Accelerating Digital Health Innovation

Session 179, February 22, 2017

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Donna Fraser, Senior Project Specialist, Partners HealthCare
Speaker Introduction

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Chief Information Officer, Brigham and Women’s HealthCare

Donna Fraser, PMP
Senior Project Specialist, Partners HealthCare
Conflict of Interest

Adam Landman, MD, MS, MIS, MHS

Other: Senior Editor at Ranked Health – a non-profit organization that evaluates digital health apps

Donna Fraser, PMP

No real or apparent conflicts of interest to report
Agenda

• Changing Healthcare Landscape
• Galvanizing Internal Culture Change Through Hackathons
• Facilitating Internal Digital Health Innovation
• Hospital Needs-Driven Innovation: Partnering with Industry
Learning Objectives

• Explain the changing healthcare landscape and the opportunities and challenges with digital health innovation to improve healthcare quality

• Describe what a healthcare hackathon entails and what participants and hospitals can get from the event

• Apply and adapt information technology resources and processes to better support innovation

• Identify new ways to partner with early stage digital health start-ups to accelerate digital health innovation in clinical settings
BWHC Experience:

Digital Health Innovation is far reaching, applying to each of these STEPS™ categories.
Changing Healthcare Landscape
Exciting Time in Healthcare

<table>
<thead>
<tr>
<th></th>
<th>Old World</th>
<th>New World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment</td>
<td>Fee-for-service</td>
<td>Outcome-based</td>
</tr>
<tr>
<td>Incentive</td>
<td>Volume</td>
<td>Value</td>
</tr>
<tr>
<td>Focus</td>
<td>Acute episodes</td>
<td>Population health</td>
</tr>
<tr>
<td>Role of Provider</td>
<td>Single episodes</td>
<td>Care continuum</td>
</tr>
<tr>
<td>Information</td>
<td>Retrospective</td>
<td>Predictive</td>
</tr>
</tbody>
</table>

Source: Cleveland Clinic Global Cardiovascular Innovation Center
Digital Health Opportunity

- Digital health market projected to be $233 billion in 2020

https://upload.wikimedia.org/wikipedia/commons/thumb/9/94/Gartner_Hype_Cycle.svg/320px-Gartner_Hype_Cycle.svg.png
Digital Health Solutions Should Help Achieve the IHI Triple Aim

https://www.ahah.net/who-we-are/tripleaim.png
<table>
<thead>
<tr>
<th>Culture</th>
<th>Participatory, team-based, transparent, improving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Processes</td>
<td>Patient-anchored and tested</td>
</tr>
<tr>
<td>Patients and the Public</td>
<td>Fully and actively engaged</td>
</tr>
<tr>
<td>Decisions</td>
<td>Informed, facilitated, shared, and coordinated</td>
</tr>
<tr>
<td>Care</td>
<td>Starting with best practice, every time</td>
</tr>
<tr>
<td>Outcomes and Cost</td>
<td>Transparent and constantly maintained</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Ongoing, seamless product of services and research</td>
</tr>
</tbody>
</table>

**Health Information**  
Reliable, secure and reusable resource

**Data Utility**  
Data stewarded and used for the common good

**Digital Technology**  
Engine for continuous improvement

**Trust fabric**  
Strong, protected, and actively nurtured

**Leadership**  
Multi-focal, networked, and dynamic

http://www.iom.edu/Activities/Quality/~/media/Files/Activity%20Files/Quality/VSRT/Core%20Documents/ForEDistrib.pdf
BWHC Digital Health Vision

Brigham and Women’s Healthcare (BWHC) will drive more seamless, efficient, patient-centered, and safe care for our patients through the development, evaluation, use and commercialization of digital health tools.
Key Pathways for Digital Health Innovation

**Internal**
- BWHC clinicians, researchers, staff
- Foster culture of innovation
- Accelerate digital health innovation
- Commercialize

**External**
- Identify hospital strategic objectives
- Pre-screen companies
- Vet with key clinical leaders
- Pilot
- Implement
- Co-develop
Galvanizing Internal Culture Through Hackathons
“Event in which computer programmers, graphic designers, interface designers, project managers, and others collaborate intensively on software projects”

Friday Night
Saturday Morning - Keynote
Saturday Morning – The Pitches
Saturday Afternoon - Sunday
“Genius Bench”
Sunday Afternoon - Pitching
2013 Hackathon Participant Survey

• Surveyed Hackathon participants during Sunday afternoon presentation/award deliberation
  – Qualtrics survey
  – Short URL displayed to group
  – Incentivized participation via crowd favorite vote
## Participant Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18-24</td>
<td>5</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>25-34</td>
<td>47</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>13</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>45-54</td>
<td>8</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>55-64</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>65+</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>44</td>
<td>60%</td>
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</table>

<table>
<thead>
<tr>
<th>Background</th>
<th>Type</th>
<th>N</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Engineer</td>
<td>16</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>Scientist</td>
<td>19</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td>Computer Programmer</td>
<td>20</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Clinician</td>
<td>29</td>
<td>39%</td>
</tr>
<tr>
<td></td>
<td>Other Health Care Professional</td>
<td>8</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>Entrepreneur</td>
<td>15</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Business Professional</td>
<td>19</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td>Patient</td>
<td>9</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>Designer</td>
<td>11</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>7</td>
<td>9%</td>
</tr>
</tbody>
</table>

N=74
# Hackathon Experience

<table>
<thead>
<tr>
<th>Number of Hackathons attended?</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is my first</td>
<td>49</td>
<td>66%</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td>22%</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5%</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>Participation Reasons</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Have fun</td>
<td>60</td>
<td>81%</td>
</tr>
<tr>
<td>Help solve health care problems</td>
<td>59</td>
<td>80%</td>
</tr>
<tr>
<td>New friends/colleagues (networking)</td>
<td>53</td>
<td>72%</td>
</tr>
<tr>
<td>Connect with other experts (e.g., designers, engineers, entrepreneurs)</td>
<td>51</td>
<td>69%</td>
</tr>
<tr>
<td>Connect with clinicians</td>
<td>33</td>
<td>45%</td>
</tr>
<tr>
<td>Start new company</td>
<td>25</td>
<td>34%</td>
</tr>
<tr>
<td>Develop technical skills</td>
<td>24</td>
<td>32%</td>
</tr>
<tr>
<td>Make connections to pilot product in clinical setting</td>
<td>16</td>
<td>22%</td>
</tr>
<tr>
<td>Prizes</td>
<td>11</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>7%</td>
</tr>
</tbody>
</table>
## Participant Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networking – new connections with clinicians, engineers, or entrepreneurs</td>
<td>57</td>
<td>77%</td>
</tr>
<tr>
<td>Inspiration</td>
<td>52</td>
<td>70%</td>
</tr>
<tr>
<td>New ideas</td>
<td>46</td>
<td>62%</td>
</tr>
<tr>
<td>Knowledge and/or skills</td>
<td>39</td>
<td>53%</td>
</tr>
<tr>
<td>Satisfaction and/or sense of accomplishment</td>
<td>30</td>
<td>41%</td>
</tr>
<tr>
<td>Progress on idea</td>
<td>28</td>
<td>38%</td>
</tr>
<tr>
<td>Not sure yet</td>
<td>9</td>
<td>12%</td>
</tr>
<tr>
<td>New job opportunities or offers</td>
<td>7</td>
<td>9%</td>
</tr>
<tr>
<td>Other (please specify):</td>
<td>5</td>
<td>7%</td>
</tr>
</tbody>
</table>
Future Plans

<table>
<thead>
<tr>
<th>Do you plan to continue working on your project?</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>53</td>
<td>74%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Next steps after the Hackathon</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue working in free time</td>
<td>39</td>
<td>75%</td>
</tr>
<tr>
<td>Pilot at Brigham and Women’s Hospital</td>
<td>26</td>
<td>50%</td>
</tr>
<tr>
<td>Work closely with clinician partners from the Hackathon</td>
<td>20</td>
<td>38%</td>
</tr>
<tr>
<td>Seek funding</td>
<td>15</td>
<td>29%</td>
</tr>
<tr>
<td>Continue working at another Hackathon</td>
<td>15</td>
<td>29%</td>
</tr>
<tr>
<td>Start company</td>
<td>11</td>
<td>21%</td>
</tr>
<tr>
<td>Other (please specify):</td>
<td>3</td>
<td>6%</td>
</tr>
</tbody>
</table>
Facilitating Internal Digital Health Innovation
Academic Medical Centers can Accelerate Digital Health Solutions

Our Path

- **Departmental systems** – informal innovation
- **HIP Cycles** – funded innovation 2008
- **iHub** – launched fall 2013
- **DHIG** – launched July 2014
Challenges Working with Academic Medical Centers

- Slow Time Scale
- Difficult Collaborations
- Research Culture


Internal Hospital Challenges with Digital Health Innovation

• Innovators, researchers and vendors may be unfamiliar and inexperienced with hospital information system requirements

• CMIO/CIO often unaware of ongoing projects – involved only when there is a problem

• Security, privacy, data integration questions are typically afterthoughts
  o Potential vulnerability for organization, patients and data
Innovator Perspective

“within a big institution like Brigham and Women’s or Partner’s, implementing new technologies can be tough, and innovative thinkers have to be ready for many ‘no’s before the ‘yes’s”

*Stephanie Shine – NICU Google Glass Pilot*

Digital Health Innovation Group (DHIG)

Offers tools/resources to assist innovators with pilots/studies that involve digital health ideas/products

1. Streamline review process
2. Make it easier to meet requirements
   a. PHS IS standards
   b. Hospital policies
   c. Security and privacy best practices
3. Support operationalization (*separate process*)
# Inclusion/Exclusion Criteria

<table>
<thead>
<tr>
<th>In Scope</th>
<th>Out of Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Project</td>
<td>Projects for operations (and implementation for entire departments or hospitals)</td>
</tr>
<tr>
<td>Research projects and small pilots</td>
<td></td>
</tr>
<tr>
<td>Example</td>
<td>Request for a new electronic referral system to be used in all primary care practices.</td>
</tr>
<tr>
<td>Evaluating the use of a mobile app to monitor patient’s pain levels</td>
<td></td>
</tr>
</tbody>
</table>
Pilot Process

Complete HIT Innovation Intake Form

BWH HIT Innovation Governance Board Review

Complete Follow-up Items i.e.
- Security Review
- Veracode Scan
- BAA
- Legal Agreement
- Signed Charter

Ready to Pilot
By the Numbers

50+ Pilots

• 40+ vendors
• 200+ documents
  – Intake Forms and Checklists
  – Business Associate Agreements
  – Master Services Agreements
  – Statements of Work
  – Charters
  – Security Reviews
  – Lessons Learned
DHIG Innovator Support

Innovations = 62
July 2014 - December 2016

- In Pilot/Study or Ready: 13
- Completing Tasks: 20
- Stalled: 3
- Watch List / To be Reviewed: 11
- Did Not Move Forward: 9
- Pilot Ended - Closing: 4
- In Production: 2

BWHC Developed vs. Vendor

- BWHC Development: 33%
- Vendor: 67%
Innovation Process: What Works

**Innovator**

- Security: DHIG/API provides advice, single point of contact and list of what is needed
- Development support for innovators who want to build software
- Able to learn from others
  - Community of innovators
  - BWH approved apps
  - Charters
  - Lessons Learned

**DHIG**

- Word is out – innovators find us
- Collaboration: Wide participation from departments who support innovators
- Innovators who develop their own applications
- DHIG/API model works at the enterprise level
- Defined process reduces risk to organization
Innovation Process: What Doesn’t Work

Innovator
• Time consuming
• Complex and confusing
• More work than envisioned
• Forces compliance
• Competing with operational priorities

DHIG
• Efforts that lack a sponsor
• “Free use of software”
• Long timelines from intake to lessons learned
• Vendor pilot to operational implementation ratio
### Lessons Learned

| About Vendors | Many products/services are early stage, not a clear leader or clarity on which will be successful  
|              | Few robust validations  
|              | Many companies do not have healthcare expertise |
| About Us     | Innovation Life Cycle can be long  
|              | Work required before “free software” can be used  
|              | Value of innovator who is committed to doing the required work and how frequently effort is underestimated  
|              | Value of developing a network to support the variety of needs  
|              | Opportunity to improve processes and expand services |
Hospital Needs-Driven Innovation: Partnering with Industry
Hospital challenges and pain points

Bring challenges closer to the solution ecosystem.

Clear the path to an implementation decision.

Solution Approaches

- Build
- Buy
- Co-Develop

Digital solutions

Map Digital Efforts to Institutional Priorities
Prioritize by Hospital Priorities

Strategic Initiatives with a focus in Digital development

Differentiators
- Scalable Innovation
- Advanced Expert Care

Competitive Factors/”Must Do’s”
- Improve Health
- Timely Access
- Exceptional Experience
- Highest Quality, Safe Care
- Affordability: Lowest Cost Possible

Translational Research Acceleration
Active Asset Management

iHub

Prioritize by Hospital Priorities
BWH Burn Application (BUILD)
Digital Wayfinding (BUY)
Herald (CO-DEVELOP)

• Create personalized, rule-based protocols to automate tasks and prioritize information
Improve satisfaction of those seeking to use digital health tools

Enable digital health pilots to improve outcomes

Ensure digital health tools adhere to security best practices

Enable digital health pilots that address these areas

Achieve savings with an efficient process that addresses the needs of the innovator and the organization
Conclusions

1. Digital health innovation is critical for continuing to deliver high quality, efficient care

2. Hackathons can help build culture of innovation, initiate ideas, and form interdisciplinary teams

3. A formal review process can help facilitate digital health innovation, while ensuring appropriate oversight

4. Strategic partnerships with vendors can lead to improved value – better products, reduced costs, and new revenue streams
Lesley Solomon
Executive Director

Jeff Greenberg
Medical Director

Josie Elias
Program Manager, Digital Health Innovation

Brian Mullen
Manager, Open Innovation Studio

Beverly Hardy
Manager, Innovation Strategy

Chris Wheelahan
Innovation Specialist

Alexandra Pelletier
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Please complete online session evaluation