CREATING THE NEXT GENERATION MHEALTH APP: A REFERENCE ARCHITECTURE

Karim Keshavjee MD, MBA, CCFP, CPHIMS-CA
Pannel Chindalo, PhD
Arsalan Karim, MD, MBA
Ronak Brahmbhatt, MD, MPH
Nishita Saha

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Faculty/Presenter Disclosure

Faculty:

Karim Keshavjee, MD, MBA, CCFP, CPHIMS-CA

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DISCLOSURE OF COMMERCIAL SUPPORT

• No Commercial Support
MITIGATING POTENTIAL BIAS

• Not applicable
DOCTORS WANT TO RX HEALTH APPS

DOWNLOAD A HEALTH APP AND CALL ME IN THE MORNING

89% of PHYSICIANS would RECOMMEND a mobile HEALTH APP to a PATIENT

93% believe that mobile health apps can IMPROVE a patient’s HEALTH OUTCOME
BUT: HEALTH APP USE IS LOW

US Internet Users Who Use Health-Related Apps, Sep 2013
% of total

- Never: 60.2%
- Rarely: 13.2%
- Yes, sometimes: 19.7%
- Yes, often: 6.7%

Note: n=400; numbers may not add up to 100% due to rounding; on a mobile device or desktop
Source: AYTM Market Research as cited in company blog, Sep 24, 2013
www.emarketer.com
WHY?:
HEALTH APPS DON’T WORK
What prevents patients and health practitioners from adopting mHealth apps?
Health Apps by Design:
A Reference Architecture for Mobile Engagement

Pannel Chindalo, InfoClin, Toronto, Canada
Arsalan Karim, InfoClin, Toronto, Canada
Ronak Brahmbhatt, InfoClin, Toronto, Canada
Nishita Saha, InfoClin, Toronto, Canada
Karim Keshavjee, InfoClin, Toronto, Canada
9 BARRIERS TO MHEALTH USE

**Conflicting Information:** App provides information that conflicts with that received from health care providers (Bierbrier, Lo & Wu, 2014);

**Health Literacy:** Language and terminology of the app may not be compatible with the patient’s health literacy (Caburnay, 2015);

**Data Entry:** Patient has to enter the data themselves (Gruman, 2013);

**Meaningful Use:** Patient cannot use information in a meaningful way;

  e.g., he or she cannot order diagnostic testing or prescribe medications to himself or herself;

**Lack of incentives** like cost saving or social approval;
BARRIERS TO MHEALTH USE (CONT’D.)

**Not Habit Forming:** Daily use of the app is not required and therefore the patient does not get into the habit of using it;

**Unknown Provenance:** Providers don’t value data collected by patients in apps downloaded from an app store whose provenance and pedigree is not known or established (Terry, 2015);

**Lack of Tools:** There is no way for providers to consume the large amounts of data that are collected in apps (Terry, 2015);

i. i.e., visualize, analyze, derive meaning from;

**Lack of Interoperability:** Providers unable to integrate app data into their own (EMR) for analysis or follow-up or share the data in their EMR with their patient’s apps (Abebe, 2013).
AT HEART – INFORMATION ASYMMETRY...

Doctors know more than patients
Doctors are trained to trust only their own data. Patient-entered data is not trusted.
ENGAGING THE PATIENT

- Self Management Support
- Physician Engagement/Leadership
- Culture of Communication
- mHealth app Architecture and Ecosystem
- Information Technology Support

Clinical Information

Education, Interventions, Advice & Information
GAMIFICATION IS NOT ENOUGH

- Patient engagement needs to be rooted in science, not games
- Need behavior change models with evidence behind them
  - Proven Behavior Change Techniques
  - Behavior Change Wheel
- Commitment needs to be cemented
  - Accountability to health care team
  - Follow-up by physician and their staff
  - App is ‘prescribed’ from EMR which activates App
APPS THAT ARE USED

US Adults That Track Their Fitness or Health Using a Wearable Device or Smartphone App

- 11% Use a wearable fitness tracker
- 14.1% Use a smartphone application
- 14.5% Plan to start using a device or app
- 60.4% Do not use a device or app
TYPE 1 DIABETES APPS

- We reviewed 201 Diabetes Apps
- Patients have traditionally always written down their insulin dosages and their blood sugar readings
- Apps are a natural replacement of paper logs and provide some additional useful functionality
- But does not apply to Type 2 diabetes, who make up 90% of patients with diabetes.
WE INTERRUPT THIS BROADCAST.....

- Bluestar is a new diabetes app that must be prescribed!
- It recently obtained FDA approval
- Got a score of 12 (out of 15) on our rating scale
- Very promising development
# PACIFICA CBT

## Client Dashboard

<table>
<thead>
<tr>
<th>Name</th>
<th>Last Mood</th>
<th>7 Day Mood Average</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe Smith</td>
<td>Very Good</td>
<td>Good</td>
<td>View History</td>
</tr>
<tr>
<td>Mary</td>
<td>Okay</td>
<td>Okay</td>
<td>View History</td>
</tr>
<tr>
<td>John</td>
<td>Awful</td>
<td>Not Good</td>
<td>View History</td>
</tr>
<tr>
<td>Sarah</td>
<td>Great</td>
<td>Good</td>
<td>View History</td>
</tr>
<tr>
<td>Emily</td>
<td>Very Good</td>
<td>Very Good</td>
<td>View History</td>
</tr>
<tr>
<td>Michelle</td>
<td>Okay</td>
<td>Okay</td>
<td>View History</td>
</tr>
<tr>
<td>Jane</td>
<td>Not Good</td>
<td>Not Good</td>
<td>View History</td>
</tr>
<tr>
<td>Peter</td>
<td>Okay</td>
<td>Okay</td>
<td>View History</td>
</tr>
<tr>
<td>Susan</td>
<td>Very Good</td>
<td>Not Good</td>
<td>View History</td>
</tr>
<tr>
<td>Nick</td>
<td>Okay</td>
<td>Okay</td>
<td>View History</td>
</tr>
<tr>
<td>Alex</td>
<td>N/A</td>
<td>N/A</td>
<td>View History</td>
</tr>
</tbody>
</table>

The dashboard also shows a mobile app interface with a message: *I am feeling calm, loved, and grateful. I had a great time at the park with my friends. It's so nice to get outside and spend time with them.*
REASONS FOR NOT MEETING CRITERIA

• Lack of integrations with devices—relatively easy these days (but requires FDA approval)

• Lack of integration with EMRs—many features are dependent on this
DISCUSSION

• There is great need for high quality apps which can be prescribed by a physician and whose use can be monitored by the health care team

• Apps need to focus on managing the whole patient along with their disease and not a small part of a patient’s care such as self management

• Better embedding physician patient relationship into patient app interactions for provider guided management
CONCLUSION

• Health behavior changes are difficult to sustain
  • Physicians can help by consistent follow-up and reinforcement
  • Make the app important – "Prescribe" it
• mHealth Apps need to have bi-directional integration with EMRs
  • Tell your EMR vendors that you need integration with Apps
REFERENCES

