

17 May 2017

Australian Securities Exchange
Level 40, Central Park
152-158 St George's Terrace
Perth WA 6000

Alcidion Co-Founder to present at eHealth QLD

Highlights:

-) Professor Malcolm Pradhan to present at eHealth QLD.**
-) Technology incorporates predictive analytics to streamline Patient Flow.**

Alcidion Group Limited (ASX:ALC) is pleased to announce that Professor Malcolm Pradhan, Alcidion's Chief Medical Officer, will present a paper on "The opportunities and barriers to AI driven healthcare" at the eHealth Queensland Conference (HIC) on June 17th 2017.

Deep learning is a branch of Machine Learning based on recent advances in neural network technology that has enabled computers to achieve better than human performance in tasks such as image recognition.

The applications for Deep Learning within the Patient Flow environment hold the potential to revolutionize patient flow as the algorithms provide predictive analytics, enabling hospitals to proactively plan workload management and capacity planning – resulting in a dramatic improvement in bed availability.

During the conference, Professor Malcolm Pradhan will talk about the challenges of applying deep learning in health informatics and particularly in patient flow management, and the performance of deep learning models for patient flow prediction compared with existing methods.

Professor Pradhan, holds formal qualifications in Medicine and a PhD in Medical Informatics from Stanford University, co-founded Alcidion with Ray Blight, the former Chief Executive and chairman of the South Australian Health Department.

Alcidion will additionally be exhibiting at the eHealth Queensland Conference.

ENDS

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About Alcidion

Alcidion Group Limited (ASX:ALC) is a publically listed, innovative health informatics company that specializes in clinical products that improve productivity, safety and efficiency. Alcidion's solutions target key problems for Emergency Rooms, Inpatient Services and Outpatient Departments and are built upon a next generation health informatics platform, which incorporates an intelligent EMR, Clinical Decision Support Engine, Data Integration Capability, Smartforms, Terminology Support and Standards Based Web Services.

Alcidion's focus is on delivering solutions that enable high performance healthcare and which assist clinicians by minimising key clinical risks, tracking patient progress through journeys and improving quality and safety of patient care.

www.alcidion.com

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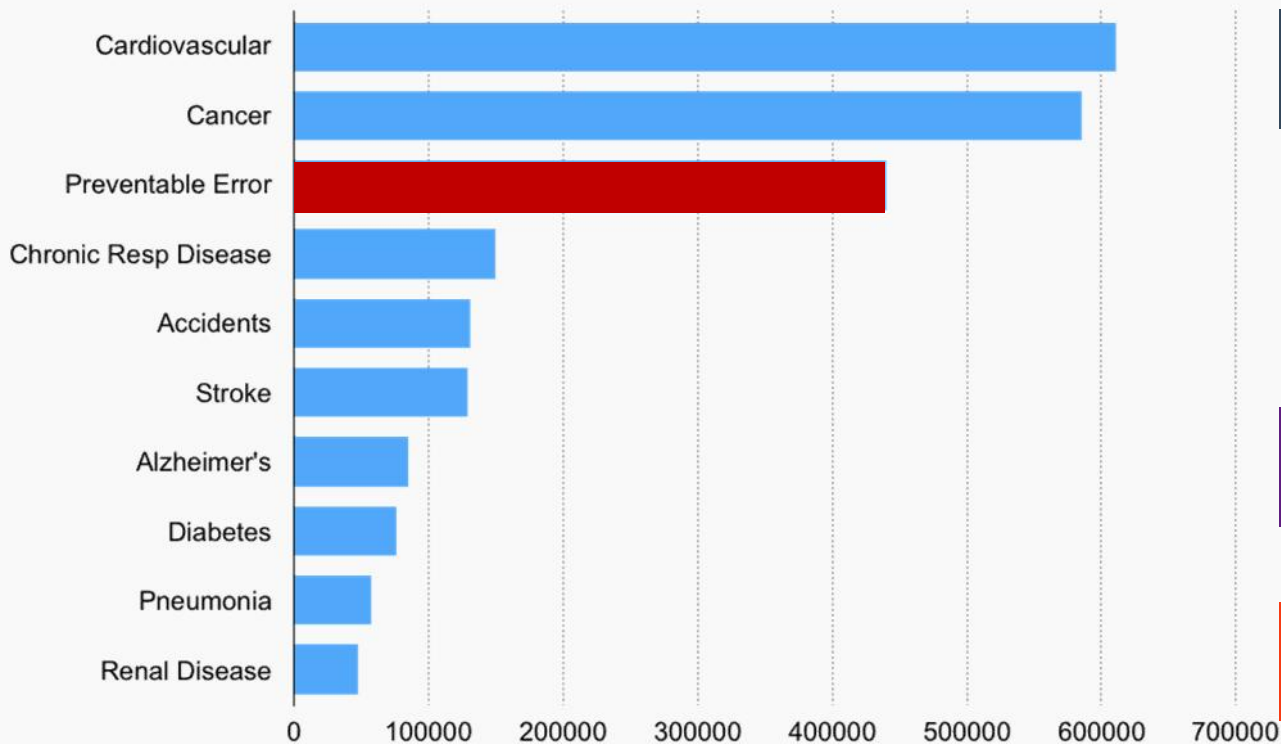


The opportunities and barriers to AI driven healthcare

Malcolm Pradhan MBBS, PhD (Stanford), FACHI
CMO, Alcidion

Adjunct Professor
University of South Australia

The State of Healthcare



Patient harm 10-50%+ of multi-day episodes

Up to 40% of lab results are not seen

30% of AMI patients not on guideline meds

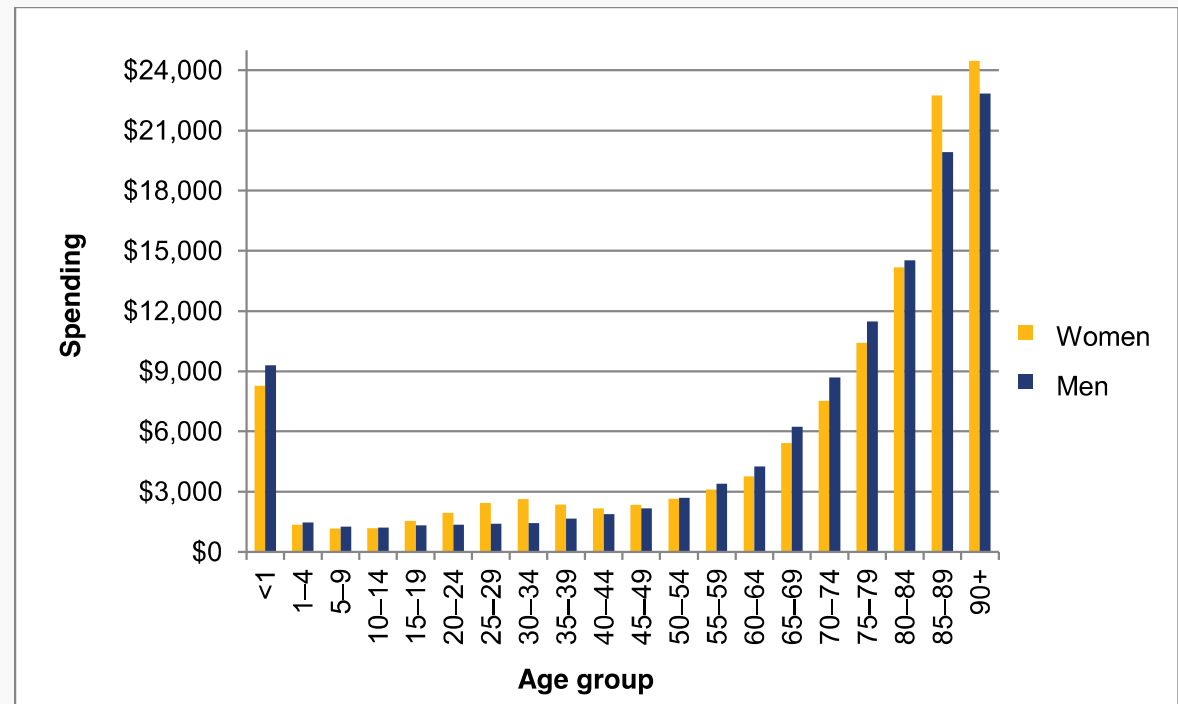
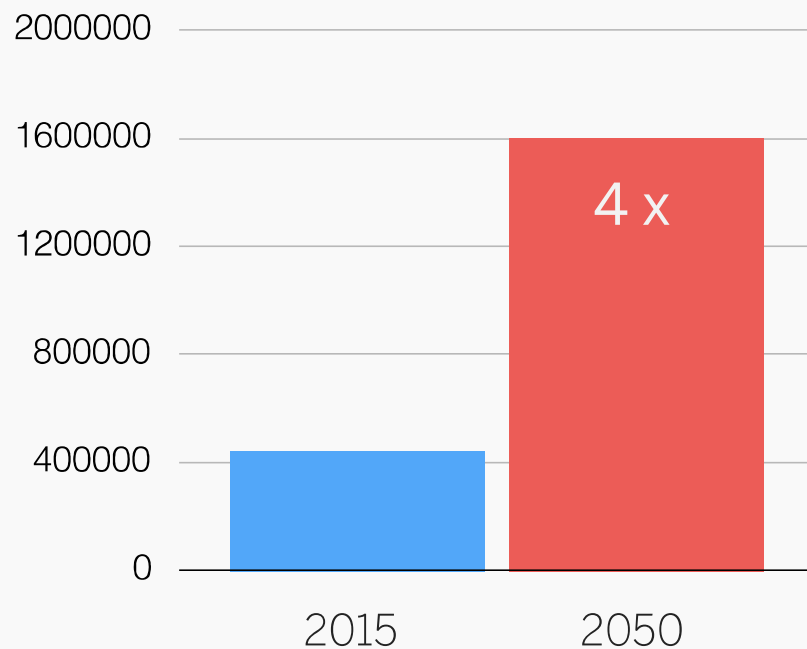
Mis- or late diagnosis in 10%–20% of cases

Performance with a highly educated and dedicated workforce

The Future is Complex



Number of People Over 85 yo in Australia



A Fundamental Question



Is safe and effective healthcare humanly possible?



Computers are necessary for a scalable healthcare



Can computers improve healthcare?

Clinical Decision Support (CDS)



- Expert level clinical performance since the 1970's in specialized areas
- By early 2000's strong evidence for decision support
 - Medication, guidelines, dosing, reminders
- HIMSS EMRAM emphasis on CDS
 - Levels 1 to 7

“Across clinical settings, new generation CDSSs integrated with EHRs do not affect mortality and might moderately improve morbidity outcomes”

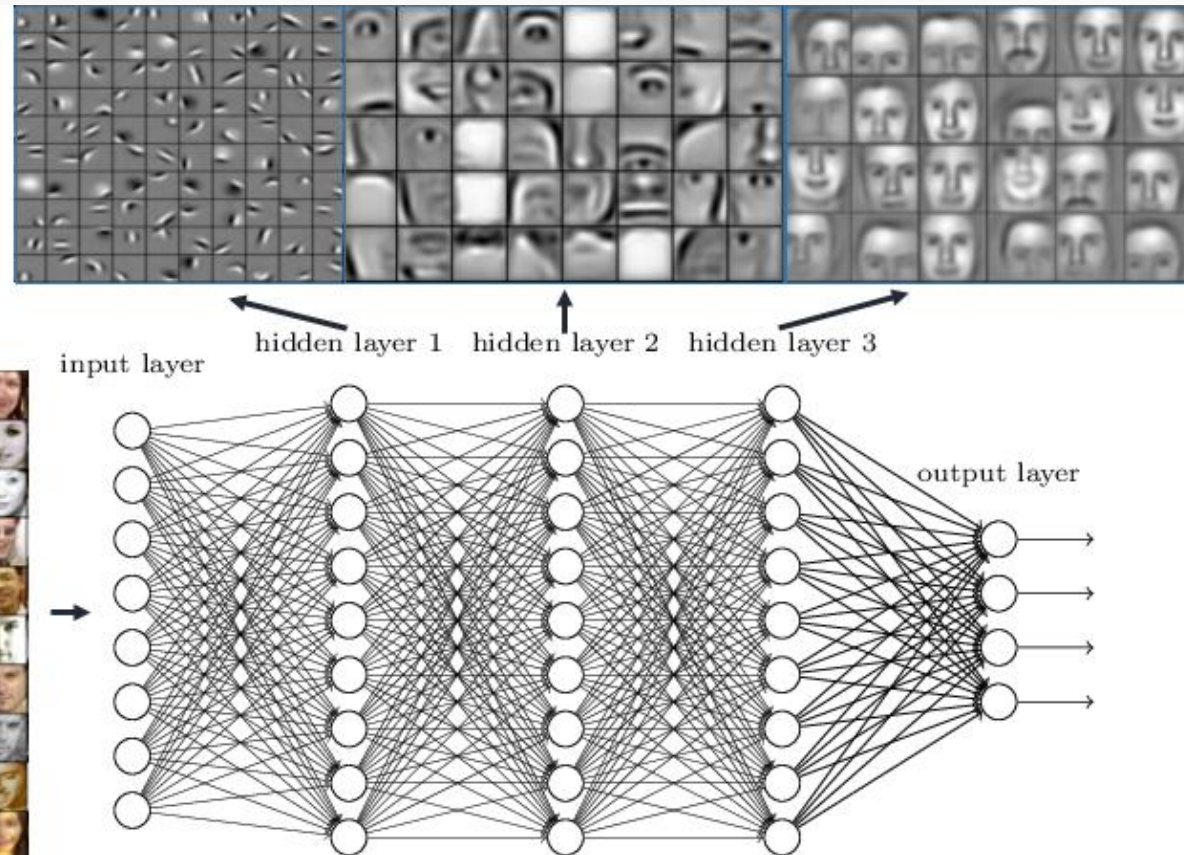
Am J Public Health. 2014. 104:e12–e22

Meanwhile, in Other Industries...



Training Networks

Deep neural networks learn hierarchical feature representations



In reality much more deep and complex e.g. 24m nodes, 15b connections

Advances in Deep Learning in Health



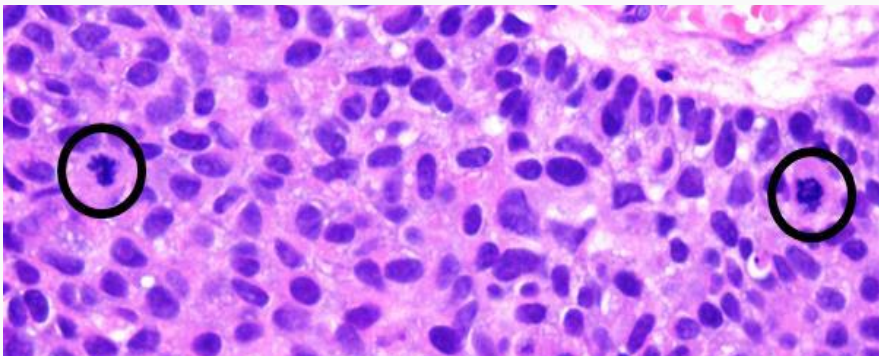
Image

Dermatologist-level diagnosis of skin cancer

Early diagnosis of Alzheimer disease

Diabetic retinopathy

Mitotic lesions on histopathology



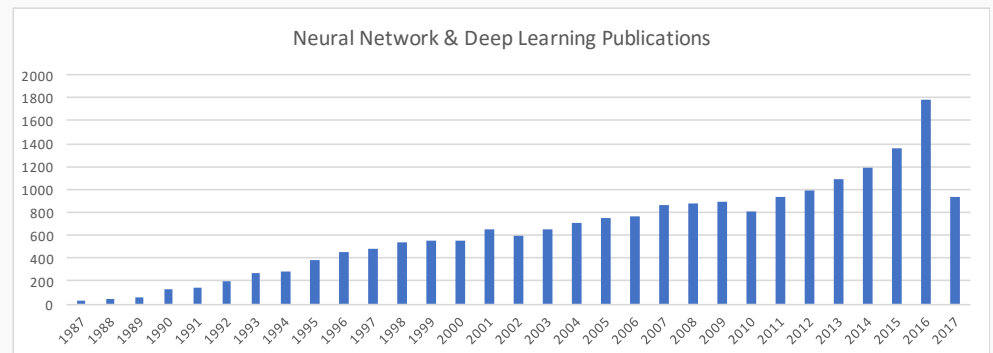
Non-Image

Prediction of CCF and COPD

Chronic disease prediction

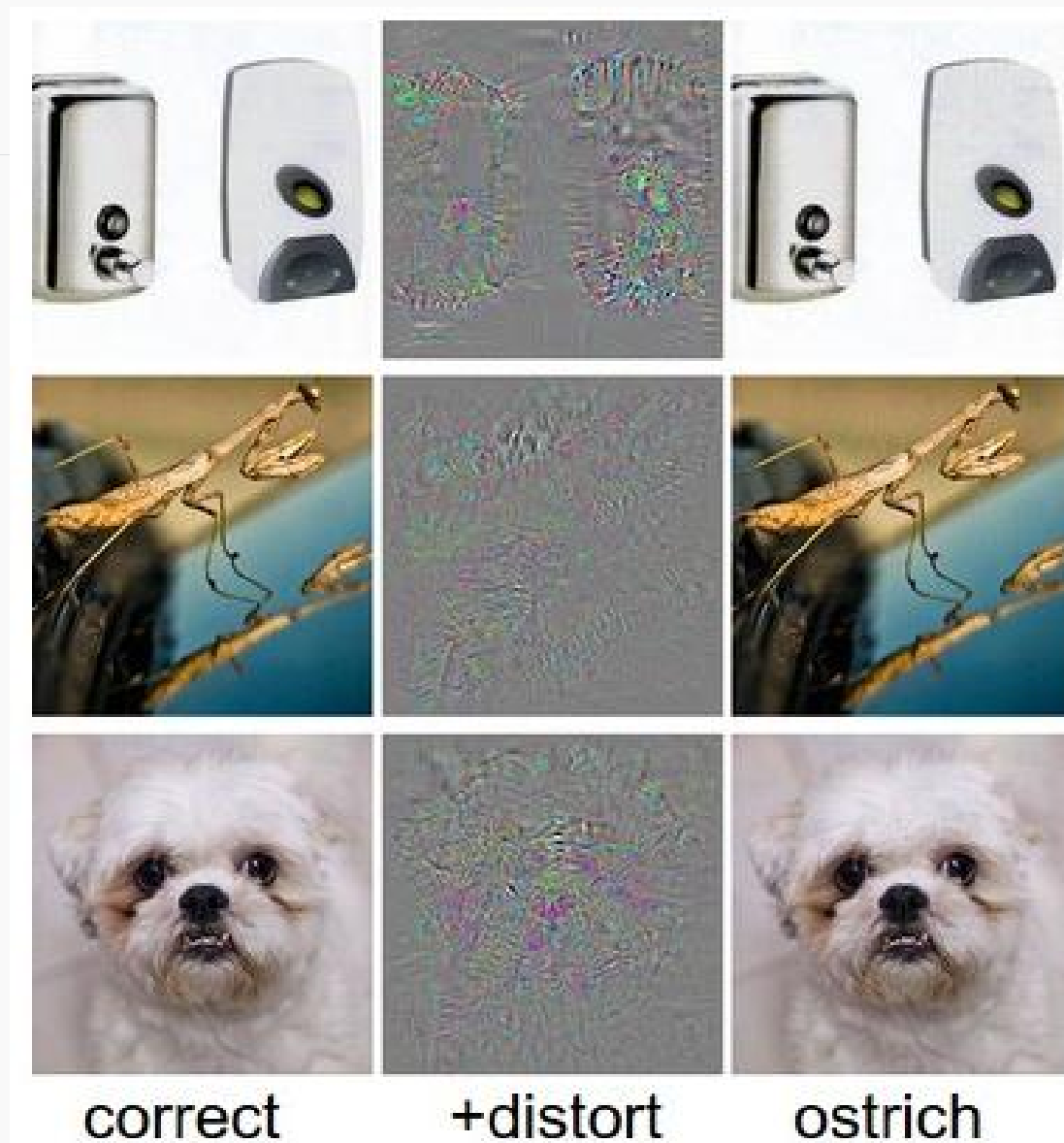
Predict suicide risk of mental health

Unplanned readmission after discharge



Caution Required

- Neural networks do not ‘understand’, they recognize based on previous experience
- Hard to encode knowledge
- Easily confused by noise
 - Google for ‘Ostrichinator’
- Retraining required for new situations
- Multiple methods will be required for robust systems in health



AI & CDS at Alcidion



Current

Risk-rated lab results with escalation

Missed results tracking

Best practice ordering guidelines

SmartForms structured data capture with best practice guidance

R&D

Deep learning: Prediction of admission, discharge, LOS

Belief networks: Phenotyping and real time patient risk

Rules: Best practice compliance

Abnormal liver function tests / jaundice

Evidence of liver decompensation

☐ Jaundice

☐ Ascites

☐ Encephalopathy

Other Findings

☒ Abnormal liver function tests with ALT >500

ALT level U/L

☒ Abnormal liver function tests

☒ Low platelets

☐ Splenomegaly

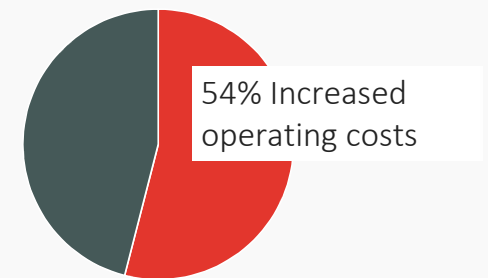
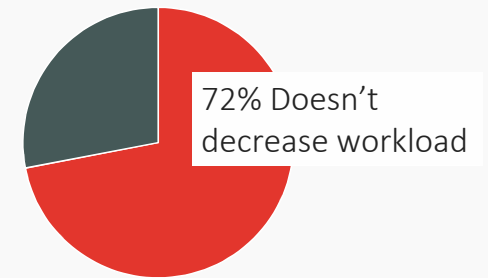
Clinical Prioritisation

Category 1 Appointment in 30 days

Systemic Barriers in Healthcare



- Interoperability
- “Dark data” – unstructured
 - ML requires labelled data (outcomes, diagnoses, etc)
- Workflow integration
 - EMRs are difficult and expensive to modify



AMA College of Physician survey on
attitudes to EMRs (2014)

Integration with Clinical Workflows



We have to make the right thing to do, the easier thing to do

Each specialty is it's own business with it's own information needs

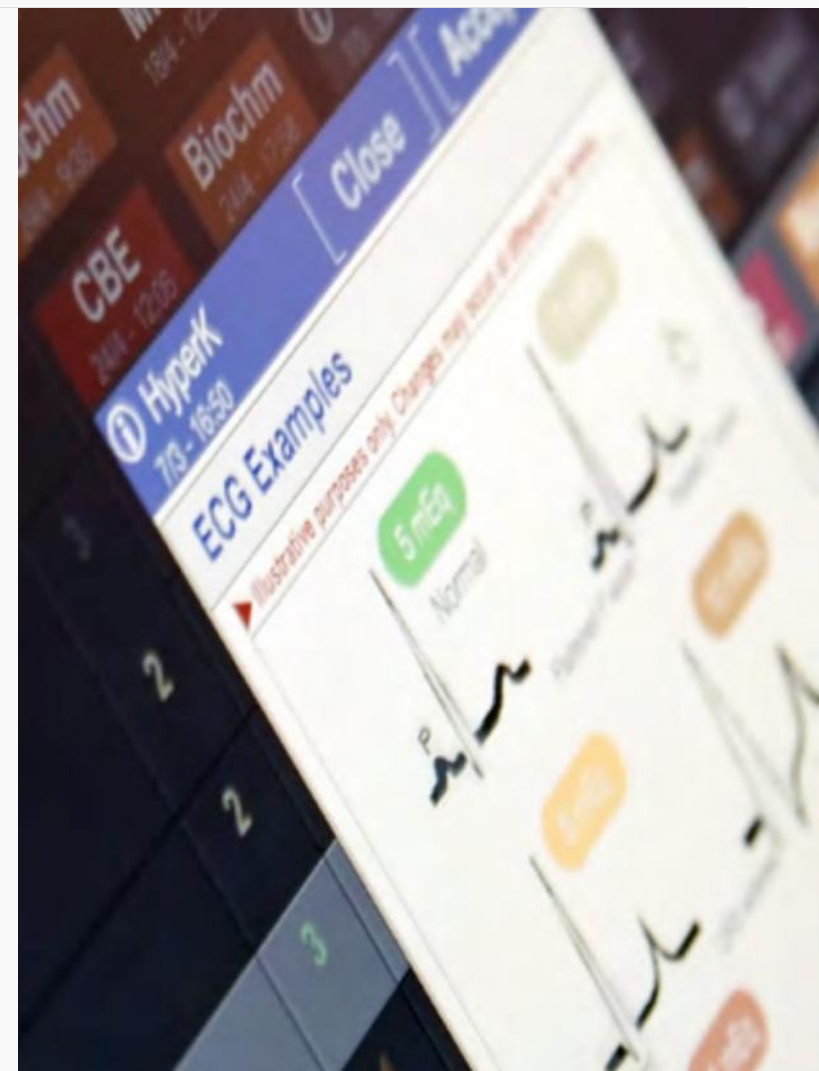
Information that drives critical decisions has to be structured

Miya Precision Orthopaedics Cardiology														
Location	Patient	LOS	Doctor	EDD	Med Ready	Risks	Imaging	Nursing / Allied Tasks	Pre Surgical Tasks	Discharge Tasks				
7F B 04	Trujillo, Katherine URN 1920001	F 59y 1	Shaw	3 Days 15 May 18:17	✓	● High Pre-op INR ● Outlier for 3 days INR 3.1	2 Films	0 incomplete 0 overdue	<input type="checkbox"/> Fasted <input type="checkbox"/> Surgical site shav... 2+ more	<input type="checkbox"/> Discharge Medica.. <input type="checkbox"/> Info Sheets <input type="checkbox"/> Post-op Appointm..	NOF	Post-Op	Protocols	VTE Prophylaxis Timing of surgery NOK Pre-op care
7F B 04	Majors, Edward URN 1920002	M 49y 2	Shaw	Today 12 May 18:17		● Surgical Risk ● Risk of internal bleeding ● Infection ● Uncontrolled BGI ● Bleeding Risk Systolic Murmur Temp 38.1 °C BGI 6.1 mmol/L INR 2.3	1 Films	2 incomplete 2 overdue	<input type="checkbox"/> Fasted <input type="checkbox"/> Surgical site shav... 2+ more	<input type="checkbox"/> Discharge Medica.. <input type="checkbox"/> Info Sheets <input type="checkbox"/> Post-op Appointm..	THR	Post-Op	Wound	Needs Review
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											Mobility	PWB PUF	Drains	Drains In

Conclusions



1. For sustainable healthcare, CDS and AI must play a bigger role
2. Interoperability and structured data are key to automating tasks and training machines
3. Integration into clinical workflows is critical to allow healthcare to take advantage of innovations in AI, and to deliver new models of care



Thank you

Alcidion @ booth 49