



# Deriving Value from Lab Data Using AI

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# Agenda

**01** Where is lab data delivering additional value

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**02** How is Artificial Intelligence further enhancing its value

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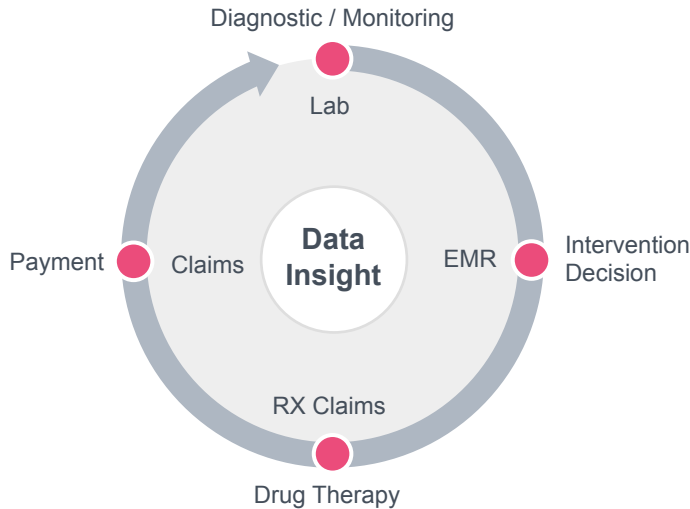
**03** Existing use cases

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**04** How you can get started

# 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

## INFLUENTIAL

80% of guidelines which are aimed at establishing a diagnosis or managing disease require laboratory tests

## TIMELY

Lab data can be delivered within days of testing, before treatment decisions have been made

## ACCURATE

Lab testing is subject to rigorous statistical analysis that includes extensive quality control

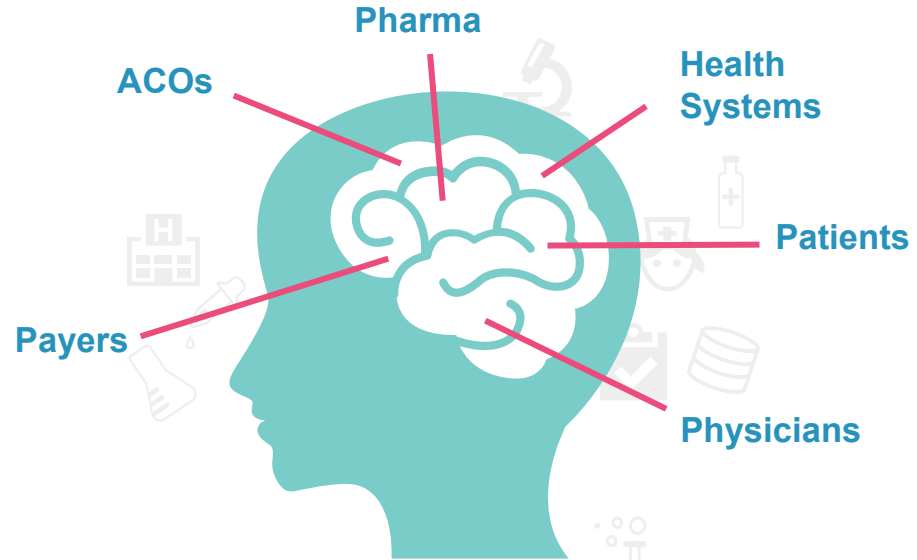
## TARGETED

Lab data is the only way to find patients based on specific test result ranges

# 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

# 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

# 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**

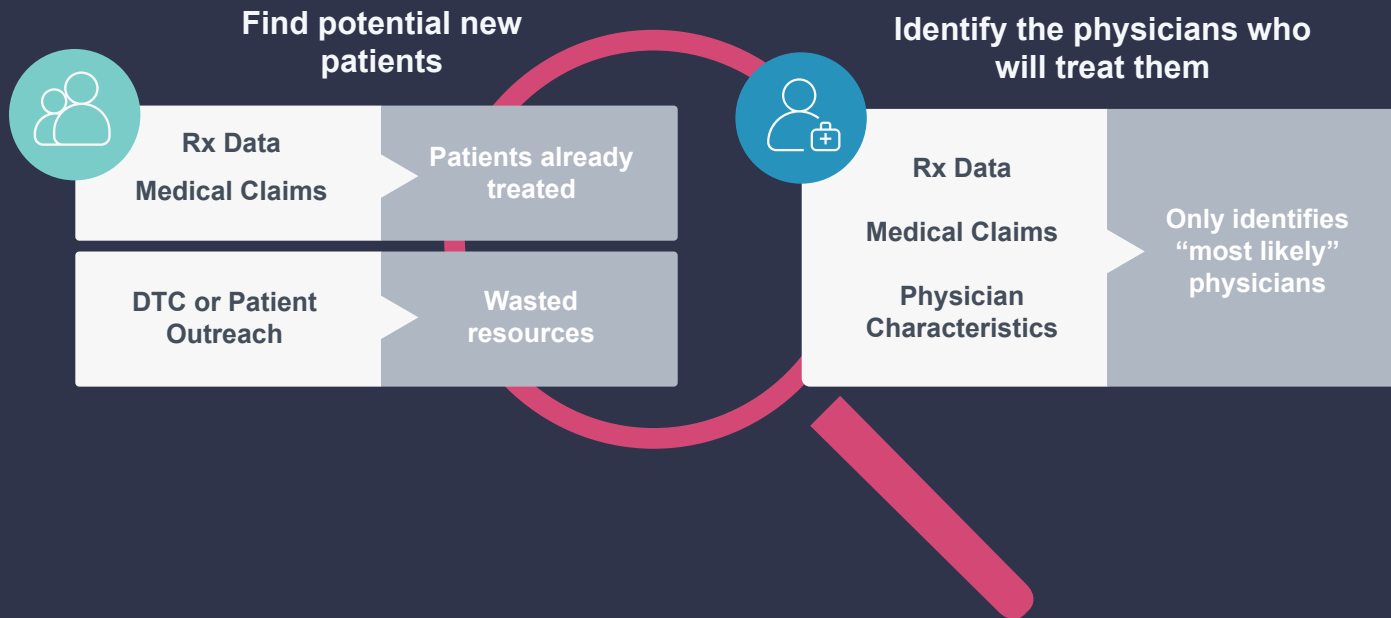
Additional  
reimbursement  
captured, with up to  
\$12M potential

**20:1**

1 year ROI

# Connect Patients to Appropriate Therapy

## Challenge



# Connect Patients to Appropriate 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**





Physician / IDN  
Use Case

Sonic Healthcare  
USA

# 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

*Lab receives portion of shared savings*

**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)

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

# 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
- Accomplish in hours what used to take lifetimes

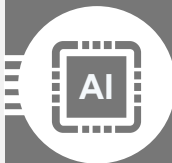
# Extract Insights from Text-Based Results

## Challenge

## AI Value

Recurrent Neural Net

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.

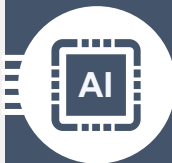


Condition: **Melanoma**

Diagnosis: **Positive**

Specimen: **Initial**

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

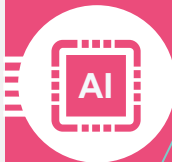


Condition: **Melanoma *in situ* and Basal Cell Carcinoma**

Diagnosis: **Positive**

Specimen: **Initial**

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



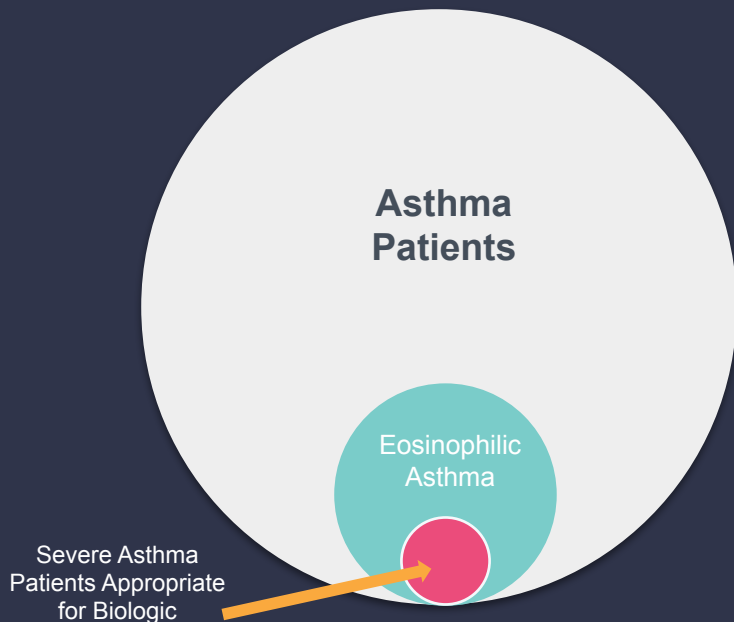
Condition: **Melanoma *in situ***

Diagnosis: **Negative**

Specimen: **Re-Excision**

Convolution Neural Net

# 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

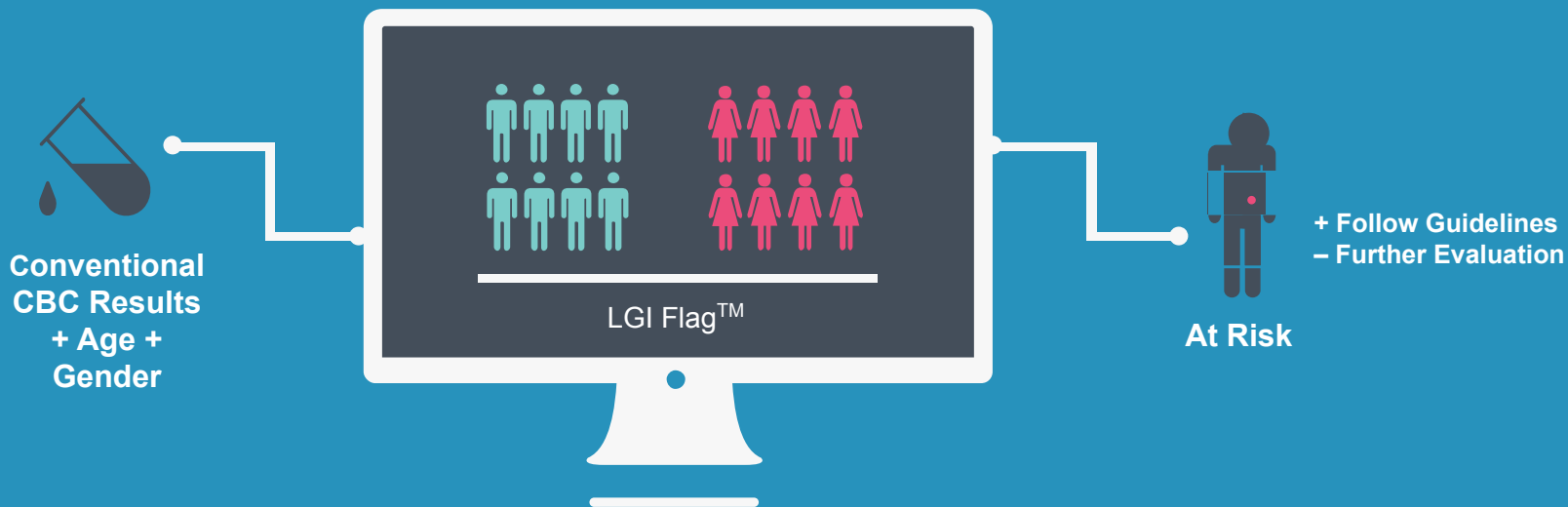
- **Predict** patients most likely to benefit from biologic at earliest possible moment in patient journey
- Better handle missing information
- More patients benefiting from therapy



## Health System Use Case

# Predict Lower GI Risk Earlier

Medial  
EarlySign



- 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

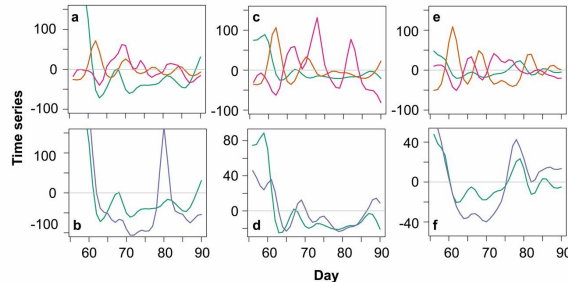
# Predict Underwriting Risk in Real-Time

## 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

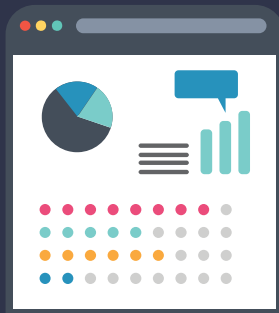


= 1.234

Risk Score

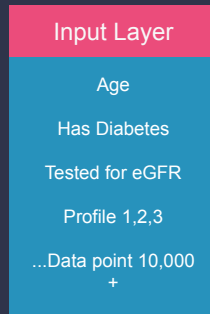
# Regularly Updated Patient Risk Scores

Extraction, Harmonization,  
Interpretation



De-ID lab data  
Sample claims

Recurrent Neural Net  
compression of data points  
into patient vector



AI Engine

Patient Vector (s)

Ingest vectors and  
generate predictions



Rollup individual members to  
group level risk score

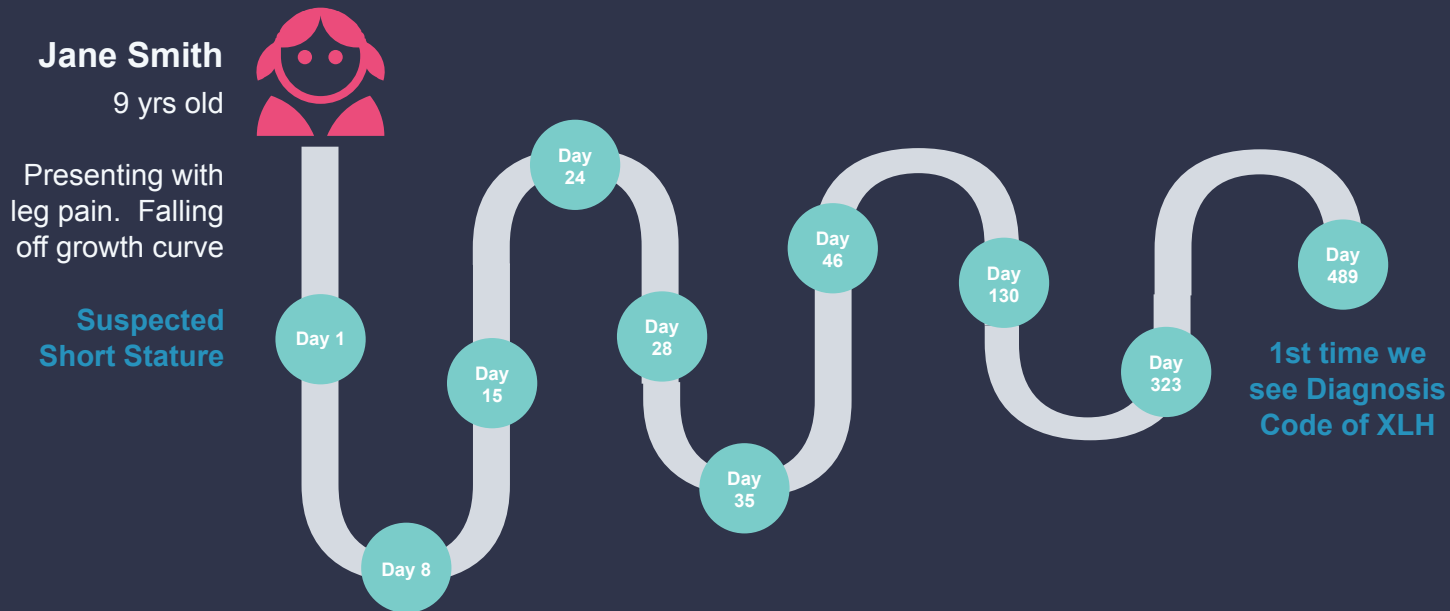
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# Reduce Diagnostic Latency

prognos

  
Patient  
Use Case

## Challenge





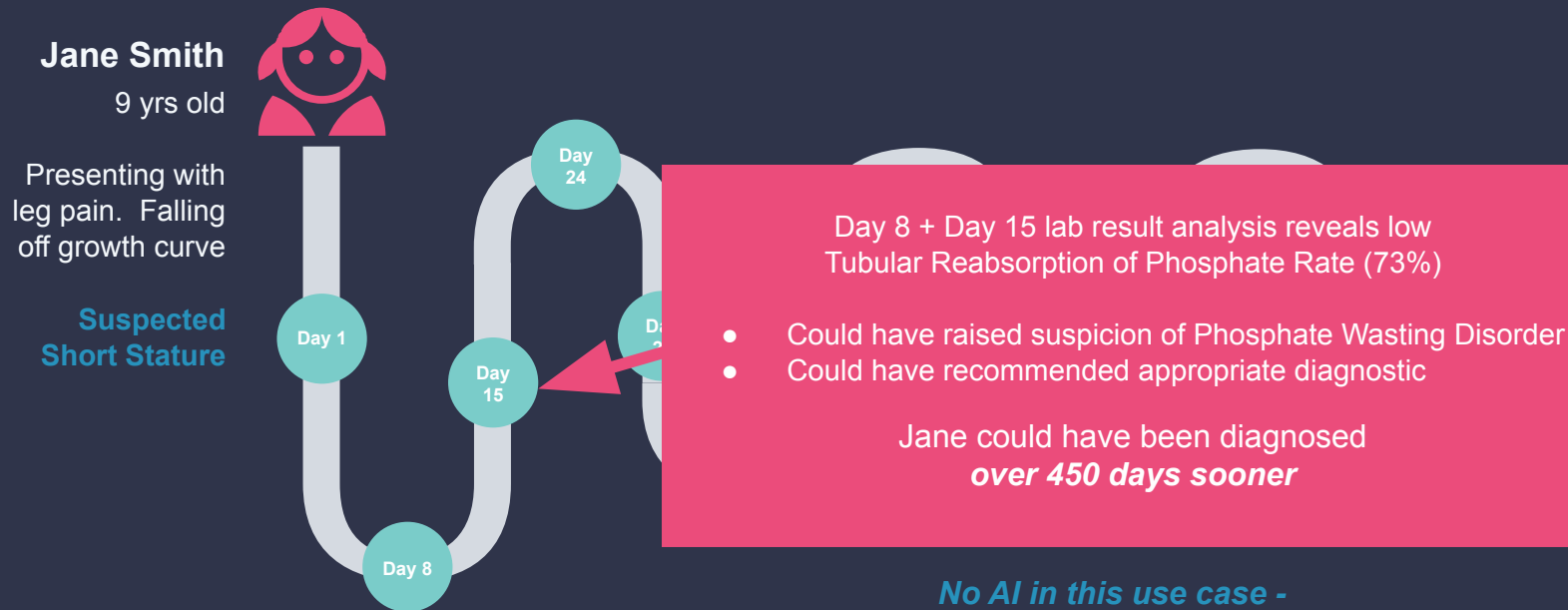


## Patient Use Case

# Reduce Diagnostic Latency

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## Lab Data Value



*No AI in this use case -  
Imagine how many more Janes we could find when we add!*

# 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

***Always adhere to HIPAA***

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THANK YOU

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