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Information Systems
1. Sana - Open Source Telemedicine

Information Systems
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2. The Challenge of Chronic Disease
Sana

✦ Multi-disciplinary research group at MIT CSAIL
✦ Free open source cellphone-based telemedicine platform
✦ Distributed network of volunteers
✦ Not just technology
sana.mit.edu

- sustainable change
- health system strengthening
- quality improvement
- capacity building
- <hard coded> algorithms to empower front line health workers
The process
An example
eHealthpoints

- Network of 38 clinics in rural Punjab, India
- Walk in primary care and clean water
- Currently acute walk in care. Want to move into chronic disease management
- First condition: Diabetes
- First challenge: Screening to find cases in community so they can be treated in clinic
The Project

• Protocol for Diabetes Screening
  • v1 international
  • v2 local
• Client developed. Server implemented
• Pilot
Sex
Age
Does anyone in your close family have diabetes
Do you have high blood pressure?
Do you have high cholesterol?
Are you:
thirsty all the time?
worried that you pass urine a lot?
worried that you have frequent infections?
Have you eaten anything or drunk anything except for water in the last 12 hours
Risk of Diabetes
Test Glucose using Glucometer
What is the blood glucose reading?
Risk
male
female
Did you have diabetes during pregnancy?
Do you have high blood pressure?
Do you have high cholesterol?
Are you:
thirsty all the time?
worried that you pass urine a lot?
worried that you have frequent infections?
any risk factor
<30
>=30 yes
no
>=30
<30 no
yes yes
no
yes
no
yes
any yes
no
>6.0 mmol/l
<6.0 mmol/dl
Poor sensitivity for random blood glucose testing
Diabetes
Impaired Glucose Tolerance
Retest at Six months
Oral Glucose Tolerance Test
Video invitation to attend healthpoint clinic in fasted state.
Written information leaflet
Fasting Glucose 75g Oral Glucose Load Test at 2 hours
Community based capillary blood glucose testing
LOW RISK
LOW RISK
Community based screening for risk factors for Diabetes
New Diagnosis materials
Refer for Appointment with Doctor
>11.1 mmol/l
7.8 < glucose < 11.1 mmol/l
< 7.8 mmol/l
1 2
3
5 6 7
8 9 10
11
12,13,17
12,14,16
11
18
16
Community-based screening of rural population for risk factors and current symptoms of Type 2 Diabetes

If at risk: community-based capillary blood glucose testing using Sana/Sensaris system

If at risk: clinic-based definitive diagnosis of at-risk population for Diabetes

DIAGNOSIS

Patient Education/Dietary advice and lifestyle interventions

Lower Blood Glucose

Identify and Manage Cardiovascular Risk

Manage Lipids

Manage Blood Pressure

Anti-thrombotic therapy

Oral hypoglycaemic Agents

Insulin

Identify and Manage complications

Kidneys

Peripheral Nerves

Eye Care

Regular schedule of monitoring
Focus on lifestyle change

SCREENING

MANAGEMENT
The Project

1. Implementation by local team needs to be managed

2. Collect data and evaluate screening
   
   1. number screened

   2. case finding rate
Experiment

1. With UC Berkeley

2. 2 Interventions
   1. Commitment Contract
   2. Price discount
Lessons

- Technology but not just technology
- Non Communicable diseases...
Non-Communicable Disease

- **Cognitive Bias**: Immediate gain.
- **Environment**: Obesogenic.
- **Time discounting**: Today’s behaviour. Tomorrow’s disease.
- **Primary Care**: Long feedback cycle. Dimensionality.
- **Risk**: Not understood...
Room for innovation
Room for innovation

- **Metadata**: Distributed sensors. Predictive models.
- **Reframe risk**: Resilience.
- **Feedback**: Connected to index behaviour.
- **Simplify**: Collapse to 1 dimension...