Opportunities and Pitfalls with mHealth
Montego Bay, 13 November 2013
Agenda

• **New frontiers with mHealth**
  – Reach and richness where it really matters
  – Applications in the mHealth field
  – The advantages

• **mHealth for not so dummies ... The pitfalls**

• **mHealth strategies**
mHealth: Reach and richness where it really matters

- **Definition:** Health services supported by mobile devices, such as mobile phones and tablets
  - Practice of medicine Collecting community and clinical health data
  - Public health

- **But what it really means is ...**
  - Healthcare reaching where it really matters
  - Getting and delivering information with maximal richness

- **mHealth has emerged in recent years as largely an application for developing countries, stemming from the rapid rise of mobile phone penetration in low-income nations**
  - Providing greater access to larger segments of a population in developing countries
  - Improving the capacity of health systems in such countries to provide quality healthcare
Healthcare reaching where it really happens ...

<table>
<thead>
<tr>
<th>Time spent in healthcare setting</th>
<th>Time spent elsewhere</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="clocks.png" alt="Clocks" /></td>
<td><img src="clocks.png" alt="Clocks" /></td>
</tr>
</tbody>
</table>

5
Leventhal’s Tetanus Experiment – Yale University 1950s

Low Fear Group

High Fear Group

Specific instructions well fitted in daily activities

3.3%

33%
Patients remotely monitored worldwide will grow from 2.8 million in 2011 to 9.4 million in 2017

- **CAGR of 26.9%** between 2011 and 2017 to reach **9.4 million connections** worldwide

- The number of **devices with integrated cellular connectivity** increased from 0.73 million in 2011 to about 1.03 million in 2012, and is projected to grow at a **CAGR of 46.3%** to **7.1 million** in 2017

- Only dedicated devices for remote monitoring.
  - Not personal mobile phone, tablet or PC for remote monitoring

Source: Berg Insight 2013
Two factors determine the rapid development and importance of mHealth in Low- and Middle-income countries

1. The myriad constraints felt by healthcare systems of developing nations
   - High population growth
   - High burden of disease prevalence
   - Low health care workforce
   - Large numbers of rural inhabitants
   - Limited financial resources to support healthcare infrastructure and health information systems

2. The recent rapid rise in mobile phone penetration in developing countries
   - To large segments of the healthcare workforce
   - The population of a country as a whole

- Increased potential of increasing quality and quantity of healthcare (information) with lowering information and transaction costs in order to deliver healthcare
Growth and opportunities are further fueled by smart phone technology and market

Available Health Related Apps

- Revenues from remote patient monitoring services that use mobile networks will rise to **$1.9 billion** globally by 2014

- Mobile Healthcare and medical App downloads will reach 44 million in 2012, Rising to **142 million downloads** globally by 2016

Source: Juniper Research 2011
Agenda

• **New frontiers with mHealth**
  – Reach and richness where it really matters
  – Applications in the mHealth field
  – The advantages

• **mHealth for not so dummies ... The pitfalls**

• **mHealth strategies**
mHealth and mFitness: the point where the mobile sector meets the healthcare sector and the fitness sector respectively

mHealth
- Basic Services
- Remote Diagnosis and Treatment
- Remote Patient Monitoring

mFitness
- Connected Fitness Hardware
- Cardiac Outpatient Monitoring
- Chronic Disease Management
- Blood Pressure Cuffs
- Connected Watches
- Connected Pedometers
- Connected Wrist Bands

Source: Juniper Research 2013
mHealth Services

- Testing and Treatment methods
  - Availability of health services

- Voice/SMS dissemination services
  - Education and Awareness

- Helpline
  - Phone number for information

- Remote Diagnosis and Treatment
  - Telemedicine
    - Photodraphs of wound / skin

- Remote Patient Monitoring
  - Cardiac Outpatient Monitoring
    - CHF
  - Chronic Disease Management
    - COPD
  - Mobile Health Records
    - Diabetes Mellitus

- Information Systems and Archives
  - Clinical decision support
    - Teleconsultation
      - App-based content

- Training and decision support for HCPs
  - Personalized training programs
    - Disease Surveillance
      - Locations and levels of disease activity
    - Epidemiological outbreak tracking
      - Resource planning

- Remote data collection
  - Policy making
    - Collaborative care
      - Remote knowledge

- Targeted information
- Therapy adherence
- Proactive treatments to prevent exacerbations

- Confidentiality
- Reach far-reaching areas

- Less cost and time to travel
- Timely diagnosis

- Targeted information
- Collaborative care
- Remote knowledge

- Timely measures and investments to alleviate burden of diseases

Sources:
- Juniper Research
- UN Foundation
- Vodafone Foundation
Agenda

• **New frontiers with mHealth**
  – Reach and richness where it really matters
  – Applications in the mHealth field
  – The advantages

• mHealth for not so dummies ... The pitfalls

• mHealth strategies
Global Cumulative Healthcare Cost-savings Opportunity from mHealth Monitoring 2013-2018: $36 Billion

Main driver: Accountable care
The delivery of healthcare funding is linked more directly to the health of the patient or individual, rather than being based upon the cost of treatment

Source: Juniper Research 2013
In the United States $700 billion of the $2.5 trillion spent on healthcare is considered wasted.

<table>
<thead>
<tr>
<th>Estimated waste ($billions)</th>
<th>Drivers</th>
<th>Potential information-based solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>270</td>
<td>Overtreatment and non-guideline care</td>
<td>• Automated, real-time prompts encourage the use of less-expensive generic drugs</td>
</tr>
<tr>
<td>140</td>
<td>Fraud and abuse</td>
<td>• Clinical data comparison across sites identifies duplicate billing</td>
</tr>
<tr>
<td>120</td>
<td>Administrative-system inefficiencies</td>
<td>• Clinical data in initial claim enables automated adjudication</td>
</tr>
<tr>
<td>90</td>
<td>Provider inefficiency and errors</td>
<td>• Timely access to discharge instructions targets support, avoiding readmissions</td>
</tr>
<tr>
<td>40</td>
<td>Lack of care coordination</td>
<td>• Real-time access to preexisting diagnostic data avoids duplicative testing</td>
</tr>
<tr>
<td>40</td>
<td>Preventable conditions and avoidable care</td>
<td>• Instant access to medication list and alerts avoids adverse drug events</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• At-home patient monitoring supports timely intervention, avoiding the need for hospitalization</td>
</tr>
</tbody>
</table>

HIMMS Health IT Value Suite

• Comprehensive knowledge repository that classifies, quantifies and articulates the clinical, financial and business impact of health IT investments

• Health IT Value Suite
  – Taxonomy and framework to quantify and discuss the impact of IT in healthcare settings
  – Relevant and credible examples that help providers, policymakers and payers evaluate the success of their IT investments and implementations with an emphasis on examining clinical, business and financial factors
  – The documented value statements in the Health IT Value Suite are collected by a systematic review of electronically-available case studies or literature references

• Health IT Value STEPS™ : Framework
<table>
<thead>
<tr>
<th>STEPS™ and Subtypes</th>
<th>Documented Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Satisfaction:</strong></td>
<td></td>
</tr>
<tr>
<td>Patient; Provider; Staff; Other</td>
<td>• Improved communication with patients</td>
</tr>
<tr>
<td></td>
<td>• Improved patient satisfaction score</td>
</tr>
<tr>
<td></td>
<td>• Improved internal communication</td>
</tr>
<tr>
<td><strong>Treatment / Clinical:</strong></td>
<td></td>
</tr>
<tr>
<td>Safety; Quality of Care; Efficiency</td>
<td>• Improved patient safety</td>
</tr>
<tr>
<td></td>
<td>• Reduction in medical errors</td>
</tr>
<tr>
<td></td>
<td>• Reduced readmissions</td>
</tr>
<tr>
<td></td>
<td>• Improved scheduling</td>
</tr>
<tr>
<td><strong>Electronic information / Data:</strong></td>
<td></td>
</tr>
<tr>
<td>Evidence Based Medicine; Data Sharing and Reporting</td>
<td>• Increased use of evidence-based guidelines</td>
</tr>
<tr>
<td></td>
<td>• Increased population health reporting</td>
</tr>
<tr>
<td></td>
<td>• Improved quality measures reporting</td>
</tr>
<tr>
<td><strong>Prevention and Patient Education:</strong></td>
<td></td>
</tr>
<tr>
<td>Prevention; Patient Education</td>
<td>• Improved disease surveillance</td>
</tr>
<tr>
<td></td>
<td>• Increased immunizations</td>
</tr>
<tr>
<td></td>
<td>• Longitudinal patient analysis</td>
</tr>
<tr>
<td></td>
<td>• Improved patient compliance</td>
</tr>
<tr>
<td><strong>Savings:</strong></td>
<td></td>
</tr>
<tr>
<td>Financial / Business; Efficiency Savings;</td>
<td>• Increased volume</td>
</tr>
<tr>
<td>Operational Savings</td>
<td>• Reduction in days in accounts receivable</td>
</tr>
<tr>
<td></td>
<td>• Reduced patient wait times</td>
</tr>
</tbody>
</table>
S=Satisfaction

- **Patient**
- **Provider**
- **Staff**
- **Other**

“I really felt that once we started this, that I’m a better doctor for it… it really makes me a much more involved doctor.”

Michael Salesin, MD, Walnut Lake OB/GYN
West Bloomfield, Michigan

*As reported by others:*

- 118% increase in patient satisfaction
- Facilitates staff retention
T=Treatment/Clinical

• Safety
• Quality of Care
• Efficiency

“Our HIS has given us the tools to improve continuity of care, clearly define and improve quality, share information across the region, and improve reimbursements…And we’re creating our envisioned regional culture of value and safety.”

David Graser, Senior Vice President, Chief Operating Officer, Marquette General Health System
Marquette, Michigan

As reported by others:

• 20% increase in physician time spent with each patient per visit
• 41,000 potential medication errors avoided due to barcode alerts at six hospitals
"The traditional approach to decision making was group consensus based on anecdotal information. Empowered by our EHR, we now base many of our decisions on data and are truly able to set the standard for care of children."

Dr. Brian Jacobs, VP, Chief Medical Information Officer
Children’s National Medical Center
Washington, DC

As reported by others:
• $500K annual decrease in claim denials
• Improves reporting capability with research functionality
P=Prevention & Patient Education

• Prevention
• Patient Education

“My liver transplant changed the direction of my personal and professional life, and now, health IT is transforming the journey.”

Donna Cryer, JD, patient

As reported by others:

• 150% increase in patients meeting diabetes management metrics
• 96% compliance rate for patient and medication scans
S=Savings

- Financial/Business
- Efficiency Savings
- Operational Savings

“In the past, our A/R time was 40-60 days, now payments come back typically within 10 days. Our claims are batched, cleaned up, and go out the same day. We have very few denials anymore.”

Jim Dunn, Practice Manager, Children’s Medical Group
Jackson, Mississippi

As reported by others:
- 80% reduction in time to admit an ED patient
- $3M reduction in paper costs
Health IT Value Suite Findings

Percent Reported

- Satisfaction: 50%
- Treatment/Clinical: 90%
- Electronic Information/Data: 40%
- Prevention/Patient Education: 10%
- Savings: 70%

HIMSS
transforming healthcare through IT®
REALIZING THE VALUE OF HEALTH IT

Health IT creates **five kinds of value** of benefit to patients, healthcare providers and communities.

- **Satisfaction**
  - 118% increase in patient satisfaction
    - Unity Health Care, Inc., 2012
  - 90% increase in staff retention
    - Hudson River Healthcare, Inc., 2011

- **Treatment/Clinical**
  - 52% decrease in 30-day readmission rate
    - Mount Sinai Medical Center, 2012
  - 20% increase in physician time spent with each patient per visit
    - Jeremy Bradley, MD, FAAFP, 2012

- **Electronic Information/Data**
  - $500,000 annual decrease in claim denials
    - Sentara Health Care, 2012

- **Prevention/Patient Education**
  - 96% compliance rate for patient and medication scans
    - Sentara Health Care, 2012
  - 191% increase in immunizations
    - James Hodgins, MD
  - 150% increase in patients meeting diabetes management metrics
    - Hawaii Pacific Health, 2012

- **Savings**
  - $9.7 million savings due to elimination of transcription services
    - Hawaii Pacific Health, 2012
  - $3.1 million reduced length of patient stays
    - Sentara Health Care, 2012
  - ROI totalling $17.7 million
    - Coastal Medical Group, 2012

[ HIMSS](http://himss.org/ValueSuite)
Agenda

• New frontiers with mHealth

• mHealth for not so dummies ... The pitfalls

• mHealth strategies
Potential barriers and pitfalls for success

• The change challenge
  – Resistance to change among healthcare organizations and clinicians
  – Misaligned incentive structures

• The financing of wireless solutions
  – Healthcare sector at large underfunded
  – The business case for mHealth versus traditional care delivery

• Technological barriers
  – Computer illiteracy
  – Availability of internet
  – Lack of standardization

• Patient privacy and security

• Harmful effects and undesirable outcomes of mHealth
Reasons why regulation of mHealth is necessary

1. Patient safety
   - Potential harmful or incorrect information / education
   - Diagnosis and treatment
   - Support clinical decisionmaking

2. Ensure evidence based medicine / decisionmaking
   - Audit clinical trial (data)

3. Standardization of health data registration

4. It is a high volume market in which a lot of money will be involved

Regulation requires multiple governing bodies
- Health authority: Health outcomes and safety / Standardization of health data registration
- Economic affairs: fair competition and protection of consumers
- Telecommunication: availability of internet access
- Legislation: Protection of privacy and security
Agenda

• New frontiers with mHealth

• mHealth for not so dummies ... The pitfalls

• mHealth strategies
Steps for a successful mHealth strategy

1. **Assess room for improvement to convince providers and payers**
   - Define Needs → Design Solutions
   - Landscape analysis
   - Target population
   - STEPS

2. **Sustainable financing of mHealth**

3. **Align with national ICT strategy for healthcare**
   - Establish national strategy if not done already
   - Align mHealth strategy with national ICT strategy

4. **Prepare for certification of mHealth Apps**
   - Align governing bodies
   - Establish criteria for certification
   - Quality system: processes for certification and control

5. **Change management strategies**
Step 1: from Needs to Solutions

- Learn about mHealth capability for Health system, Providers and Clients
- Explore possible solutions and desired results: (Intermediate) outcomes and Impact
- Develop a logic model

Source: Mitchell M, Labrique A. A logic model for mHealth Systems. Personal Communication 2013
Step 2: Landscape analysis

• **Mobile Technology Landscape**
  – What is the mobile phone market penetration in the country/region?
  – Who are the key players in the mobile industry?
  – What are the current mobile market trends and drivers (for example SMS, big data, Internet)?
  – Explore current mobile industry regulations, policies, and upcoming changes.
  – What is the average monthly mobile phone expense for the proposed target population?
  – What is the average total cost of mobile phone ownership for an individual, and is it changing?
  – What are typical use cases? How do customers use mobile phone services?

• **mHealth Landscape**
  – Are there similar or complementary mHealth solutions?
  – What is the local technological capacity to support mHealth?
  – What are the national policies regarding mHealth?
  – Who are the players in the mHealth space [project implementers, non-governmental organizations (NGOs), technology partners, MNOs, ministry of health (MOH) officials, policy makers, funders]?
Step 3: Target population

• Define target population
  – Describe target audience of the solutions
  – How will they benefit from the solution

• Explore Technology Access & Mobile Use of Target Audience
  – Current technological access and practices of the end users.
  – Assess target population’s mobile phone use and how it affects the usability of the proposed mHealth solutions

• Conduct Formative Research with Members of the Target Audience
  – Focus groups and 1-on-1 interviews
  – Assess if and how they will best benefit from the mHealth solutions

• Validate the mHealth Concept
Step 4: STEPS
Assess the potential health care expenditure that could be shifted to mHealth

• The market sizing challenge
  – Competitive indicators needed to develop a market size from the bottom up are absent
  – Data on health expenditures from the top down lack detail for most developing countries

• Therefore determining a credible market size requires approaches that maximize the use of imperfect secondary data
  – Methodology 1: Top-down from health budgets with needs-based segmentation
  – Methodology 2: Top-down from health ICT or eHealth budgets
  – Methodology 3: Bottom-up from health care program cost and volume potential data