

**17th Annual International
Healthcare Summit
Kelowna, BC**

Precision Health and Imaging Analytics

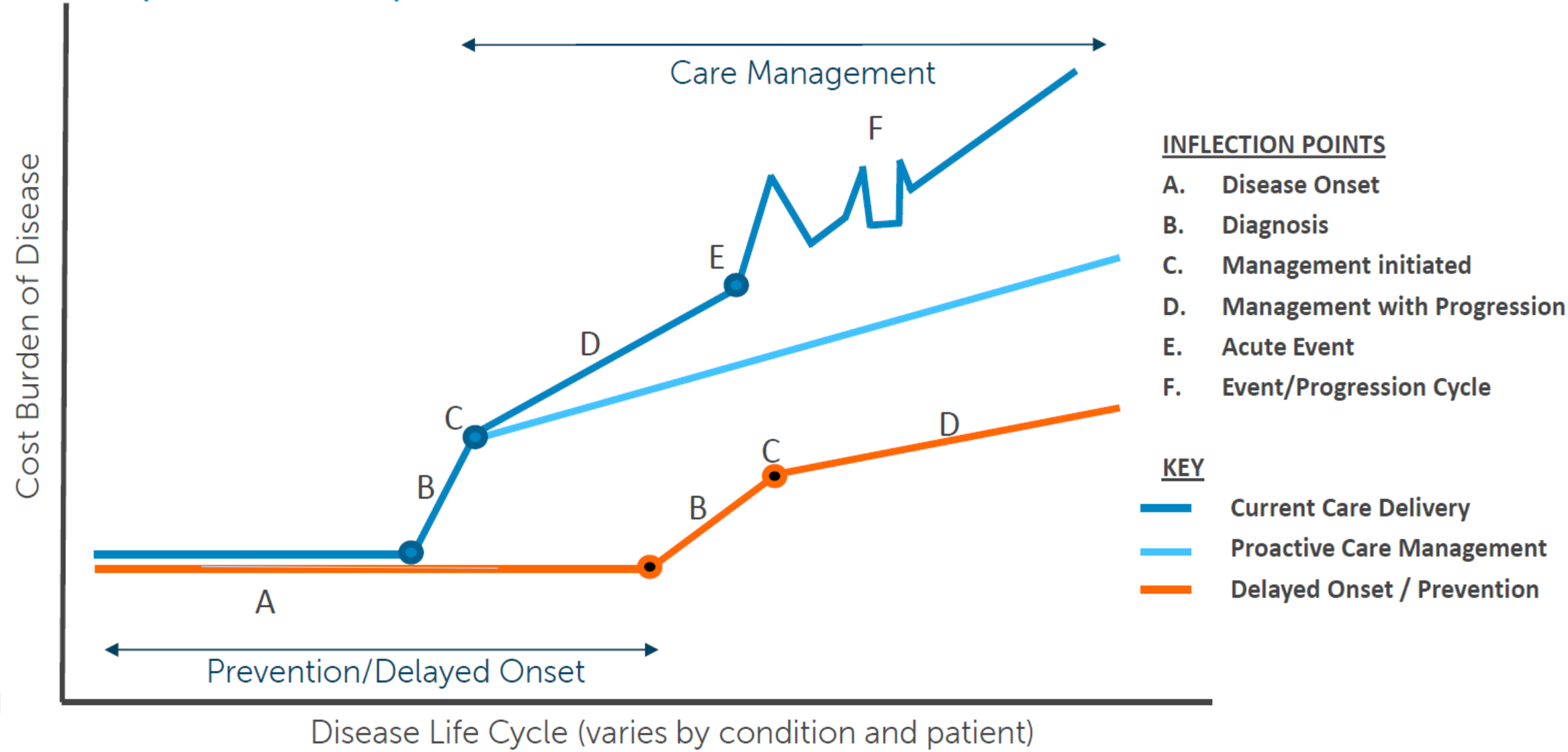
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Medical Director, Healthcare Solutions & Consulting
June 26, 2017

Precision Health

Predicting and preventing diseases before they manifest by tapping into health data to provide targeted, predictive and personalized care.

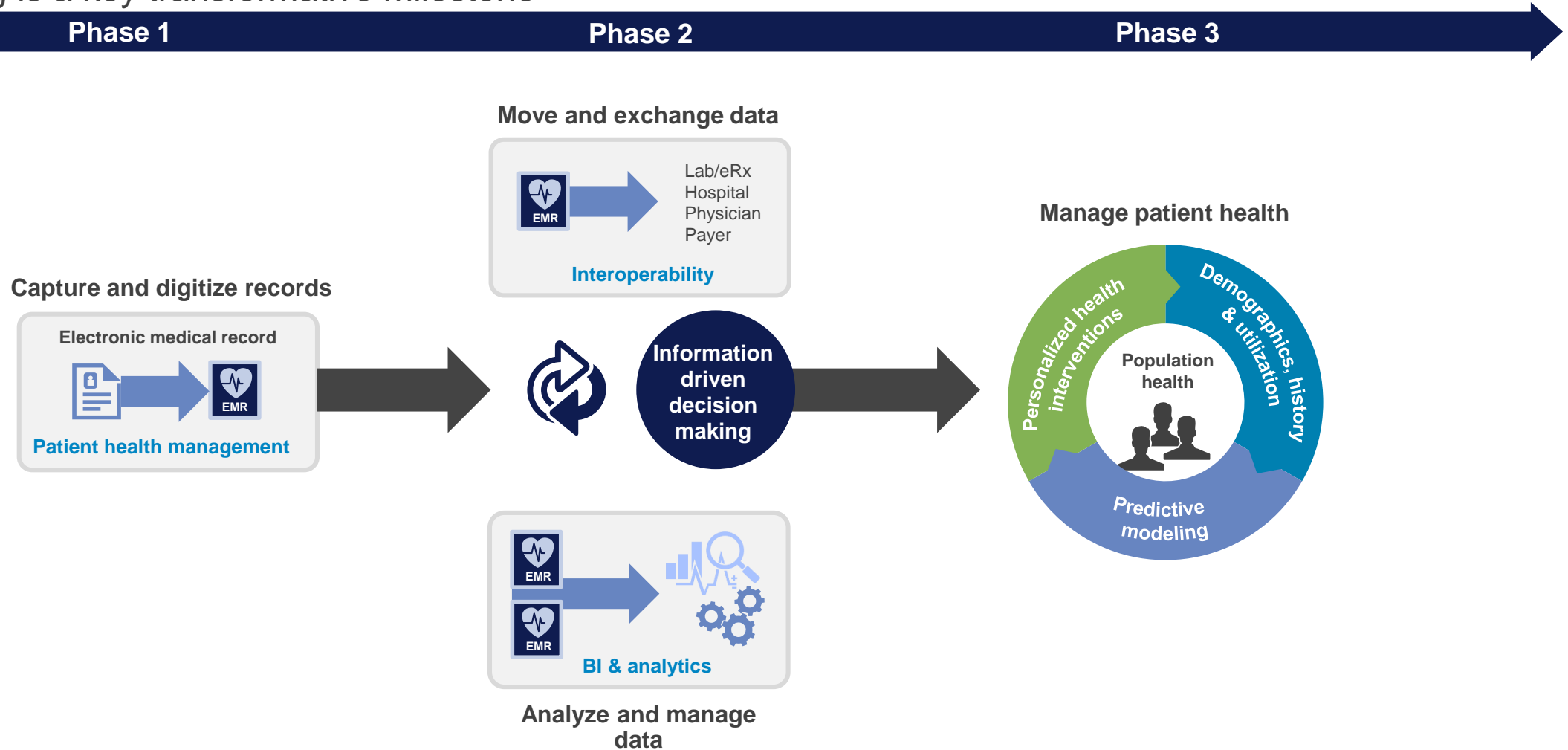


Impact of Data-Driven Care Management

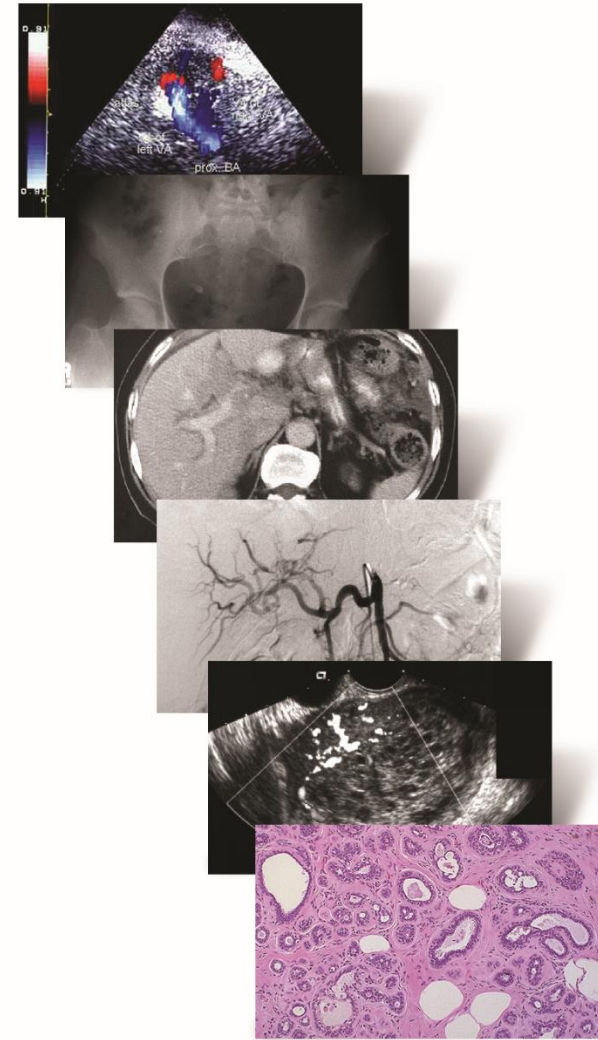


Evolution of Healthcare Delivery

As healthcare delivery evolves towards collaborative care models, the ability to share data and use it to improve decision making is a key transformative milestone



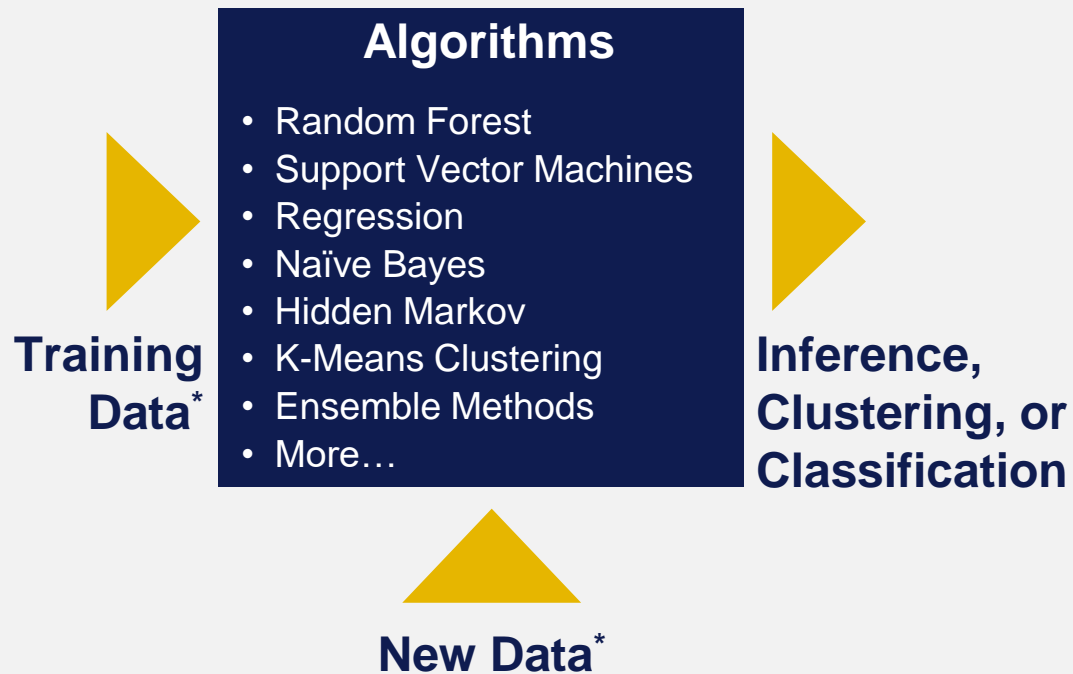
Imaging analytics uses machine vision and machine learning to analyze vast amounts of data and automatically detect patterns and features.



What is Machine Learning?

Classic ML

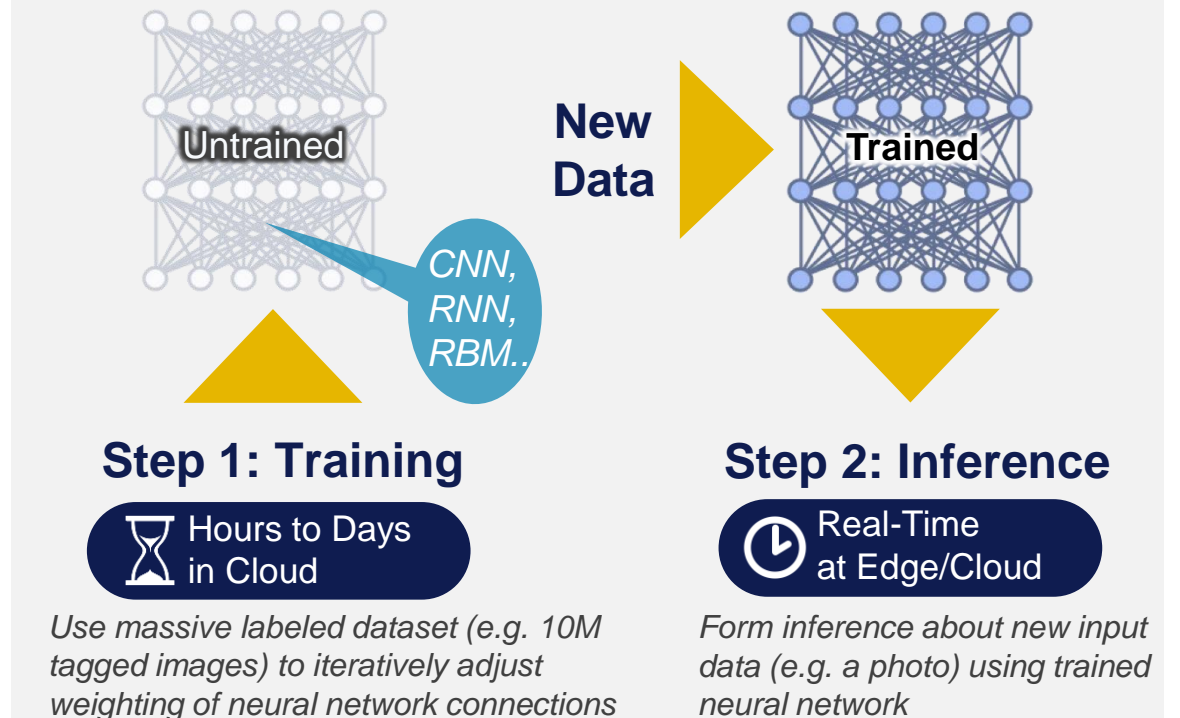
Using optimized functions or algorithms to extract insights from data



*Note: not all classic machine learning functions require training

Deep learning

Using massive labeled data sets to train deep (neural) graphs that can make inferences about new data



Source: Prashant Shah, Director of Engineering, Intel Health and Life Sciences

Advances in Machine Vision and Machine Learning in Medical Imaging



- 3D visualization is an important tool but it is not machine vision
- Machine vision is the ability to automate and identify anatomy and measure its characteristics
- Machine learning takes one or more measurements and relates them to disease states based on learned patterns
- Proper application of these technologies create actionable insights impacting patient care
 - » Not just more data points but recommendations on clinical pathways and patient risk

Imaging Across the Continuum of Care

Imaging is part of all phases in healthcare

- Screening
- Diagnosis
- Treatment

Imaging is accessed by multiple participants

- Nurses
- Primary care physicians
- Interventionists (e.g. surgeons, cardiologists)
- Specialists (e.g. oncologists)
- Patients

Collaboration is changing – more than just sharing results

- across multiple users
- accessing multiple clinical applications
- potentially across multiple facilities



Clinical images,
scanned documents,
HL7 reports, video,
still images,
waveforms...

The Value in Imaging Insights – Picture This

A metaphor for clinical imaging – look at this picture and identify who is from out of town



The Value in Imaging Insights

A metaphor for clinical imaging – incidental findings

Beyond identifying who is from out of town, tools can help show when, where, and what was bought as incidental findings



Imaging Analytics: Uncovering Hidden Risks

Diagnostic imaging uniquely positioned to identify incidental findings

Why imaging?



A standard of care in diagnostic process



Event to baseline patients health beyond the prescribed reason for exam



Opportunity for comparison with previous images to track change



Advances in imaging technology have made incidental findings available

Source: Imaging Performance Partnership interviews & analysis

Why incidental findings ?



Lowest cost of identifying disease



Identify patients at risk profiles



High value event to reduce cost of care and increase safety (incident avoidance and dose reporting)



Improve patient outcomes

Imaging Analytics: A Growing Library of Tools

A platform* for leveraging diagnostic imaging procedures

- A secure connection
- Imaging studies filtered by institutional criteria and sent for screening analysis
- Results range from incidental findings to consistent quantitative documentation
- Results can be sent to the VNA, PACS, EHR, and/or care management solution

Growing Library of Tools for Disease Detection

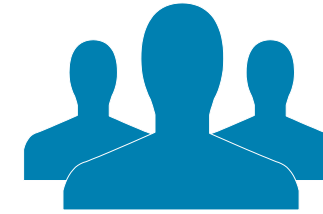
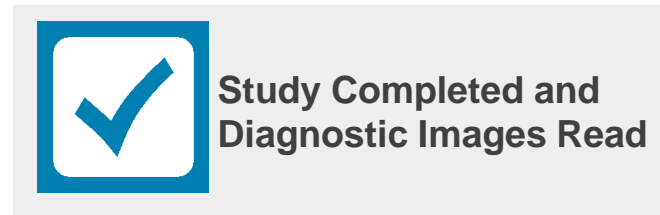
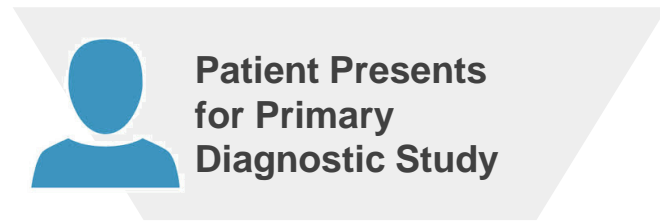


* Platform Powered by NTT Data, Inc./Zebra Medical Vision, LLC

** Algorithm not available for sale in the U.S., Pending FDA

Integrating into Diagnostic Imaging

Automated quantification for aiding diagnostic reading



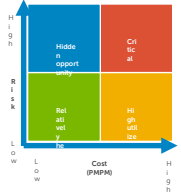
Primary Care Team

Foreseen Value:

- Easier detection of asymptomatic disease from existing studies (incidental finding)
- Interpretation and productivity enhancement for radiology, cardiology and future areas of imaging

Alternate Integration of Imaging Analytics

Options for automated initiation of screening



Population health consumption stratification using ordered studies



Patient eligibility and imaging study type

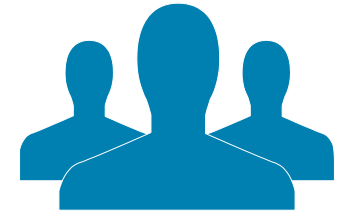


Primary care selection of screening with principle diagnostic request

Automated Imaging Analytics



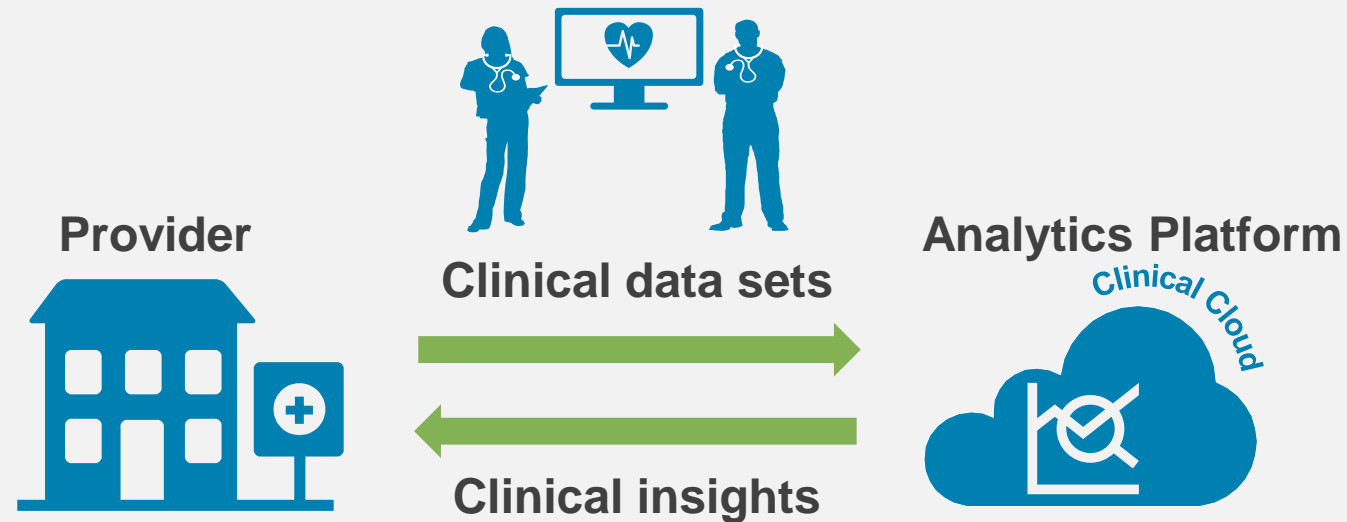
Patient Disease Screening Result(s)



Primary Care Team

The Benefits of Imaging Analytics

Precision health depends on the use of all available health data, and full use of existing diagnostic images requires a coordinated partnership between the radiologist, the primary care physician/team and the patient.



The Goal of Healthcare is to Optimize Health and Well-being

Health is Wealth





NTT DATA Services