



DATA ANALYTICS TO SELECT MARKERS AND CUT-OFF VALUES FOR CLINICAL SCORING

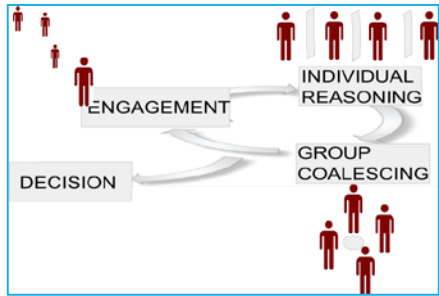


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FEDERATION UNIVERSITY BALLARAT

Smart systems for health care group reasoning

ARC Discovery with (Monash, Deakin, FedUni), ARC Linkage (RMIT)

Reasoning
community model



Argumentation
theories to structure
reasoning

Stranieri, Yearwood, Burstein, Warren, Wolff, Mays

Understanding ward
round

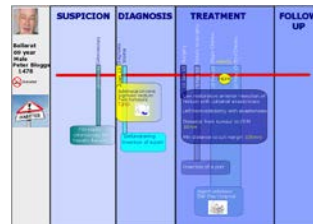
PhD Pervasi



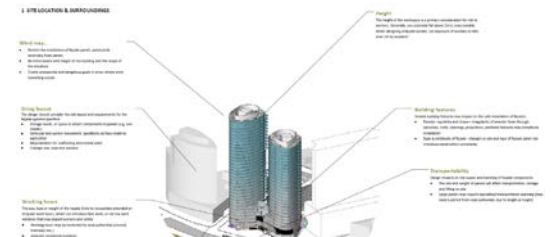
Information
visualisation to
enhance
multimorbidity
reasoning

Effects of patient
trajectory visualisation
on MDM

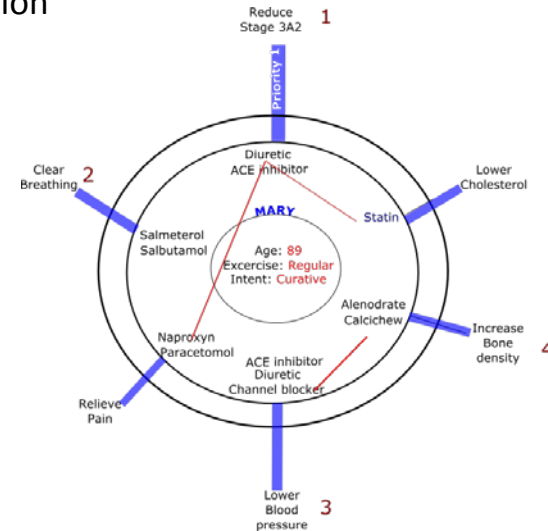
PhD Sharma



Information
visualisation to
enhance design for
construction safety
reasoning



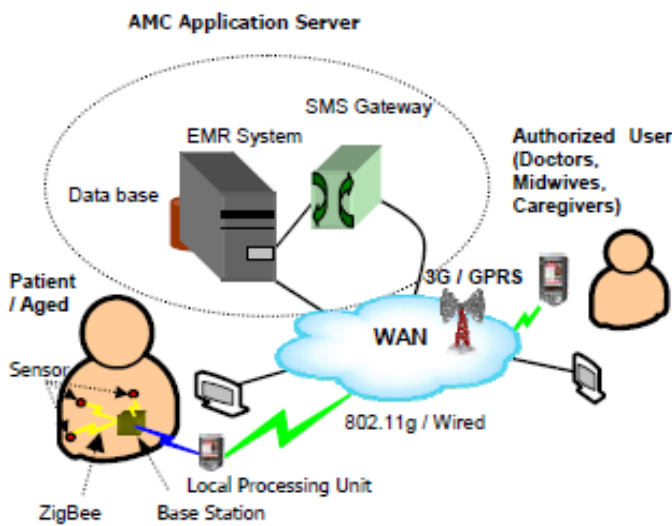
Stranieri, Blismas, Lingard



Remote patient monitoring

Funding: ANZ Medical Trustees, Karpagum College India,

Cloud based wearable sensor



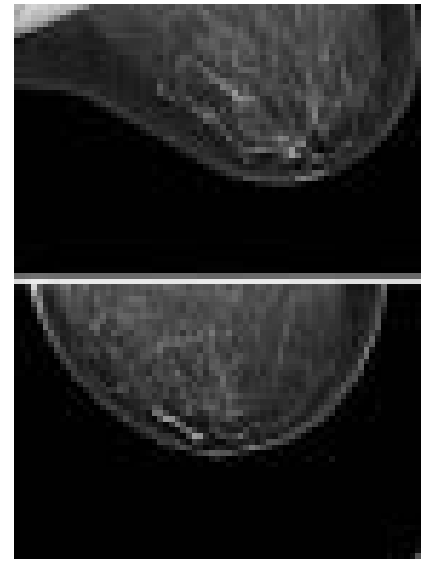
MEWS Score

This section displays a screenshot of a 'Healthcare Support System' interface. The interface includes a header 'Home > Activities' and a welcome message: 'Welcome Trishala Mathew. You are logged in as a doctor.' Below this, there is a 'Patient Name: Ranjit' field and three links: 'View patient's medical record', 'Go to dashboard', and 'View current patients'. There are also two buttons: 'Send Email' (with 'Mail Sent to Ranjit' below it) and 'Click Here' (with 'To View Real Time trending data' above it). At the bottom, there is a copyright notice: '©2014 healthcare support system. All rights reserved. [Privacy](#) | [Feedback](#) | [Contact Us](#)'.

Accompanying the screenshot are three images: a patient with multiple sensors on their chest and arm, a close-up of a hand wearing a blue wrist-worn sensor, and a man with a chest-mounted sensor.

N-grams for Mammogram classification

PhD Kulkarni



Balasubramanian, Stranieri



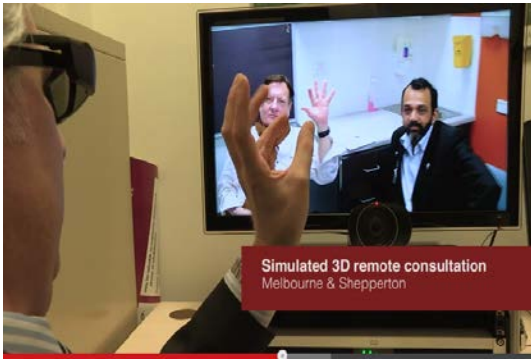
HD3D Telemedicine for shortage

Tele-dentistry with UniMelb Oral Health CRC, Maryborough DS

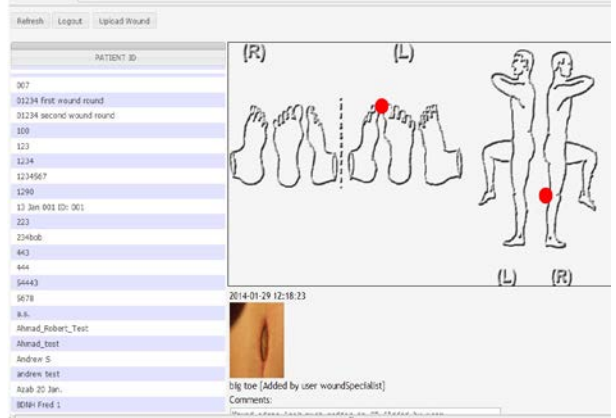


Stranieri, Marino, Collmann

Tele-psychiatry with UniMelb Dept Psychiatry



3D Tele-wound with Wimmera Health Care Group, West Wimmera Health Services



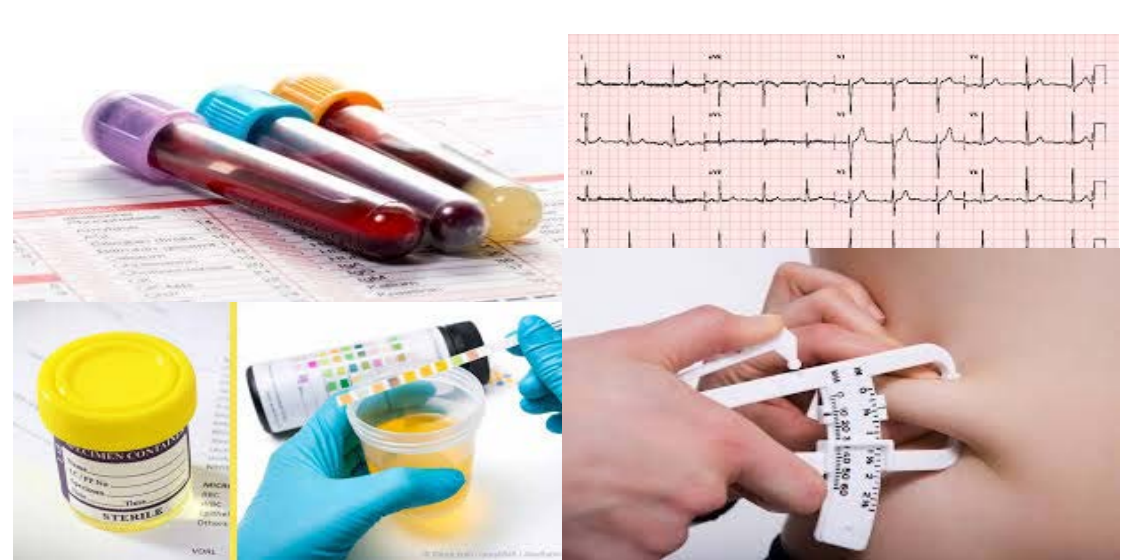
Screening Clinics for the Management of Chronic Conditions



Herbert Jelinek
CSU



>6,000 participants
screened since 2006



>40 tests per person
>150 features/test results
>6000 records

Traditional Screening

Tests on a large scale to identify the presence of disease in apparently healthy people

Periodic test for specific condition eg colorectal cancer screening

Clinical

Disease is well defined, Test sensitivity, specificity good, treatments available for positive tests

Feasible

Test is simple and safe
Test is cost-effective

Chronic Management Screening

Tests on a large scale to help empower chronic condition sufferers (or at risk) to manage their condition

Annual health status tests (>50 tests)

Technological case

Low cost devices, EEG, ECG, Bloods, Thermal cameras, retinal cameras, etc

Economic case

Cost effective if run as a placement for student nurses

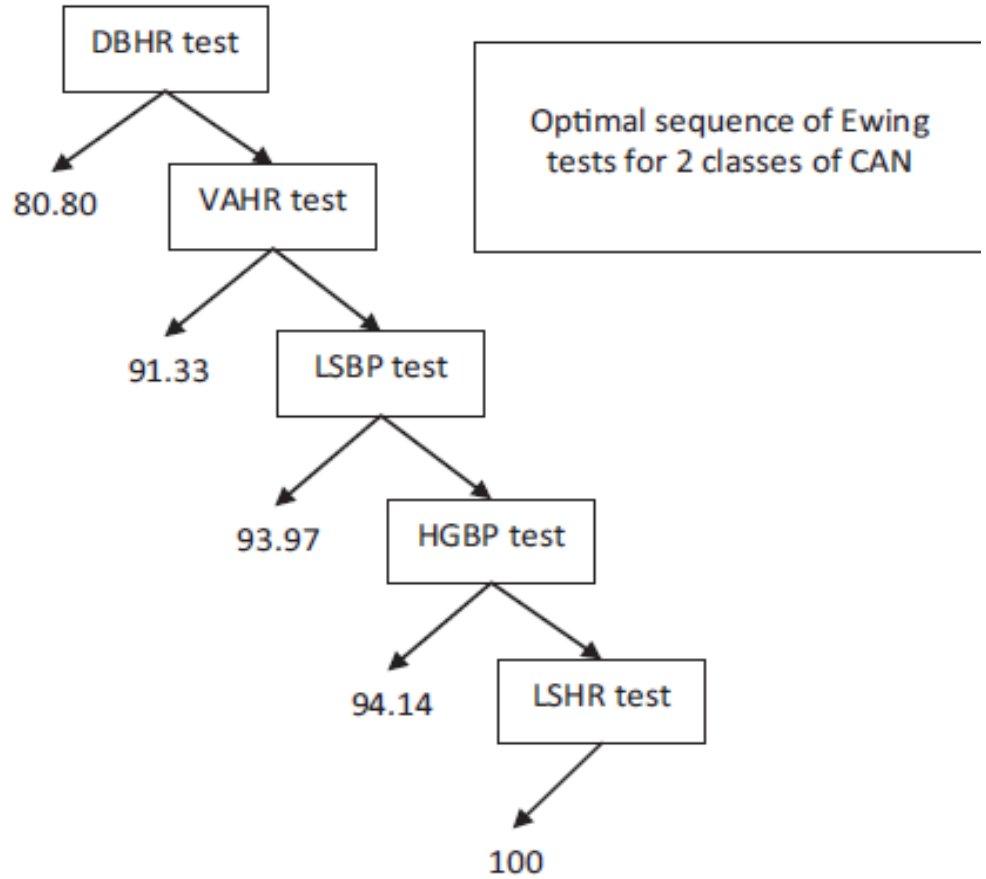
Clinical case

Unique Big Data Analytics for Public Health

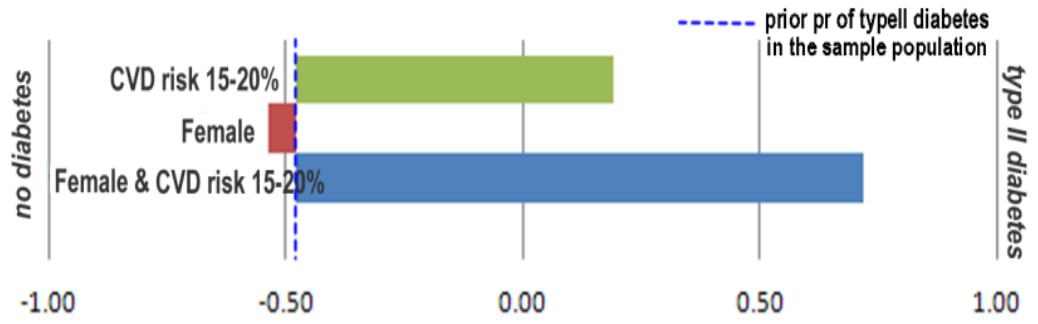
Empower people to self manage
Reach groups that avoid doctors

DATA ANALYTICS FROM SCREENING DATA

Optimal sequence of Ewing Battery tests for cardiovascular autonomic neuropathy



Hypothesis suggestion: women with 15-20% cvd risk higher likelihood of diabetes than either factor alone



DATA ANALYTICS FROM SCREENING DATA

Use data analytics to discover cut-off thresholds for scoring systems

Low Risk T2DM	HbA1c < 4.9	HbA1c Between 4.9 and 6.2	HbA1c > 6.2	High Risk T2DM
	8-OHdG < 982		8-OHdG ≥ 982	

Look for Multiple Pairs : HbA1c + only one other (for translation to clinical use)

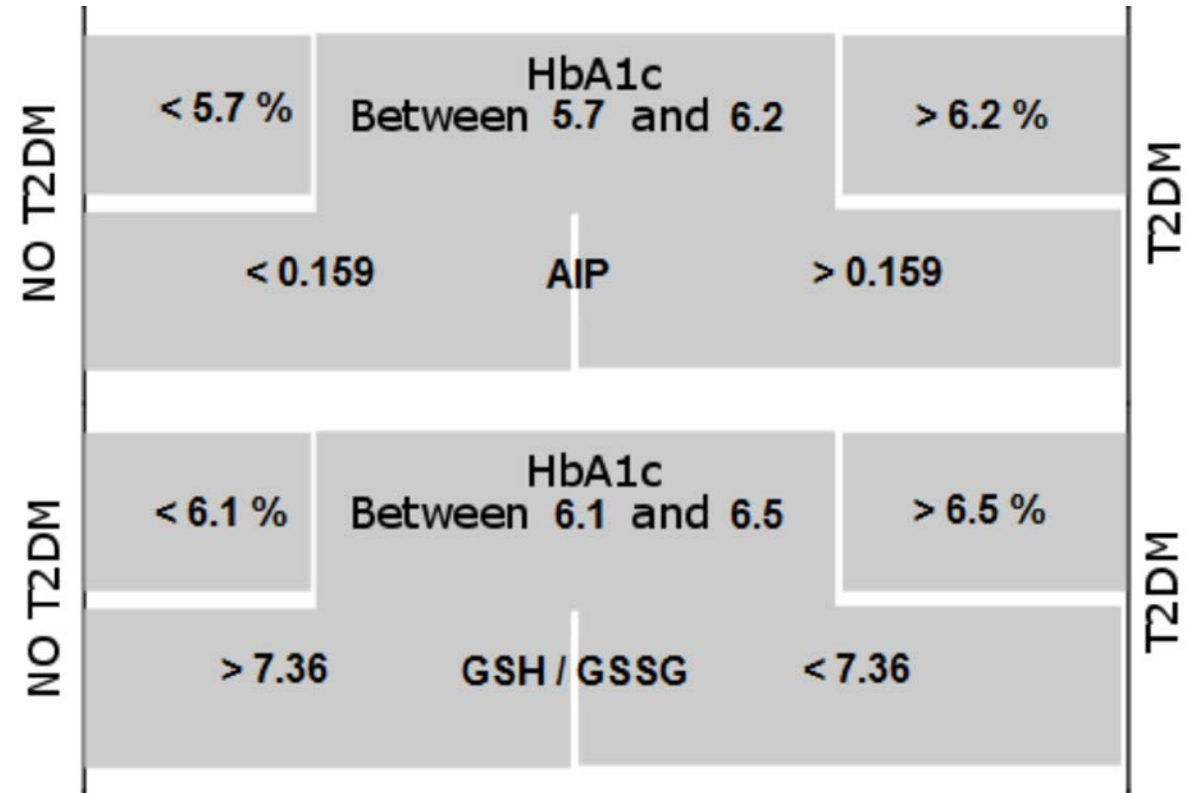
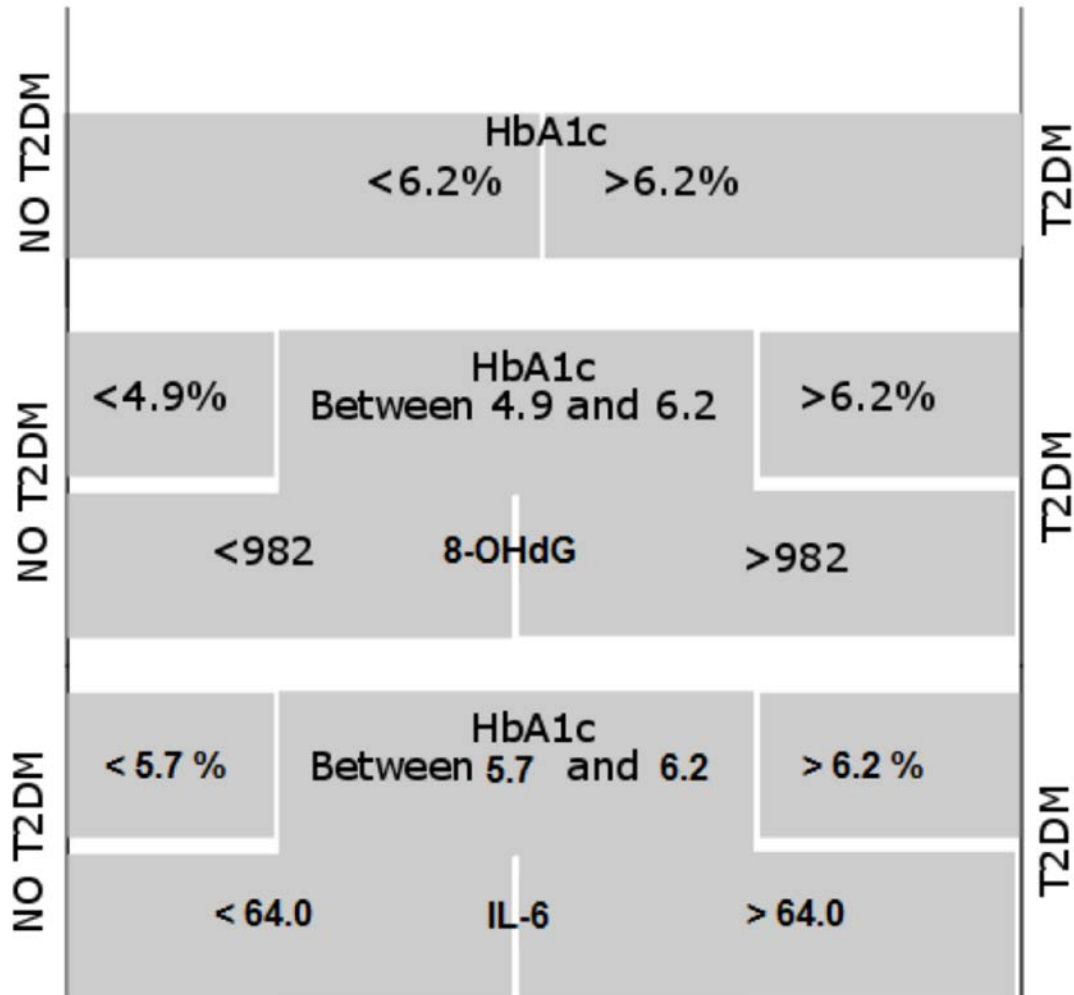
If HbA1c < 4.9% then T2DM = No

Else if HbA1c > 6.2% then T2DM = Yes

Else if 8-OHdG < 982 then T2DM = No

Else if 8-OHdG ≥ 982 T2DM = Yes

The Results: Many Mini Scoring Systems



AusDrisk

The Australian Type 2 Diabetes Risk Assessment Tool (AUSDRISK)

- Your age group**
 - Under 35 years 0 points
 - 35 – 44 years 2 points
 - 45 – 54 years 4 points
 - 55 – 64 years 6 points
 - 65 years or over 8 points
- Your gender**
 - Female 0 points
 - Male 3 points
- Your ethnicity/country of birth:**
 - Are you of Aboriginal, Torres Strait Islander, Pacific Islander or Maori descent?
 - No 0 points
 - Yes 2 points
 - Where were you born?
 - Australia 0 points
 - Asia (including the Indian sub-continent), Middle East, North Africa, Southern Europe 2 points
 - Other 0 points
- Have either of your parents, or any of your brothers or sisters been diagnosed with diabetes (type 1 or type 2)?
 - No 0 points
 - Yes 3 points
- Have you ever been found to have high blood glucose

- How often do you eat vegetables or fruit?
 - Every day 0 points
 - Not every day 1 point
- On average, would you say you do at least 2.5 hours of physical activity per week (for example, 30 minutes a day on 5 or more days a week)?
 - Yes 0 points
 - No 2 points
- Your waist measurement taken below the ribs (usually at the level of the navel, and while standing)

Waist measurement (cm)

For those of Asian or Aboriginal or Torres Strait Islander descent:

Men	Women	
Less than 98 cm	Less than 80 cm	<input type="checkbox"/> 0 points
90 – 100 cm	80 – 98 cm	<input type="checkbox"/> 4 points
More than 100 cm	More than 90 cm	<input type="checkbox"/> 7 points

For all others:

Men	Women	
Less than 102 cm	Less than 88 cm	<input type="checkbox"/> 0 points
102 – 110 cm	88 – 100 cm	<input type="checkbox"/> 4 points
More than 110 cm	More than 100 cm	<input type="checkbox"/> 7 points

Add up your points

- Have you ever been found to have high blood glucose (sugar) (for example, in a health examination, during an illness, during pregnancy)?
 - No 0 points
 - Yes 6 points
- Are you currently taking medication for high blood pressure?
 - No 0 points
 - Yes 2 points
- Do you currently smoke cigarettes or any other tobacco products on a daily basis?
 - No 0 points
 - Yes 2 points

If you scored 6-11 points in the AUSDRISK you may be at increased risk of type 2 diabetes. Discuss your score and your individual risk with your doctor. Improving your lifestyle may help.

Your risk of developing type 2 diabetes within 5 years*:

- 5 or less: Low risk**
Approximately one person in every 100 will develop diabetes.
- 6-11: Intermediate risk**
For scores of 6-8, approximately one person in every 50 will develop diabetes. For scores of 9-11, approximately one person in every 30 will develop diabetes.
- 12 or more: High risk**
For scores of 12-15, approximately one person in every 14 will develop diabetes. For scores of 16-19, approximately one person in every 7 will develop diabetes. For scores of 20 and above, approximately one person in every 3 will develop diabetes.

*The overall score may overestimate the risk of diabetes in those aged less than 25 years.

If you scored 12 points or more in the AUSDRISK you may have undiagnosed type 2 diabetes or be at high risk of developing the disease. See your doctor about having a fasting blood glucose.

Department of Health
<http://www.health.gov.au/preventionoftype2diabetes>

Recap



1. **Screening to empower people to manage their chronic conditions:**
 1. Is technologically and economically feasible
 2. Is clinically useful
2. **Benefits include:**
 1. **Opens up Big Data Analytics for Public Health**

Next Steps



1. **Diabetic retinopathy pilot in rural India**
2. Look for partners to Replicate DISCRI