



Intelligent Dermatology:

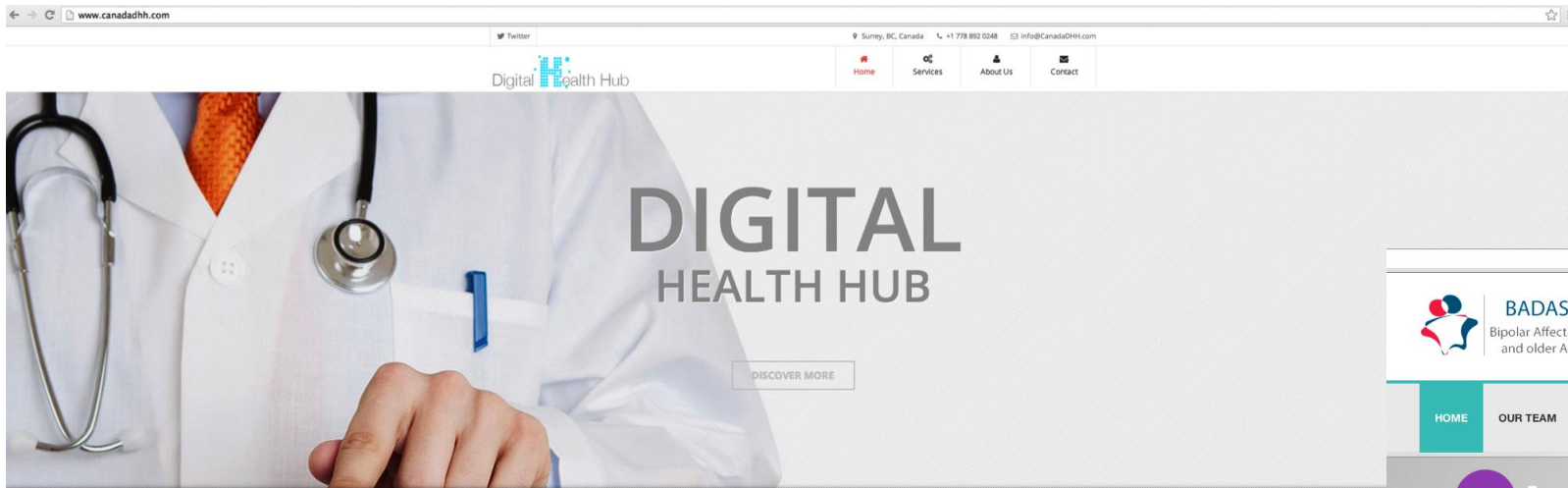
Unlocking the power of data for improved outcomes in skin health and care

Maryam Sadeghi, PhD
CEO – MetaOptima Technology Inc.

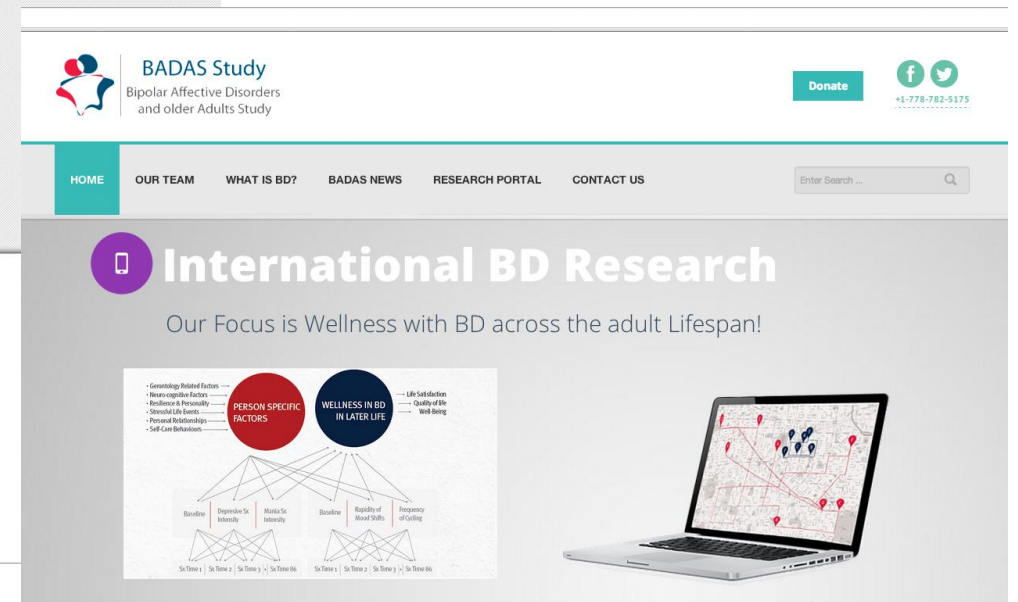
Our vision is to be the world leader in smart data-driven dermatology and analytics.

Our mission is to facilitate faster and more accurate care for anyone anywhere.

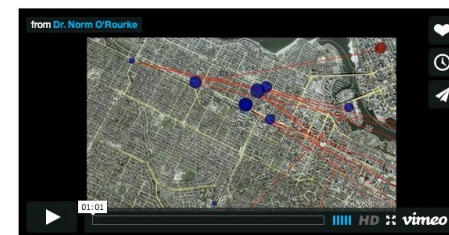
Digital Health Hub



**WE CREATE INNOVATIVE DIGITAL CARE
SOLUTIONS ON THE EDGE OF YOUR
IMAGINATION!**



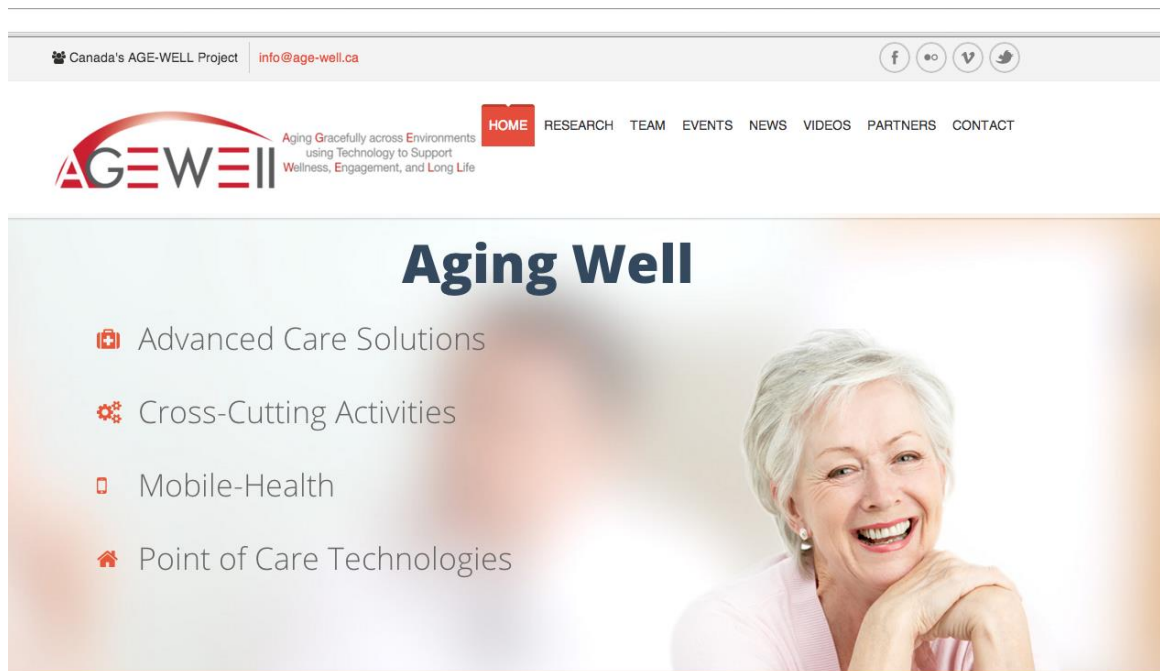
WHAT IS BIPOLAR DISORDER?



About BADAS

This program of study brings researchers with SFU's Interdisciplinary Research in the Mathematical and Computational Sciences (IMACS) Centre together with academic clinicians. Our team includes experts in BD research and practice, geropsychology, social work, technology, geography, computing science, health psychology, mathematics and neuropsychology. We constitute a multinational and multidisciplinary team. Significant synergies exist across this network of experts in BD research, practice and technology. We will use of advanced qualitative and quantitative research methods (e.g., mixed methods, experiential sampling, latent growth and hierarchical linear modelling). Exceptional research training and knowledge translation (KT) opportunities are envisioned.

Digital Health Hub



About AGE-WELL

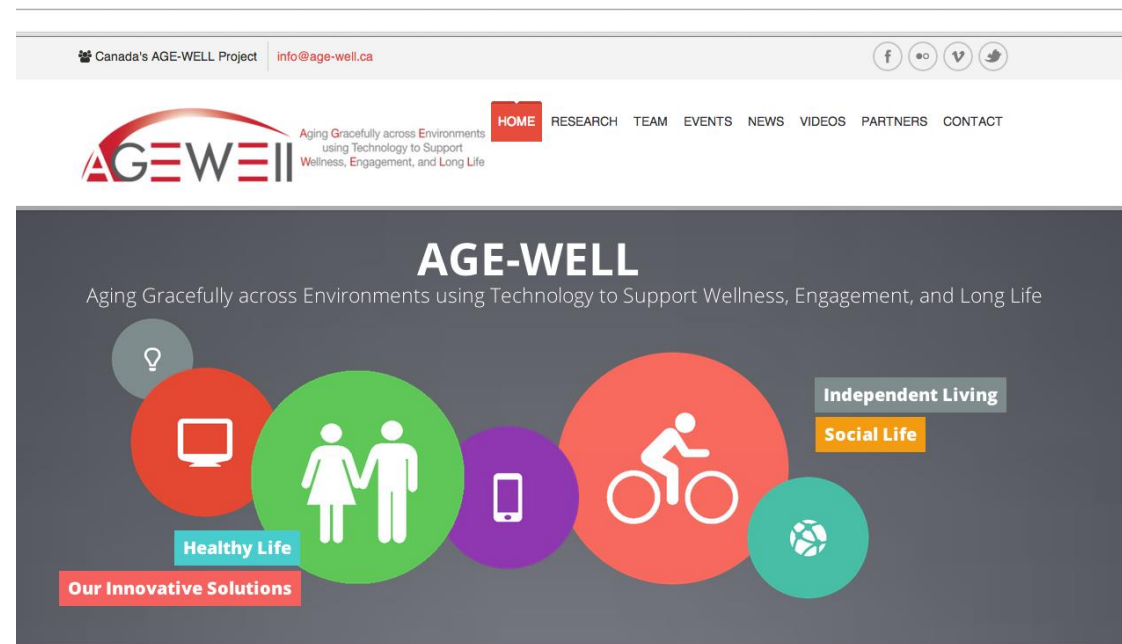


AGE-WELL: Aging Gracefully across Environments using Technology to Support Wellness, Engagement, and Long Life

A globally aging population demands innovative approaches to ensure people across societies can live and age well. In particular, there is a need to move from health and social agendas that emphasize dependency as we age, to ones that promote healthy aging and independence.

The AGE-WELL Vision

The vision of the AGE-WELL is to harness the potential of technology to provide high-quality and sustainable services and solutions to meet the needs of the current and future generations of older adults in Canada. Our vision includes the creation of capacity for Canada to further establish its position as a global leader



About AGE-WELL



AGE-WELL: Aging Gracefully across Environments using Technology to Support Wellness, Engagement, and Long Life

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My Journey – Science and Entrepreneurship

NSERC Innovation Challenge Award



SFU's Dean Medal



CIPPRS Doctoral Award



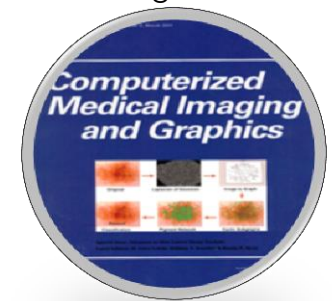
Microsoft ACM Silver Medal



World Congress of Dermatology Gold Medal



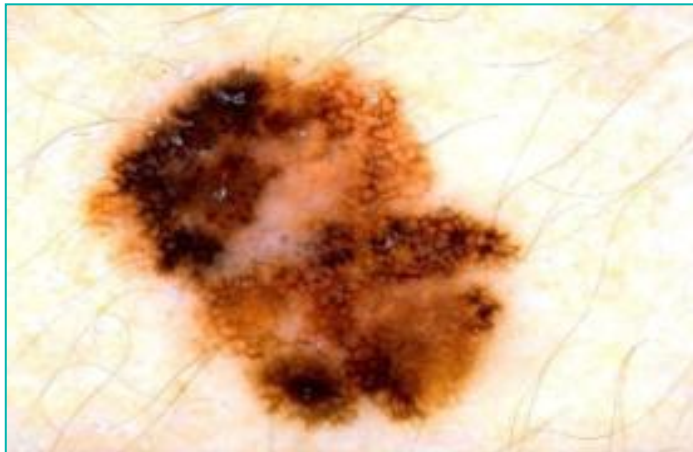
CMIG Journal Recognition



Computer-aided Analysis of Skin Lesions

- Benign lesions
- Skin Cancers
 - Basal Cell Carcinoma (BCC)
 - Squamous Cell Carcinoma (SCC)
 - Melanoma

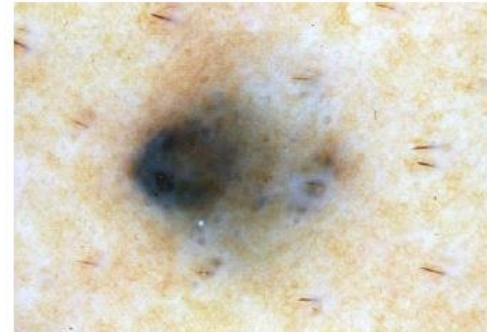
Melanoma



(a) Freckles



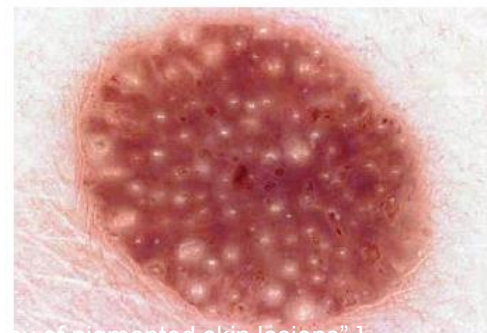
(b) Lentigo (Solar)



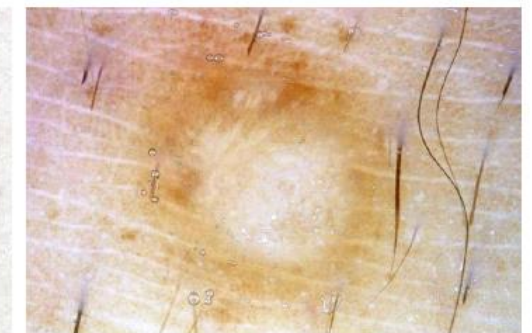
(c) Melanocytic Nevus (Blue Nevus)



(d) Atypical Nevus (Clark's Nevus)



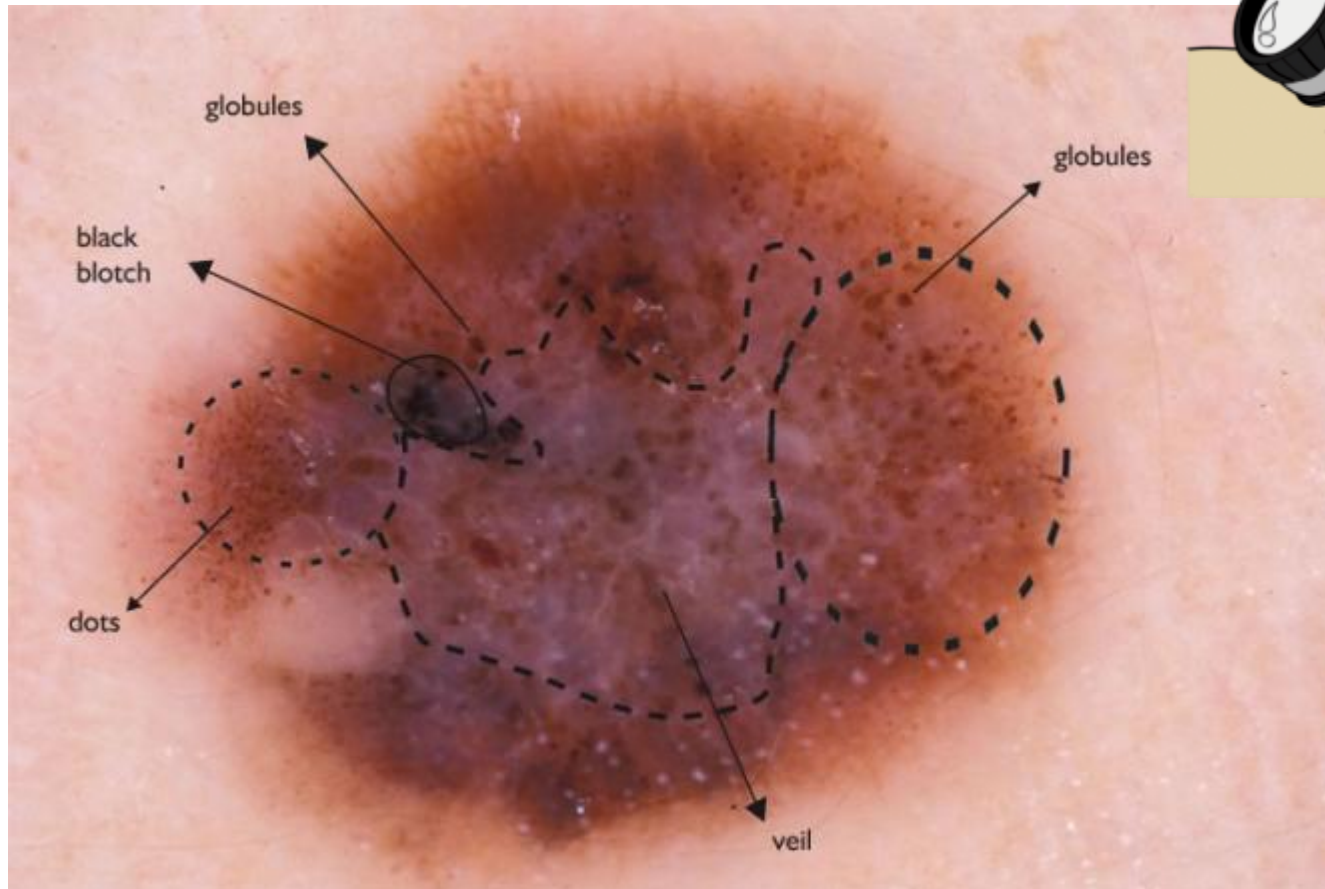
(e) Seborrheic Keratosis



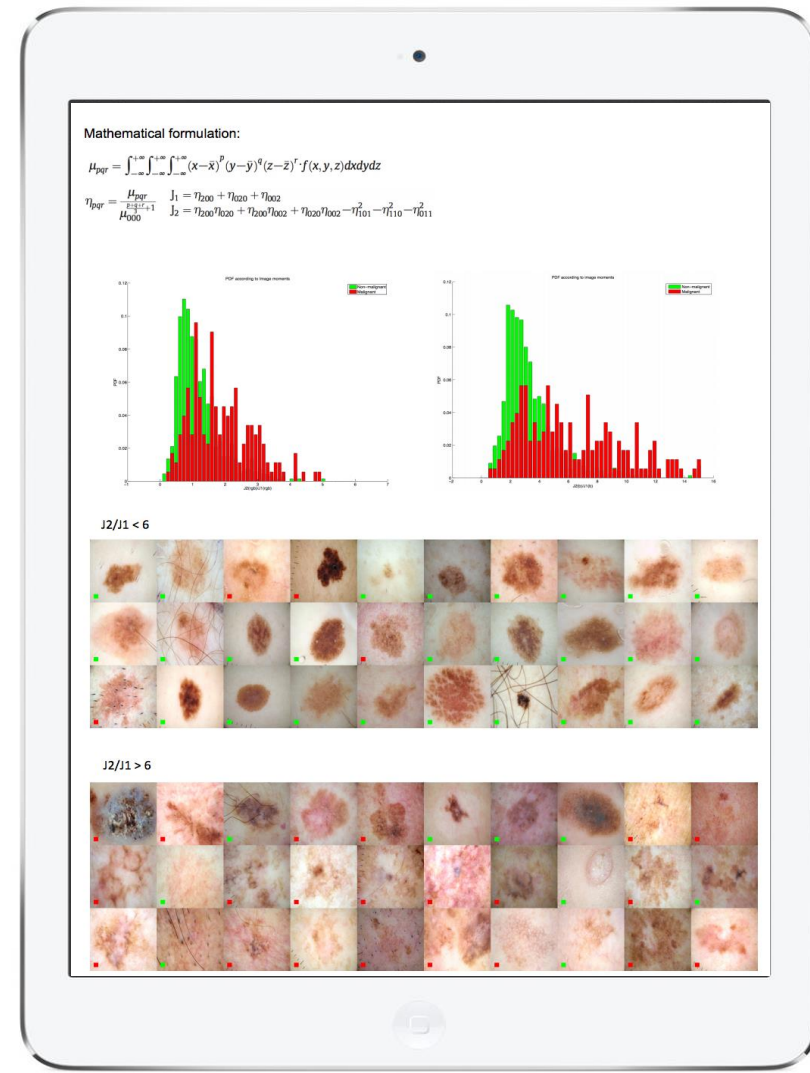
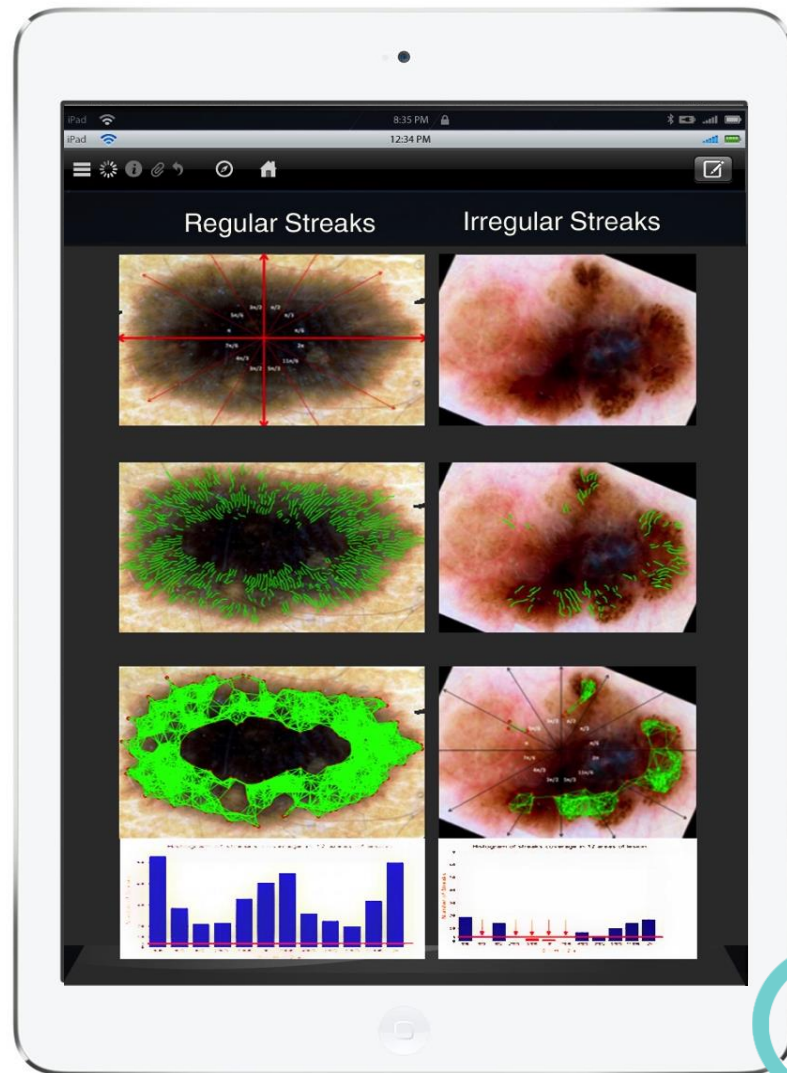
(f) Dermatofibroma

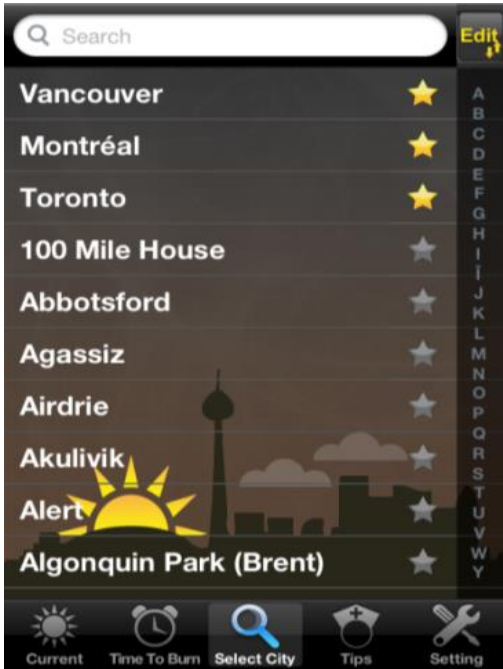
Dermoscopy

- ❖ Improves diagnostic accuracy by 30%
- ❖ Allows the examiner to look past the surface and into the deeper layers



Pattern Recognition and Matching





UV Canada Features

Vancouver
change
13°C Mainly Clear



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Melanoma a fast rising cancer in Canada

Canadians spend too much time in sun without protection, cancer society finds

CBC News Posted: May 28, 2014 3:01 AM ET | Last Updated: May 28, 2014 5:13 PM ET



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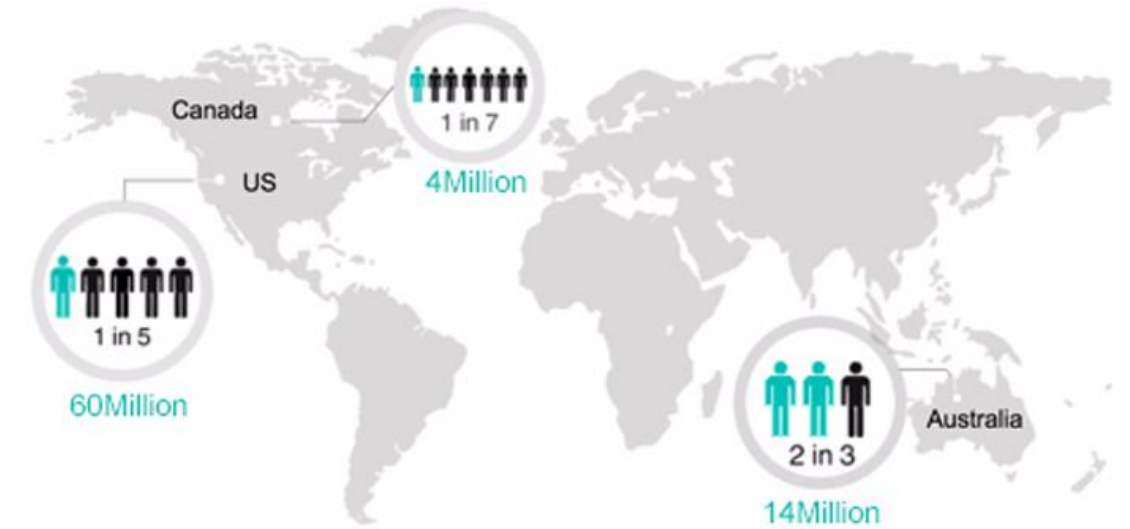


■ Jus
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bill

A BIG Problem

- Skin Cancer is the most common cancer
 - 2 in 3 Australians
 - 1 in 5 Americans
 - 1 in 7 Canadians
- Doubles every 10 years
- Early diagnosis saves life and cost

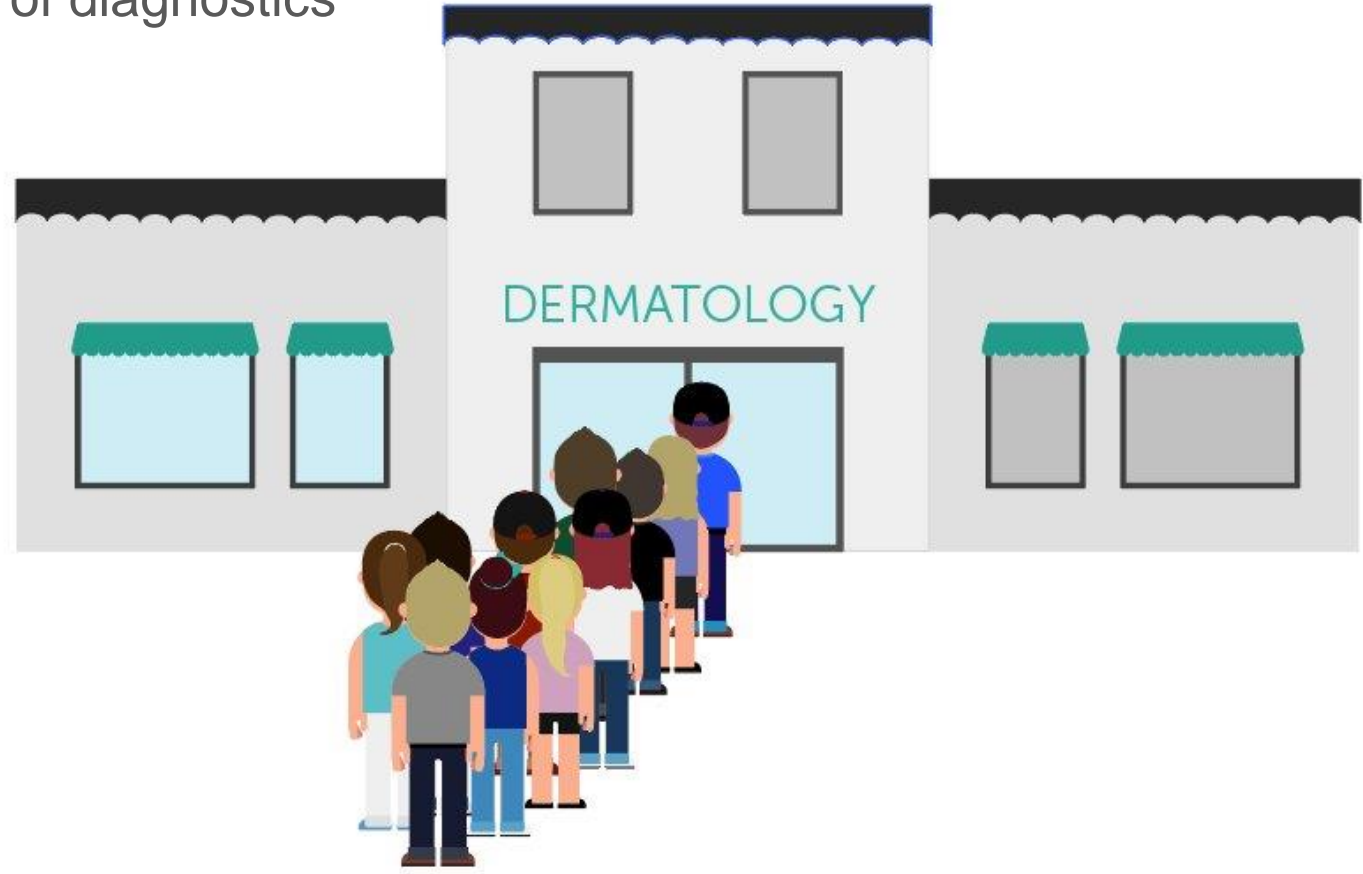
	Early Stage	Late Stage
Survival Rate	98%	15%
Cost	\$200	\$150,000



150,000,000 Patients Worldwide

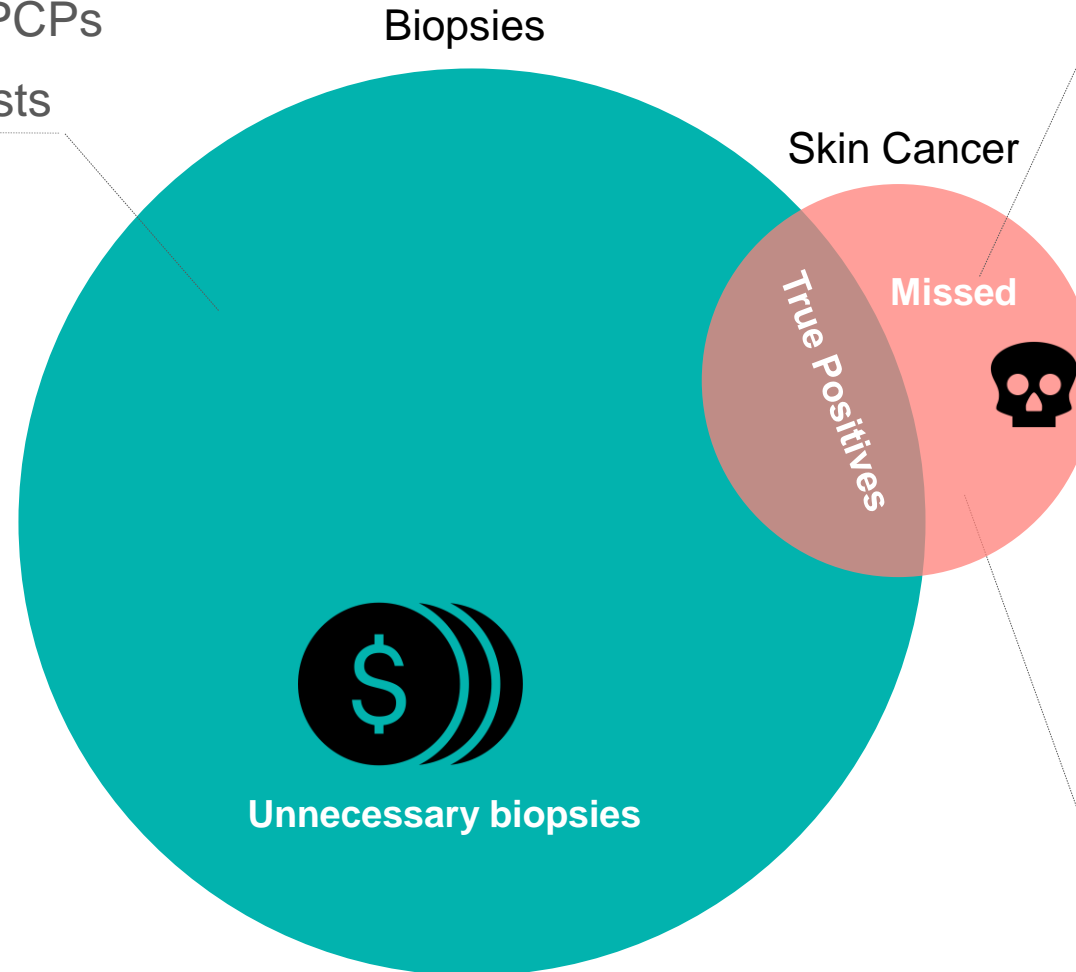
Access to Care

- Long wait times to access specialists
 - From 3 to 12 months
- Primary Care Physicians are in front line of diagnostics
- PCPs do not have training



Deadly & Costly

39 benign biopsies for **1** cancer
97% false positive rate for PCPs
66% for expert dermatologists

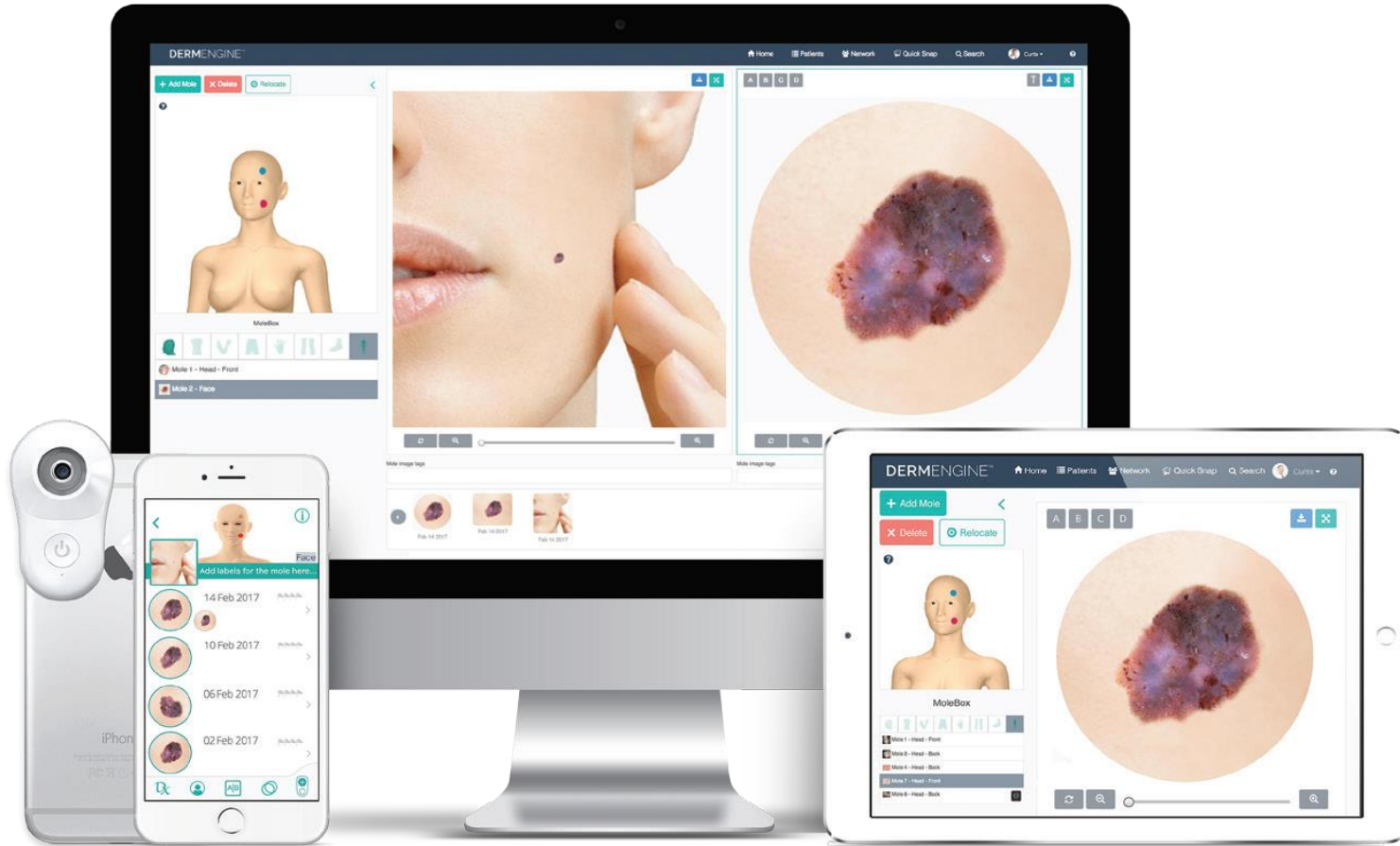


16% Melanoma-related malpractice insurer's claims

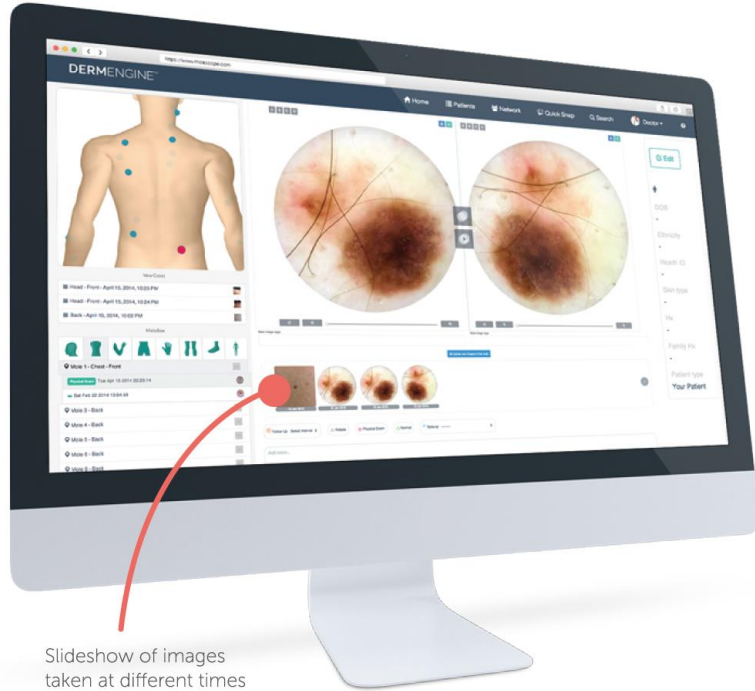
30% of all cancers are initially missed



Solution: Data-driven Intelligent Dermatology



Our Products



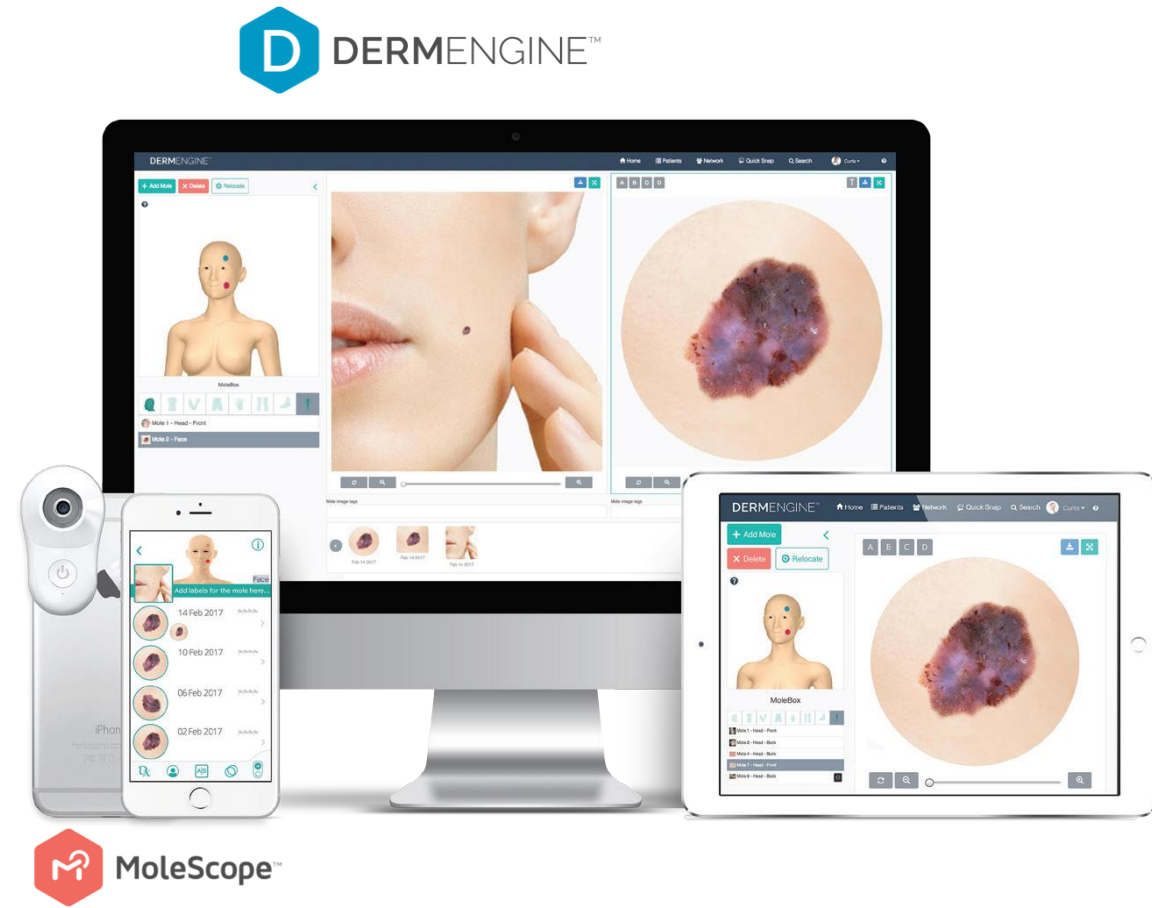
DermEngine is an end-to-end proprietary dermatology platform.



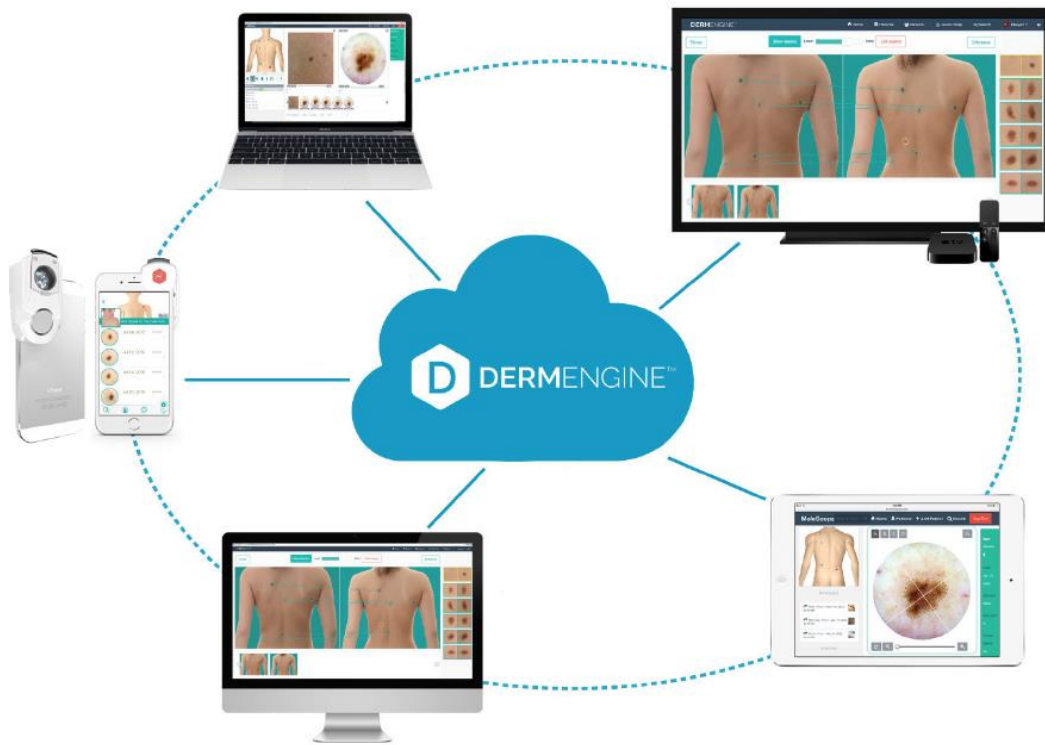
MoleScope is a mini-dermoscope attachable to smartphones

DermEngine

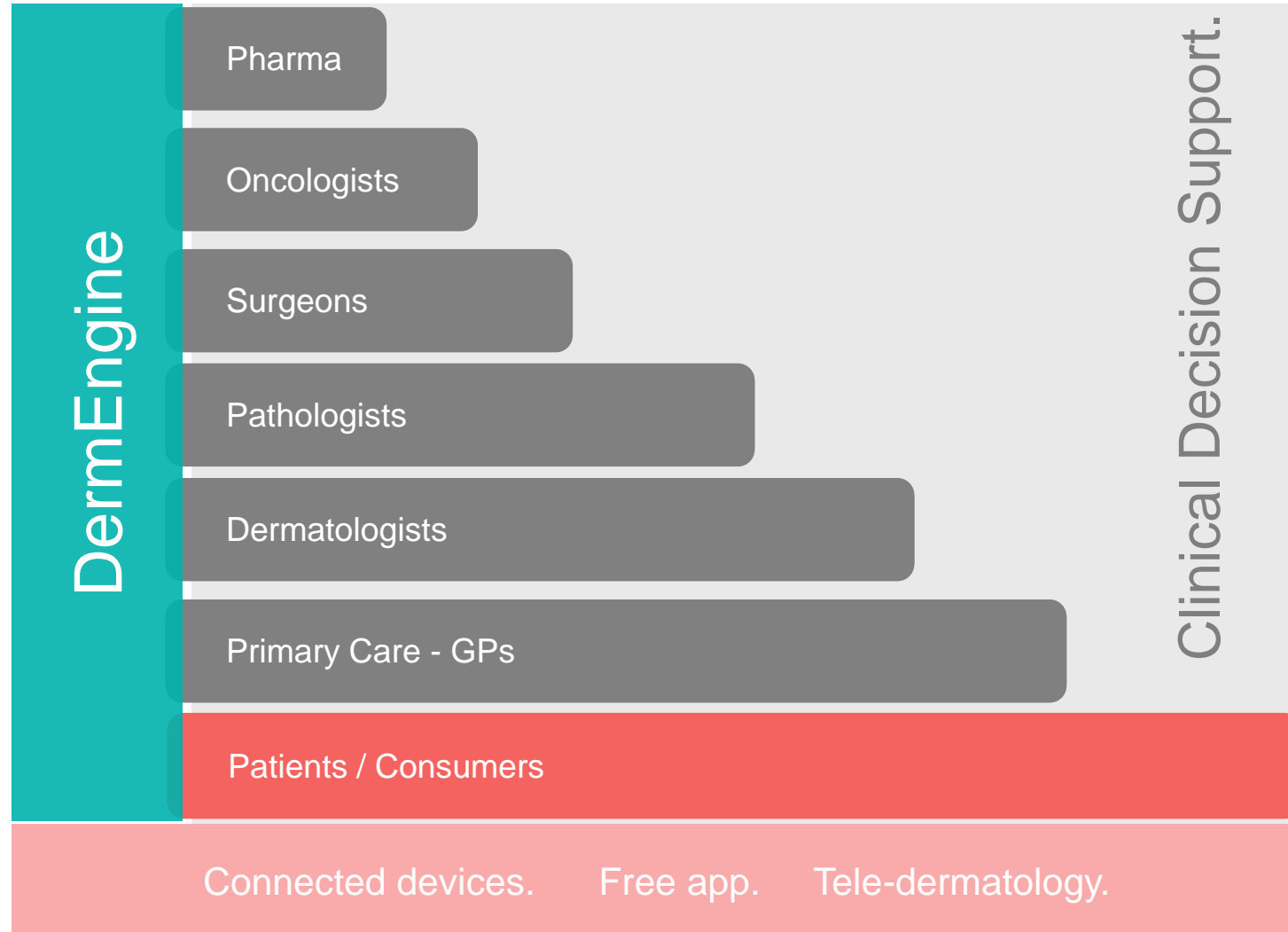
- DermEngine is an end-to-end proprietary dermatology platform offering
 - Easy to use and advanced imaging tools
 - Efficient clinical workflow
 - Intelligent clinical decision support tools
 - For diagnostics & therapeutics
- DermEngine offers a powerful ENGINE
 - For payers and providers
 - By leveraging their data
 - Using Machine Learning & Computer Vision algorithms



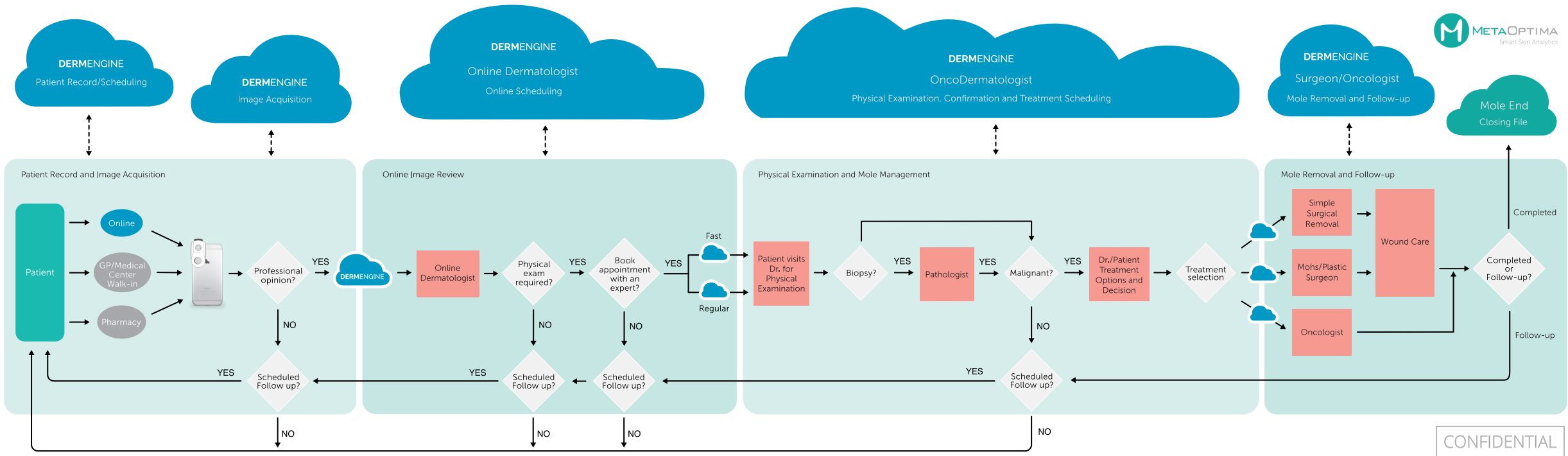
Cross Platform Connected Eco-system



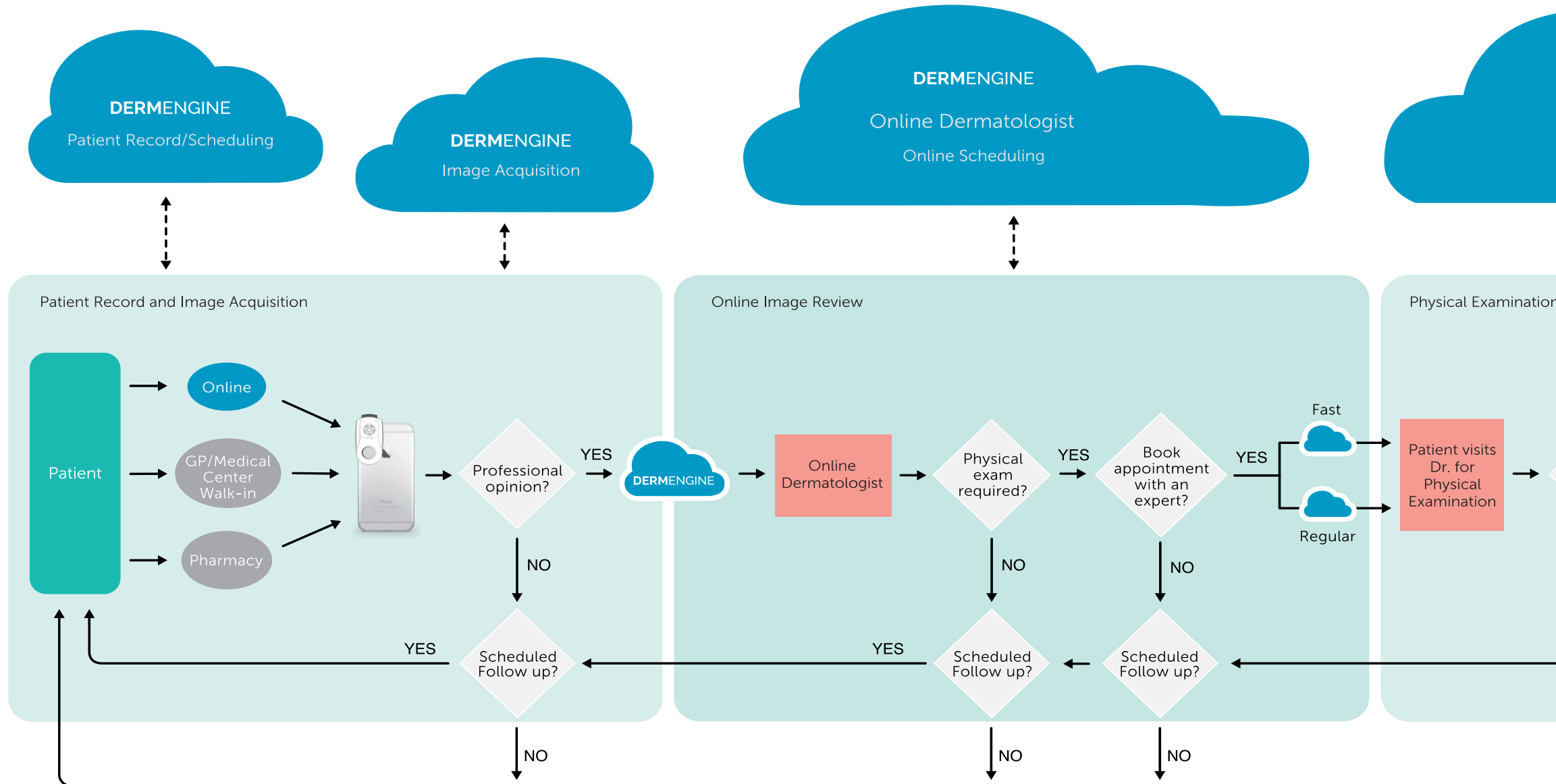
Vertical Integration of Artificial Intelligence



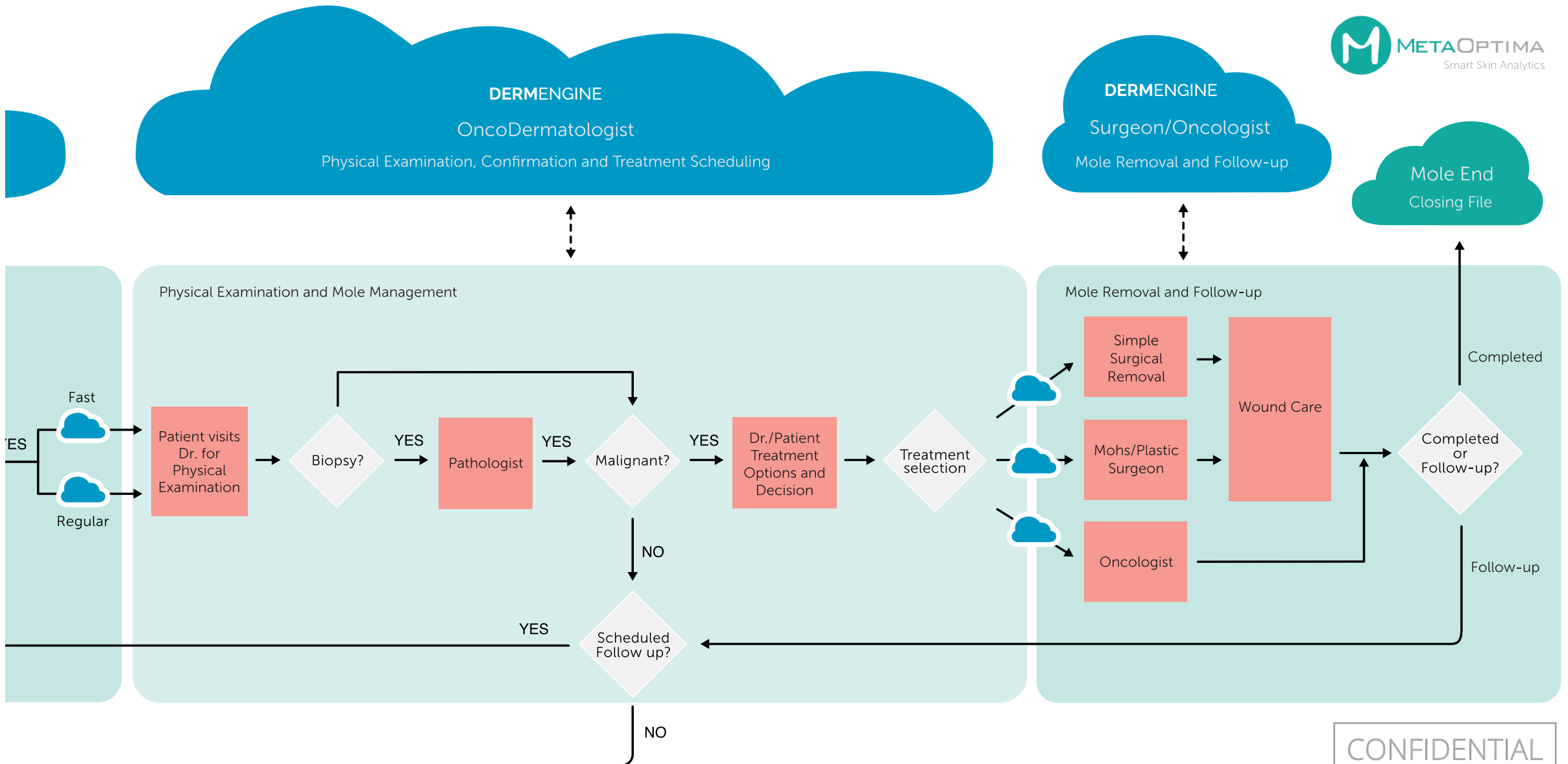
Ecosystem



Ecosystem

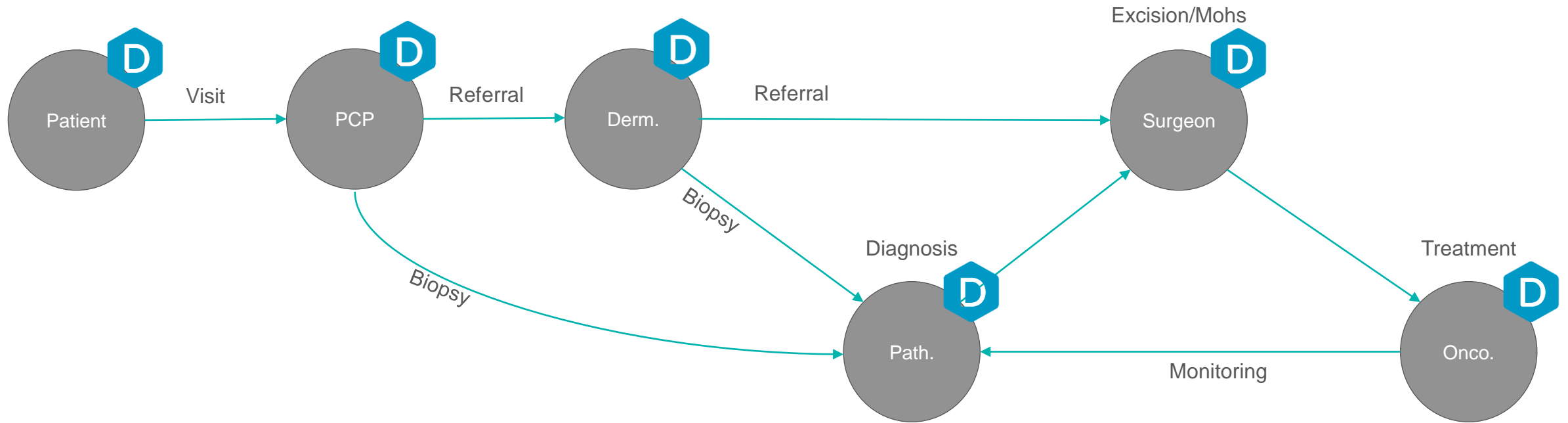


Ecosystem



CONFIDENTIAL

Patient Journey



Dermatology





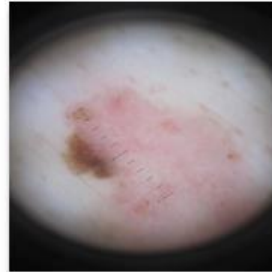
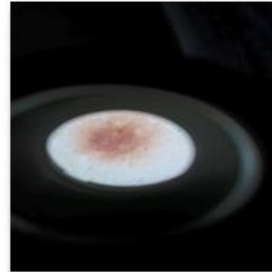


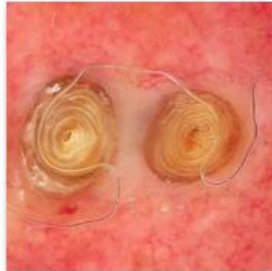
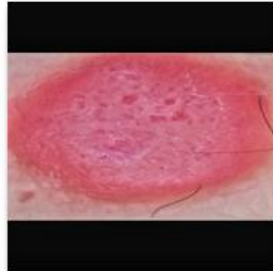
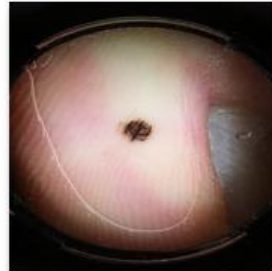
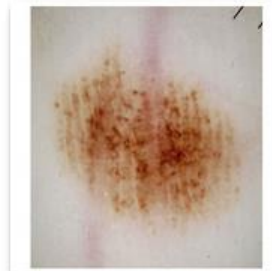

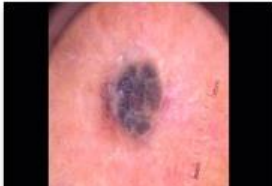

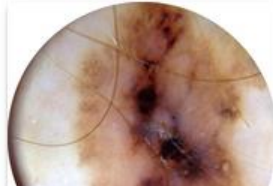


Dermsocial

dermsocial.com

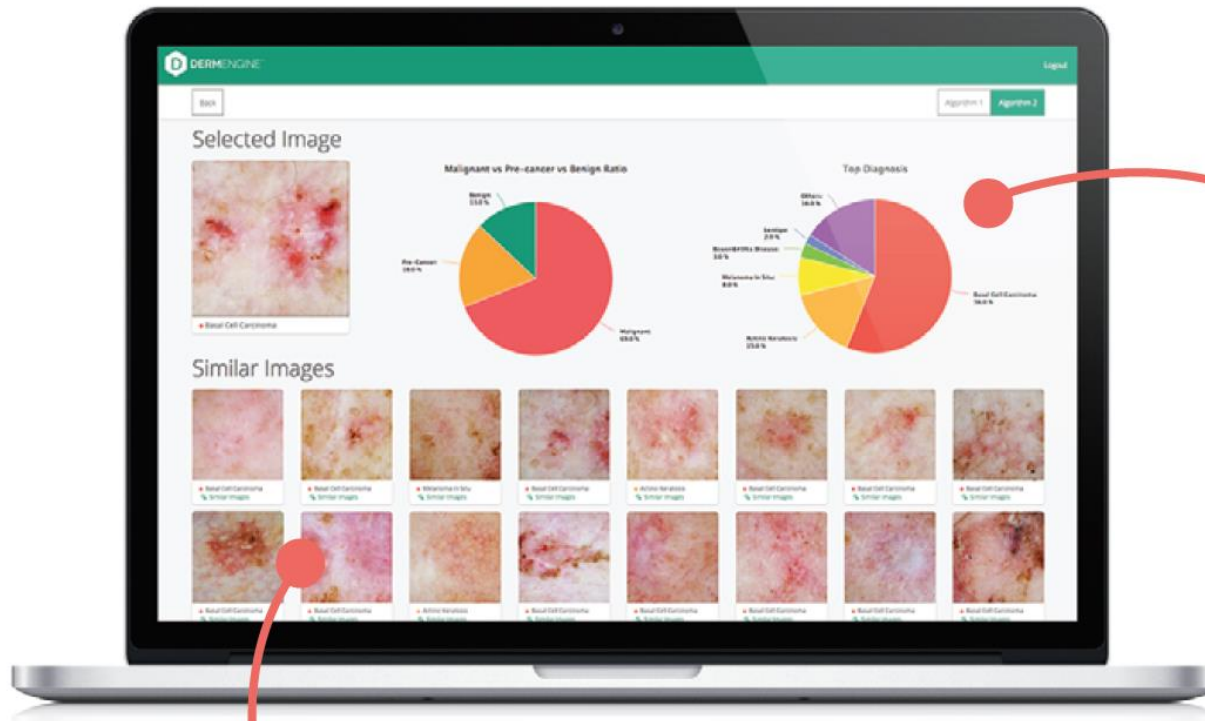
Hi, Majid Logout

HomeMy CasesNew CaseStats

Hi, MajidLogout

 <p>SMALL BUT TYPICAL Doctor (urologist) retired. 70 y. Casual observation of the left th...</p>	 <p>Hi! 68th old female, half-year ago noted nail change on food. KoH test negative....</p>	 <p>Hi. 80 year old female with a long duration of pigmentation. I am sure you will know ...</p>	 <p>75 year old male, farmer skin New lesion appeared on the chest and grew within the la...</p>	 <p>Woman, 60 y.o. Lesion on the back...</p>	 <p>33 year old with slowly enlarging 'lesion' pictured macro at 6 o'clock, also an incid...</p>
 <p>a pigmented lesion on the back with a 32 years old woman...</p>	 <p>On the frontal region of a 77 years old male...</p>	 <p>To my friends who go to Vienna 2015, with my best wishes for a good trip. Lesions see...</p>	 <p>On the dorsum of the left hand of a 39 years old female with a history of 8 months.....</p>	 <p>A small contribution to the acral lesions. Male, 32 y, left big toe, small lesion app...</p>	 <p>This lesion was encountered 2 weeks ago on a 53 year old lady having her first skin c...</p>
					

Clinical Decision Support



Visual report of analysis results in the form of charts and graphs

Find similar lesions automatically and compare side by side

DEEP ANALYTICS

- Visual Search
- Evolution Tracker

Clinical Decision Support

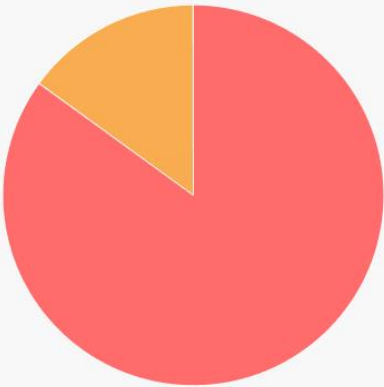




Selected Image

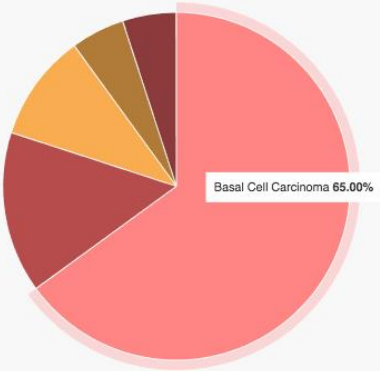


Malignancy



Malignant Pre-Cancer

Top Diagnoses



Basal Cell Carcinoma 65.00%

Basal Cell Carcinoma
Nodular Basal Cell Carcinoma
Actinic Keratosis
Bowen's Disease
Squamous Cell Carcinoma
Others

Similar Images

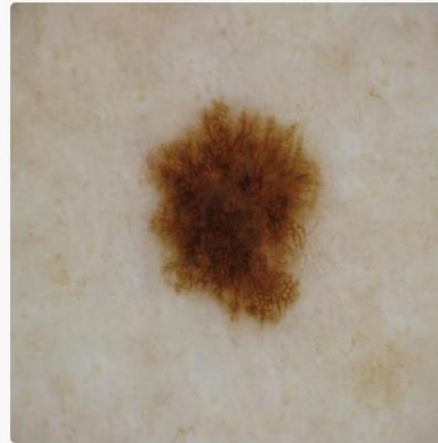




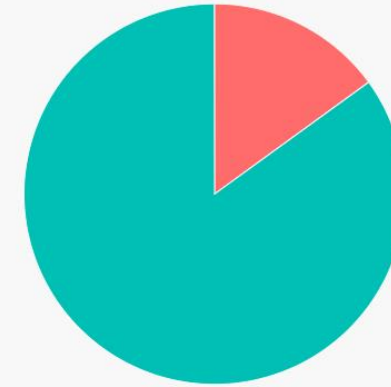
Statistics of most similar images



Selected Image

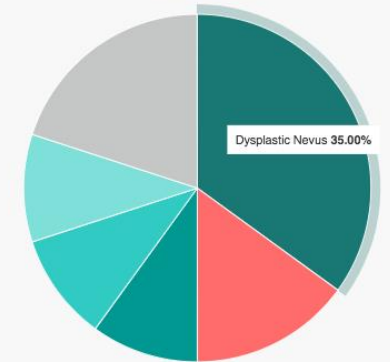


Malignancy



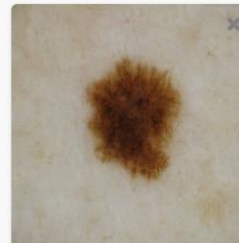
● Malignant ● Benign

Top Diagnoses



● Dysplastic Nevus ● Melanoma In Situ
● Compound Nevus
● Hypermelanotic Nevus
● Benign Melanocytic Nevus ● Others

Similar Images



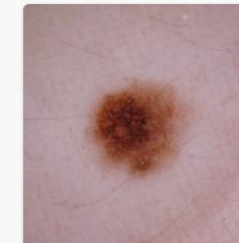
● Dysplastic Nevus



● Dysplastic Nevus



● Melanoma In Situ



● Compound Nevus



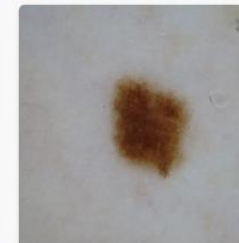
● Hypermelanotic Nevus



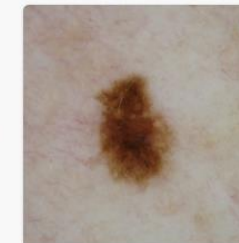
● Benign Melanocytic Nevus



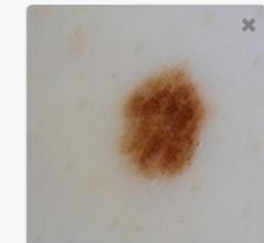
● Dysplastic Nevus



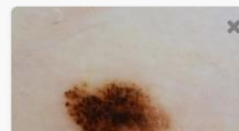
● Melanoma In Situ



● Hypermelanotic Nevus

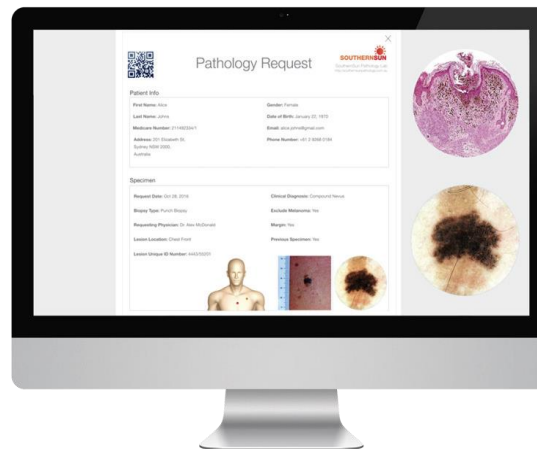



● Dysplastic Nevus



DermEngine Pathology Module

- Integration with Pathology lab systems
- Integration with major Practice Management Systems in AUS and NZ: Best Practice, Genie, ClinicToCloud, MedTech, etc.
- Integration with US Pathology providers is in progress





Pathology Request

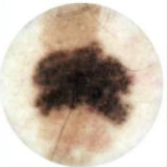
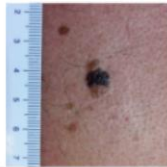

Your Lab Logo

Patient Info

First Name: Alice	Gender: Female
Last Name: Johns	Date of Birth: January 22, 1970
Medicare Number: 211492334/1	Email: alice.johns@gmail.com
Address: 201 Elizabeth St, Sydney NSW 2000, Australia	Phone Number: +61 2 9268 0184

Specimen

Request Date: Oct 28, 2016	Clinical Diagnosis: Compound Nevus
Biopsy Type: Punch Biopsy	Exclude Melanoma: Yes
Requesting Physician: Dr. Alex McDonald	Margin: Yes
Lesion Location: Chest Front	Previous Specimen: Yes
Lesion Unique ID Number: 4443/55201	

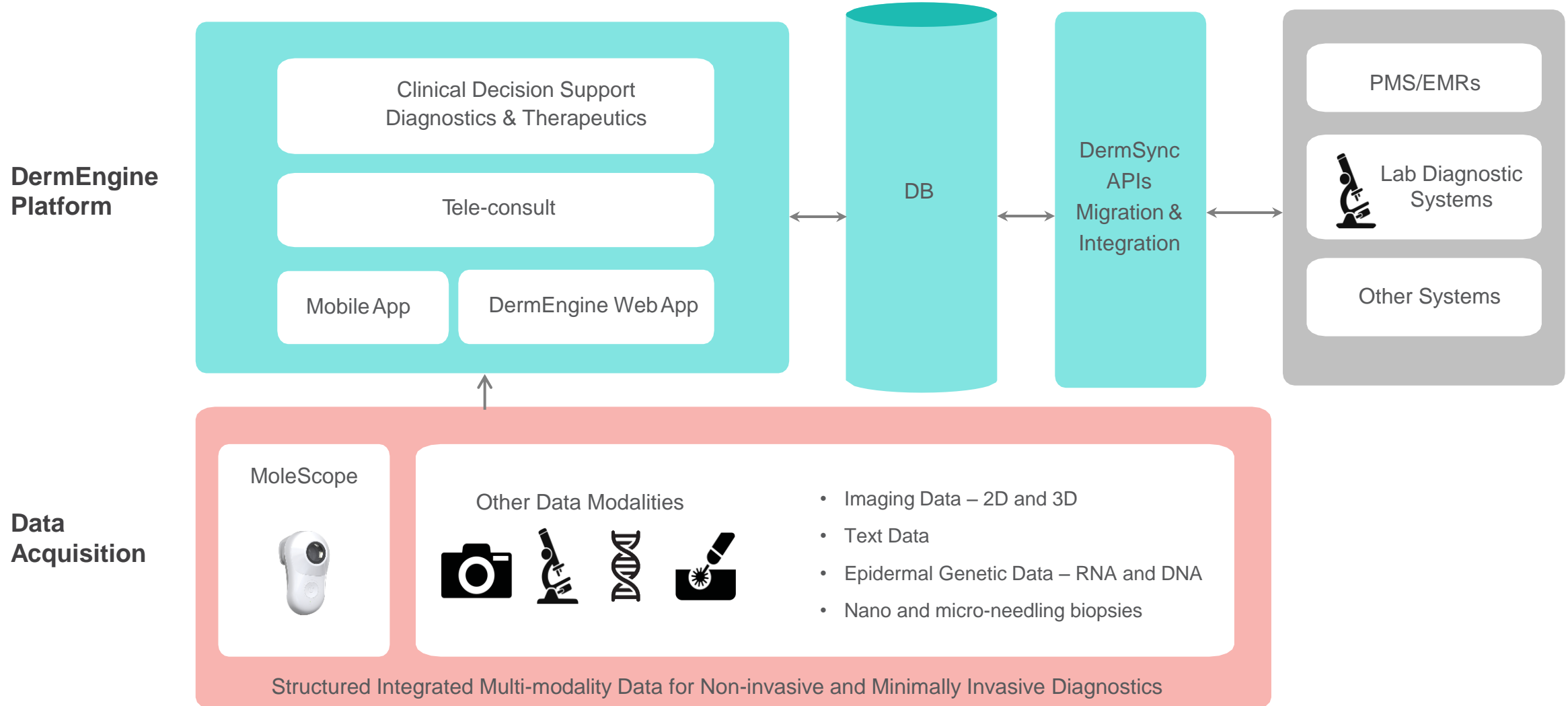


Signature

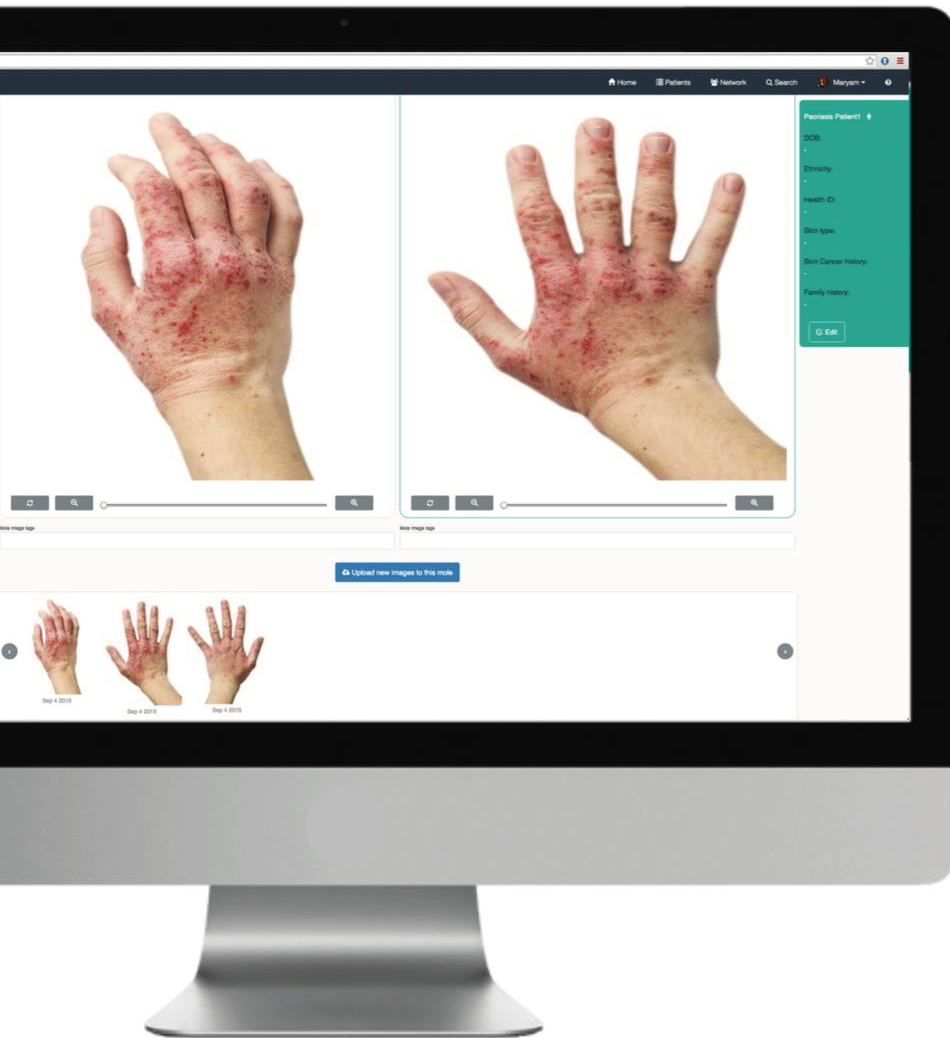
Doctor's Signature:	Patient's Signature:
Date:	Date:

<https://dermengine.com>

The Engine



Chronic Dermatological Conditions



Web and Mobile App Management



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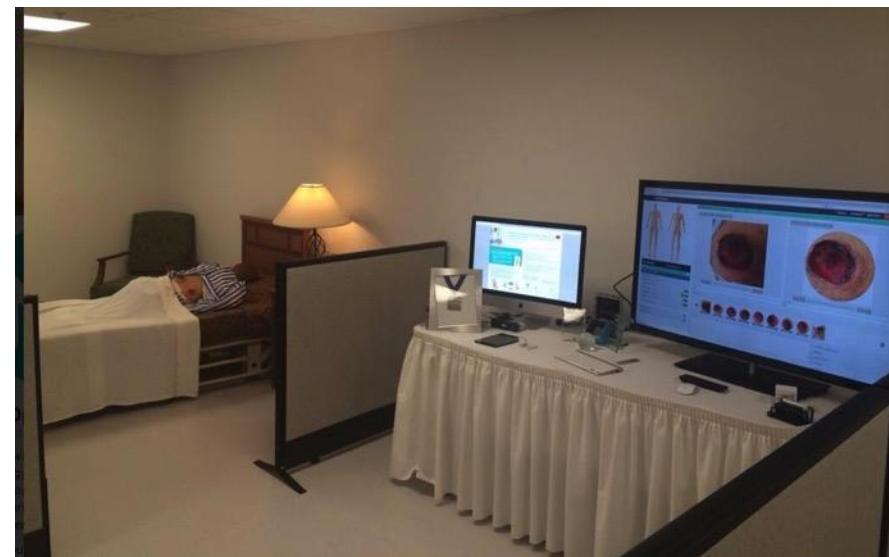
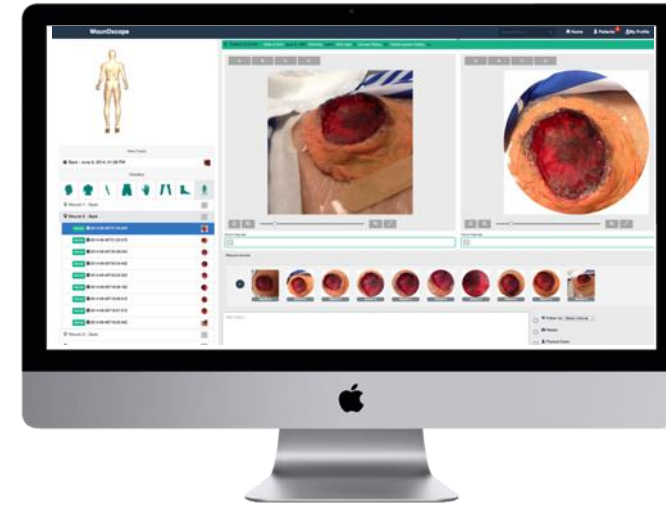


MetaOptima @MetaOptima · Jun 12

@FAS_SFU @sfu @retconcepts isn't it amazing? Our innovation will make a better world for #seniors #digitalhealth @CanadaDHH @MoleScope

Details

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MetaOptima @MetaOptima · Jun 6

Very honored and excited to be a part of the Innovation Center @Retirement Concepts! A better world for #Seniors pic.twitter.com/yV6cf7UfL

Reply Retweet Favorite

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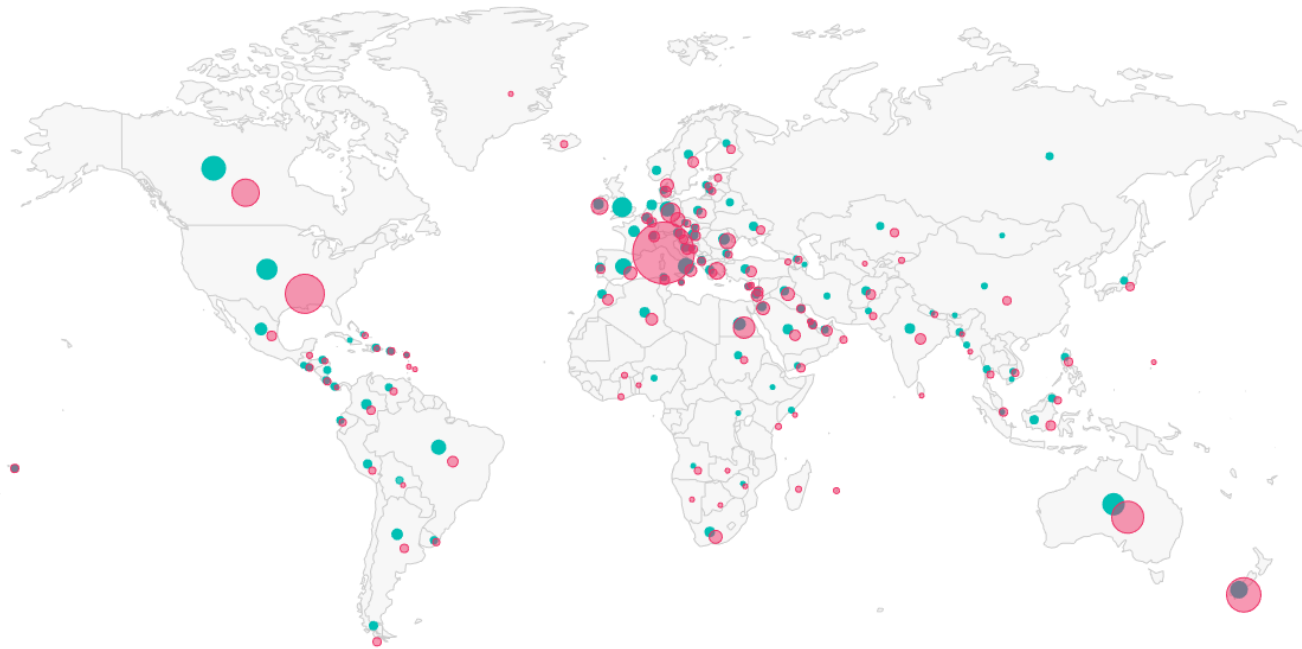
Regulation Roadmap

- HIPAA-compliant
- Regional data centers
- Visual Search will be exempt from FDA's Cures Act
- Class I for MoleScope
 - Health Canada, FDA, CE Mark, TGA (AU) and MedSafe (NZ) → Done
 - Brazil, Mexico, Argentina → In Progress
- Class II for DermEngine diagnostics
 - ISO Certification → Done
 - Health Canada, CE & FDA → In Progress



Traction

- DermEngine has the largest database of Skin Cancer images in the world
 - Gets bigger everyday physicians use the system



3.9K

Professionals

125K

Patient Profiles

500K

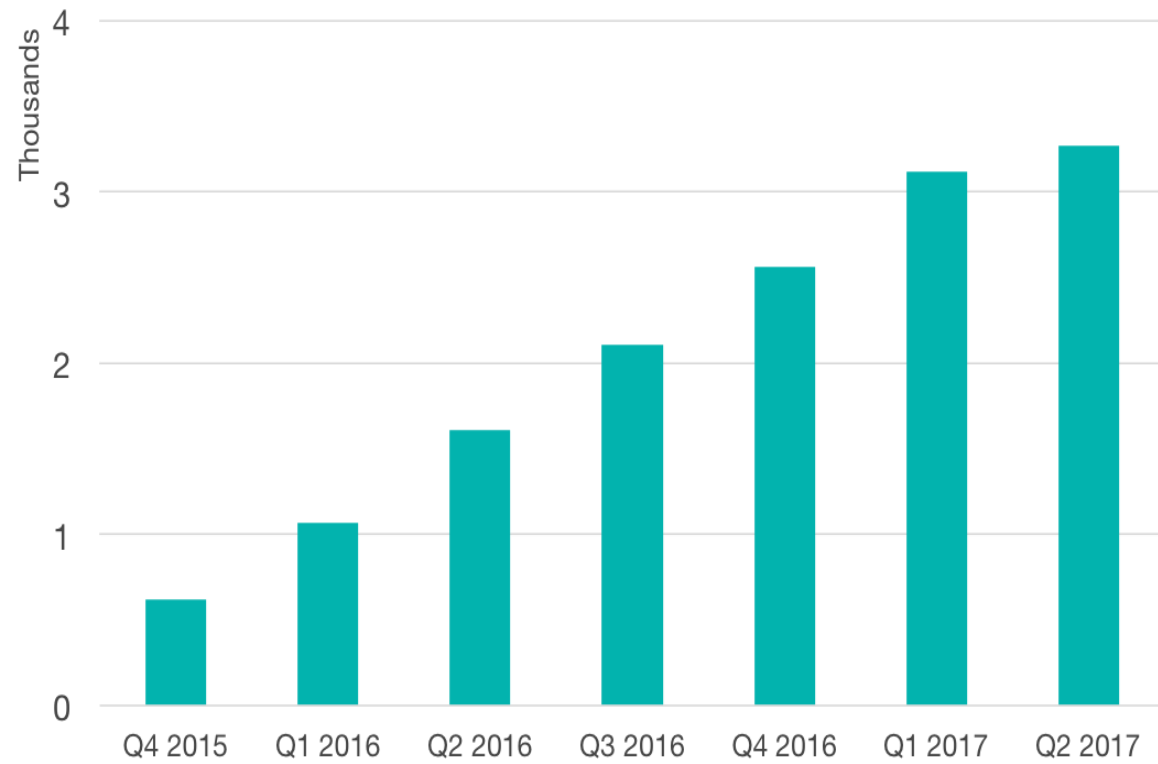
Dermatology Images

129K

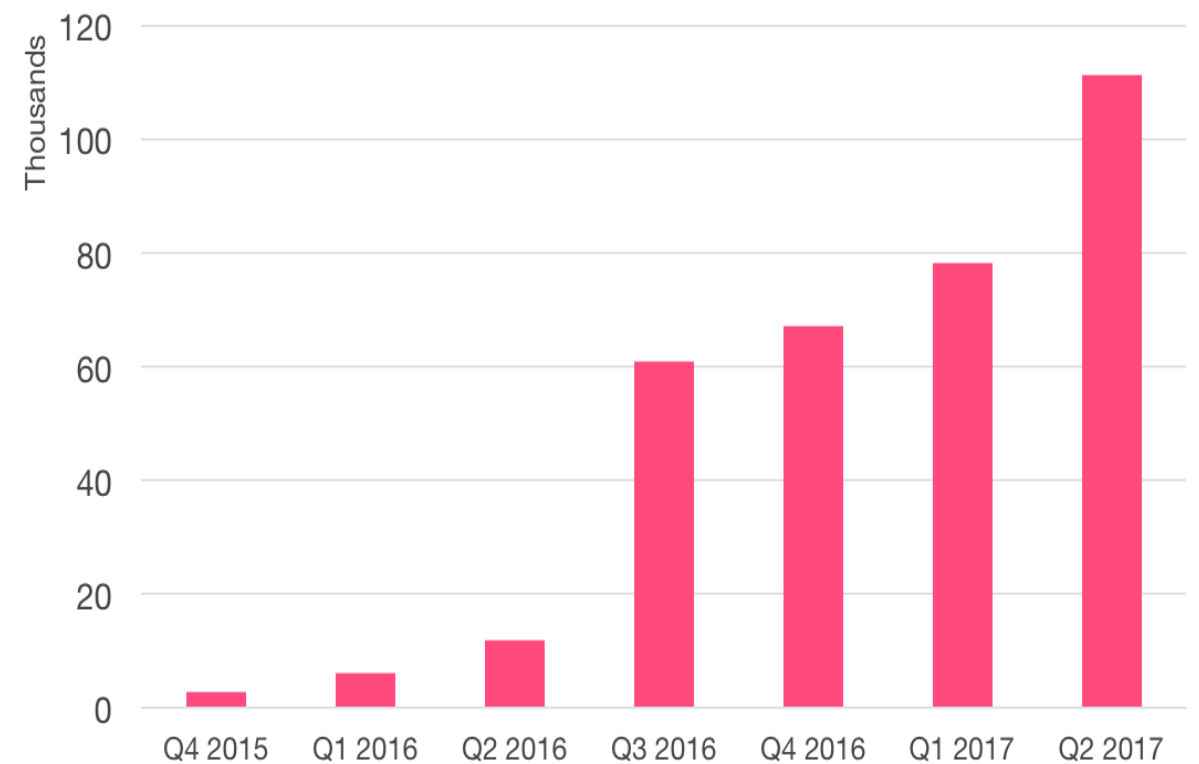
Labelled Images

Traction

Professionals



Patients



Pharmaceuticals

L'Oreal, La Roche Posay, Henkel, Coty, Roche, Sanofi, Allergan, Valeant, Genentech, J&J, Merck, BMS

Public Health

Federal Governments, Health Authorities, First Nations, Military & Veterans

HMOs, Hospitals, Clinic Chains

SunDoctors, Mount Sinai, Quebec Hospital, Sydney Royal Prince Alfred Hospital, Mayo Clinic, Cleveland Clinic, Kaiser Permanente, Aetna, Blue Cross, Geisinger, CIGNA, Humana, Ascension Health, UPMC, Highmark

Pharmacy Chains

London Drugs, Shoppers Drug Mart, FamiliPrix, Pure Pharmacy, Boots, Walgreens, CVS

Pathology Labs

SouthernSun, Sonic, Quest Diagnostics, DermPath, AmeriPath

Device + DermEngine Subscription + Service Transactions



PARTNERS & CHANNELS

Distributors

IDCP, TeamMedical, AmTech, Brazil, US, South Africa, Asia

Medical Device & Software Companies

Philips, GE, IBM, McKesson, Canfield, 3Gen, **DinoLite**

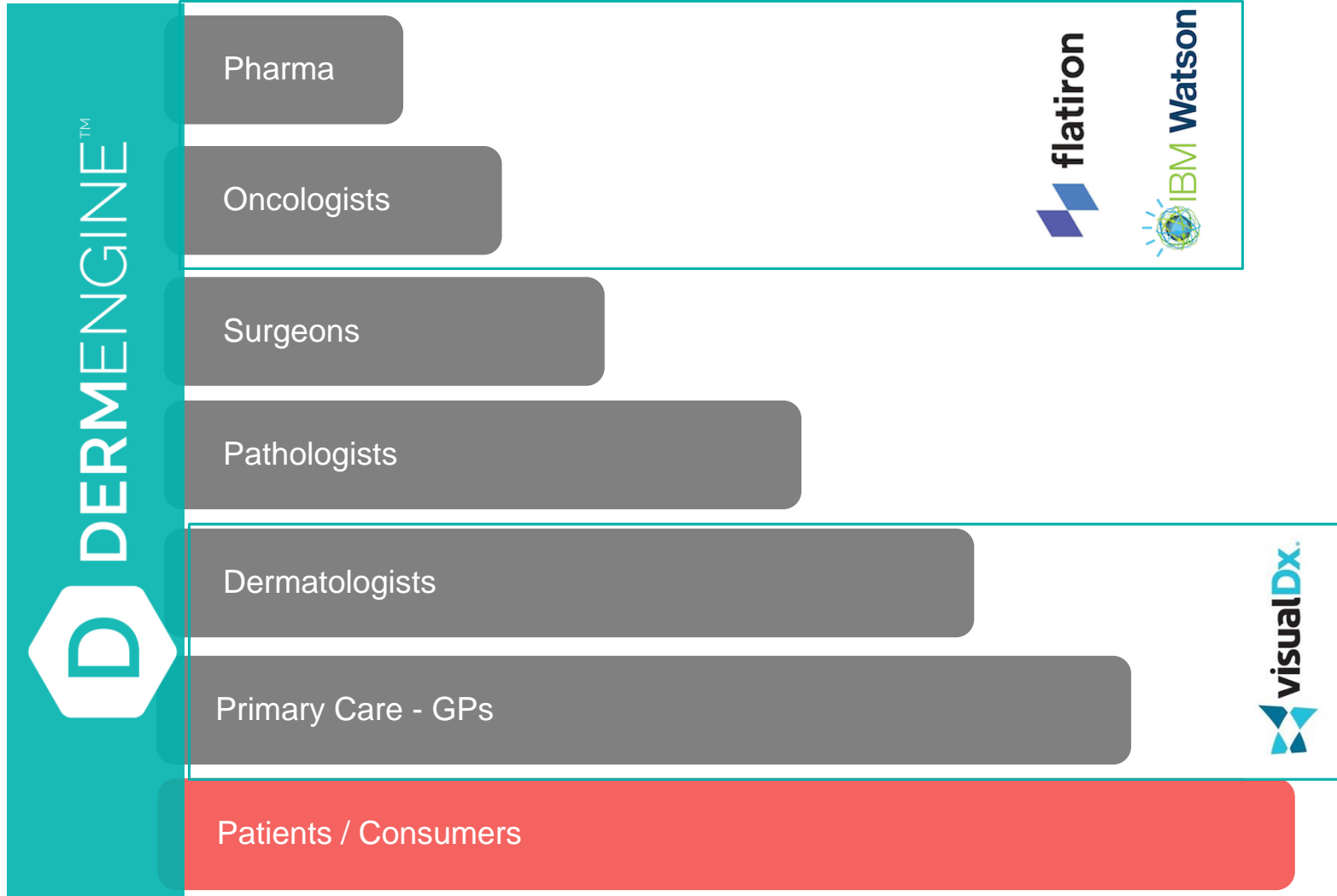
EMRs and TeleMedicine

BestPractice, MedicalDirector, Genie, ClinicToCloud, MedTech, DermOnCall, Teladoc, Telus Health, Epic, Cerner

Customers

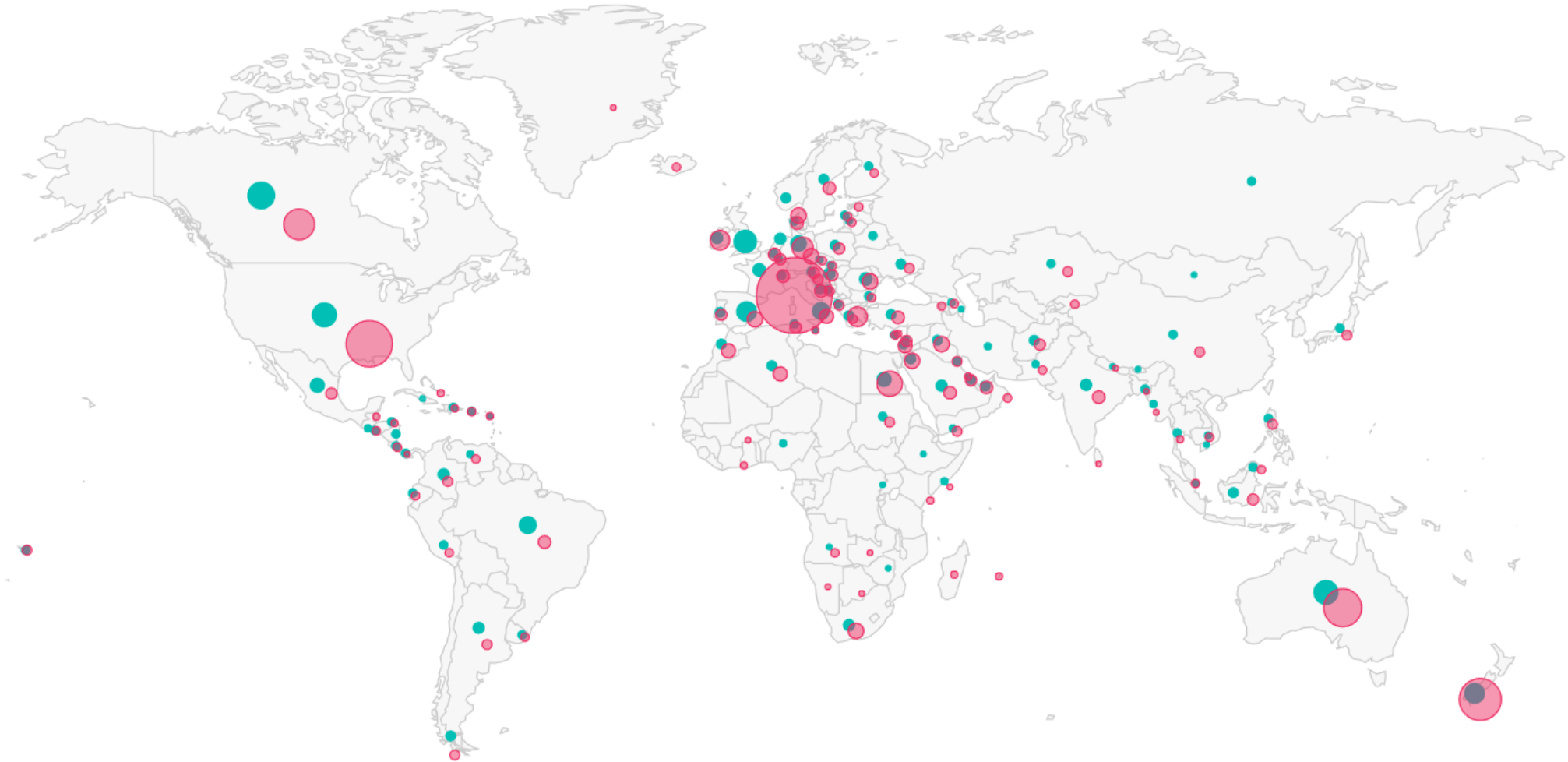


Competition



User Map

DermEngine Doctors & Patients by country



Dermatology eTriage in Canada

■ Problem:

- Canada facing shortage of dermatologists
- Long waiting time (8 months to 12 months) for dermatologist
- Referrals from GPs required, but there is no efficient referral solution

■ Solution:

- Empowering GPs and FPs at the front line of healthcare
- Using smart and secure solutions for eTriage in dermatology
- Efficient workflow using Integration with current EHRs/EMRs

DermEngine – Teledermoscopy Validation



Study Protocol

Study Protocol for teledermatology and teledermoscopy as tools to help general practitioners in effective eTriage of suspicious skin lesions prior to dermatology evaluation

AUTHORS : Joël Claveau, Marie-Pierre Faure, Stella Atkins, Josée Bordeleau, Simon Claveau, Maryam Sadeghi.

Abstract

Background: Teledermatology has the potential to improve skin health management through the regular monitoring of skin disorders and pigmented lesions by medical professionals. Although the benefits of utilizing Telehealth for improved telemedicine management have been extensively studied, the feasibility of using teledermoscopy to support skin management when connecting general practitioners with dermatologists has not been investigated thoroughly. This study aims to evaluate the use of teledermatology for remotely monitoring pigmented lesions and implementing a connected referral system for effective eTriage.

Methods: The study comprised of a connected platform (DermEngine) and its mobile application which was supported by a mobile dermatoscope (MoleScope). MoleScope was used by GPs to capture high quality images of the pigmented lesion, while DermEngine was used by them to refer the cases to a dermatologist at the regional skin cancer center. The dermatologist would have access to patient information through this system and provide an eTriage report. All communications and patient results were compiled and used for the final study.

Discussion: This is the first study to evaluate the efficacy of teledermatology being used to optimize eTriage consultations used for pigmented lesions. If effective, this Teledermatology program has great potential to improve the referral system between general practitioners and dermatologists.

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Keywords: Skin cancer, Teledermoscopy, Teledermatology

- Clinical Outcomes
- Effective e-triage of skin cancers
- Expert Opinion on a Secure referral network

ABSTRACT BODY:

Body: Access to dermatology is a big challenge in Canada. Following a visit to a general practitioner, the actual time delay to see a dermatologist varies from 6 to 24 months. To help facilitate timely evaluation and prioritization of suspicious skin lesions by a dermatologist, we conducted a controlled trial on the efficiency of e-triage with teledermatology and teledermoscopy. A group of 23 general practitioners were enrolled and trained to use their iPhone and a MoleScope® device in the evaluation of a suspicious skin lesion. After obtaining patient's informed consent, clinical and dermoscopic images of one suspicious skin lesion were taken by physicians, incorporated in a specialized DermEngine eTriage module and sent to the dermatologist. A total of 312 patients were enrolled in the study and later evaluated by the dermatologist. The time delay to see the various patients was between 14 to 90 days according to the degree of suspicion. A total of 6 melanomas, 15 basal cell carcinomas and 8 squamous cell carcinomas were diagnosed in the study. Other benign lesions were acquired benign nevi, atypical nevi, seborrheic keratoses, angiomas and dermatofibromas. With the growing incidence of skin cancers, we are expecting a very high work load in the future and we believe new technologies like this one could bring optimized patient management and earlier diagnosis of cutaneous malignancies.



Dermatology Made Intelligent



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