



Deriving Value from Lab Data Using AI

G2 Lab Institute
November 7, 2019




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Agenda

- 01 Why is lab data valuable
- 02 Where is lab data delivering value
- 03 How is AI enhancing this value
- 04 How you can get started

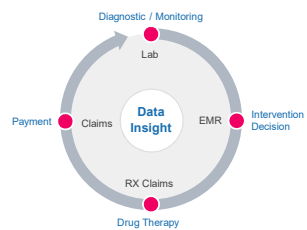


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Lab Data Drives Key Healthcare Decisions

Lab data is collected before other health data and can provide insight into a variety of healthcare questions



Lab data is relevant, timely, and detailed enough to support key healthcare decisions

<p>INFLUENTIAL</p> <p>80% of guidelines which are aimed at establishing a diagnosis or managing disease require laboratory tests</p>	<p>TIMELY</p> <p>Lab data can be delivered within days of testing, before treatment decisions have been made</p>
<p>ACCURATE</p> <p>Lab testing is subject to rigorous statistical analysis that includes extensive quality control</p>	<p>TARGETED</p> <p>Lab data is the only way to find patients based on specific test result ranges</p>

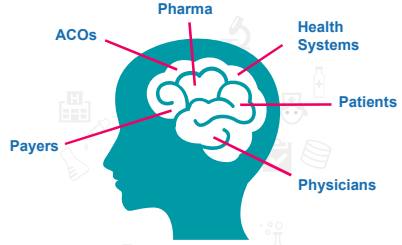


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Who Finds Lab Data Valuable?

Lab data has been traditionally valued by the ordering physician in the form of an individual result report...





...but now insights derived from lab data are valued by other audiences



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Payer Use Case: Quality Metrics Improvement

Challenge

- Reimbursement penalties for Medicaid managed care
- Missed metrics, care coordination

Lab Data Value


- Identify patients with risks and care gaps
- 2 year history for new members
- Insights to improve metrics
- Lab paid PMPM

Source: "Engaging Payers to Create New Value for Labs and Establish Collaborative Care" Rick VanNess MS, Executive War College, April 30, 2019

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Payer Use Case: Risk Adjustment



Challenge

- Risk adjustment model - member health (HCCs) drives reimbursement
- HCCs often missed, late, or not available
- Chart pulls to confirm HCCs are costly

Lab Data Value

- Identify missed HCCs from lab results
- More accurate and timely classification
- 2 year history for new members
- More targeted chart pulls

100K ACA member population

15% More HCCs found, undetected by claims


\$4M Additional reimbursement captured, with up to \$12M potential

20:1 1 year ROI

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Provider Use Case: Proactively Close Testing Gaps



Challenge

Ensure diabetics are receiving regular monitoring to avoid high-cost events

Lab Data Value

Identify testing gaps and proactively close them on behalf of physicians

15-20%

Patients identified by lab criteria who do not carry a diabetes diagnosis code

30-65%

Patients who have care gaps based on current guidelines and are due for follow up

44%

Patients who came in for testing based on lab's proactive contact (nearly half within 24 hours)


Lab receives portion of shared savings

Source: The Dark Report, Volume XXV, No. 16 - November 13, 2018

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Pharma Use Case: Connect Patients to Therapy



Challenge

Find potential new patients

Rx Data Medical Claims

DTC or Patient Outreach

Patients already treated

Wasted resources

Identify the physicians who will treat them

Rx Data Medical Claims Physician Characteristics

Only identifies "most likely" physicians

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Pharma Use Case

Connect Patients to Therapy

Lab Data Value

Lab data identifies physicians treating patients **best served by a therapy** and those **not responding to a current therapy**

Time interventions **before treatment decisions are made**

Customize education to a physician's **current patient needs**

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How is AI Enhancing Lab Data Value

DEEP LEARNING

CONVOLUTION

RECURRENT NEURAL NETWORKS

PREDICTIVE MODELLING

NATURAL LANGUAGE PROCESSING

ATTENTION NETWORKS

SEQUENCE MODELS

MACHINE LEARNING

Predict with acceptable probability and confidence

- Discover new relationships in data, even in absence of full data
- Build models in hours that used to take lifetimes

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Lab Use Case

Accelerate Pathology Diagnosis

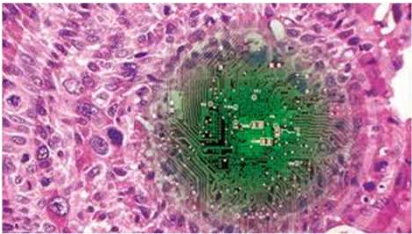
PathAI
PAIGE
nucleai
PROSCIA
Google
SpIntelx

Challenge

- Pathologist shortage
- Large caseloads
- Repetitive/routine tasks

AI Value

- Reduced turnaround times
- Reduced error rates
- Improved quality



Over \$100M of venture investment since 2018

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Lab Use Case

Extract Insights from Unstructured Results

Challenge

MALIGNANT MELANOMA, BIOPSY. BRESLOW THICKNESS: 0.44 MM (ZERO POINT FOUR FOUR MILLIMETER), CLARK'S LEVEL: II. ULCERATION: ABSENT. MITOSES: LESS THAN 1 PER SQUARE MILLIMETER.

BASAL CELL CARCINOMA, NODULAR MELANOMA IN SITU ATYPICAL LENTIGINOUS JUNCTIONAL MELANOCYTIC PROLIFERATION WITH FOCAL FEATURES SUGGESTIVE OF EARLY EVOLVING LENTIGO MALIGNA.

SCAR REPARATIVE CHANGES; NO RESIDUAL MELANOMA IN SITU IS IDENTIFIED.

AI Value

Natural Language Processing
Recurrent Neural Net

Condition: **Melanoma**
Diagnosis: **Positive**
Specimen: **Initial**

Condition: **Melanoma in situ and Basal Cell Carcinoma**
Diagnosis: **Positive**
Specimen: **Initial**

Condition: **Melanoma in situ**
Diagnosis: **Negative**
Specimen: **Re-Excision**

Convolution Neural Net

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Pharma Use Case

Connect Hard-to-Find Patients to Therapy

Challenge

- Pharma biologic appropriate for severe eosinophilic asthma patients, not controlled on ICS/LABA
- Traditional methods to identify patients ineffective due to small highly-specific subgroup

AI Value

- Predict patients most likely to benefit from biologic at earliest possible moment in patient journey
- Better handle missing information
- More patients benefiting from therapy

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Health System Use Case

Predict Disease Risk Earlier

Conventional CBC Results + Age + Gender

LGI Flag™

At Risk

+ Follow Guidelines
- Further Evaluation

- Predict Lower GI risks from CBC results
- Validated by data studies - core algorithms with over 20M patients in 14 institutions
- Clinical decision support to healthcare organizations and physicians

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Payer Use Case

Predict Underwriting Risk in Real-Time

Challenge

- Adequately pricing small/mid-sized group health plans
- Actuarial data prediction limitations
- Difficulty acquiring claims history on prospective members

AI Value

- Real-time population risk score
- Models based on lab data and sample claims
- ~10% improved predictions, \$ tens millions saved

= 1,234 Risk Score

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Payer Use Case

Predict Underwriting Risk in Real-Time

Extraction, Harmonization, Interpretation

De-ID lab data
Sample claims

Recurrent Neural Net compression of data points into patient vector

Input Layer
Age
Has Diabetes
Tested for eGFR
Profile 1,2,3
Data point 10,000 +

AI Engine

Patient Vector (e)

Ingest vectors and generate predictions

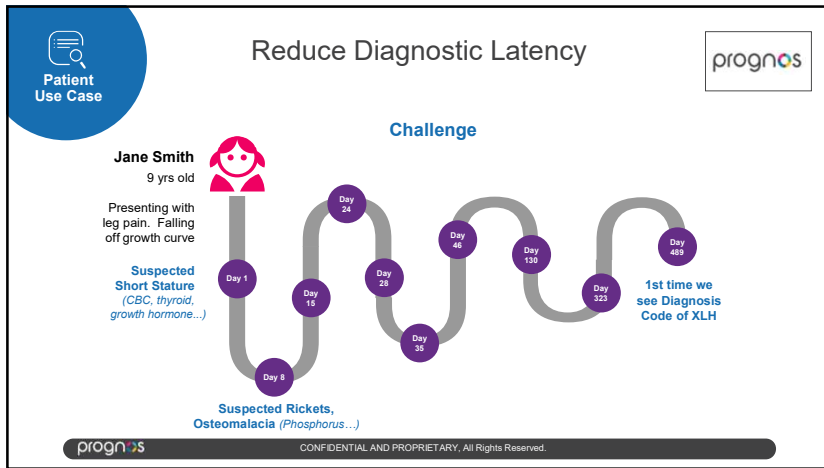
20.5% Chance of CKD
113.5% Riskier than avg. patient
...etc.

Rollup individual members to group level risk score **1,234**

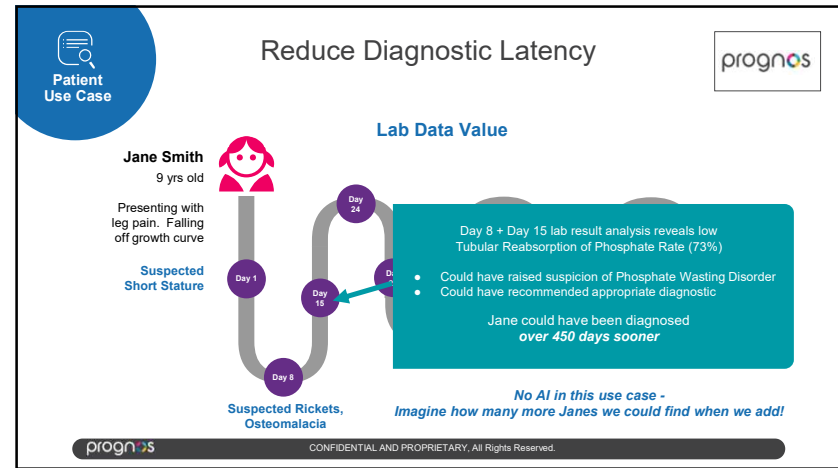
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Getting Started

- Understand the opportunity
- Understand your dataset
- Understand your stakeholder relationships, competencies and ability to invest
- Partner as needed to fill gaps and accelerate time-to-value

- Ensure your raw data is fit-for-purpose
- Add clinical analytics to derive insights
- Add AI to enhance insights

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THANK YOU

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