An interoperable, open platform is key for scaled AI implementation in routine workflows

A case study analysis using Proscia DermAI on large datasets

Manuel Garcia Castejon, Director General, Iberia & LATAM | Dr. Thomas Sollie, Medical Director |
Proscia Inc.,
October, 2022

Your speakers for today

Manuel Garcia Castejon

Director General, Iberia & LATAM
Proscia Iberia

Manuel is an industry veteran leading the Spain and LATAM commercial operations for Proscia. Manuel has been a well-known figure in laboratory informatics in the Iberia/ LATAM markets and has helped numerous organizations successfully adopt cutting edge technology solutions to advance lab operations.

Dr. Thomas Sollie

Medical Director

Dr. Thomas Sollie, is the senior clinical AI advisor of pathology for TMC, Unilabs as well as the Medical Director at Proscia Inc., Dr. Thomas Sollie has keen interest in digital and computational pathology and truly believes that technology can help advance cancer diagnostics. Dr. Thomas Sollie brings hands-on experience in implementing digital and computational (AI) pathology solutions at scale across a number of lab sites.

OUR MISSION

Estamos acelerando la transición de la patología a lo digital y utilizando esos datos para cambiar la forma en que diagnosticamos y tratamos el cáncer.

PROSCIA®

Working globally with our customers to change the way the world practices pathology

Founded in 2014 out of Johns Hopkins

Global reach

Hubs in US and Europe

Nearly 100 Proscians

United in our mission

Experienced leadership

With deep pathology and technology expertise

Domain-focused investors

$76M+ raised to date

Concentriq digital pathology platform

Frost & Sullivan's 2021 North America Customer Value Leadership Award

Powering the world's digital pathology

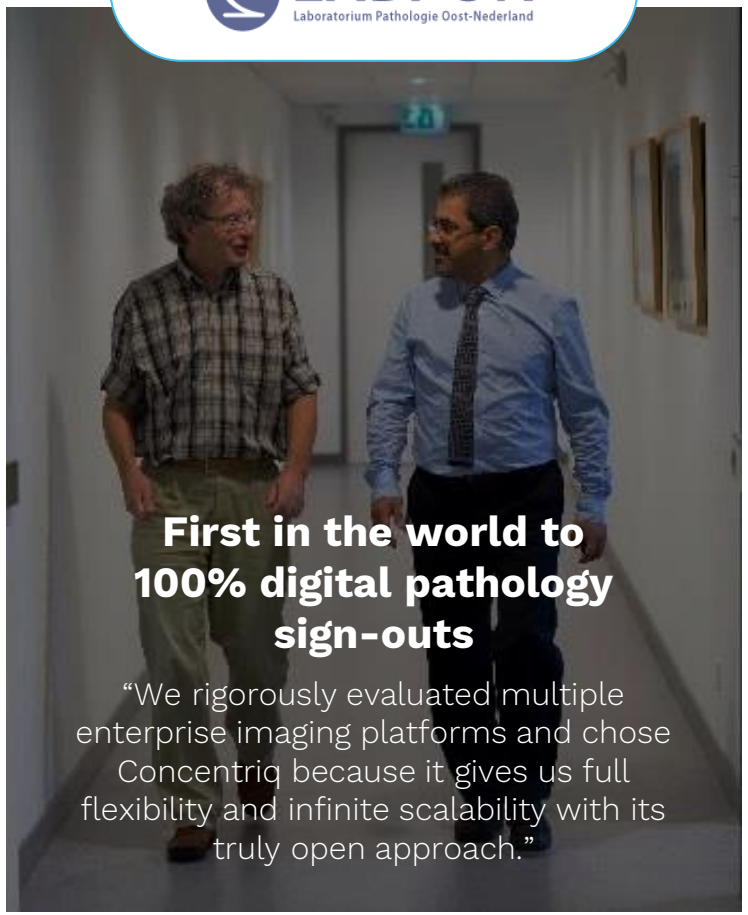
Proscia is trusted by **6,500+** pathologists and scientists[1]

And many more…

1 June 2021 total registered users across Concentriq Dx and Concentriq for Research

Leading labs trust Proscia's solutions

LABPON
Laboratorium Pathologie Oost-Nederland



First in the world to 100% digital pathology sign-outs

"We rigorously evaluated multiple enterprise imaging platforms and chose Concentriq because it gives us full flexibility and infinite scalability with its truly open approach."

The Joint Pathology Center

World's largest repository of tissue samples (55 million images)

JPC is digitizing its tissue archive - the world's largest repository of human pathology specimen - to capitalize on this invaluable source of medical data.

Unilabs

One of the largest diagnostic providers in EU (>200 labs, 200M tests/yr)

Unilabs has selected Proscia to validate and implement AI-enabled digital pathology (DermAI) in high throughput clinical workflows.

Unified Platform, Purpose-Built Products

Concentriq Digital Pathology Platform

CONCENTRIQ® Dx

Drive efficiency, quality and confidence in your lab

CONCENTRIQ® FOR RESEARCH

Unify research, accelerate discovery

Concentriq Dx (v 2.1) is CE-marked for in-vitro diagnostic use in Europe and is available for primary diagnosis in the US during the COVID-19 public health emergency.

CONCENTRIQ Dx BY PROSCIA

Construido para potenciar los laboratorios de diagnóstico modernos

Centrado en el patólogo

Una experiencia de usuario centrada en el patólogo

Abierta y verdaderamente interoperable

Interoperabilidad líder con un motor de integración completo

Alta Escalabilidad

Escalabilidad de nivel empresarial con un espacio de trabajo unificado para equipos distribuidos

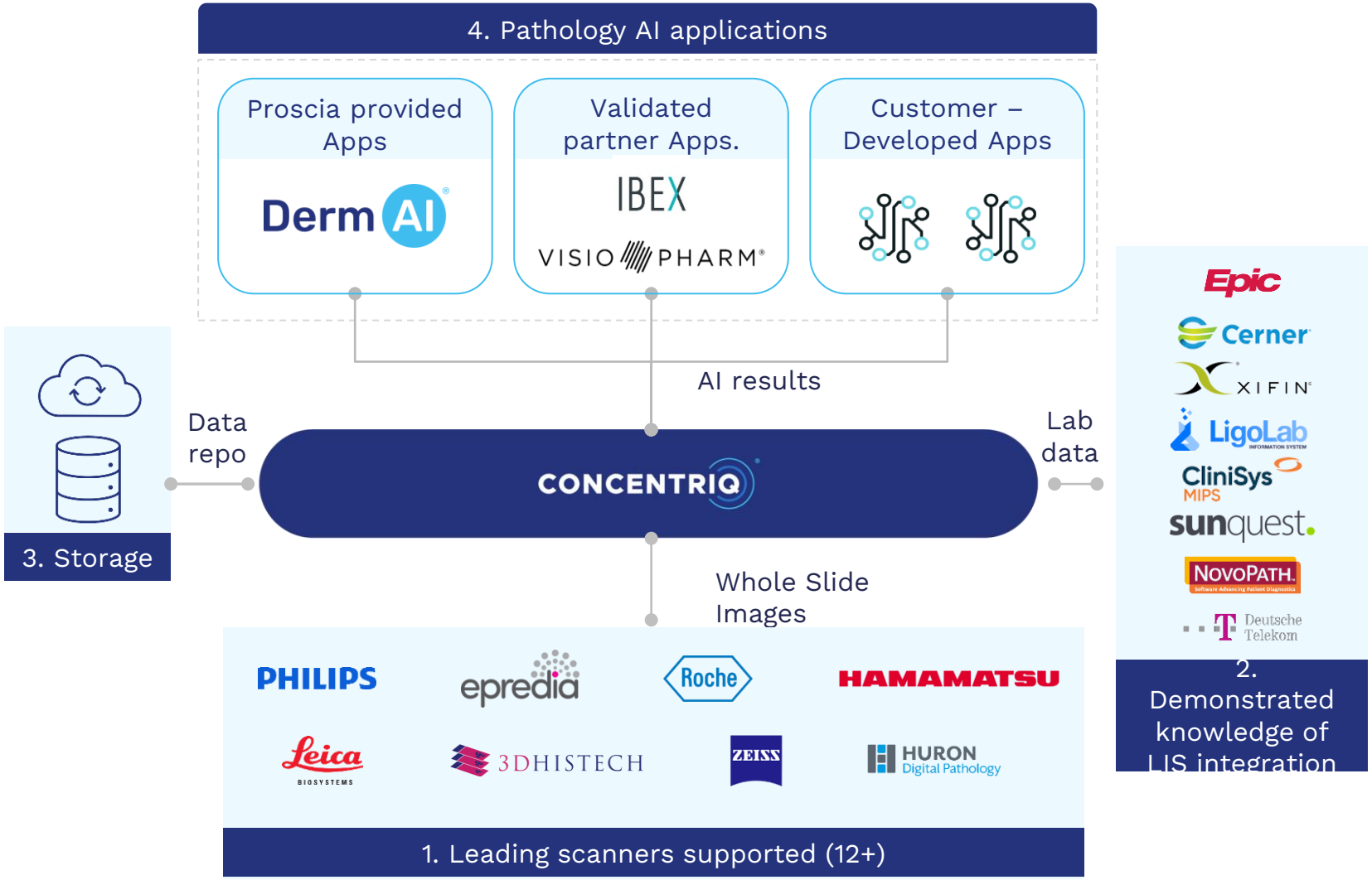
Computacional de forma nativa

Listo para la inteligencia artificial y entregar patología computacional hoy

Concentriq Dx (v 2.1) is CE-marked for in-vitro diagnostic use in Europe and is available for primary diagnosis in the US during the COVID-19 public health emergency.

Verdaderamente interoperable

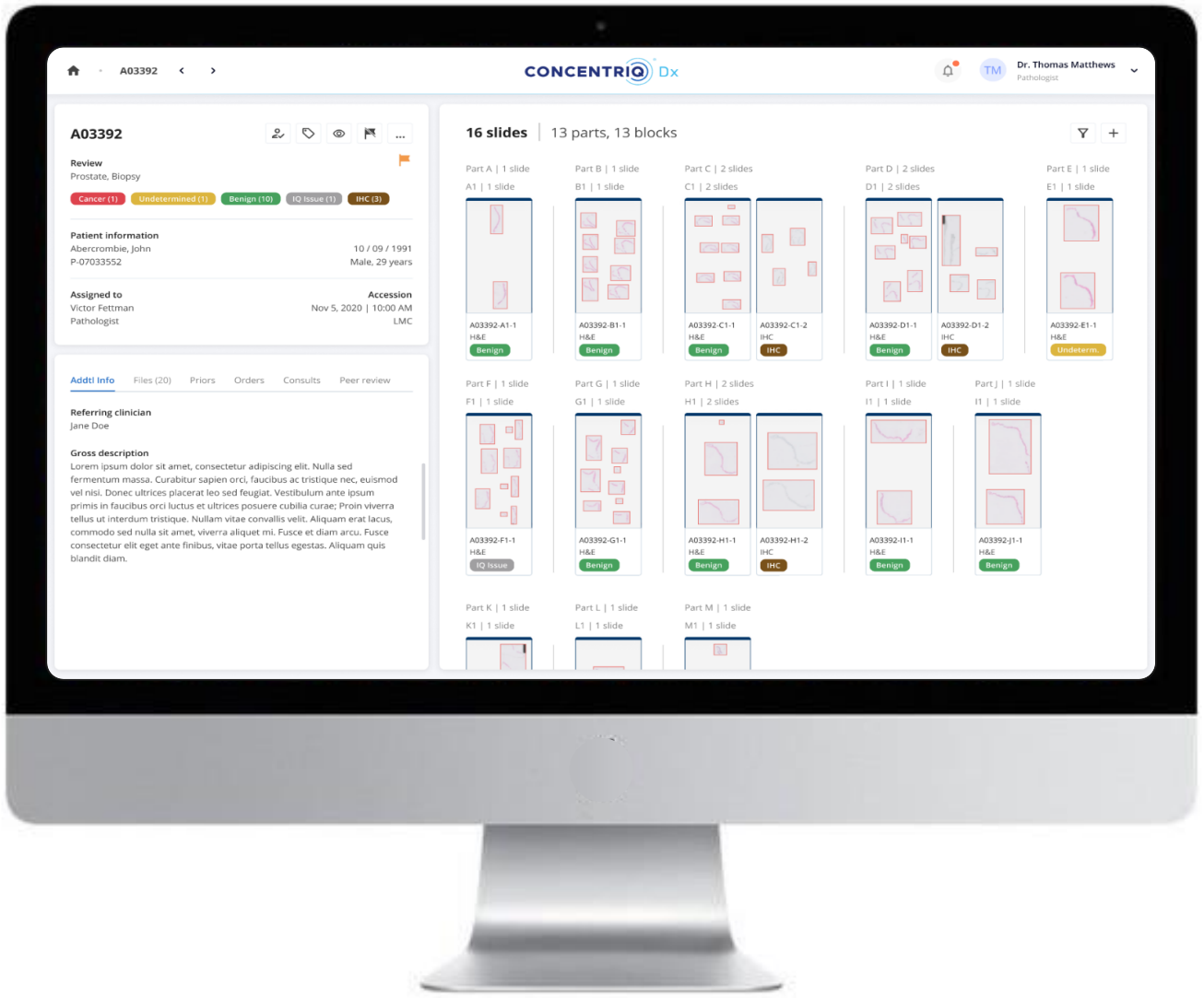
Concentriq® Dx se creó para conectar todo su ecosistema de patología digital a través de su API RESTful.



Concentriq Dx (v 2.1) is CE-marked for in-vitro diagnostic use in Europe and is available for primary diagnosis in the US during the COVID-19 public health emergency.

Computacional de forma nativa

La plataforma de patología digital Concentriq® integra la IA directamente en el flujo de trabajo de rutina de alto rendimiento*. La plataforma brinda la oportunidad de ejecutar múltiples aplicaciones de IA automáticamente en función de los metadatos relevantes.



For research use only

Concentriq Dx (v 2.1) is CE-marked for in-vitro diagnostic use in Europe and is available for primary diagnosis in the US during the COVID-19 public health emergency.

Concentriq Dx supports scaled interoperability with own & 3P apps

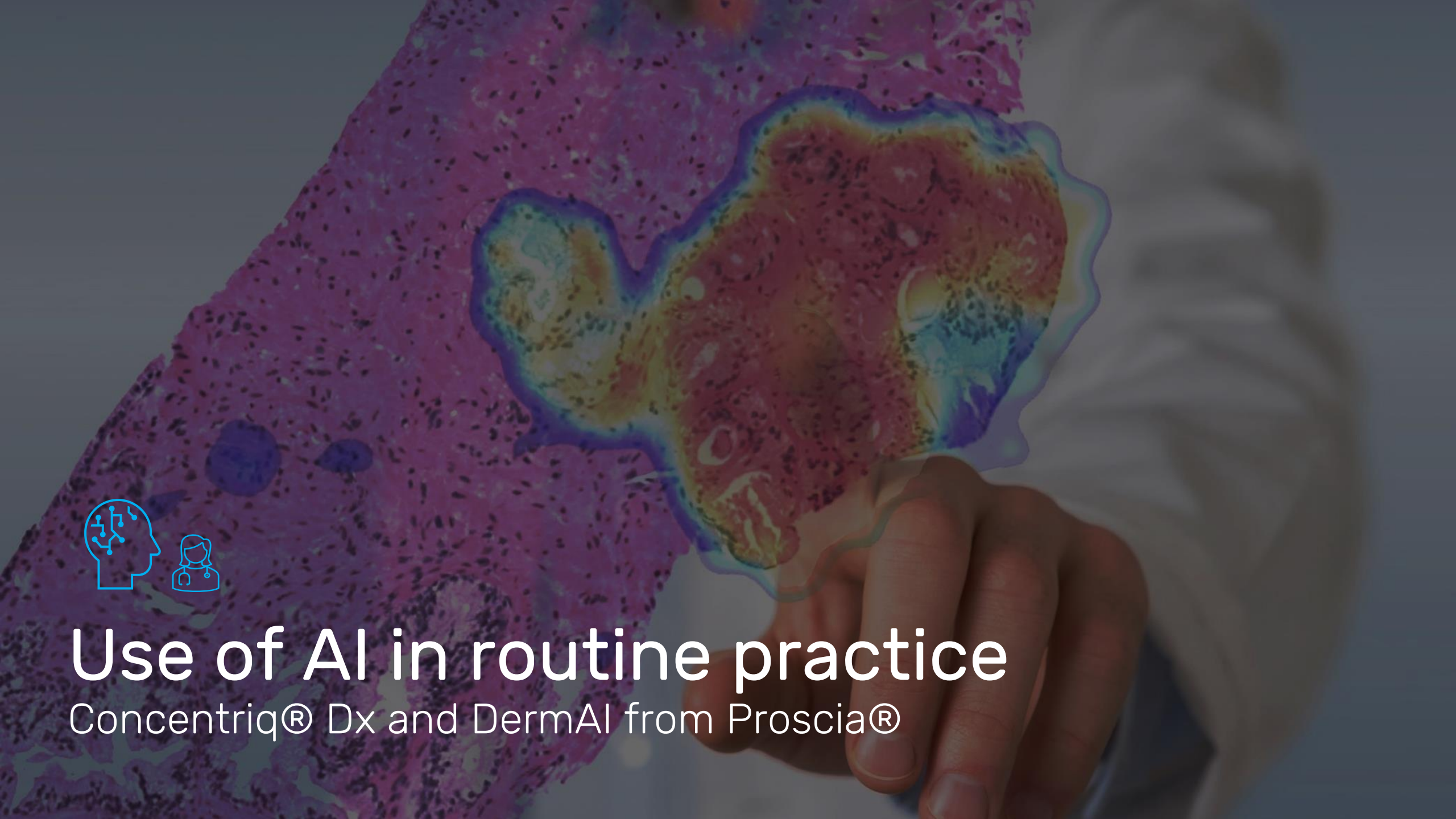
Prostate	Breast	Derm
Colon	Lung	QC

PROSCIA

IBEX

VISIOPHARM®

Concentriq Dx (v 4.1.1) is CE-IVDR marked for in-vitro diagnostic use in Europe and is available for primary diagnosis in the US during the COVID-19 public health emergency.. Please note that the Galen solution needs to be used in accordance with the intended use and regulatory labelling on the Galen solution as specified by Ibex Medical Analytics



Use of AI in routine practice

Concentriq® Dx and DermAI from Proscia®

The shortage of pathologists is acute and will become worse!

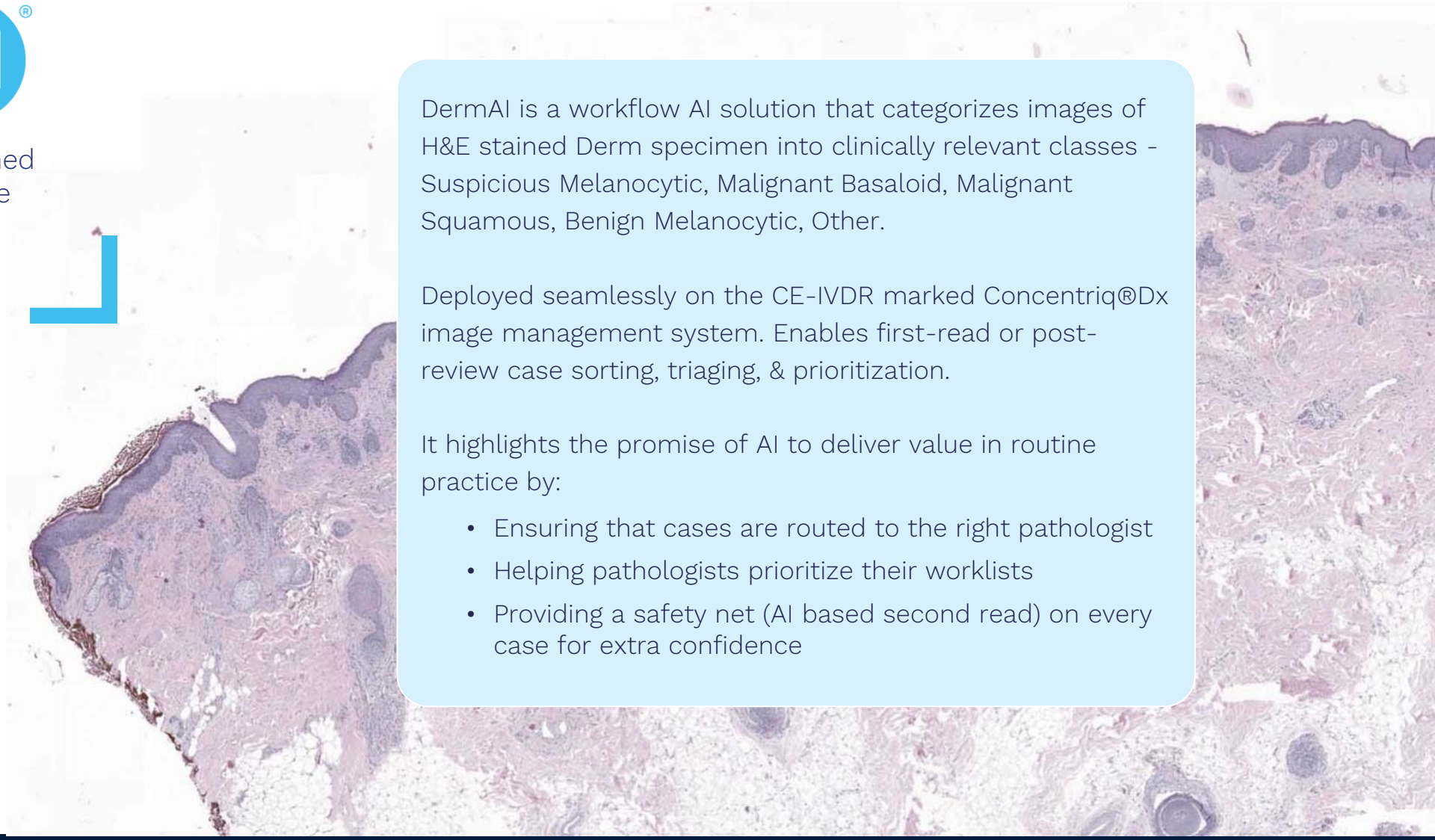
Technology can be our friend in helping us battle this!

Let us discuss the learnings from the test evaluation of DermAI in a large commercial reference lab setting!

PROSCIA's

DermAI®

Workflow solution designed to drive efficiency in the routine practice of dermatopathology



DermAI is a workflow AI solution that categorizes images of H&E stained Derm specimen into clinically relevant classes - Suspicious Melanocytic, Malignant Basaloid, Malignant Squamous, Benign Melanocytic, Other.

Deployed seamlessly on the CE-IVDR marked Concentriq®Dx image management system. Enables first-read or post-review case sorting, triaging, & prioritization.

It highlights the promise of AI to deliver value in routine practice by:

- Ensuring that cases are routed to the right pathologist
- Helping pathologists prioritize their worklists
- Providing a safety net (AI based second read) on every case for extra confidence

*Proscia DermAI™ is for Research Use Only.

DermAI: One of the most complex AI problems to solve

Dermatopathology is high volume, accounting for 25-30% of case volume in the lab.

Dermatopathology is highly repetitive, with 10 diagnostic outcomes accounting for 66% of cases.

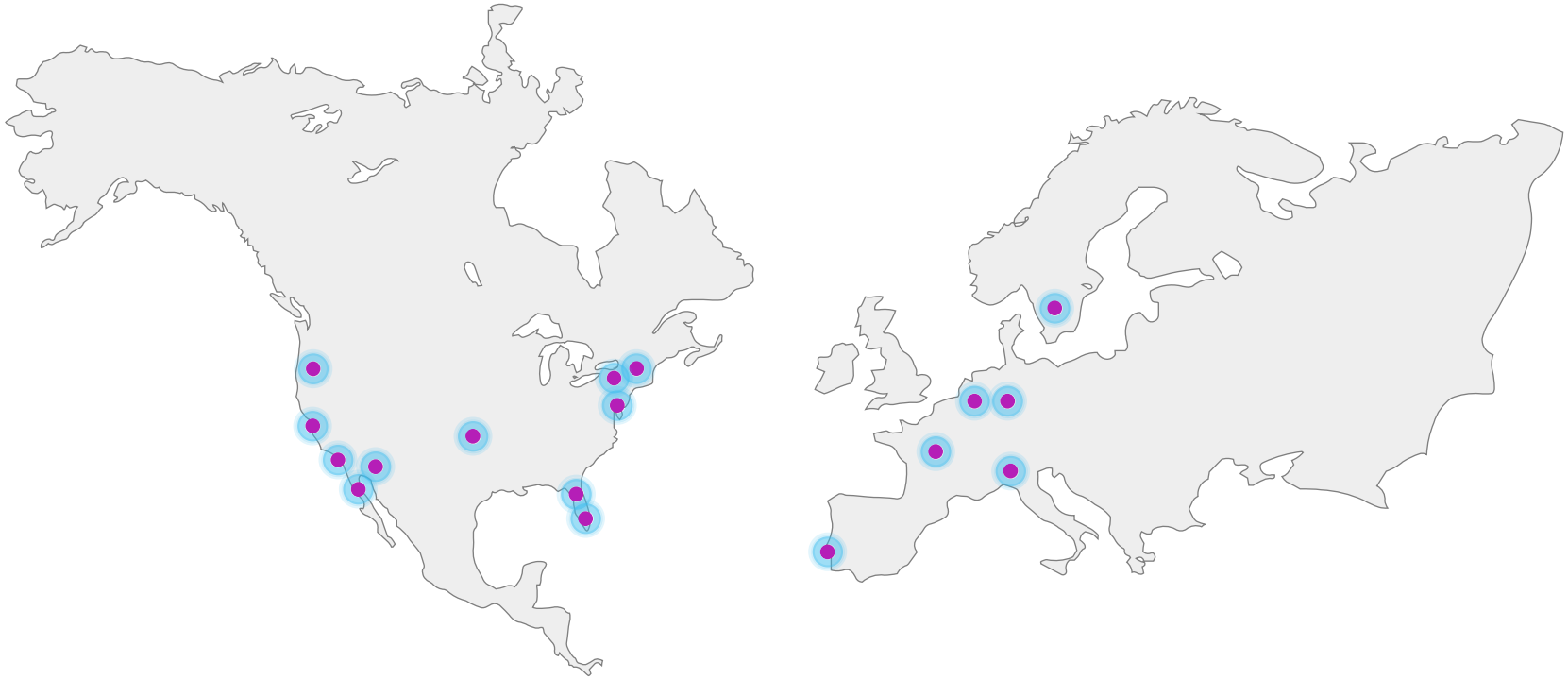
Melanomas are difficult to read and have low concordance rates (30-65%)*

*Real world data from DermAI deployment

Distribution of cases is poorly optimized between generalists and specialists.

*Proscia DermAI™ is for Research Use Only.

DermAI is built with data from leading labs globally



Trained and validated on 50,000+ WSIs

Robustly tested for scanner & stain variability across global sites.

PHILIPS

Leica

3DHISTECH

HAMAMATSU

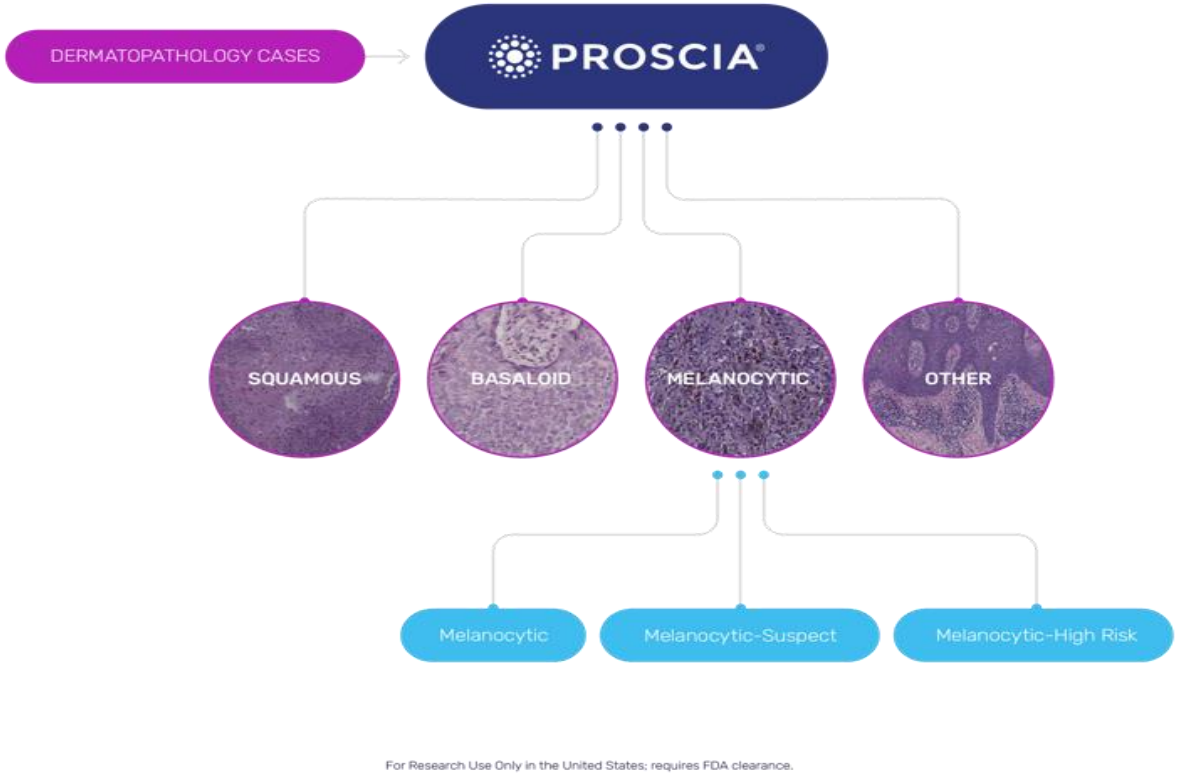
Roche

A case study of DermAI performance on real world data

Test setup (minimal calibration) at one of the largest commercial lab networks

- **Calibration data** set of **only 198 WSIs** – ground truth confirmed and representative WSIs (1-2) chosen by a Derm pathologist from a total of 195 specimens.
  - An equal number of specimens from every supported DermAI category was used for calibration; namely, 33 melanocytic high-risk specimens, 33 melanocytic low risk specimens, etc.

- **Test data:** A specialist dermatopathologist reviewed an additional 1500 specimens of which WSIs to include and created **a test set with 1695 WSIs**.



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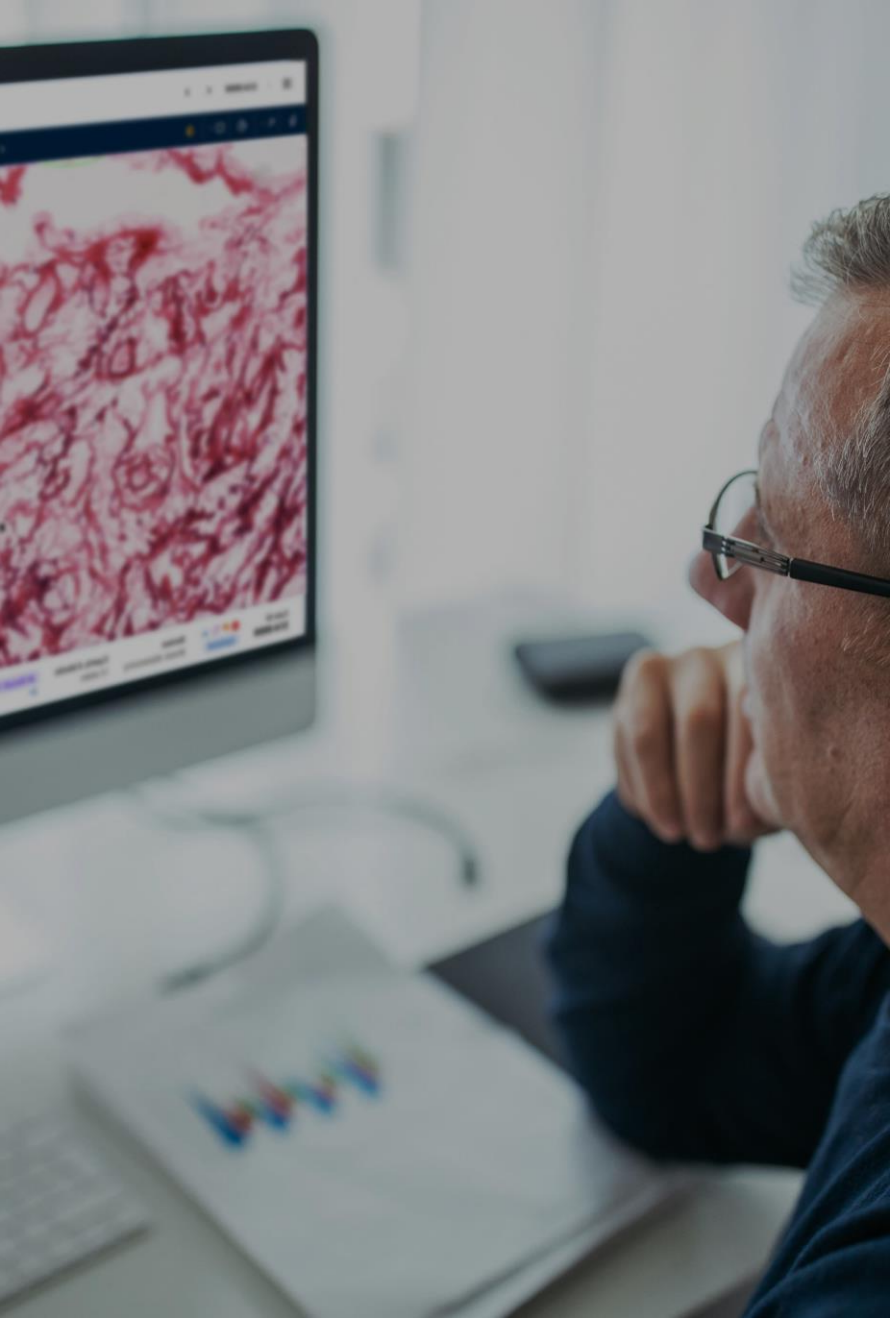


DermAI Performance At-A-Glance

Key benefits observed from DermAI at this lab

30-35% average turnaround time reduction for melanoma (in total)

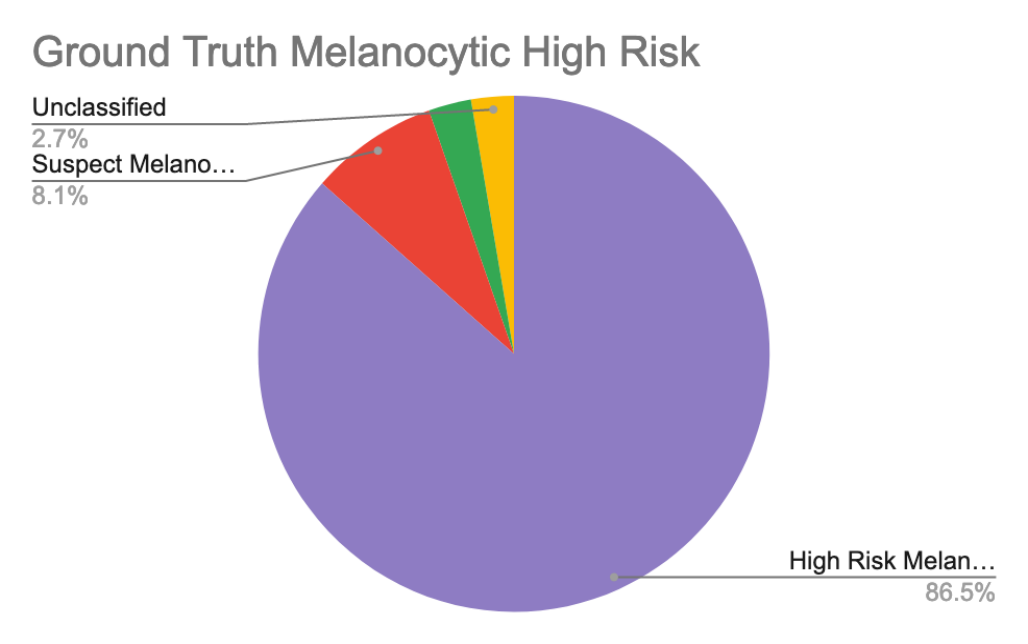
100% of melanoma cases go directly to Derm paths; 40+% increase in easy cases to general paths

35-40% reduction in number of cases that get a second review.

80% of melanoma cases detected by reviewing only ~16% cases; 70% with just 9% cases.

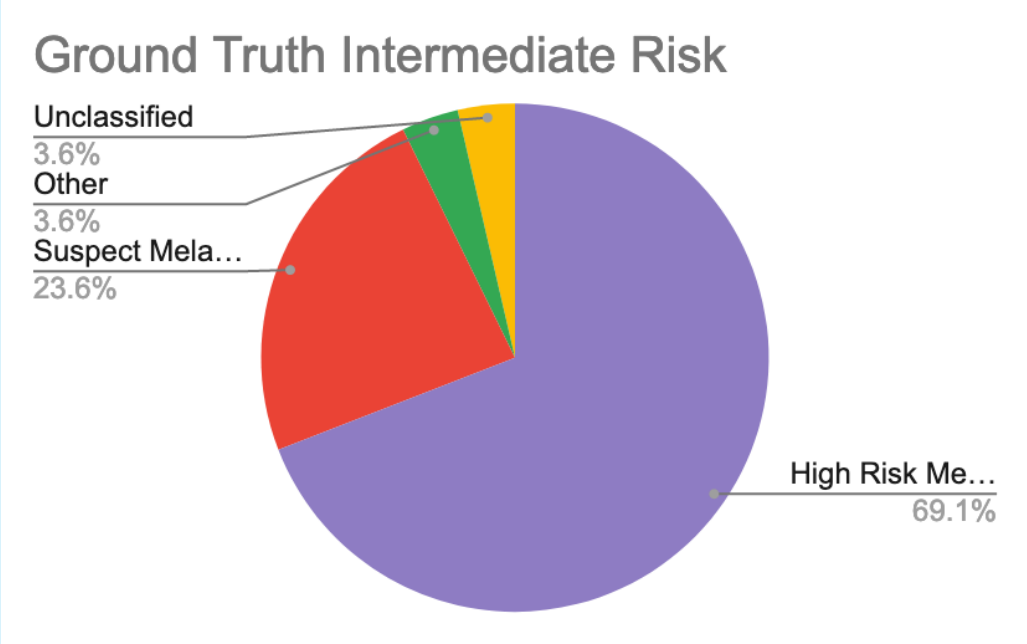
DermAI is highly accurate in identifying High Risk and Intermediate Risk Melanoma cases

Profile of (GT) Melanoma - High Risk cases as classified by DermAI; All assigned to Dermpaths

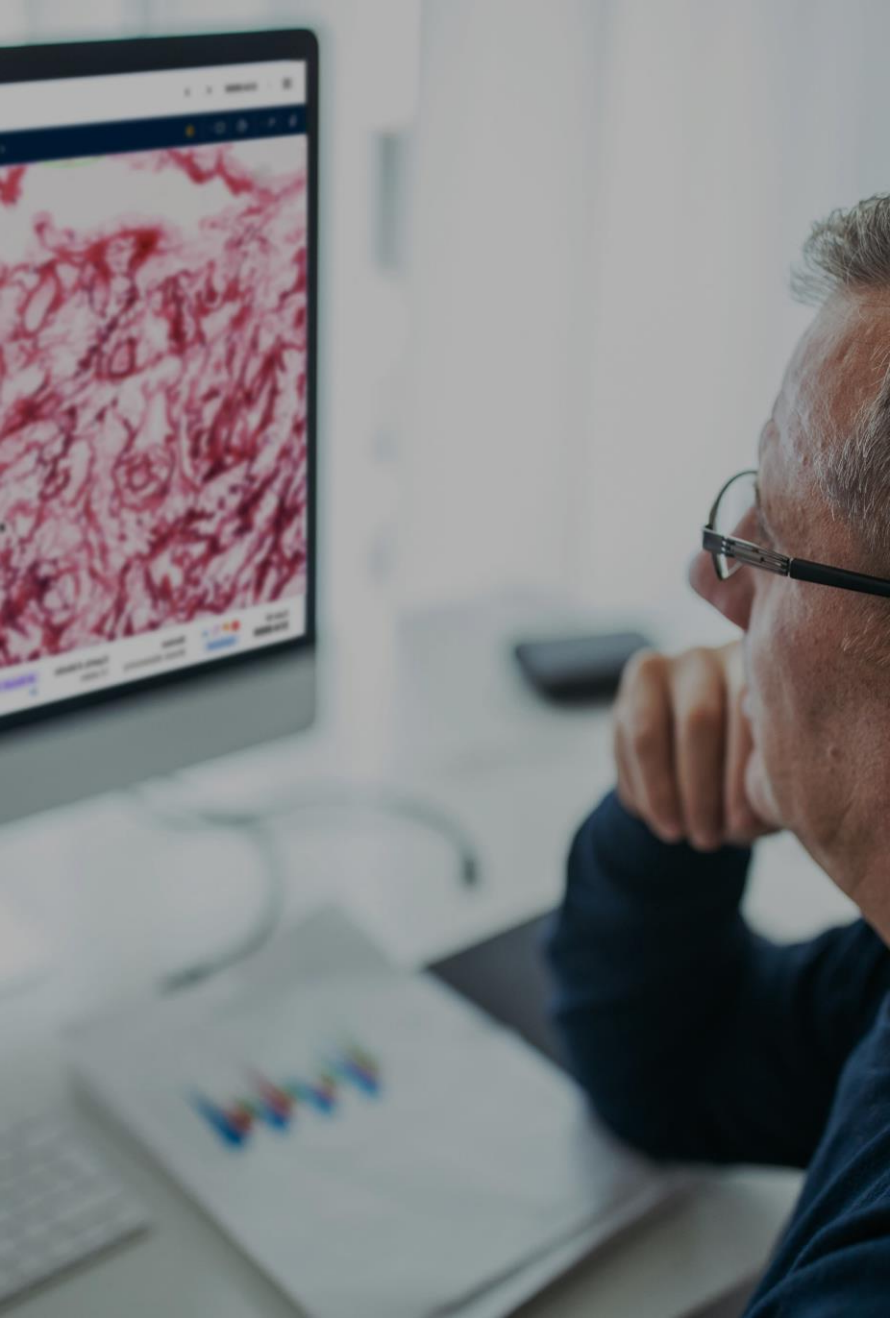


94.5% of all High-Risk Melanoma cases are classified as High Risk or Suspect by DermAI algorithm

Profile of (GT) Melanoma - Intermediate Risk cases as classified by DermAI; All assigned to Dermpaths

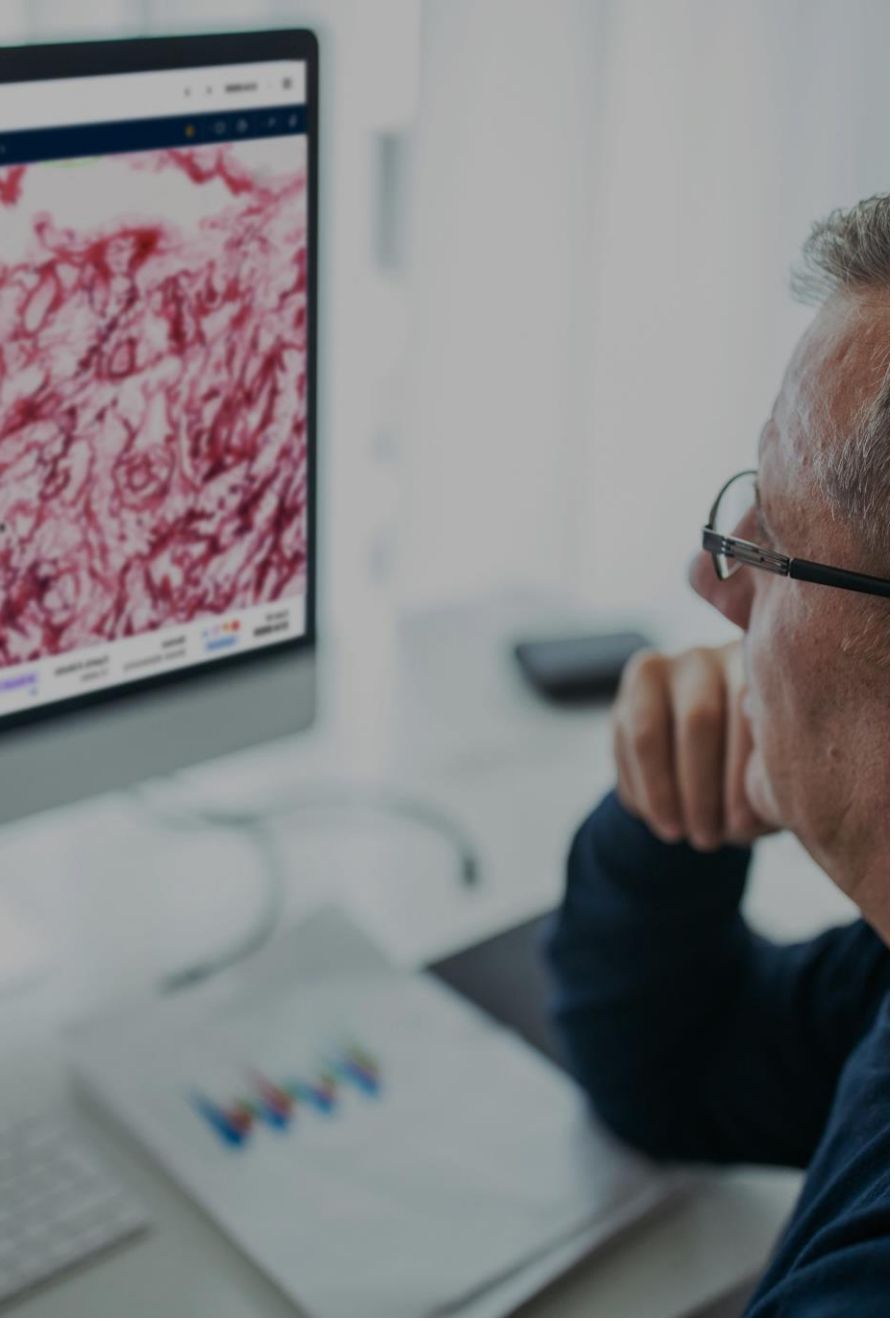


92.7% of all Intermediate-Risk Melanoma cases are classified as High Risk or Suspect by DermAI algorithm

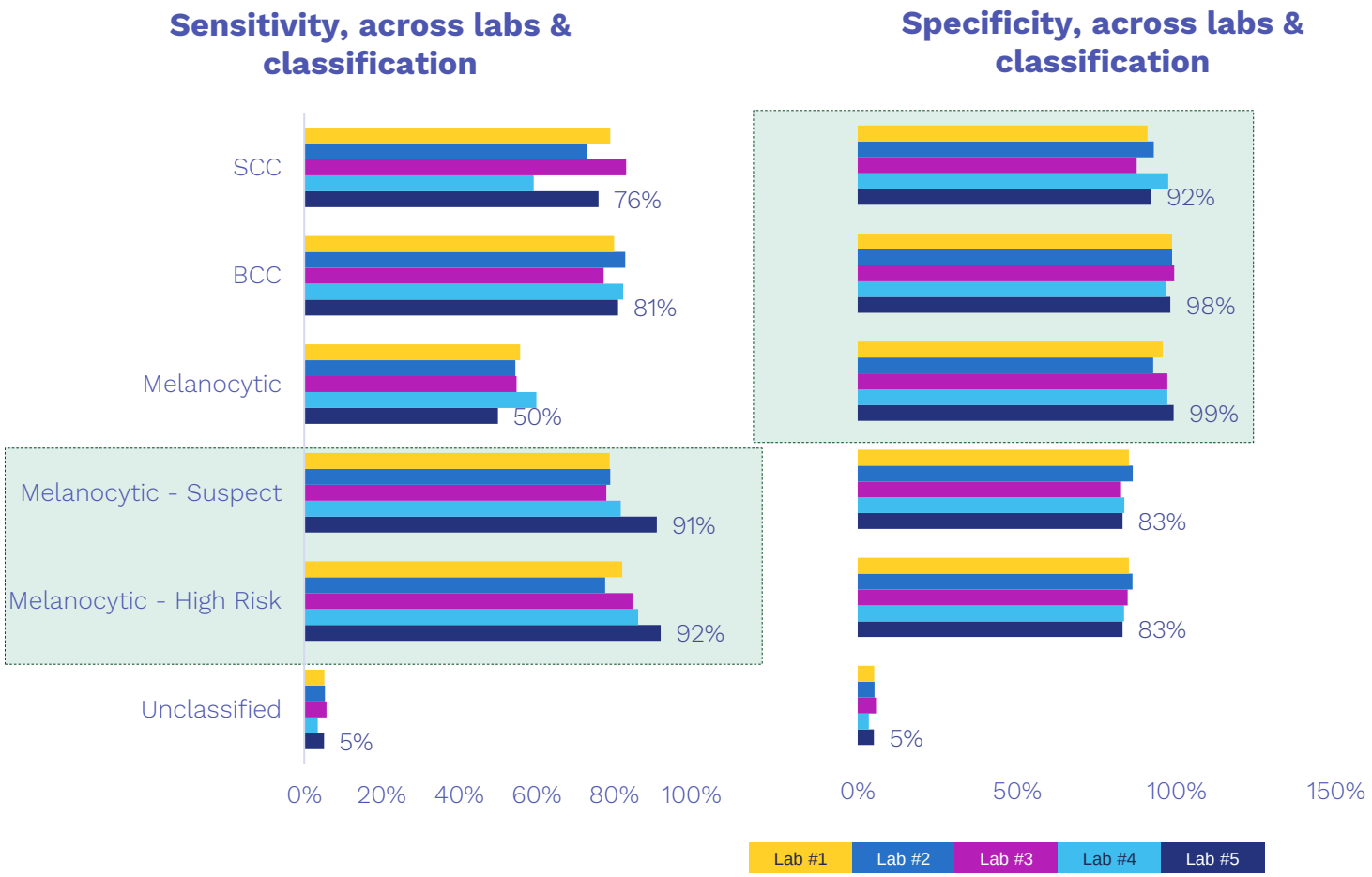


DermAI is also highly specific for other indications as shown below

Category	Sensitivity	Specificity	%Unclassified
Unclassified			**5.1%**
Melanocytic - High Risk	**92%**	83%	
Melanocytic - Suspect	**91%**	83%	
Melanocytic	50%	**99%**	
BCC	81%	**98%**	
SCC	76%	**92%**	

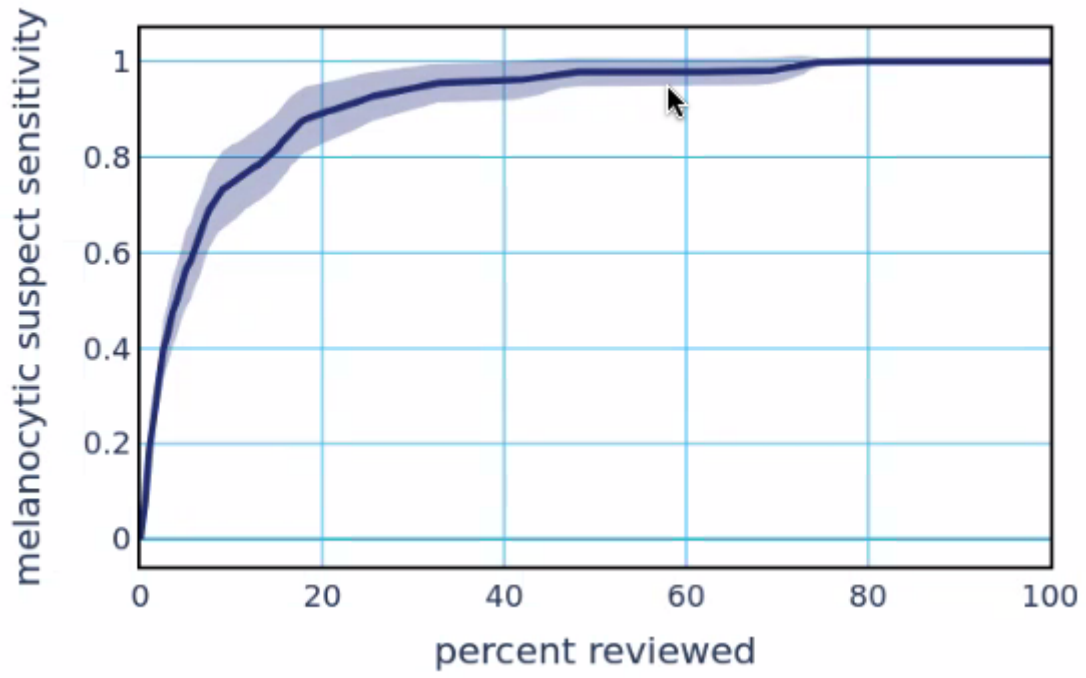


DermAI Performance is proven to be similar across lab and image format variations



How useful is DermAI in identifying Melanoma cases?

By looking at 10-15% of incoming cases first, most of the Melanoma cases can be identified



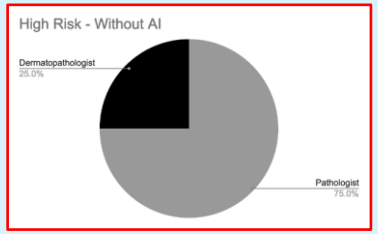
Note: this is a conceptual chart from another US lab site, but we can quickly update this with the actual chart for Unilabs data

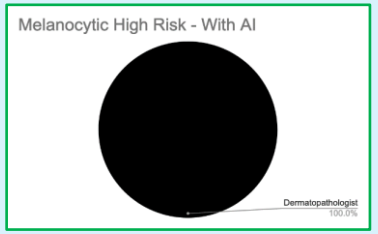
- All specimens get a melanoma confidence score from DermAI
- By arranging the cases in the descending order of the Melanoma "confidence score" we identify that:
  - 80% of melanoma cases detected by reviewing only ~16% cases
  - 70% with just 9% cases
- Usually this number is higher (90% melanoma cases identified with ~10% of cases reviewed) in most other laboratories
- This particular data set from this commercial lab was enriched for a higher proportion of Melanoma, so when we test DermAI against a sequential set of cases we expect this performance to be even better as evidences in other laboratories.

Secondly, once these high-risk cases are identified they are re-assigned to specialist dermatopathologists

Without AI
With AI

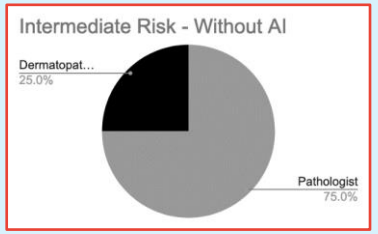
Melanoma – High Risk

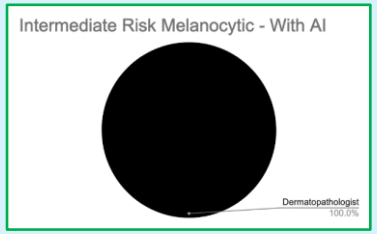




100% Melanoma High Risk is assigned to Derm paths after DermAI

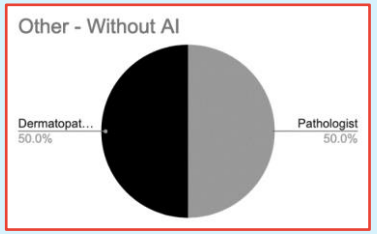
Melanoma – Intermediate Risk

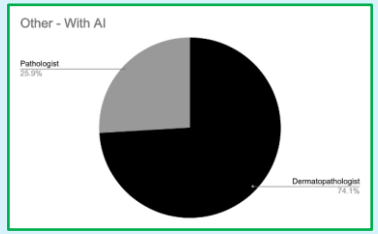




100% Melanoma Intermediate Risk is assigned to Derm paths after DermAI

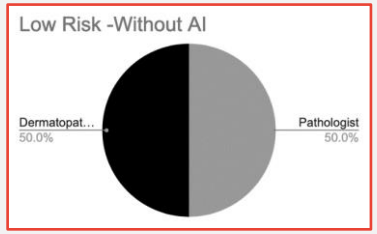
Other

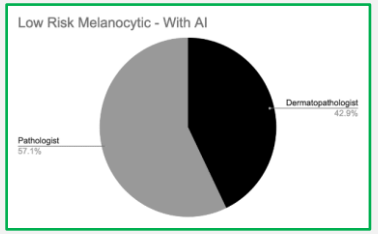




75% Other is assigned to Derm paths after DermAI

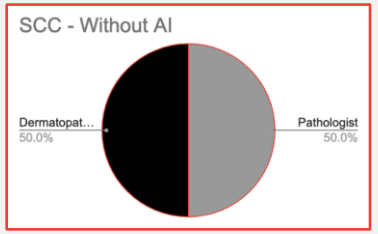
Melanoma – Low Risk

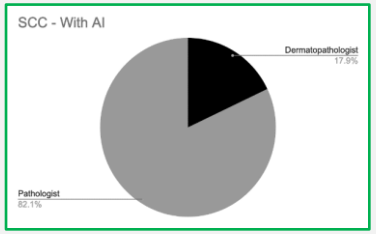




58% of Melanoma – Low Risk are assigned to General paths after DermAI

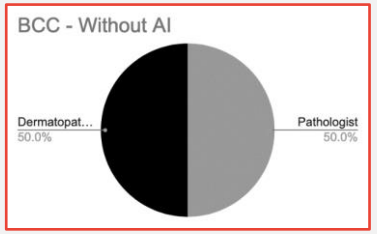
SCC

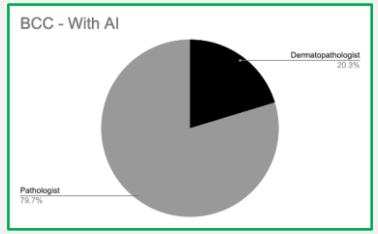




82% of Squamous cases are assigned to General paths after DermAI

BCC





76% of Basaloid cases are assigned to General paths after DermAI

More importantly, at this lab, DermAI was proven to result in estimated TAT reductions of about 30-35%

Avg. melanoma TAT without Clinical Flagging

Baseline TAT

Avg. melanoma TAT with Clinical Flagging

15% reduction

Avg. melanoma TAT with DermAI & without Clinical Flagging

45% reduction

Percentage of malignant melanoma cases that get flagged by the clinicians

26%

Percentage of malignant melanoma cases that get flagged by DermAI

92%

PPV of clinician-flagged cases for melanoma

5%

PPV of DermAI flagged cases for melanoma

25%

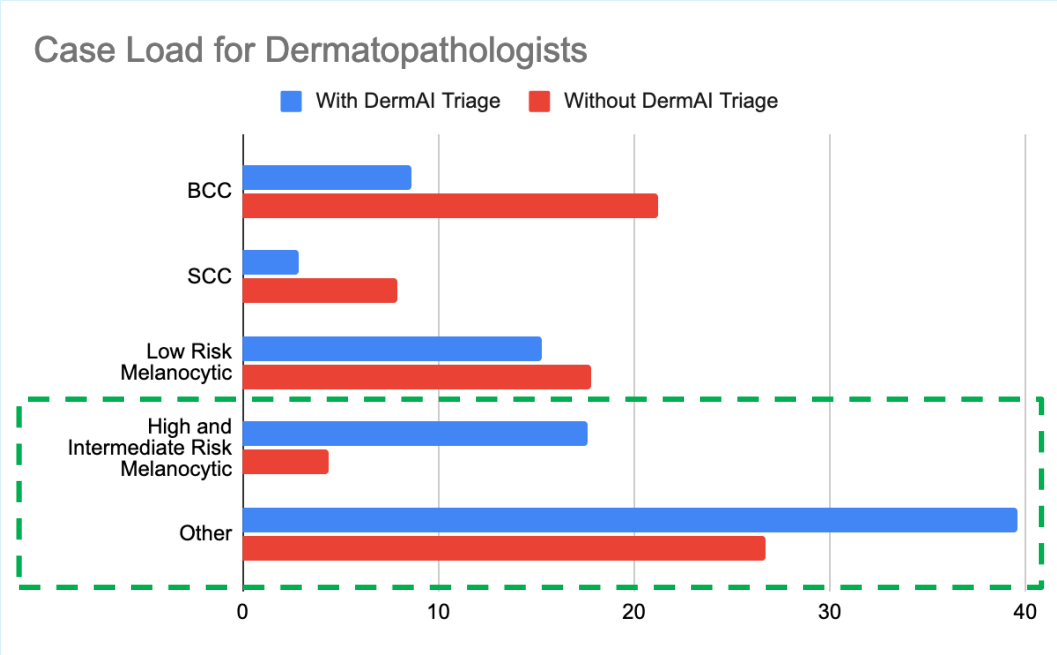
>>> 30%+ potential reduction in TAT in most workflows measured till date!

>>> DermAI as a triaging tool is likely ~5x more effective than Clinician flagging

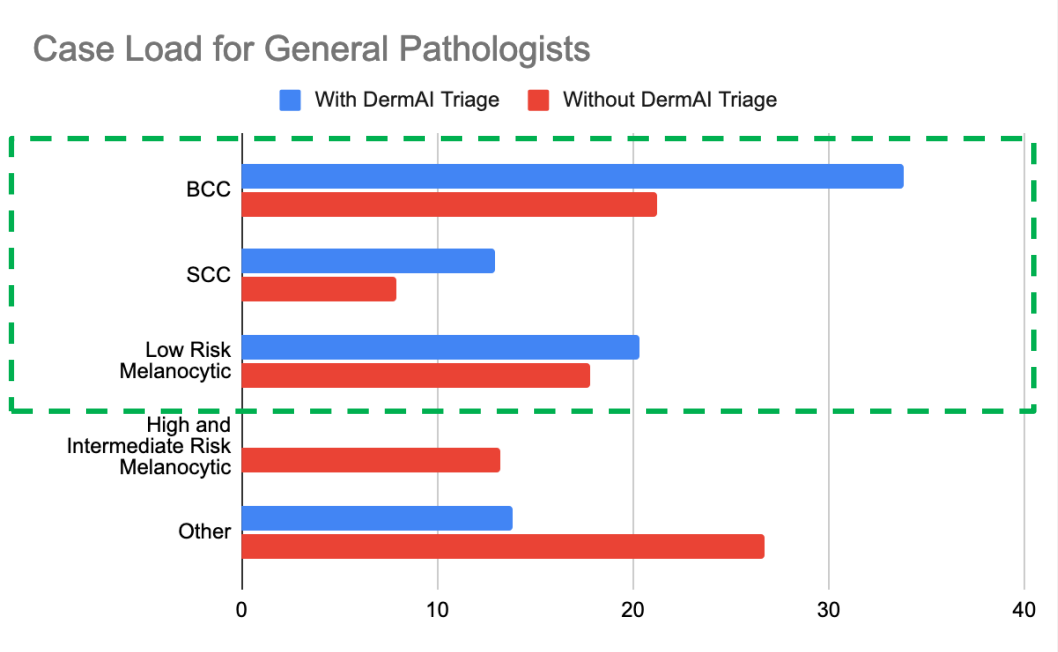
Workflow Impact of DermAI (4)

Estimated Case load distribution & change by class post DermAI for this laboratory

Derm Pathologists
(42% of case load assigned)



General Pathologists
(58% of case load assigned)



Key Takeaways

1. DermAI calibration burden is minimal and easy to accomplish.
2. DermAI performance is well tested against multiple labs, scanners, and variations. Performance is fairly standard across variations
3. 80% of melanoma cases detected by reviewing only ~16% cases (70% with just 9% of cases reviewed)
4. Estimated 35-40% reduction in cases that are be reviewed twice (first by pathologist and then by dermatopathologist).
5. Estimated 30-35% potential reduction in TAT when DermAI is used in combination with Clinician flagging
6. DermAI as a triaging tool is likely ~5x more effective than Clinician flagging

Thank You

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