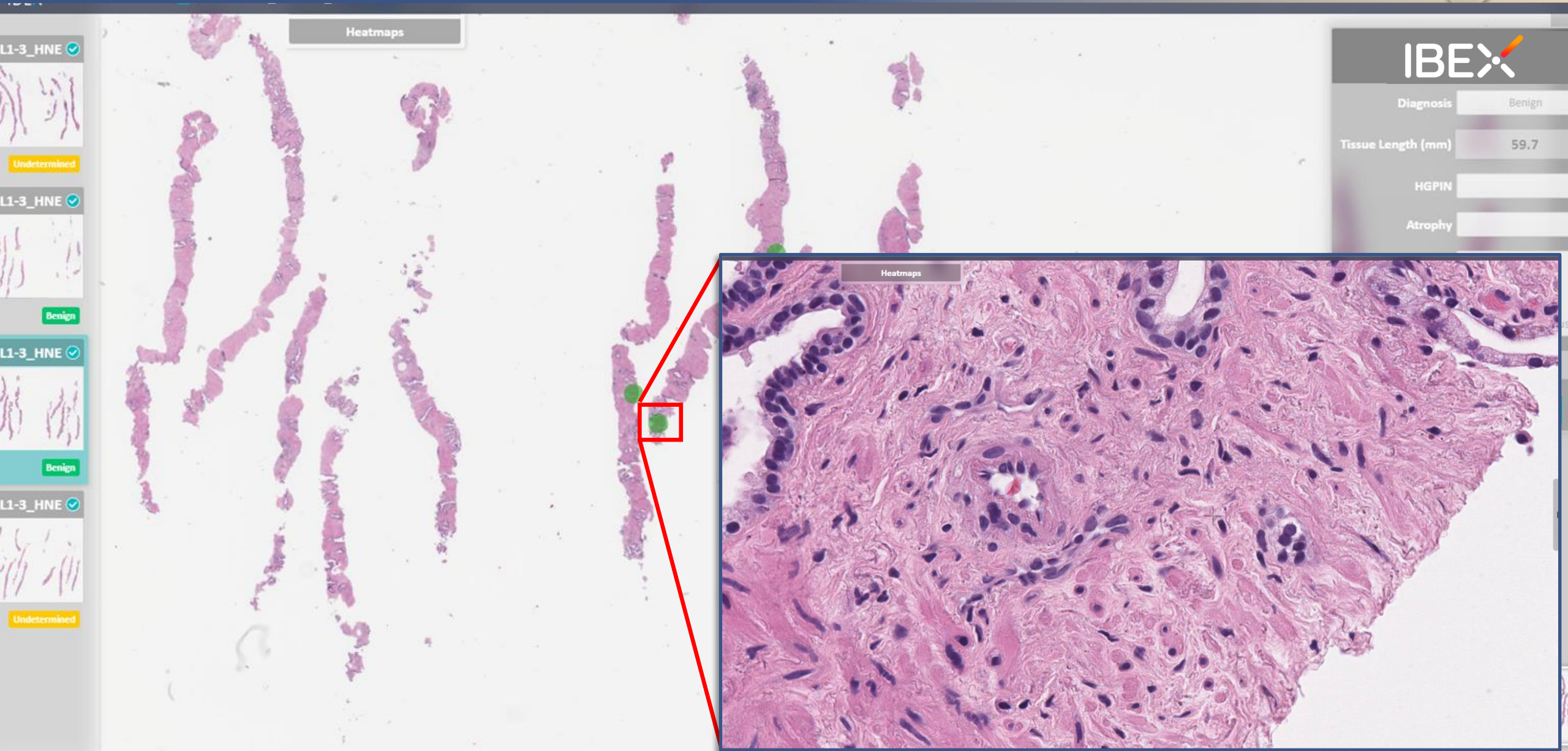
(Maintained over time)

>70% of prostate cases in Wales reported by AI

Ibex AI in Practice: Example case

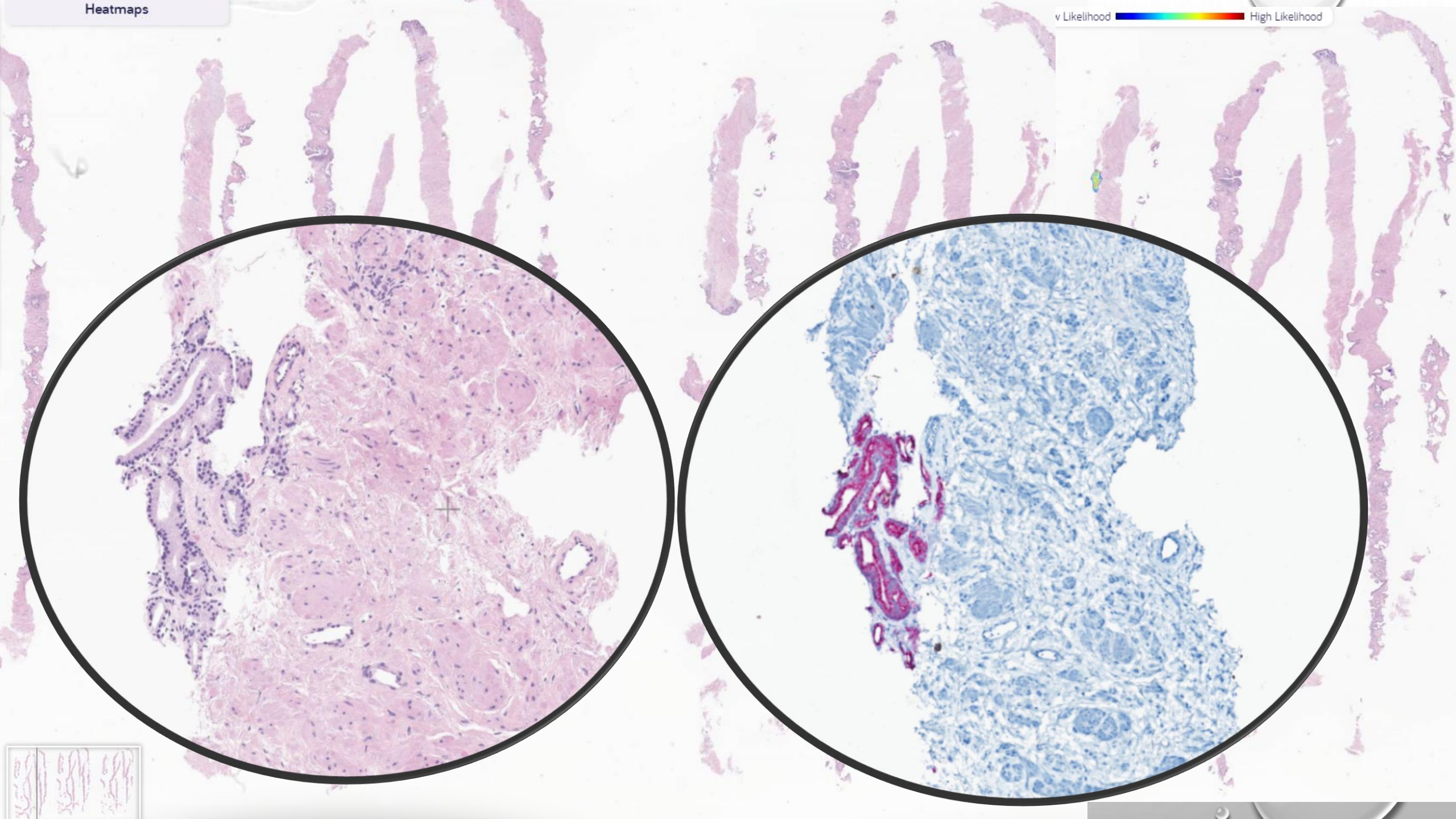


Ibex AI in Practice: Example case

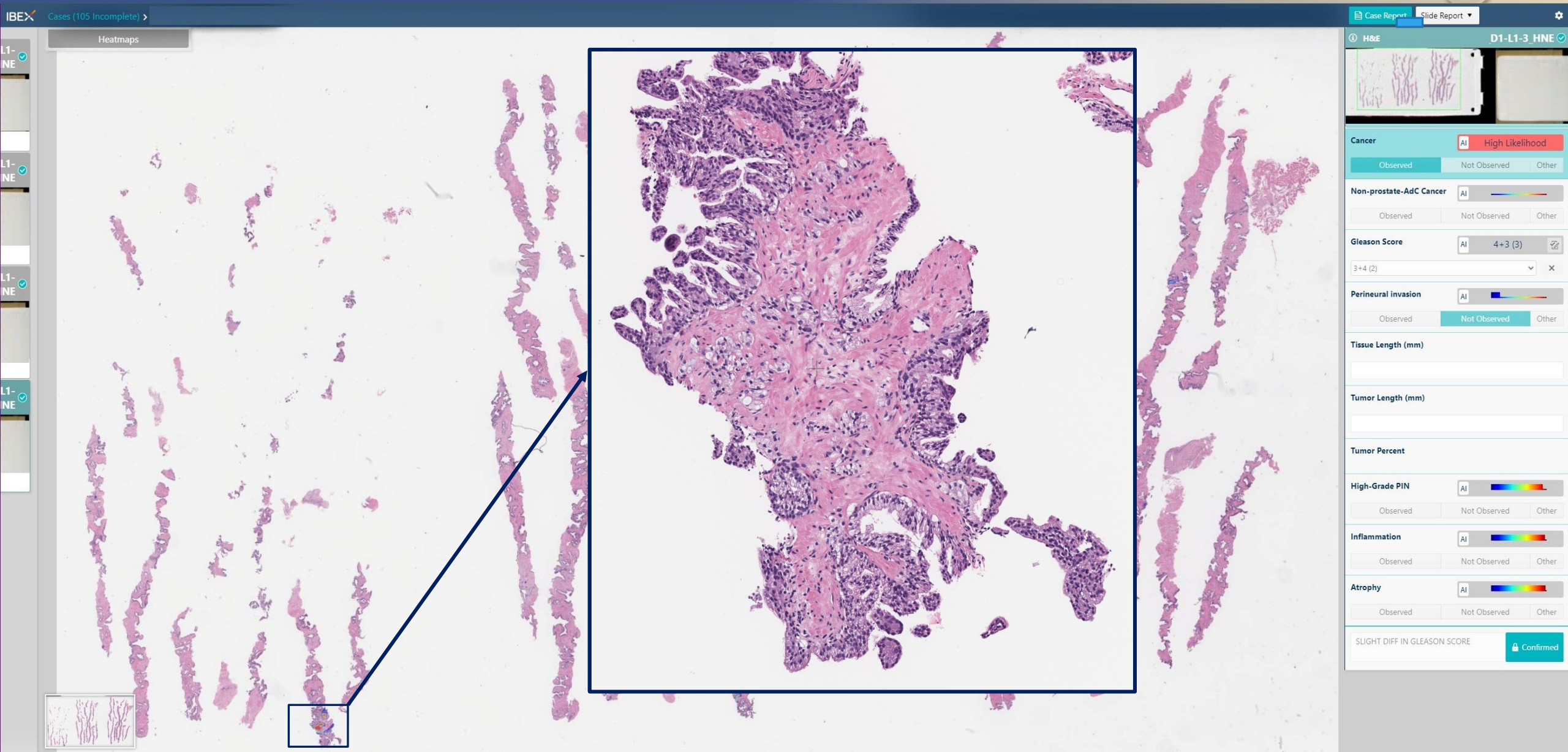


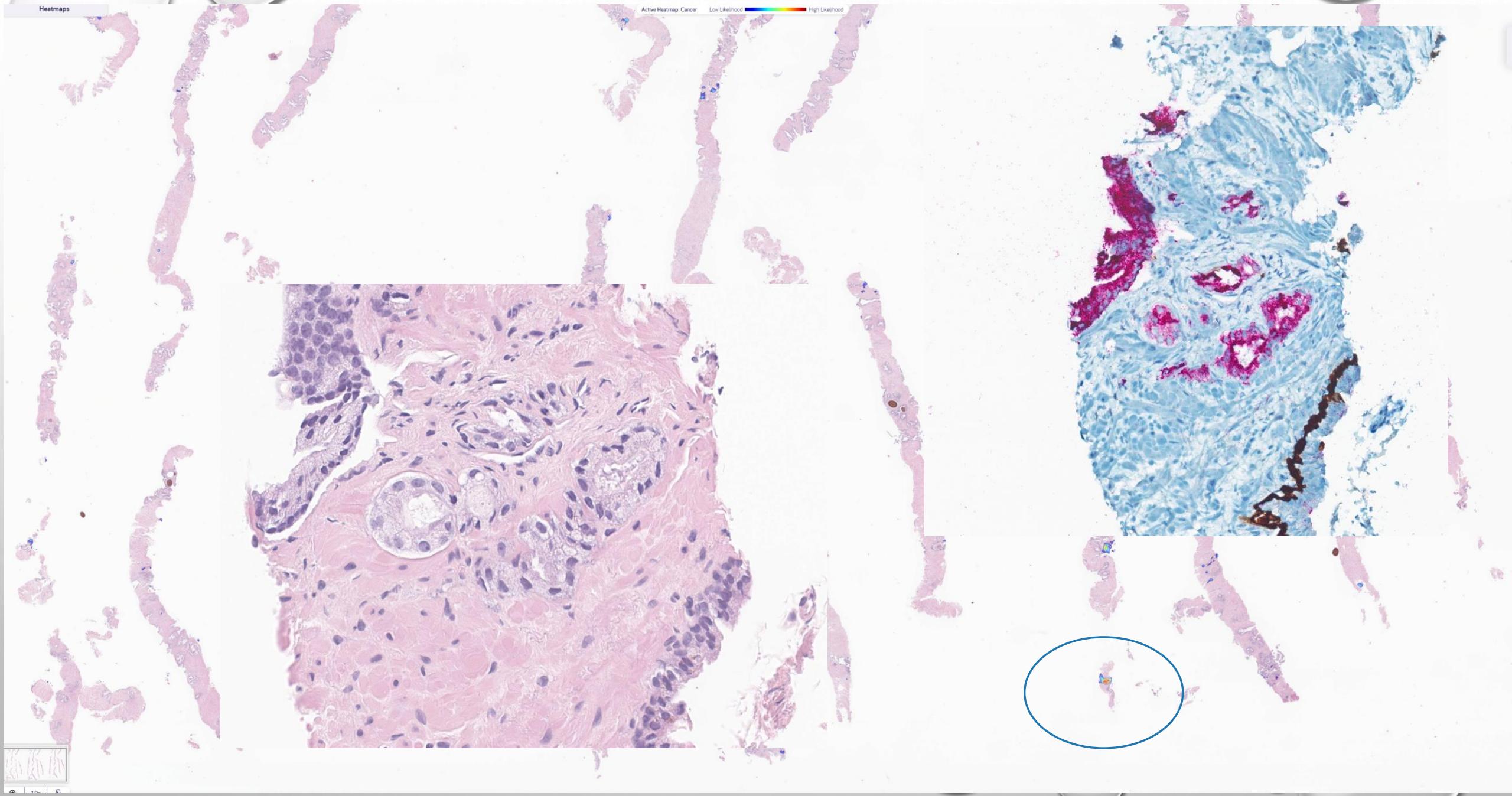
Heatmaps

v Likelihood High Likelihood

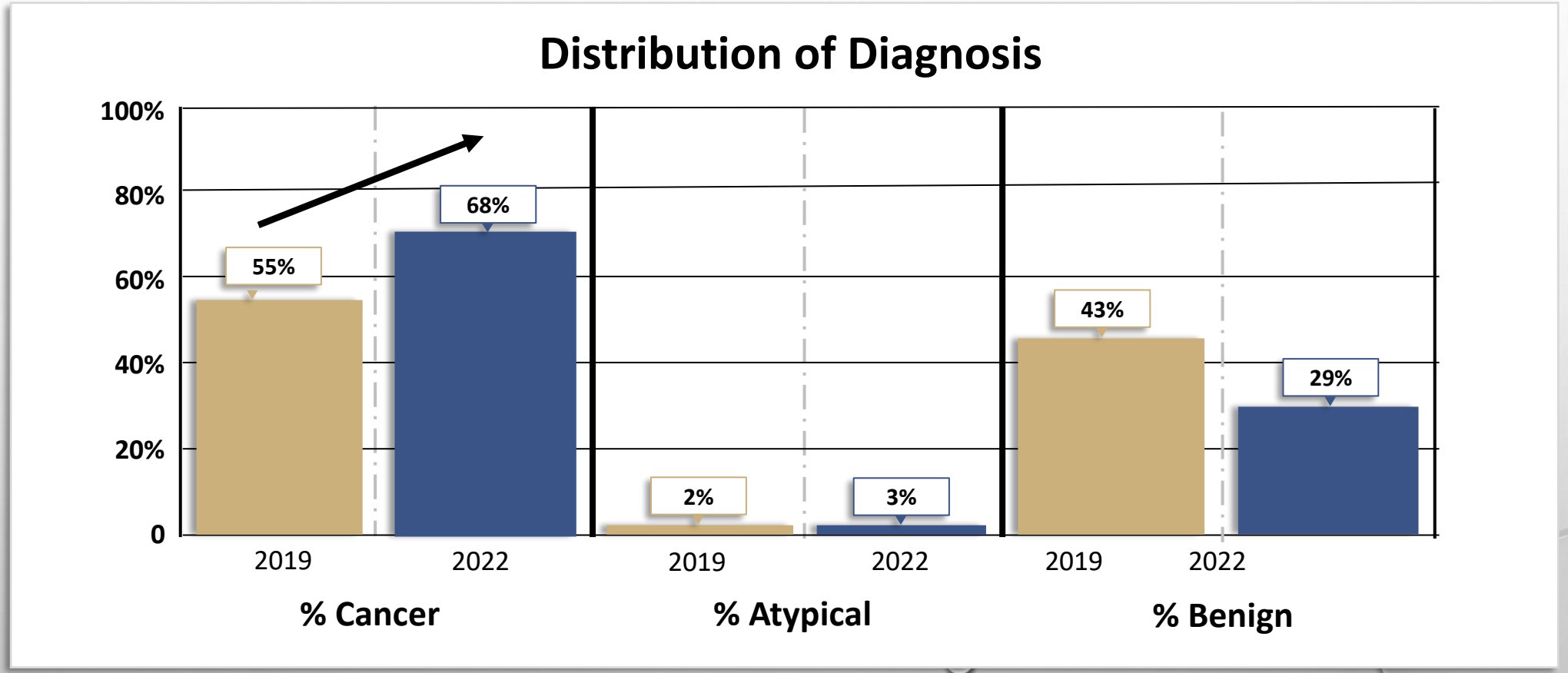


Ibex AI in Practice: Example case




Heatmaps
Active Heatmap: Cancer
Low Likelihood
High Likelihood

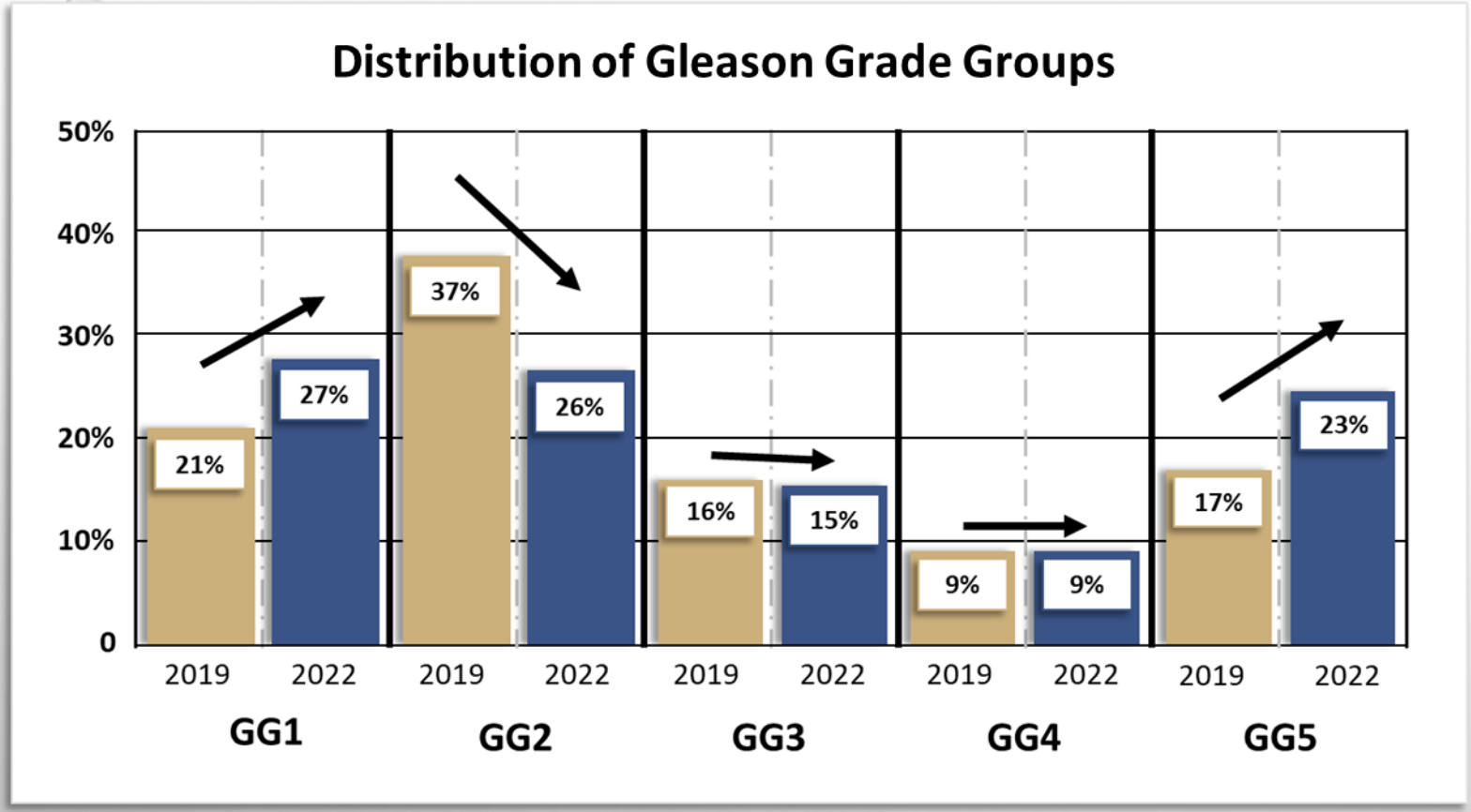
Case Characteristics

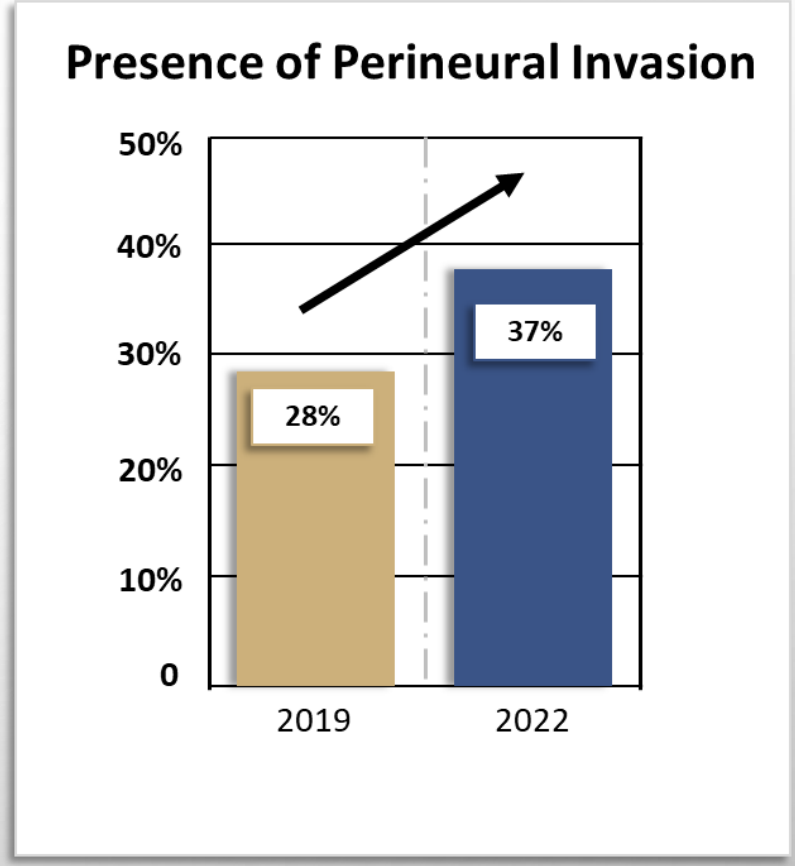


Jan - Jul **2019:** Workflow without AI

Jan - Jul **2022:** Workflow with IBEX

Gleason Distribution & Perineural Invasion





Cancer cases Jan-Jul **2019**: Workflow <u>without</u> AI

Cancer cases Jan-Jul **2022:** Workflow <u>with</u> IBEX

BREAST AI IN ROUTINE CELLULAR PATHOLOGY

THE EXPERIENCE IN BCUHB

CHALLENGES

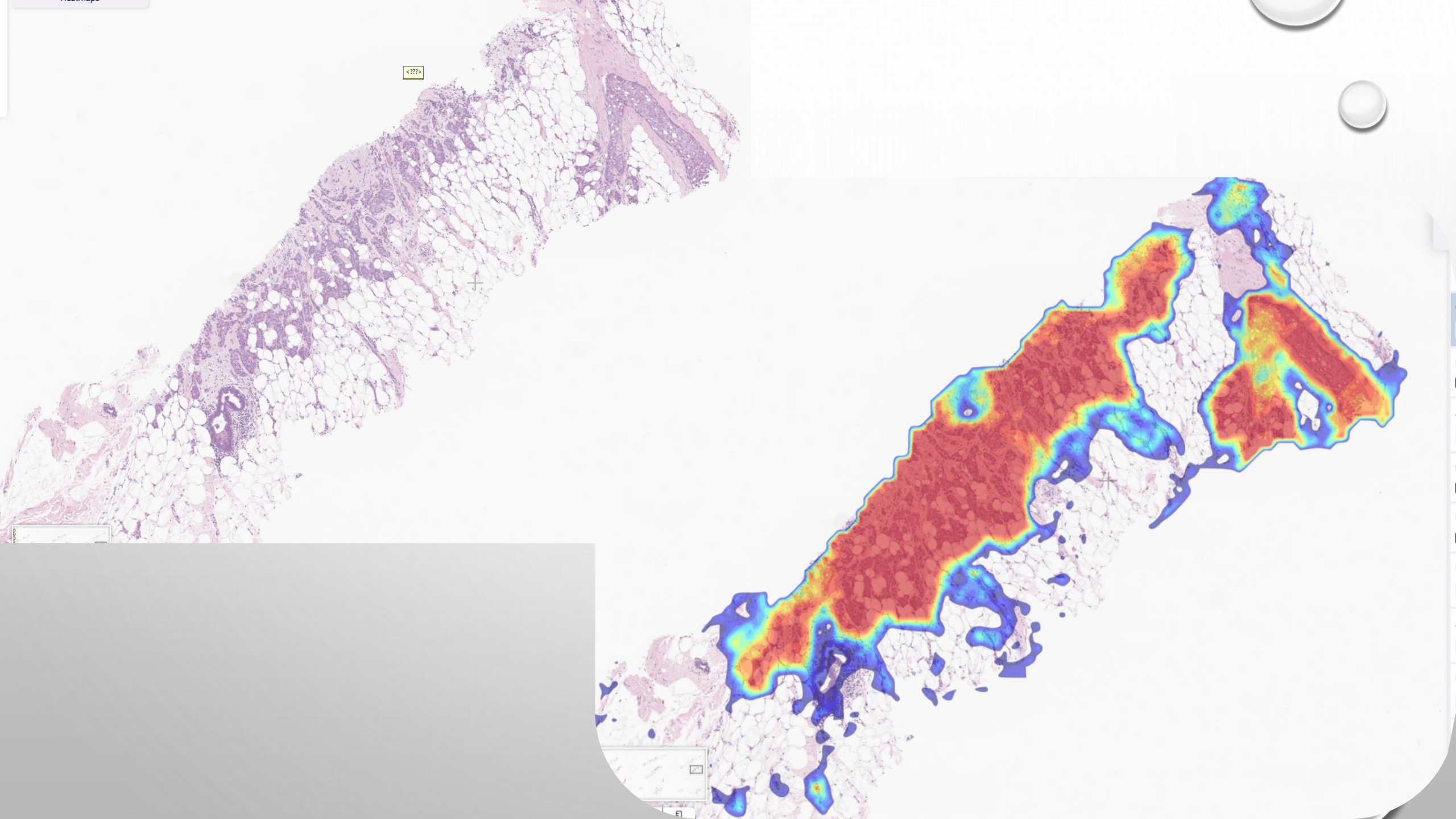
- THE DEMANDS ON CELL PATH IN THE BREAST CANCER PATHWAY ARE INCREASING
- THERE ARE DELAYS INHERENT IN A CENTRALIZED SERVICE – OFF SITE CLINICS AND TRANSPORT
- MDT DEADLINES
- FEWER PATHOLOGISTS
- MORE PATIENTS

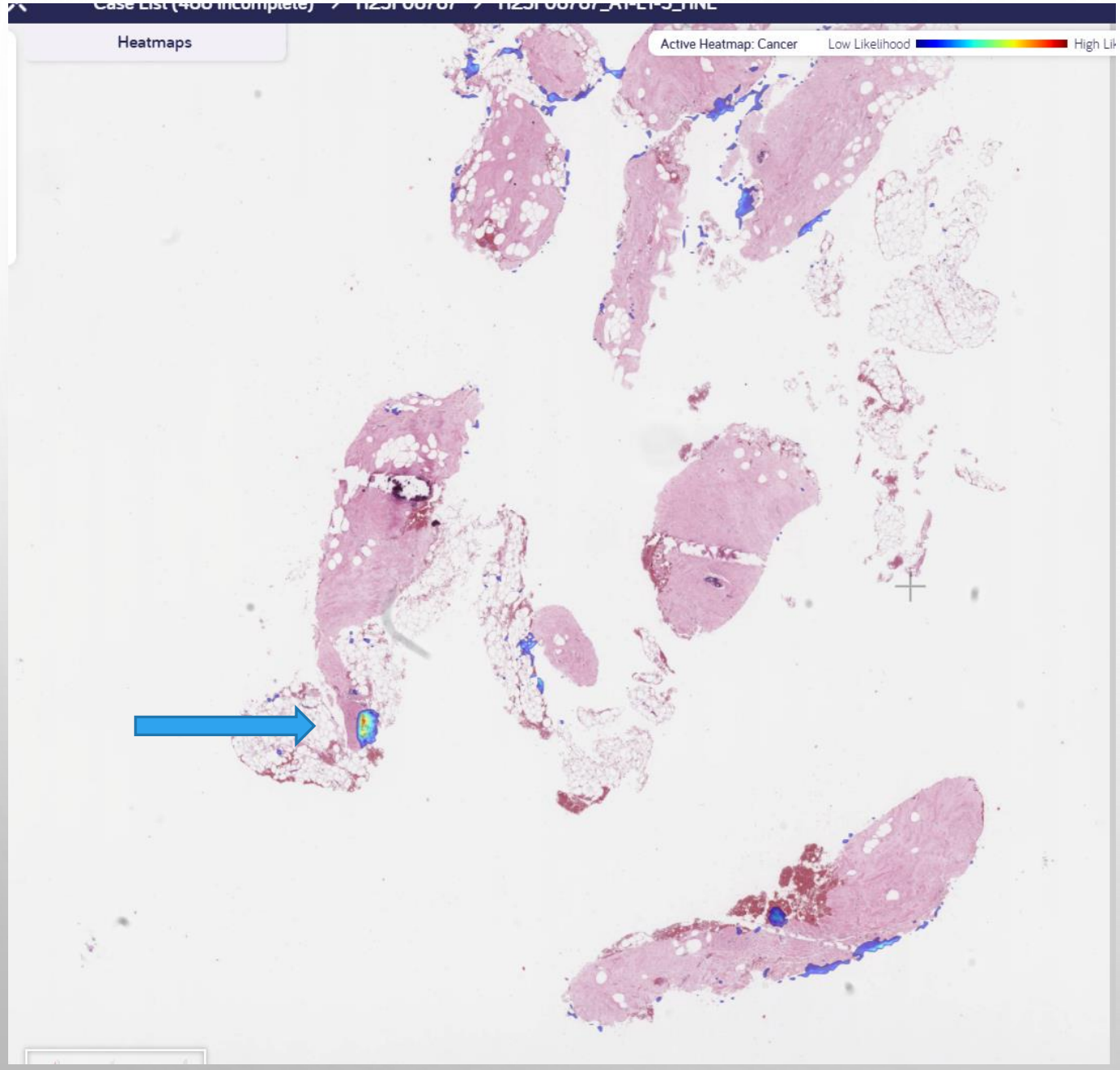
WHAT'S ON OFFER?

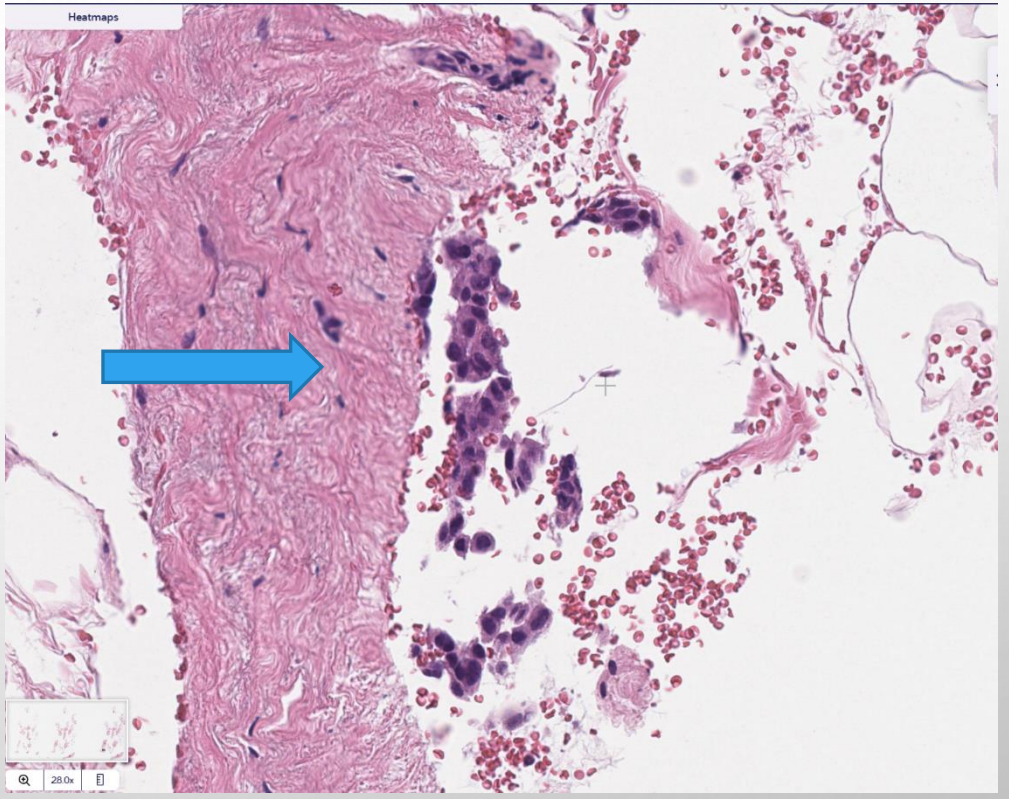
- AI SOFTWARE TO READ DIGITISED BREAST CANCER SLIDES AVAILABLE
- AN APPETITE TO IMPROVE
- A DESIRE TO IMPROVE THE PATIENT JOURNEY
- A VERY SUPPORTIVE CHARITY…….

THE STORY SO FAR

- SUPPORTED BY MOONDANCE CANCER INITIATIVE
- WORKED WITH IBEX
- VALIDATED THE METHOD
- AIDED THE MACHINE LEARNING
- ADOPTED INTO WORKFLOW
- USED IBEX TO TRIGGER THE REQUEST FOR RECEPTOR STATUS MARKERS
- GAVE THE PATHOLOGISTS A COMPLETE CASE TO REPORT




Heatmaps
Active Heatmap: Cancer
Low Likelihood
High Li


Heatmaps
28.0x

IS IT WORKING?

- DATA IS BEING COLLECTED TO LOOK AT TIME SAVING FROM ORDERING THE RECEPTOR MARKERS BEFORE THE PATHOLOGIST HAS HAD TO SCREEN THEM
- BREAST AI PROJECT MORPHOLOGICAL ASSESSMENT FOLLOWED BY AI GENERATED RECEPTOR REQUESTING MAKING LEAN WORKFLOW – 1900 PATIENTS AND NEARLY 3000 SPECIMENS SO FAR.
- USING A WORKAROUND TO ALLOW THE ORDERING, WAITING FOR CONNECTIVITY
- EVERY SLIDE GETS READ BY AI AND A PATHOLOGIST – DOUBLE REPORTING
- ARE WE IMPROVING THE PATIENT PATHWAY?

LOOKING GOOD SO FAR

OTHER PROJECTS ONGOING

AUTOMATION IN READING AND ANALYSING ER, PR, HER2 INCLUDING DDISH

UPPER GI ALGORITHM DEPLOYMENT

PAN CANCER DETECTION

FELLOWSHIP PROGRAM IN AI PATHOLOGY

HAEMPATH AI

Thanks to the teams!

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Betsi Cadwaladr University Health Board

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Bae Abertawe Swansea Bay University Health Board

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Aneurin Bevan University Health Board

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Hywel Dda University Health Board

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Cwm Taf University Health Board

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Caerdydd a'r Fro Cardiff and Vale University Health Board

CANOLFAN RAGORIAETH SBRI
SBRI CENTRE OF EXCELLENCE

MOONDANCE CANCER INITIATIVE

ymchwil canser cymru
cancer research wales

GIG CYMRU NHS WALES
Y Weithrediaeth Executive

IBEX

“Believe you can and you ae halfway there.” – Theodore Roosevelt

Courtesy from Chat GPT.. ☺

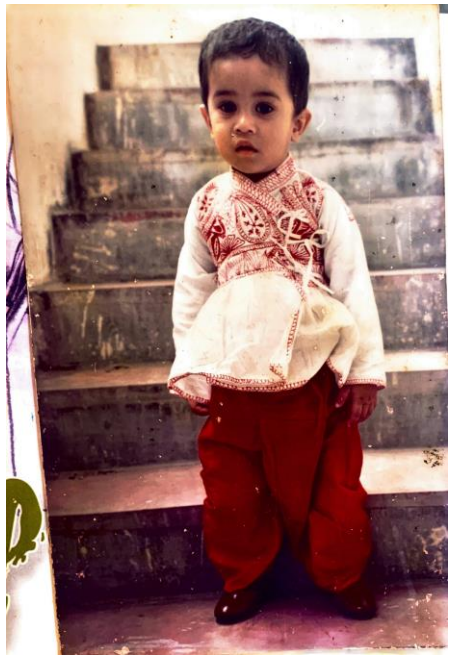
Speaking Now…

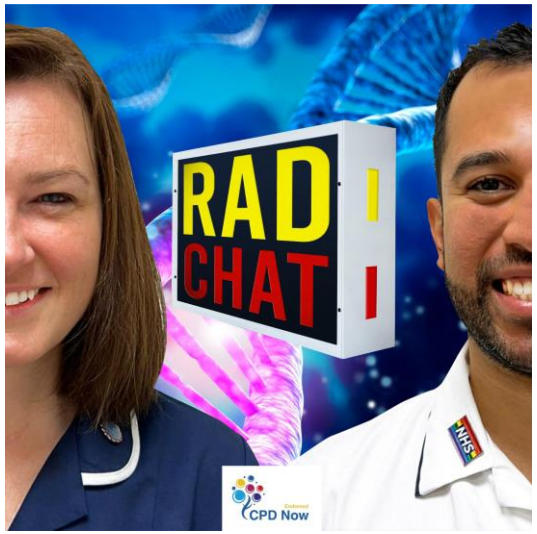
Naman Julka-Anderson
Research Radiographer and Allied Health Professional
Clinical Advisor - The Royal Marsden NHS Foundation Trust, Institute of Cancer Research and Macmillan Cancer Support

Health inequities for people of colour undergoing radiotherapy

Naman Julka-Anderson

Me



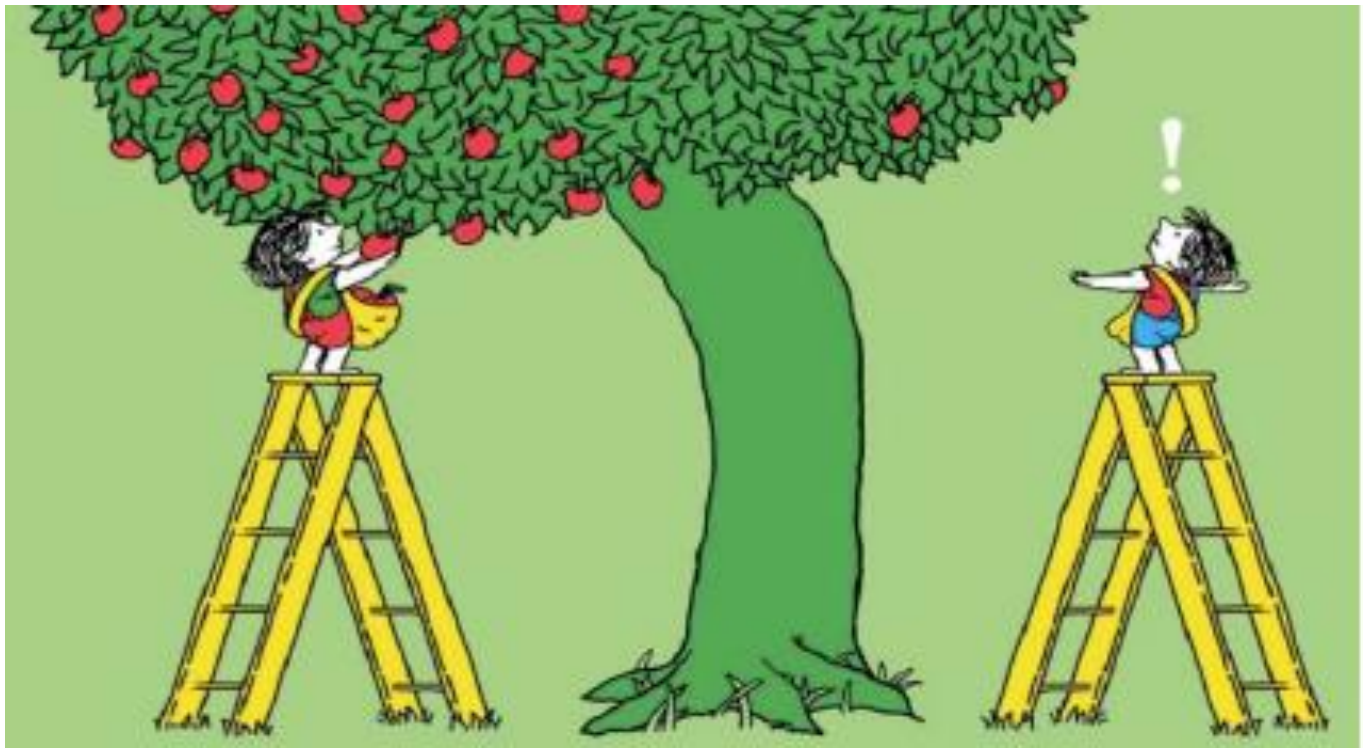


Radiotherapy UK
Vital cancer treatment

MOVE AGAINST CANCER.

5K YOUR WAY
MOVE AGAINST CANCER

No Conflicts of Interest



Radiography History

General body considerations

Consistent production of high quality radiographs requires development of an easily followed technique that is satisfactory in most instances. It is useful to develop a technique chart that shows the maximum permissible deviations from the norm. *The best total results can be obtained only when the time-temperature method of film processing is employed.*

Anatomic and physiologic variations in the patients present an element that precludes written presentation. Listed below are some of the variations requiring consideration. The exposure percentage changes are approximate and are to be varied within set limitations according to the requirements of the patient.

Physical condition	*Exposure change*
Extremely obese	Increase exposure 5 to 15 times
Muscular	Increase exposure 30 to 40% or to as much as 2 to 5 times
Very thin	Reduce exposure 20%
Child	Reduce exposure 20 to 50%
Elderly person	Reduce exposure 50%
Negroid	Increase exposure 40 to 60%
In wet cast	Increase exposure 3 to 4 times
In dry cast	Increase exposure 2 times

Pathologic condition	*Exposure change*
Sclerosis	Increase exposure 50%
Osteomyelitis	Increase exposure slightly
Osteoporosis	Reduce exposure 30 to 50%
Paget's disease	Increase exposure 50%

Bavli and Jones (2022)

TABLE I.

PATIENT CLASSIFICATION

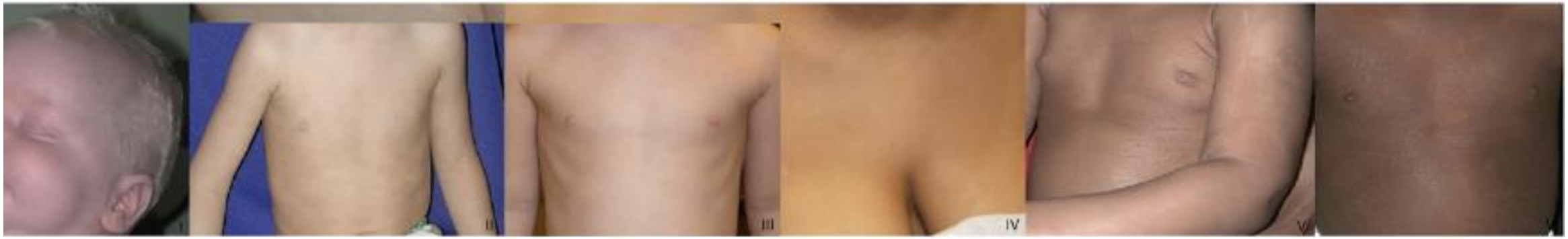
Easy to Penetrate	*Normal*	*Hard to Penetrate*
Very young	Average white adult 20 to 55 years.	Excessive musculature
Old		
Under-developed		Additive pathology
Destructive pathology	Normal musculature and bone development	Black or brown color

Modification in Technique		
4 kv.p. less than for normal or K-4	Normal K values	4 kv.p. more than for normal or K+4

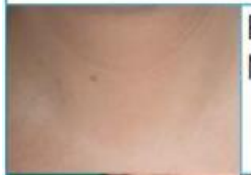
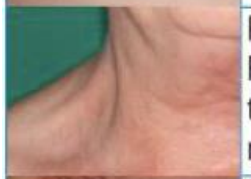
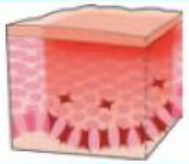
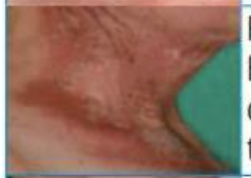
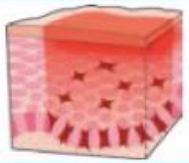
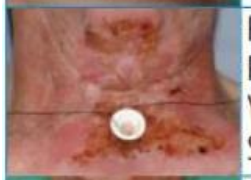
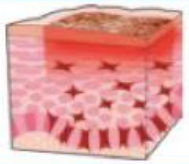
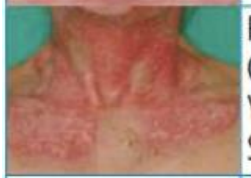
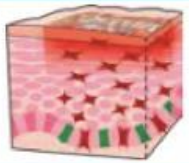
Bavli and Jones (2022)

Skin

With permission from: [7]Jothishankar and stein (2019)

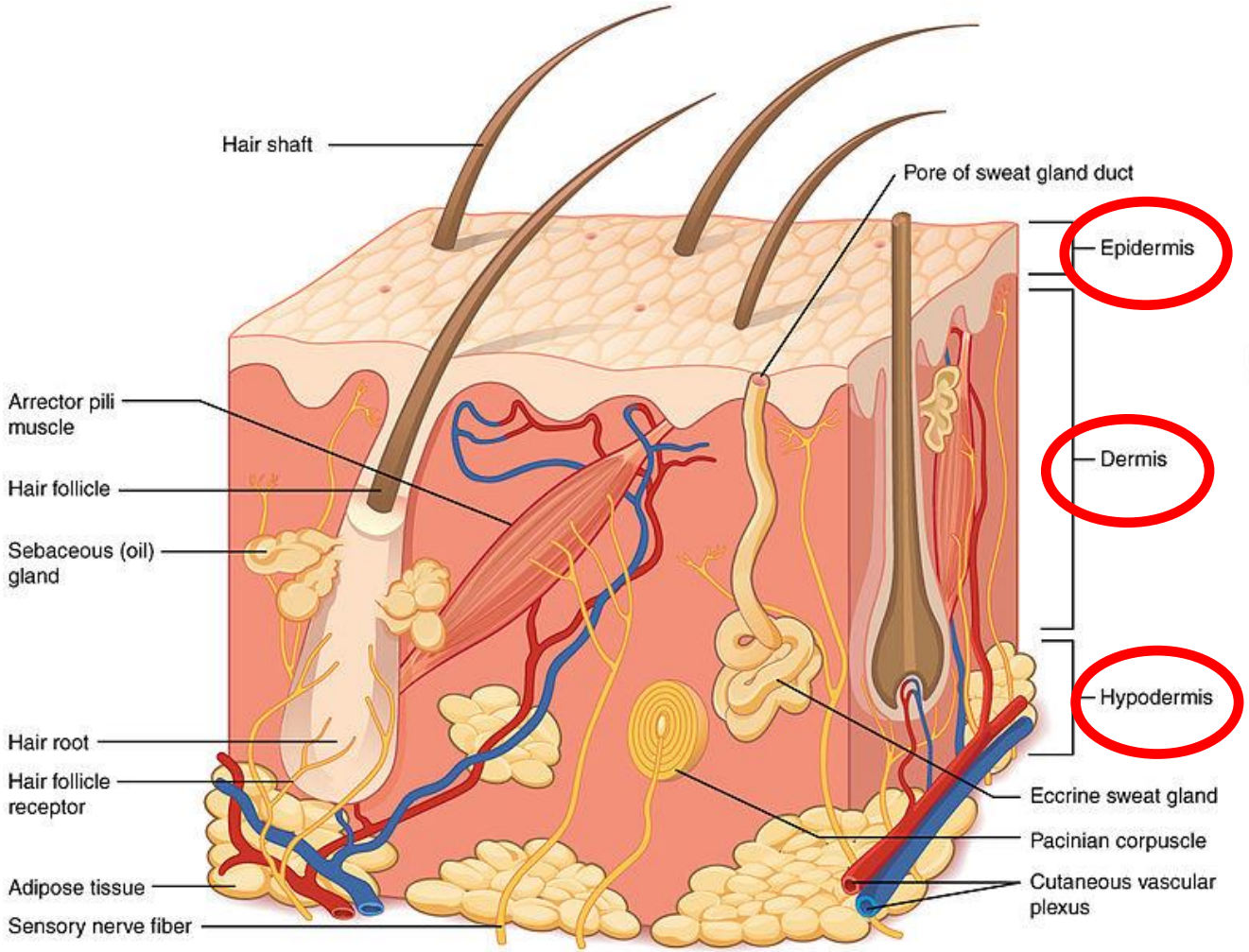


- 57 year old female
- Jamaican heritage
- Dark skin tone
- SCC Left Tonsil
- Severe RISR
- “Textbooks only show white skin”

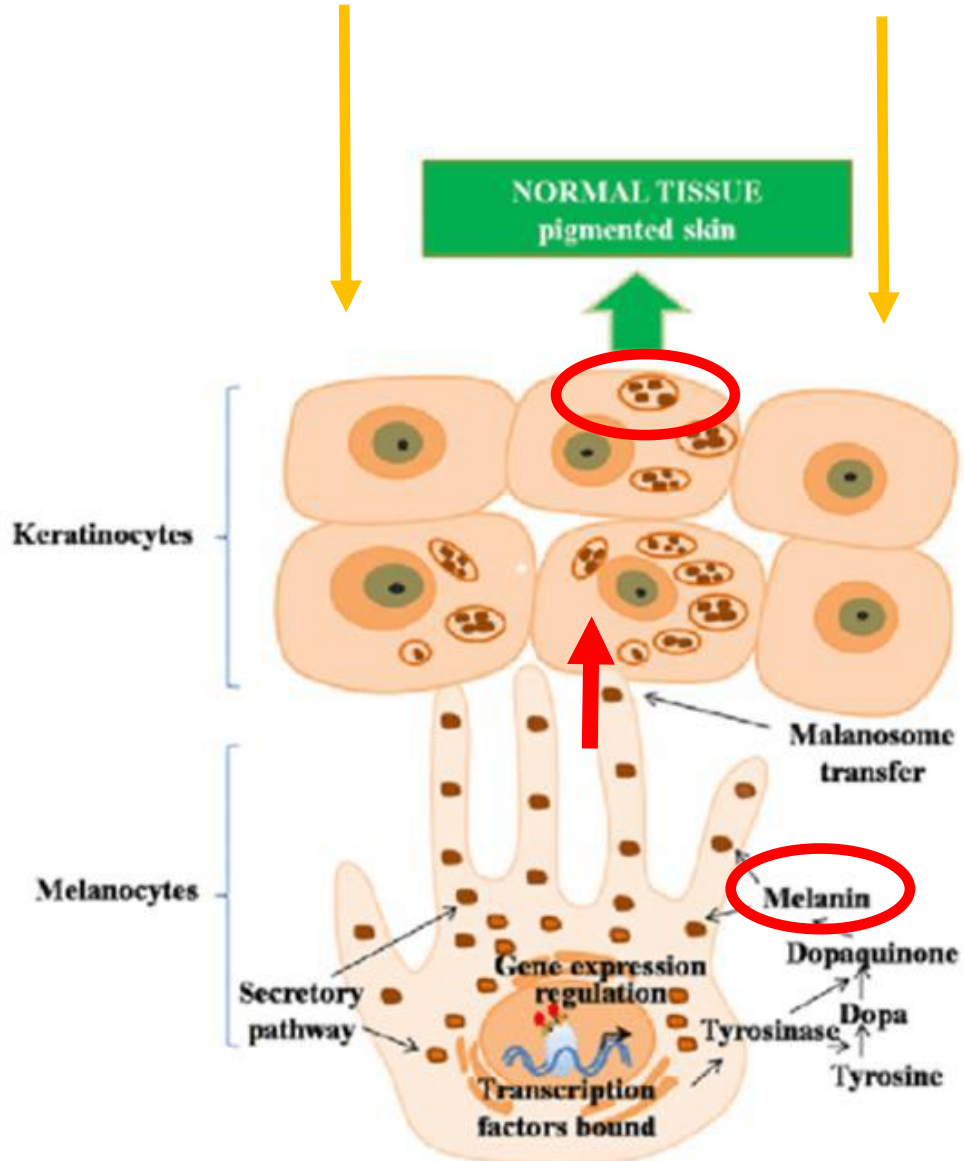
Assessment / Observation		*Effects of Radiotherapy on Skin Cells*
	RTOG 0 No visible change to skin	
	RTOG 1 Faint or dull erythema. Mild tightness of skin and itching may occur	
	RTOG 2 Bright erythema / dry desquamation. Sore, itchy and tight skin	
	RTOG 2.5 Patchy moist desquamation Yellow/pale green exudate. Soreness with oedema	
	RTOG 3 Confluent moist desquamation. Yellow/pale green exudate. Soreness with oedema	
	RTOG 4 Ulceration, bleeding, necrosis (rarely seen)	

4STH (2018)

Skin

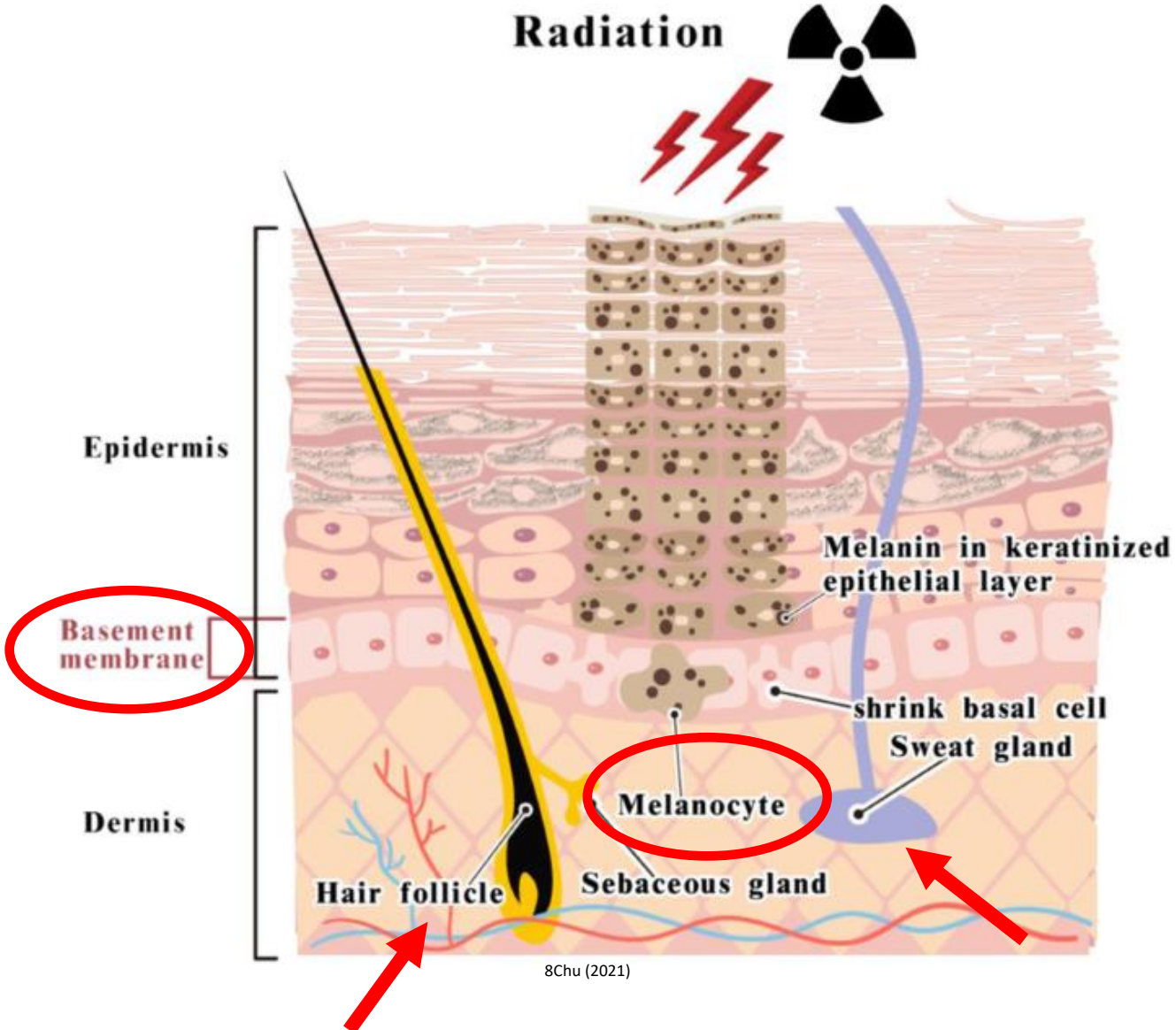


5OpenStax College (2013)



6Salinas-Santander, Trevino and Rosa (2018)

Radiation Induced Skin Reactions



8Chu (2021)

Consent Forms

Possible early or short-term side-effects

Start during radiotherapy or shortly after completing radiotherapy and usually resolve within two to six months of finishing radiotherapy. Frequencies are approximate.

Expected
50%–100%

- ☐ Tiredness
- ☐ Skin redness, irritation, itching, flaking, peeling, scaling and dryness in the treatment area
- ☐ The skin may scab over several times
- ☐ Skin breakdown in the treatment area – for example oozing, weeping, scabbing and/or bleeding
- ☐ Hair thinning or loss in radiotherapy area

Possible early or short-term side-effects

Start during radiotherapy or shortly after completing radiotherapy and usually resolve within two to six months of finishing radiotherapy. Frequencies are approximate.

Expected
50%–100%

- ☐ Tiredness
- ☐ Skin soreness, redness, itching and blistering in the treatment area
- ☐ Hair loss in the treatment area
- ☐ Bowel frequency (opening your bowels more often than normal) and urgency (a sudden urge to open your bowels)
- ☐ Looser stools with more mucous or wind compared to normal
- ☐ Pain around anus when opening bowels

Possible early or short-term side-effects

Start during radiotherapy or shortly after completing radiotherapy and usually resolve within two to six months of finishing radiotherapy. Frequencies are approximate.

Expected
50%–100%

- ☐ Tiredness
- ☐ Skin soreness, redness, blistering and itching in the treatment area
- ☐ Thickened and ropey secretions
- ☐ Dry mouth
- ☐ Oral ulcers
- ☐ Pain in the mouth and/or throat which can cause problems with swallowing
- ☐ Loss or change of taste
- ☐ Voice changes
- ☐ Cough
- ☐ Loss of appetite
- ☐ Hair loss in treatment area
- ☐ Anxiety, low mood, feeling fed-up or poor sleep

Possible early/short-term side-effects

Start during radiotherapy or shortly after completing radiotherapy and usually resolve within two to six months of finishing radiotherapy. Frequencies are approximate.

Expected
50%–100%

- ☐ Tiredness
- ☐ Temporary hair loss in treatment area

Common
10%–50%

- ☐ Skin soreness, redness and itching in the treatment area

Toxicity tools

Table 1: Radiation Therapy Oncology Group (RTOG) and Common Terminology Criteria for Adverse Events (CTCAE) scoring for radiation induced skin reactions

	0	1	2	3	4	5
RTOG	No changes	Faint erythema Dry desquamation Decreased sweating	Tender Bright erythema Moderate oedema Patchy moist desquamation	Moist desquamation in areas other than skin folds Pitting oedema	Ulceration Haemorrhage Necrosis	Death
CTCAE	No changes	Faint erythema Dry desquamation	Moderate erythema Patchy moist desquamation	Moist desquamation in areas other than skin folds Bleeding induced by minor trauma	Life-threatening consequences: full-thickness skin necrosis Spontaneous bleeding	Death

Erythema and 'redness' (adapted from BAD, 2021)

Erythema (from the Greek erythros, meaning red) is a change in colour of an area of skin, caused by increased blood flow. It is a symptom common to many diseases, particularly inflammatory skin diseases.

While redness can be an obvious symptom in people with less deeply pigmented skin, where it contrasts clearly against light skin tones, this is not necessarily the case in people with dark skin tones; for example, black, brown and olive skin tones. An example of this is sunburn: it is a common misconception that people with dark skin tones do not burn in the sun. It can happen but may not be easily visible. If it does occur, it may not appear as 'redness' that people generally associate with sunburn.

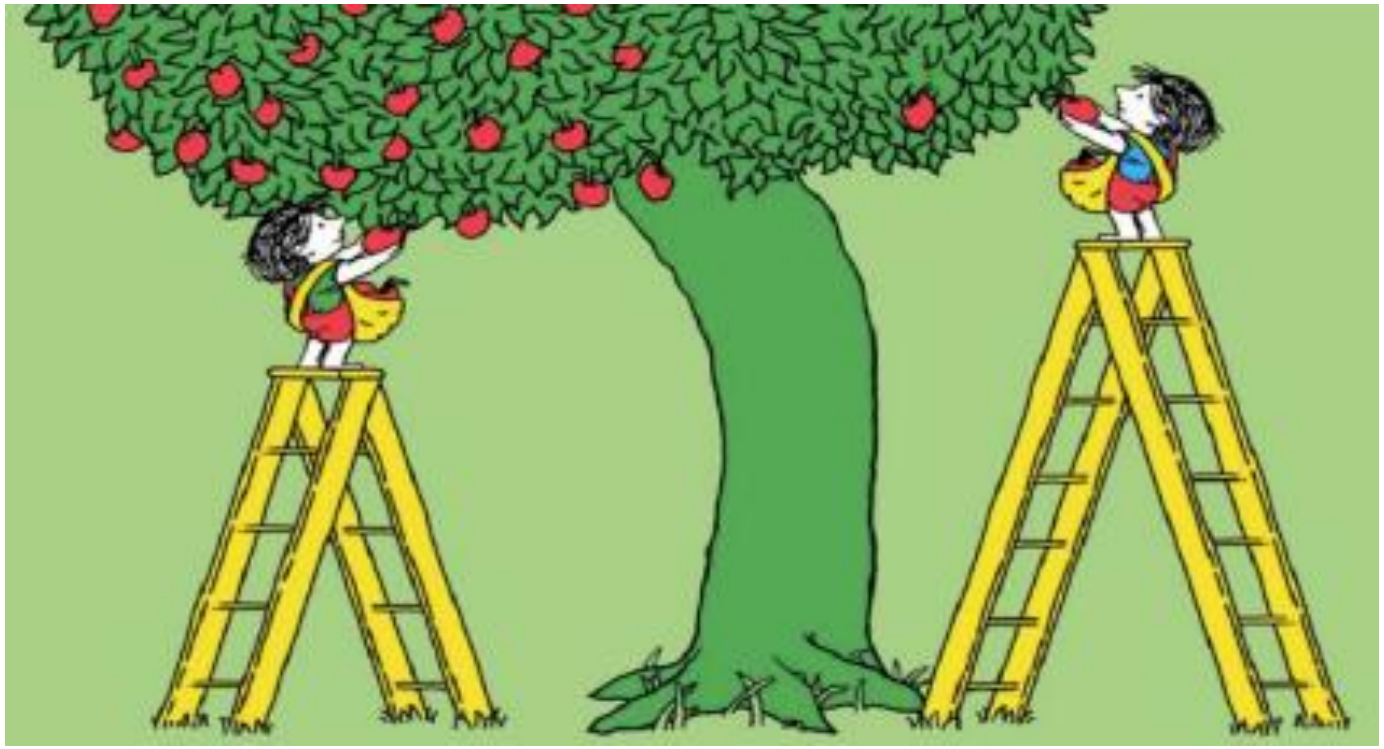
The term redness itself can be misleading, as the colour change can run the spectrum of pink, red, and purple – in some cases it may be limited to a subtle darkening of the existing skin tone.

While the signs of erythema in dark skin can be easy to miss, there are ways of spotting it. Changes in skin colouration are often the main sign – this can be easier to spot when affected areas are compared with unaffected skin.

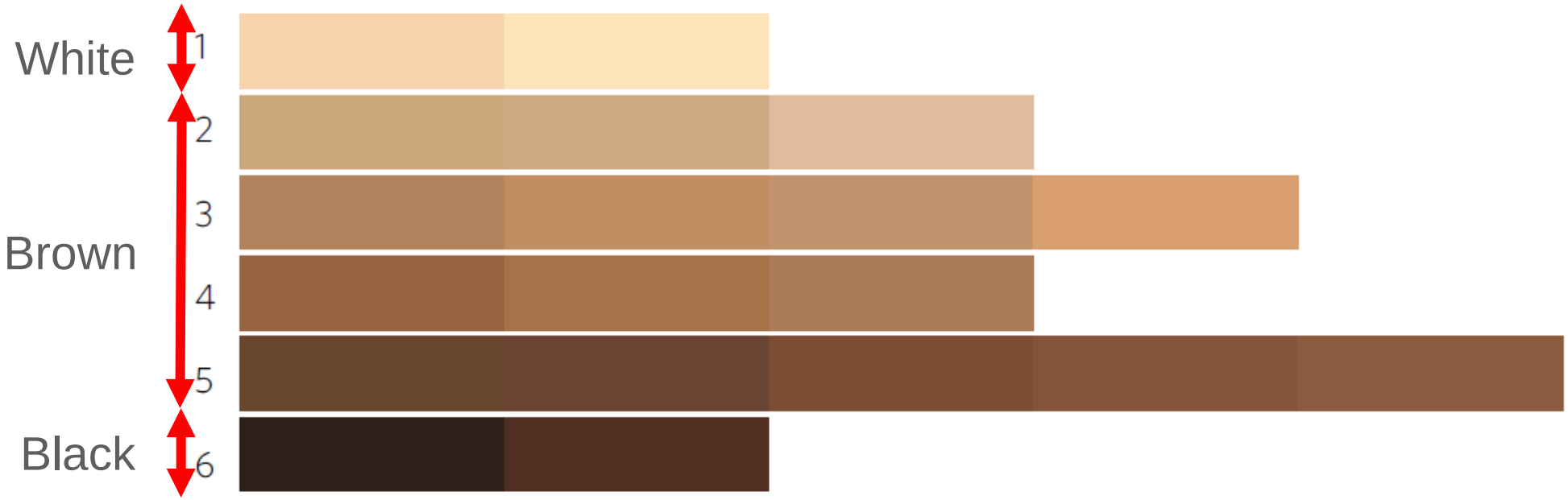
There is no straightforward way to predict exactly what colour erythema will look like in an individual's skin. It is dictated by a person's skin tone, of which there are many more variations than most people realise, and the nature of the disease in question.

In addition to this, if you suspect that inflammation is not easy to spot on your patient's skin, then it is sensible to take into consideration other potential symptoms of their condition.

https://www.wounds-uk.com/resources/details/addressing-skin-tone-bias-wound-care-assessing-signs-and-symptoms-people-dark-skin-tones



Equity



Skin tone tool (adapted from Ho and Robinson, 2015)

Equity

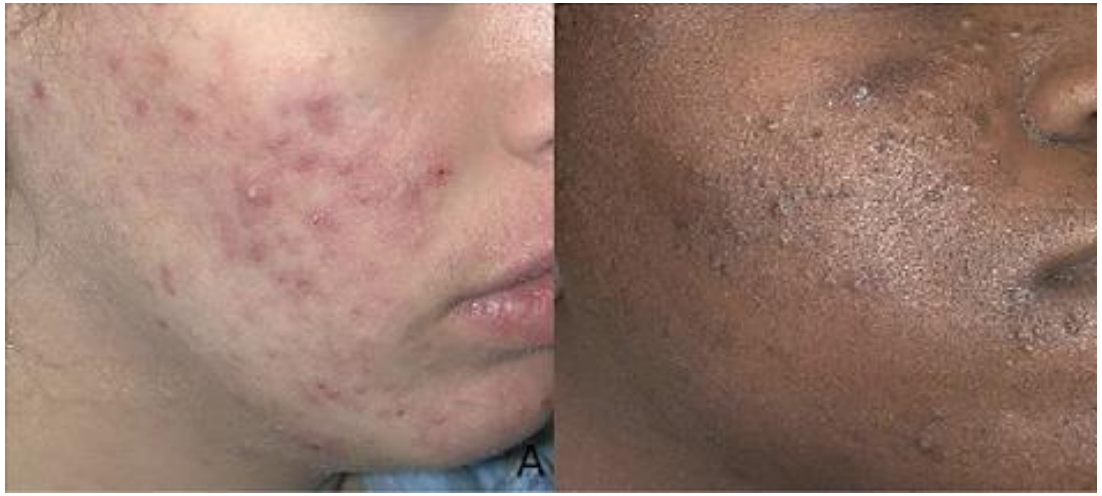
Action points: Assessment

- Use the skin tone tool to assess and record the patient's baseline skin tone
- Do not look for 'redness', but for skin changes
- Use all of the senses, especially touch
- Assess for warmth (use an infrared thermometer if needed)
- Ask the patient about their skin and listen to their perspective
- Use photography for recording and monitoring, rather than as a diagnostic tool, where possible.

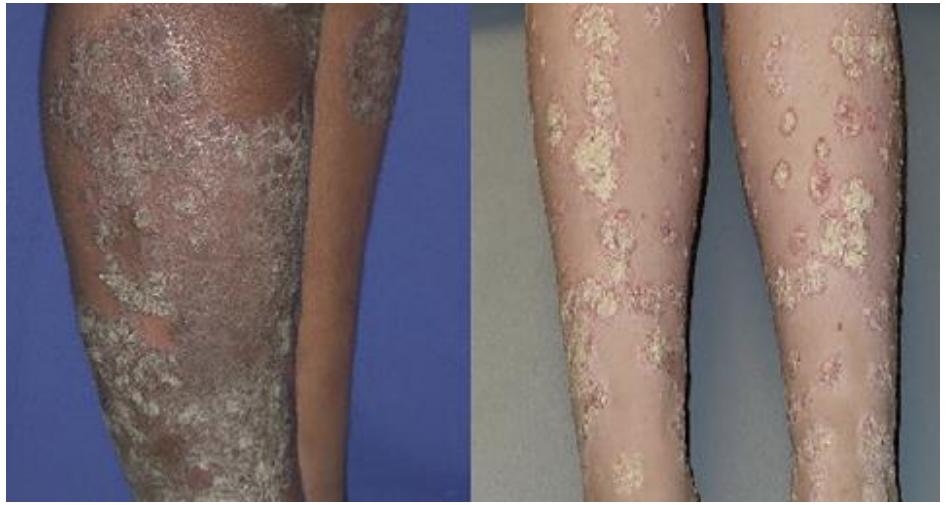
Wounds International (2022)

Equity

Erythema vs pigmentation



With permission from: [7]Jothishankar and stein (2019)



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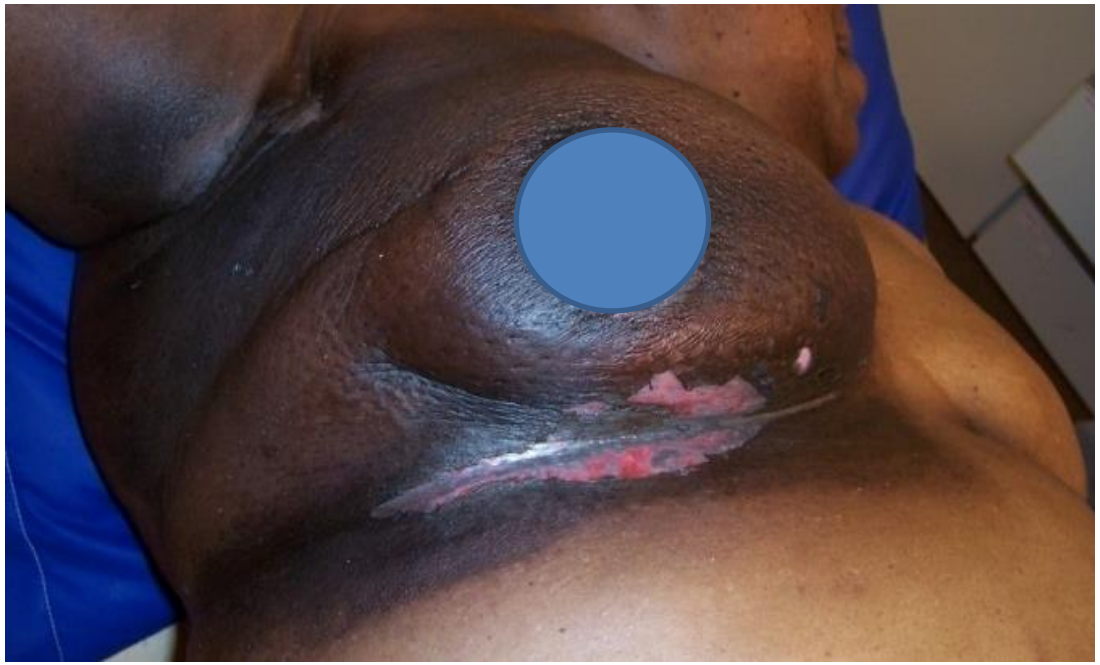
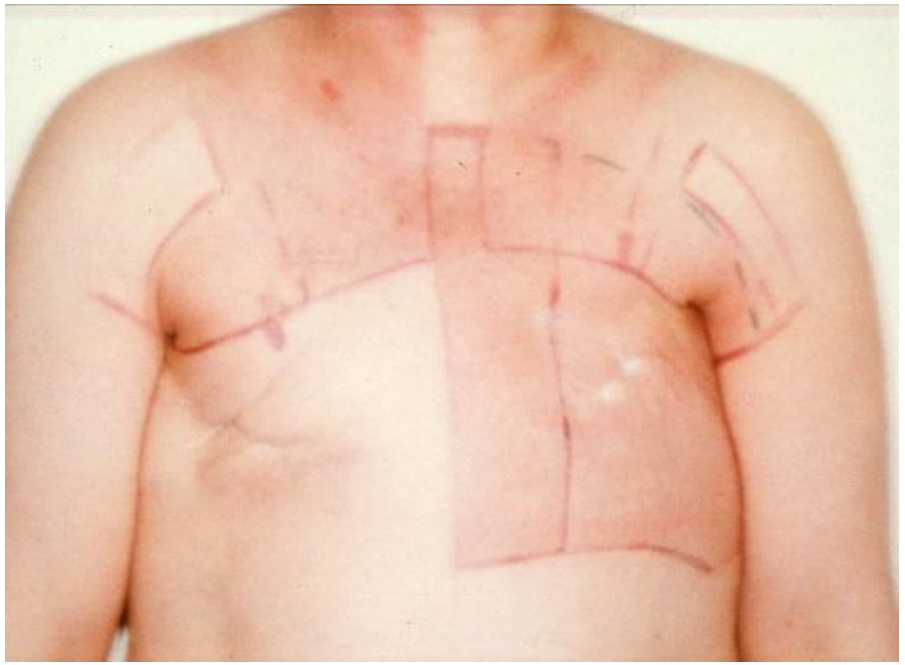
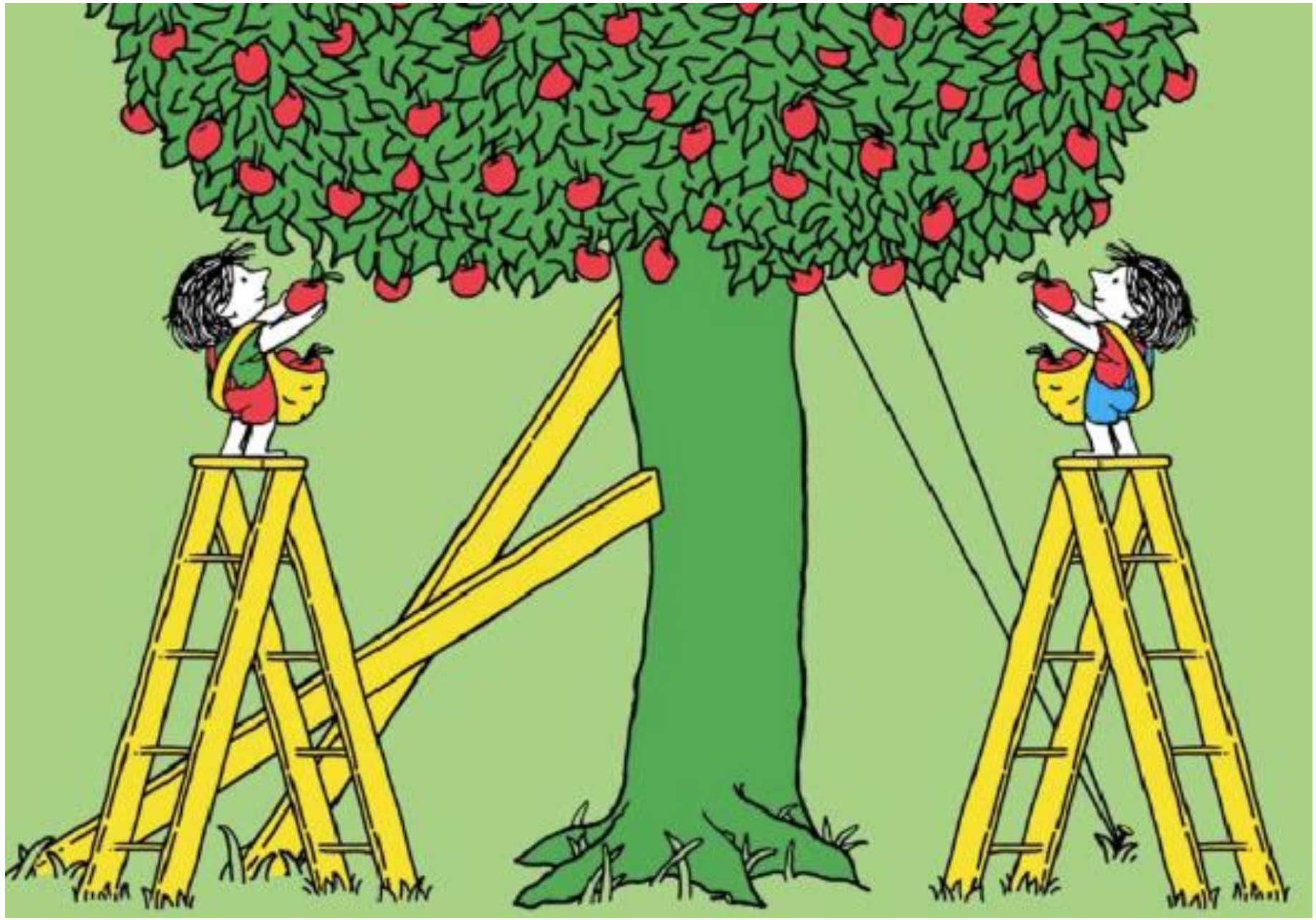


ESTRO Skin Care Guidelines (unpublished), photo courtesy of Nicola Russell



ESTRO Skin Care Guidelines (unpublished), photo courtesy of Nicola Russell



Common
10%–50%

☐ **Skin soreness, itching, blistering and colour changes in treatment area**
– redness in white skin tones and subtle darkness, yellow/purple/grey appearance in brown and black skin tones

1 Erythema (redness) non-blanching or persistent blanching	2 Erythema to Maroon - non-blanching or persistent blanching	3. Maroon discolouration	4. Purple or Maroon discolouration	5. Purple discolouration or Hyperpigmentation (skin darker than surrounding area)	6. Hyperpig-mentation (skin darker than surrounding area)

Skin Tone Tool (adapted from Ho & Robinson, 2015)- Wounds UK (2021) Best Practice Statement: Addressing skin tone bias in wound care: assessing signs and symptoms in people with dark skin tones. Wounds UK, London.

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CLINICAL PERSPECTIVE | ARTICLES IN PRESS

Structural racism in radiation induced skin reaction toxicity scoring

Naman Julka-Anderson

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Abstract

Racially motivated biases are often implicit and can go unnoticed, especially if *your* normal is white and adjustments are required to cater for 'others.' Current consent forms and grading tools within radiotherapy are not inclusive of all skin tones. This commentary highlights gaps in care within radiation induced skin reactions (RISR) assessment for people of colour. Healthcare professionals and patients are directed to look for visual cues such as redness for RISR, but this is not always visible on people with pigmented skin. Their skin may go darker than their normal or changes across the colour spectrum. The lack of understanding of these fundamental differences are leading to people of colour being oppressed through structural racism and racialised myths. Using inclusive terminology will allow for moving away from the current view of healthcare that white skin is the norm. People of colour deserve more than are currently offered in RISR toxicity assessment.

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Understanding therapeutic radiographers' confidence in assessing, managing & teaching radiation induced skin reactions (RISR): A national survey in the UK

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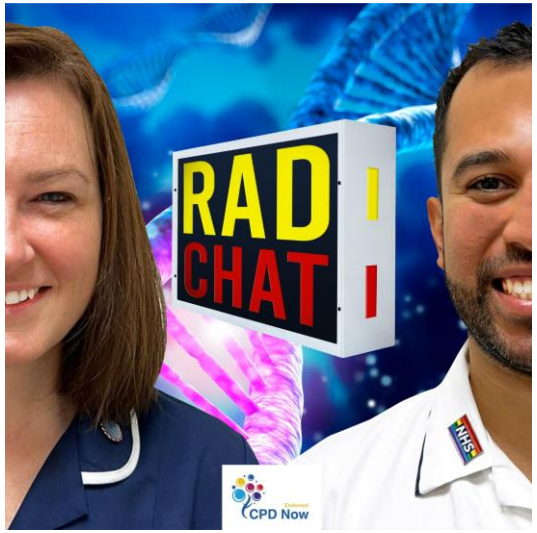
ABSTRACT

Introduction: The standard toxicity tools adopted for assessing Radiation Induced Skin Reactions (RISR) do not currently reflect how skin changes occur across all skin tones.
A one size fits all approach is adopted currently for RISR assessment. The aim of this study was to understand what evidence-based practice and RISR tools are being used across the therapeutic radiography workforce and the levels of confidence in using these tools.

Thank you



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Drinks and Networking

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