

CURRENT PROJECT



Mobile
self-management
support system for
patients with complex
chronic diseases

A photograph of a green apple and a stethoscope. The apple is on the left, and the stethoscope is on the right, with its chest piece resting on the apple. The stethoscope has a blue tube and silver-colored metal parts. The background is white, and there is a reflection of the apple and stethoscope on the surface below. A horizontal olive-green bar is overlaid across the middle of the image, containing the word "MOTIVATIONS" in white, bold, uppercase letters.

MOTIVATIONS

com·plex

adjective

käm'pleks, kəm'pleks, 'käm,pleks/ - consisting of many different and connected parts

Complex Chronic Disease

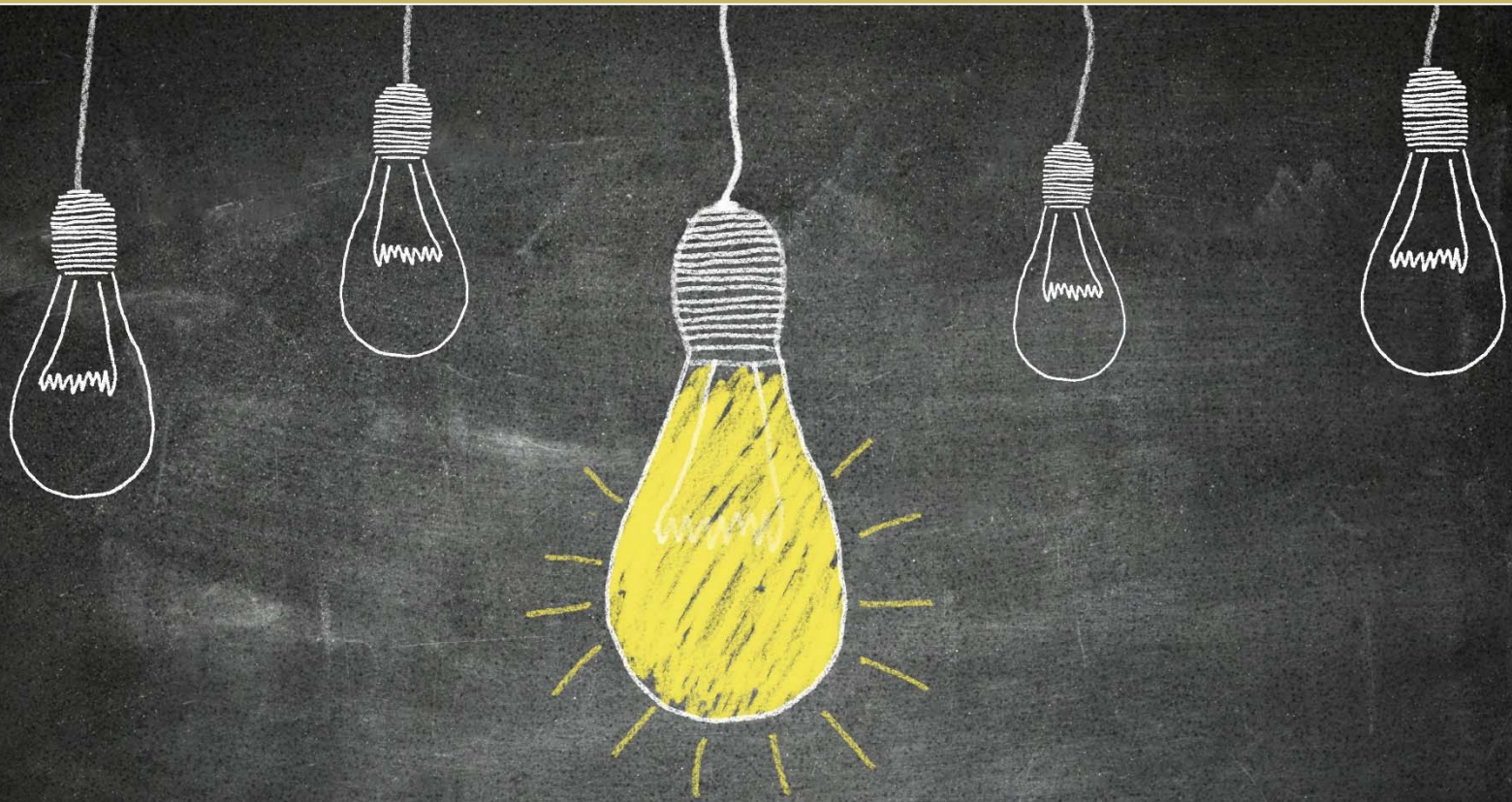
- Two or more co-morbidities
- Multiple medications
- Seen several providers
- Visit various levels of health care and transition points

= CHRONIC KIDNEY DISEASE PATIENTS!

New Model of Care

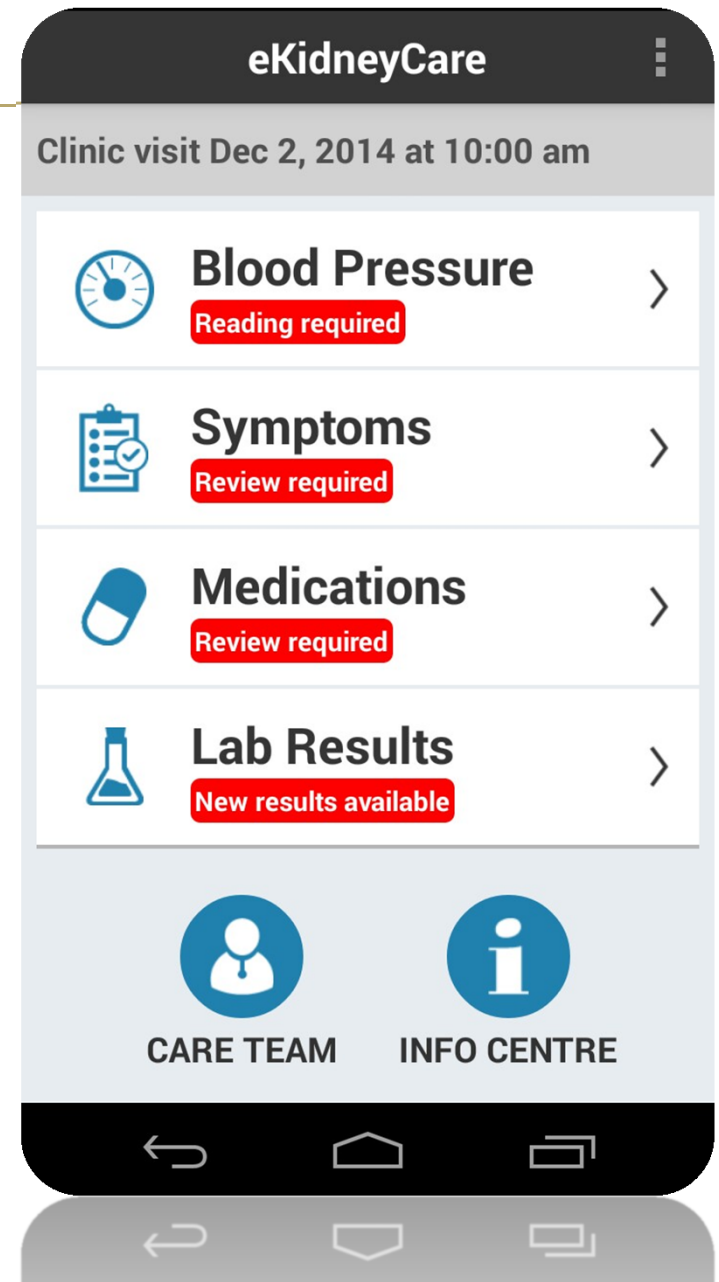
- Patients juggle multiple tasks: Need simple tools
- Improve clinical outcomes (health and well being)
- High risk for adverse events: Identify and prevent adverse events

OUR SOLUTION



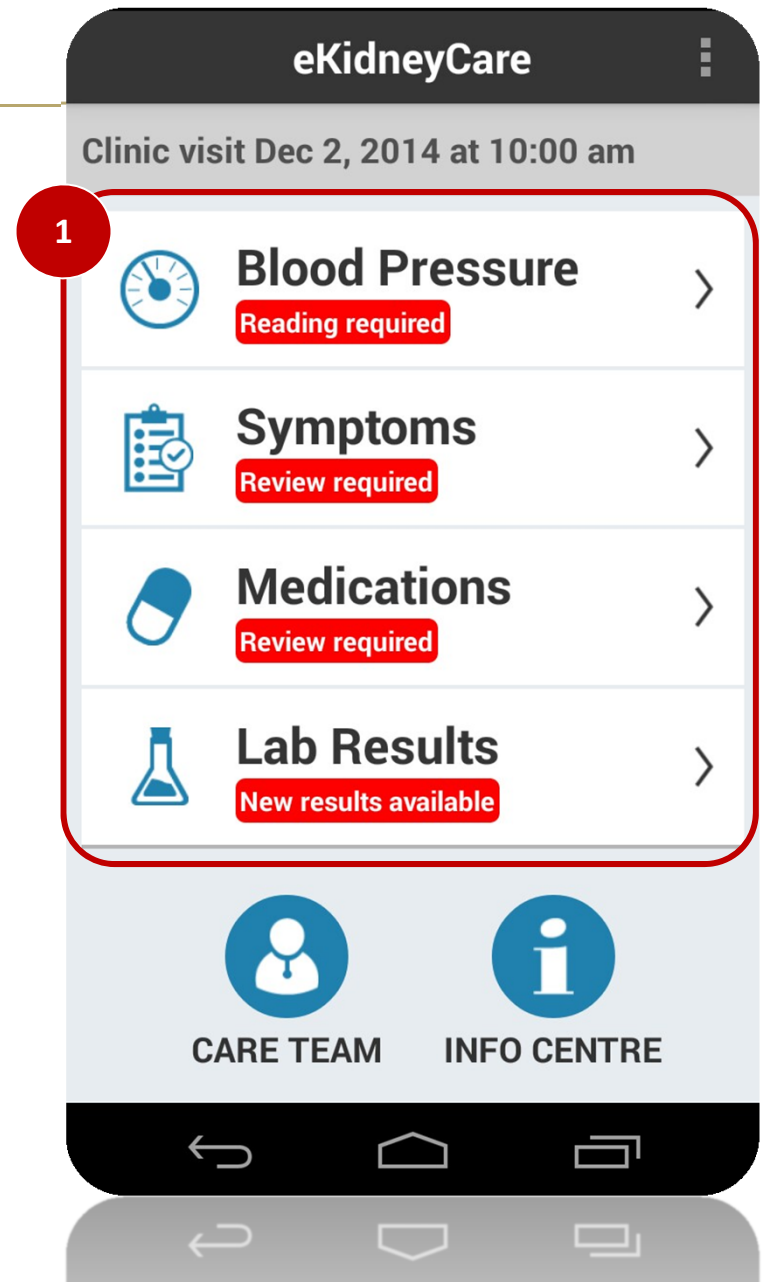
MOBILE PLATFORM

- 4 behavioural domains of chronic diseases
- Supported by two KEY foundational elements:
 1. Care Team
 2. Knowledge



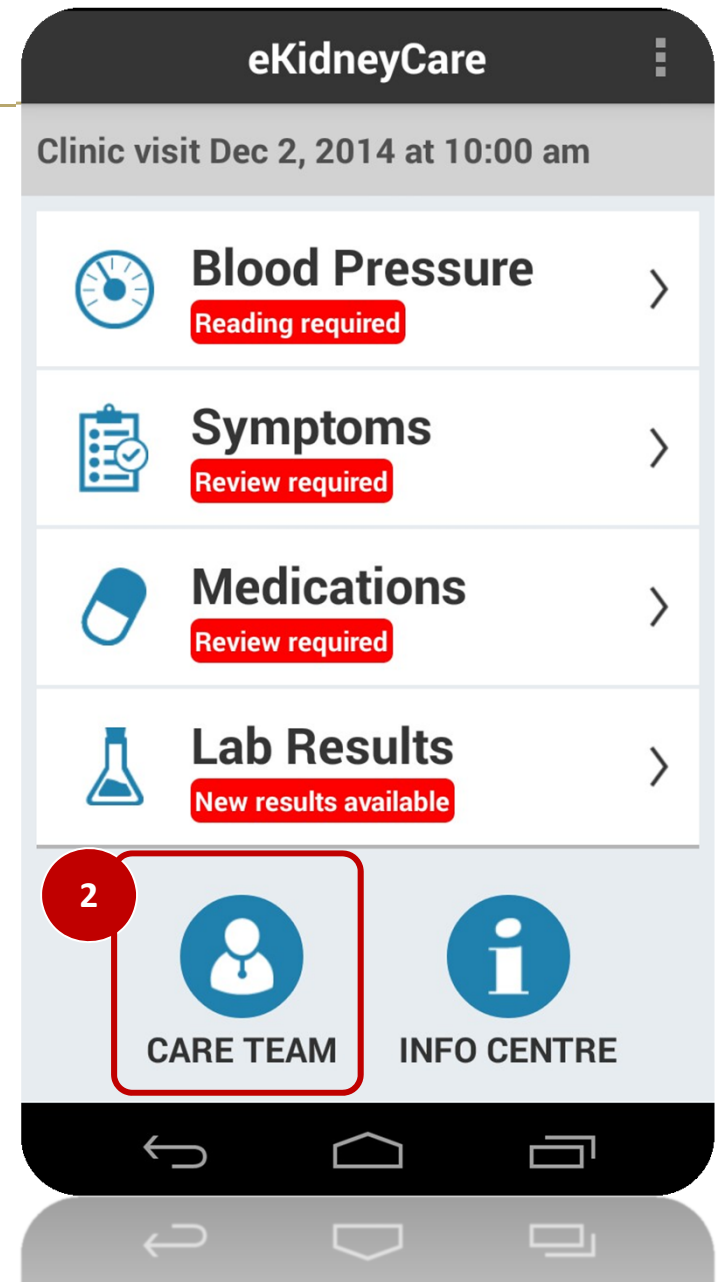
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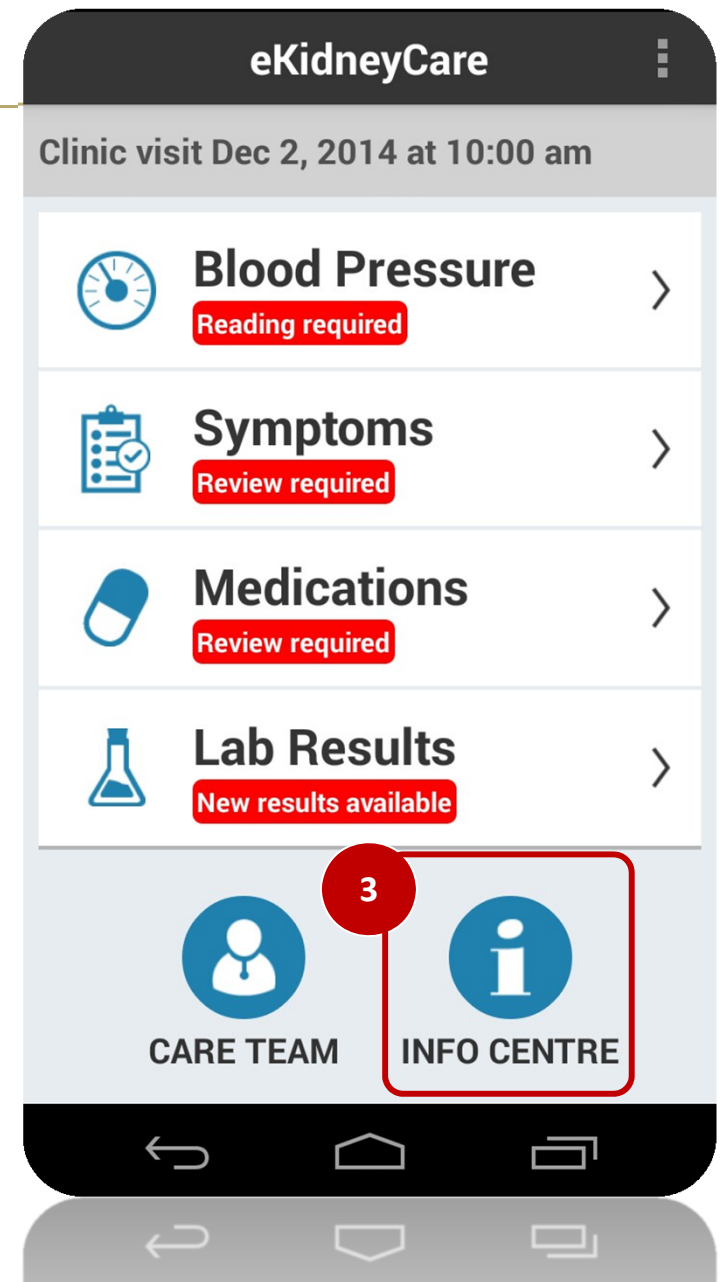
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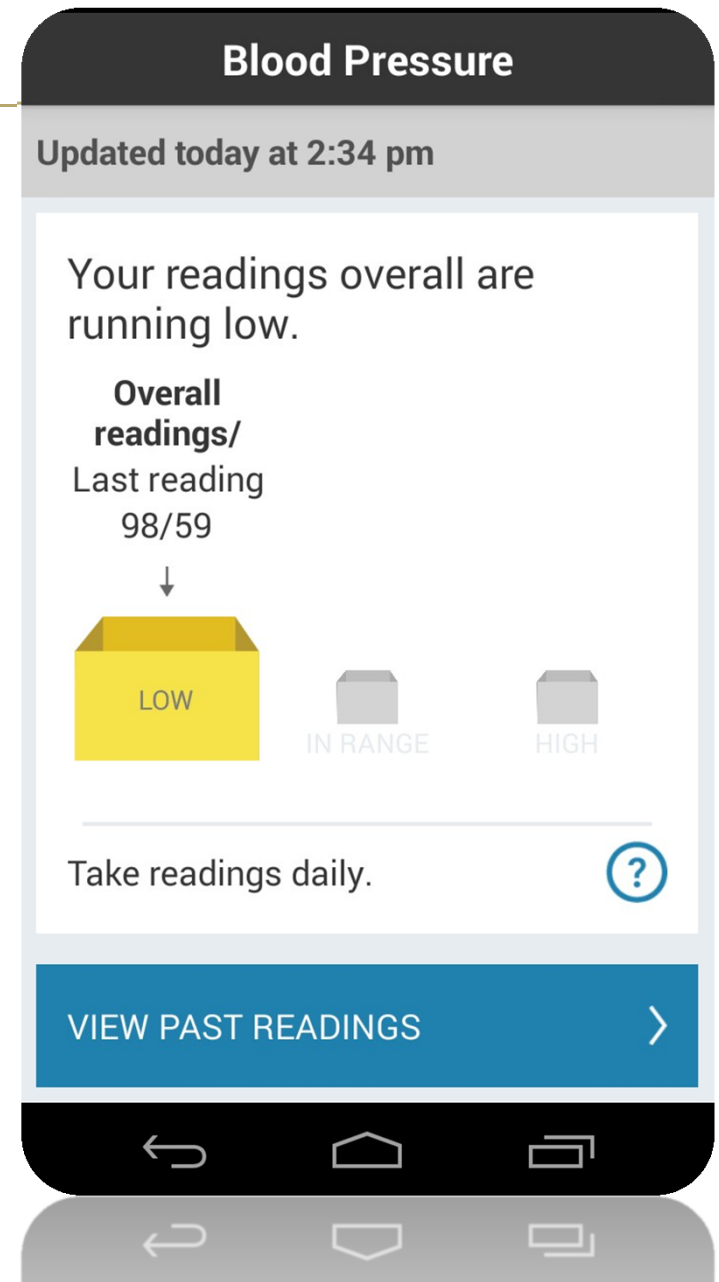
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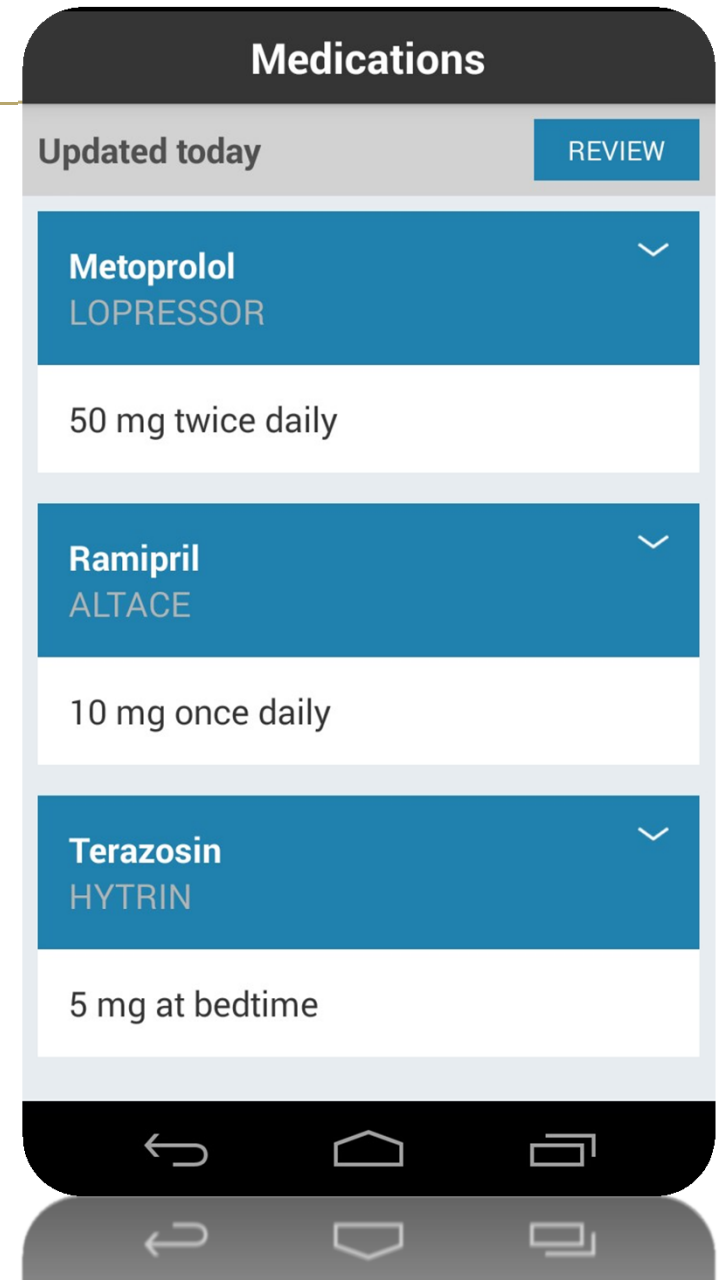
Blood Pressure

- Paired with Bluetooth enabled blood pressure cuff
- Seamless data transfer
- Automatic and interactive feedback messages from pre-programmed algorithms



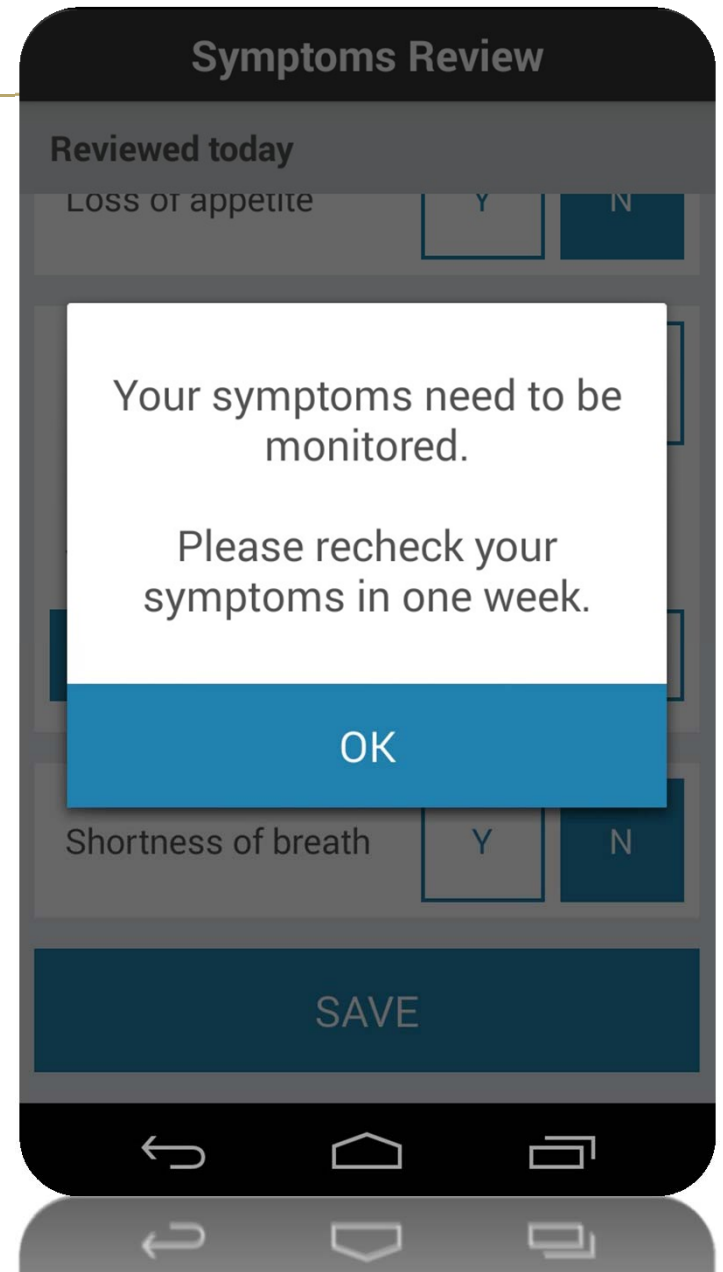
Medications

- Active interface pharmacy record system
- Real time updated medication list
- Regular review of medications to notify care team of changes to medications or problems



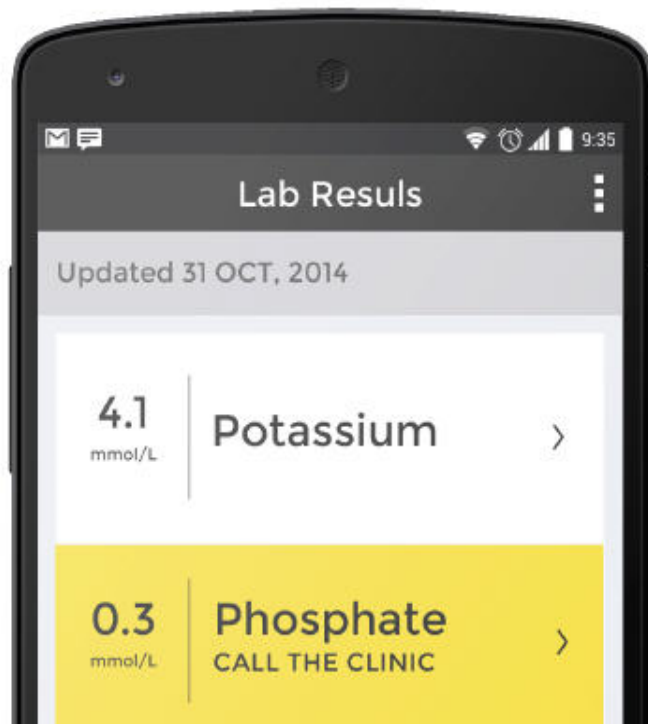
Symptoms

- Assessment of five directed symptoms
- Action messages for patient to monitor symptoms

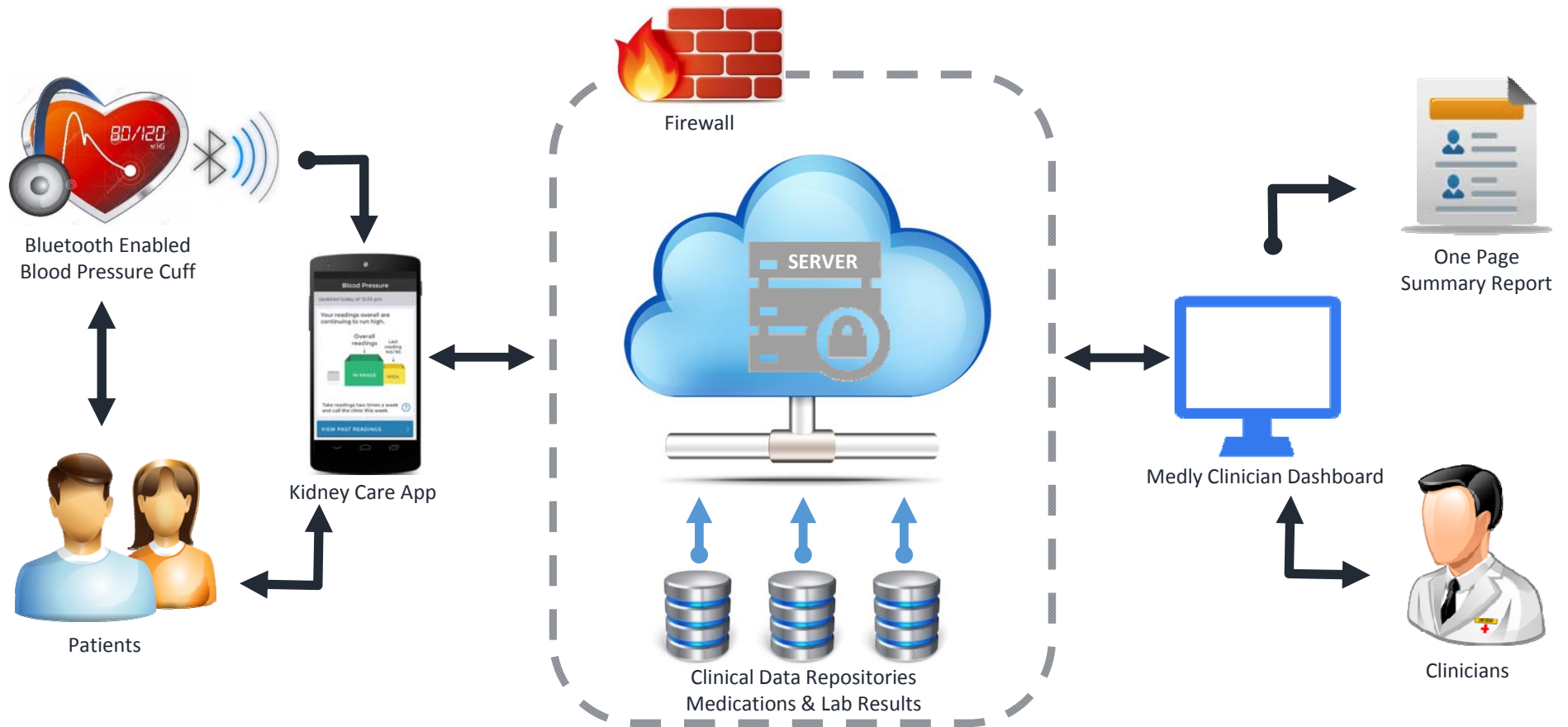


Lab Results

- Interfaced with clinical laboratory systems
- Real time update of lab results
- Personalized action messages and feedback for patients



System Architecture



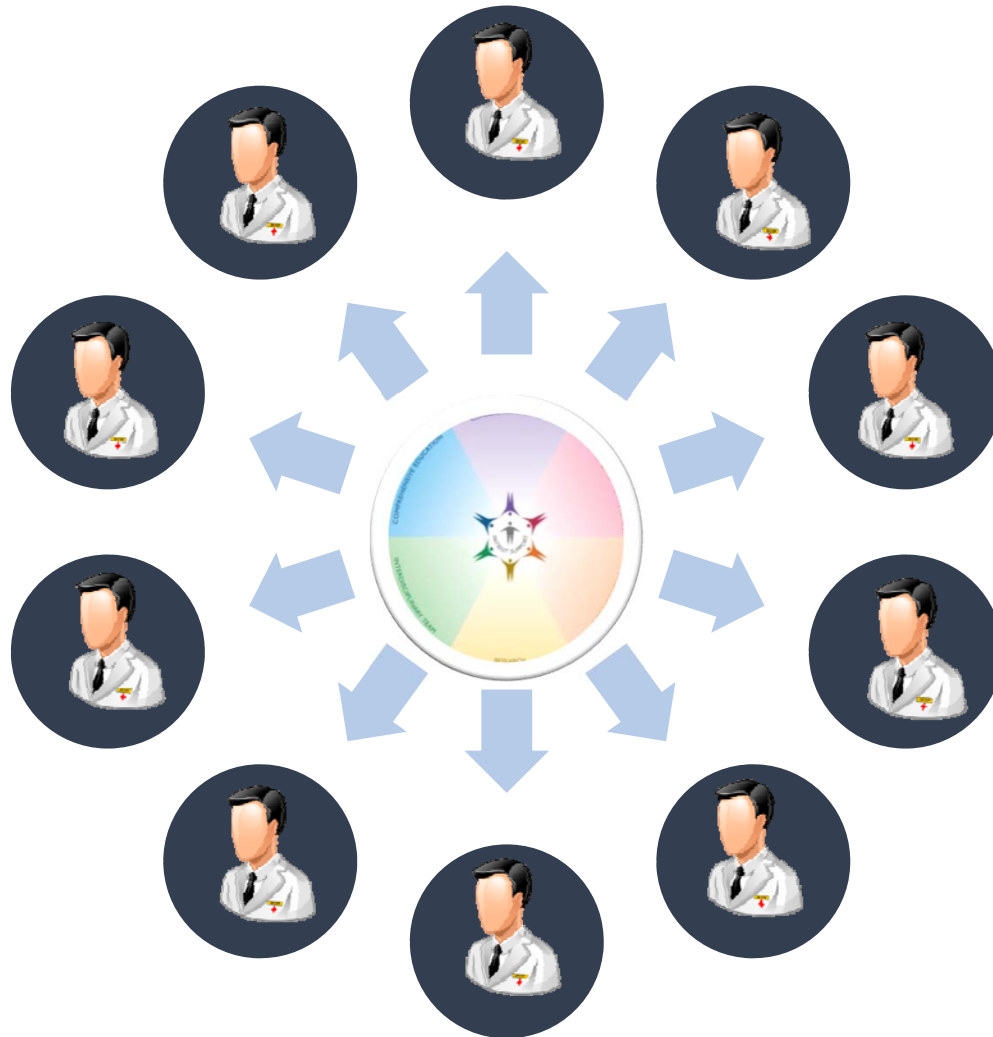
MEASURE

THE TEST

BUILD

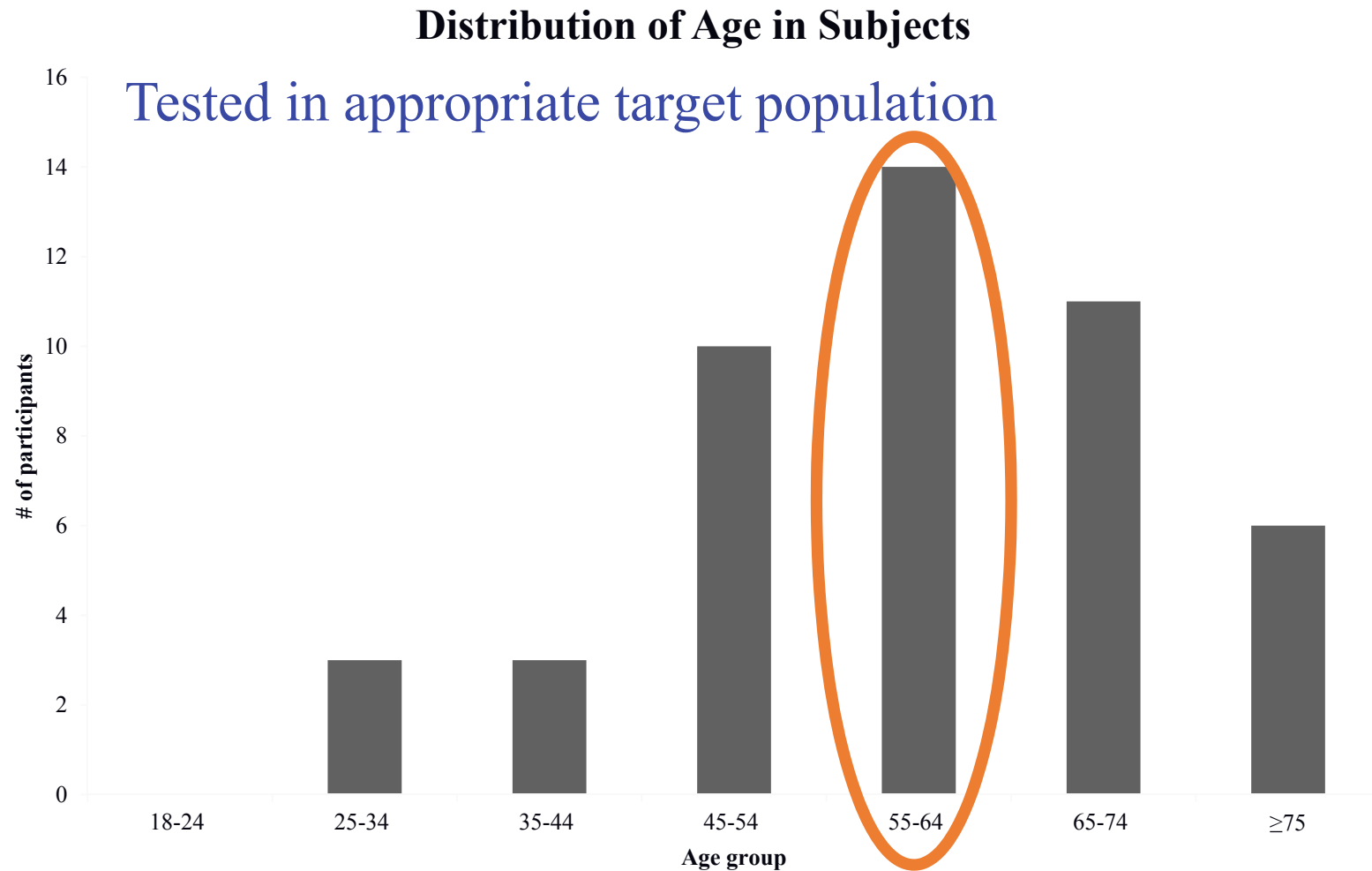
LEARN

Setting and Population



- 47 patients
- Renal Clinic at UHN
- 10 to 15 medications
- Top two co-morbidities:
Diabetes
Hypertension

Age Distribution



Objectives



Accepted

- ac·cept

ək'sept/ *Verb*: To give an affirmative answer to

Measured by system adoption and adherence

Effective

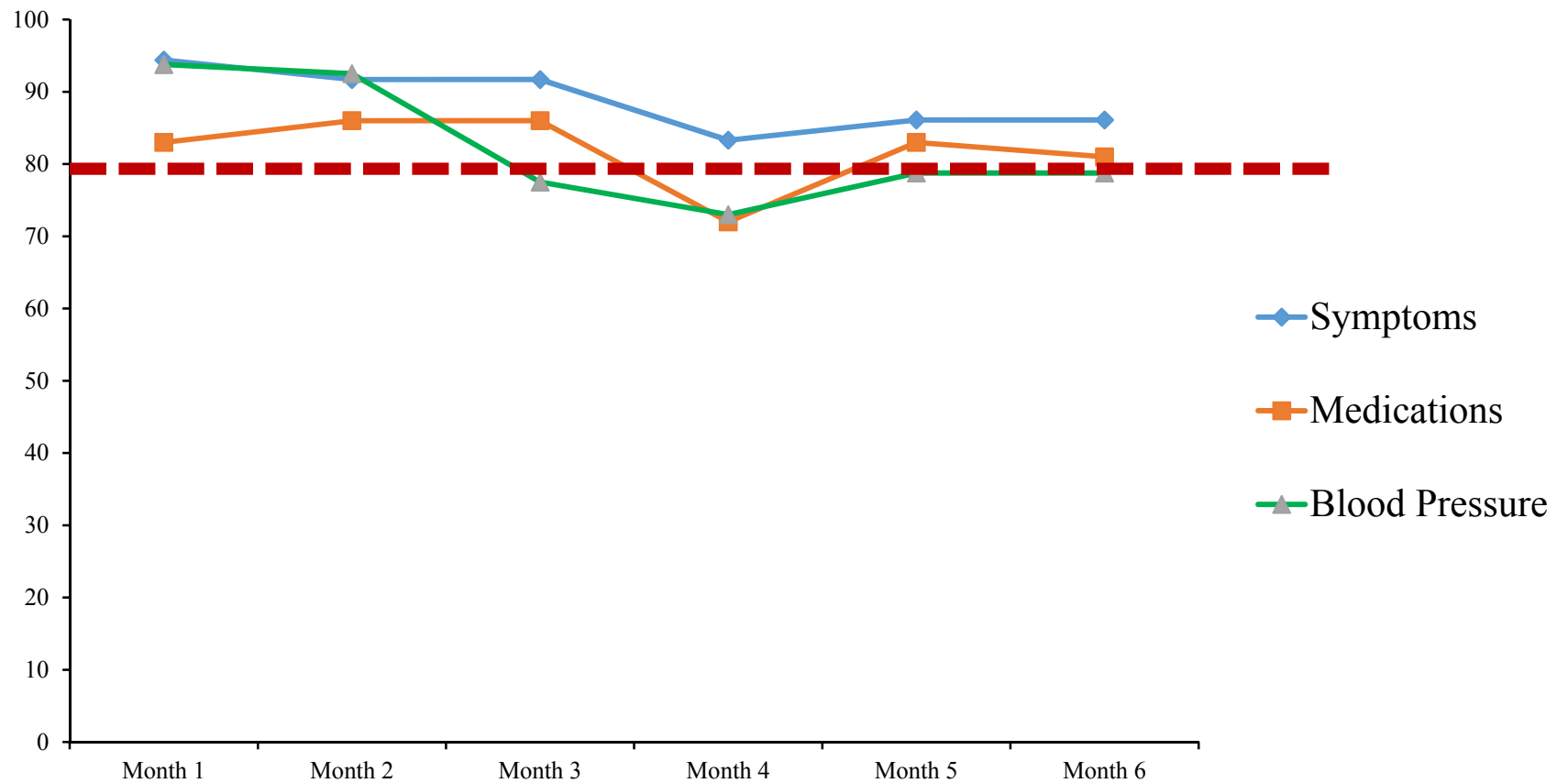
- ef·fec·tive

ə'fektiv/ *Adjective*: successful in producing a desired or intended result.

Measured by clinical outcomes (Blood pressure, medications, labs, symptoms and self-management behaviours)

Accepted- Adherence to System Use

- Adopted, accepted and sustained



Effective

- Blood Pressure
- Improvement in timely and accurate diagnosis
 - Preliminary results: 27% patients of undiagnosed high BP received clinical intervention and treated



- Decrease 6.1mmHg of SBP and 0.83 mmHg of DBP

Effective

- Medications
- Identification of medication errors
 - 49% reported medications required intervention to prevent further harm to patient
 - 2 cases resulted in permanent harm and required intervention to prevent hospitalization
- Improvement in medication adherence
 - Medication possession ration of 0.66 to 0.80 for anemia agents



Effective



- CKD specific blood work
- No changes in laboratory results seen in potassium and phosphate
- Slight improvement in hemoglobin
 - Short duration of study
 - Patients reported not enough lab values to impact behavioural changes

Effective

Symptoms



- Monitoring of symptoms resulted in:
 - Clinical interventions in deteriorating patients
 - repeat blood work
 - extra visit to clinic
 - Early intervention for high risk patients
 - Changes to poorly tolerated medications



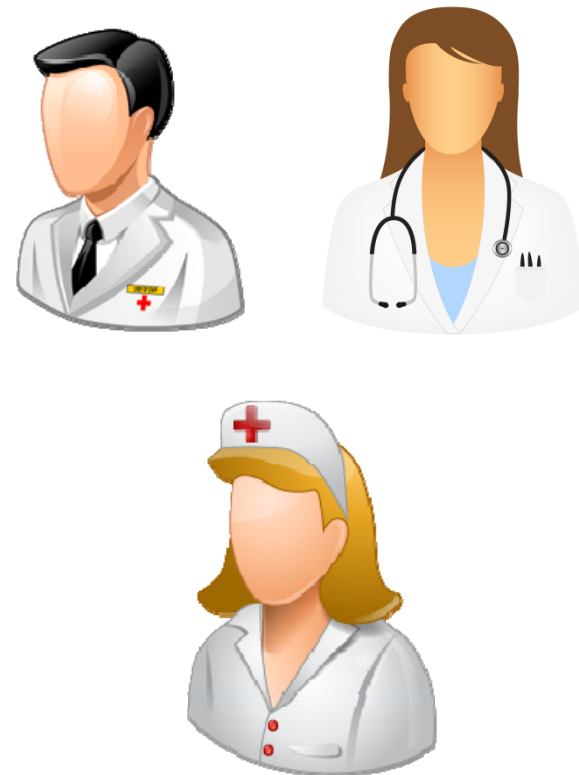
PARTICIPANT EXPERIENCES

Qualitative Interviews

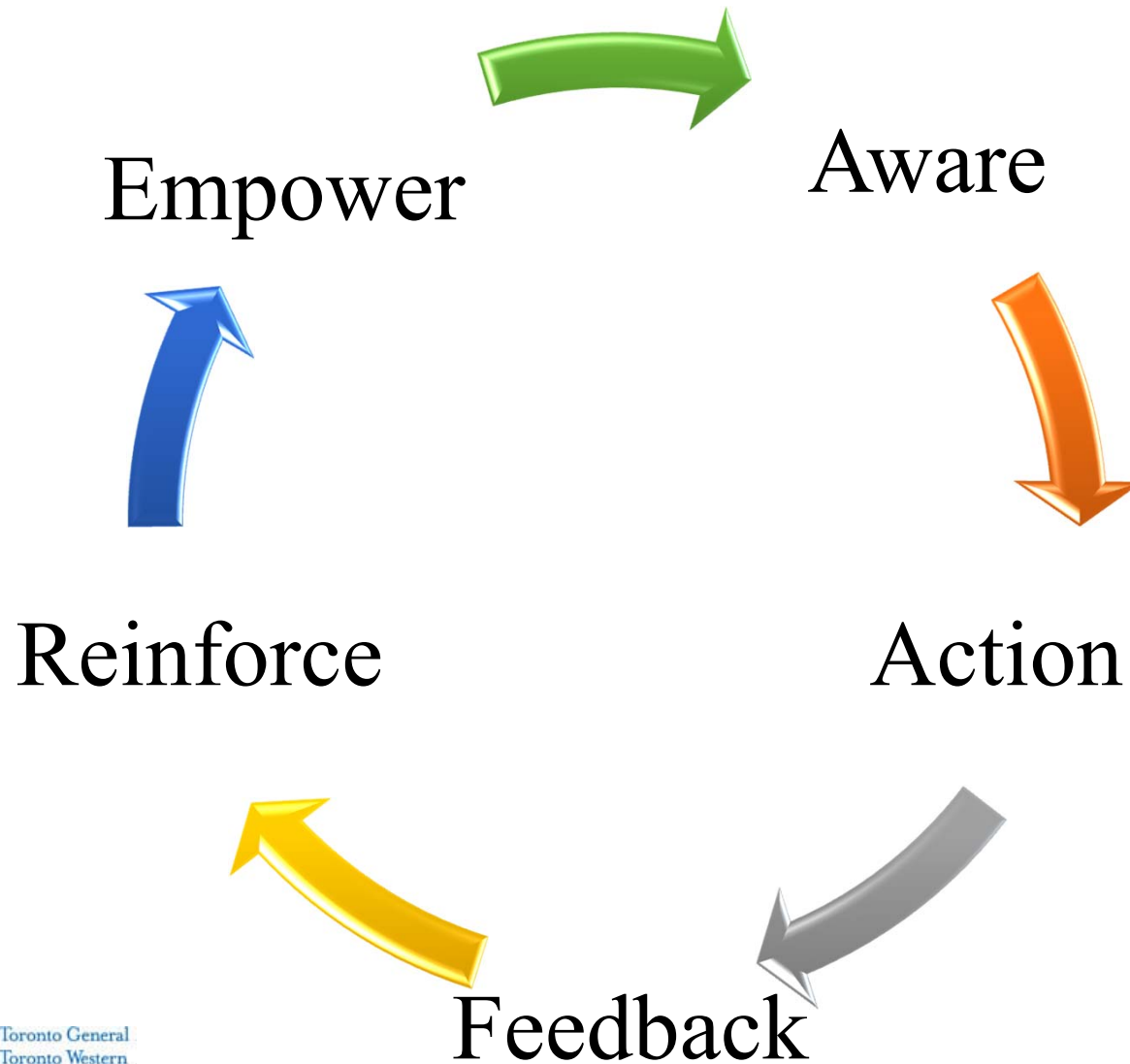
- 34 patients



- 11 Clinicians



Experiences and Feedback: Self-Management





FUTURE IMPLICATIONS



Highlight Cases

- *Medication Reconciliation*
 - identification of a new script by non-renal prescriber for a medication that can lead to kidney failure
- *Medication Adherence*
 - identified unanticipated difficulties with prescribed treatment adherence
- *Timely diagnosis / treatment*
 - reduction of stroke risk through accurate diagnosis of poorly controlled home BP readings

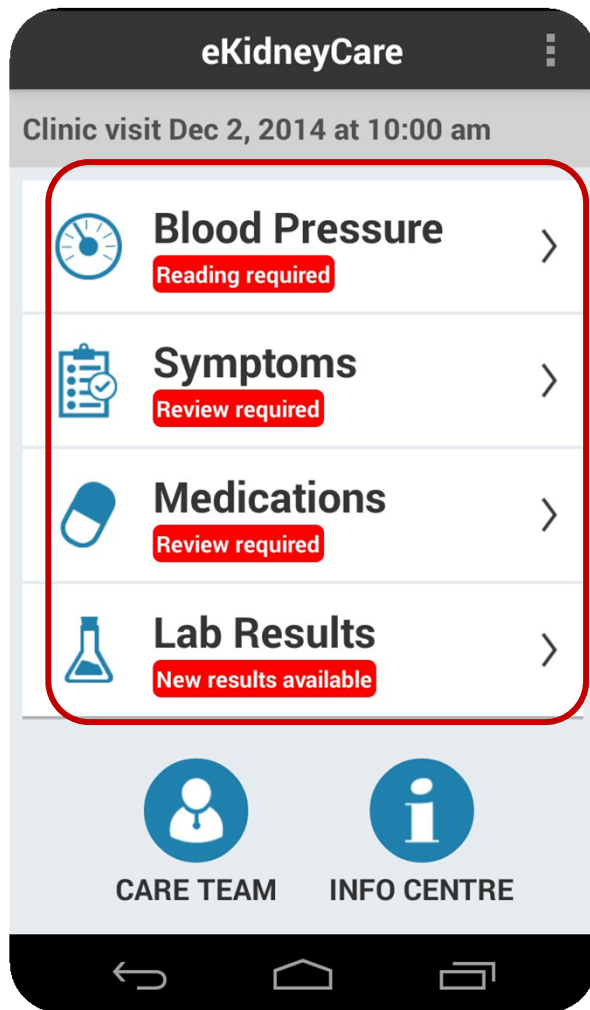
Broadening the window of observation to:

- improve health and well being of patients
- reduce utilization of the health system and costs

Limitations

- Single academic centre
- Duration of study only 6 months
- Scalability and sustainability for wider adoption

BOTTOM LINE



Simple health related behaviours can translate improvement in health and health system savings



Consumer driven mobile platform to support and streamline these activities to turn them into sustained behaviours

FROM MOTIVATIONS TO OUTCOMES

- Streamline and simplify patient tasks
 - ✓ Comprehensive chronic disease management tool
- Better clinical outcomes
 - ✓ Timely diagnosis and treatment of blood pressure
 - ✓ Identification and prevention of medication errors
 - ✓ Improved medication adherence

Acknowledgements

Project Team

UHN Nephrology Division

- Dr. Alexander G. Logan
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