Innovation for Providers
This course will explain why innovation is essential for health system survival, and present strategies for health system engagement in innovation. The discussion will focus on operational and digital innovations. Presenters will describe how Health systems are carving a path for innovation, and how they assess financial viability and ROI for opportunities. The audience will learn from mistakes and successes.

Course Objectives:

• Understand the value for healthcare innovation

• Understand strategies for health system engagement in operational and digital innovation

• How to carve a path for innovation

• How to assess financial healthcare innovation viability and ROI

• Lessons learned from mistakes and successes.
The Opportunity is Out There

75% of health system leadership believe digital innovation is essential to meeting long-term goals and establishing a competitive advantage.

70% of IT leaders believe their department has insufficient resources to support digital innovation.

54% believe that time put into digital innovation is spent inefficiently.

23 MONTHS Average time it takes to get from identifying a need to implementing a solution.

*American Hospital Association 2017*
Status Quo

- Commoditized Relationships
- Fear/Apathy
- Inefficiency
- Technology

Broken Healthcare

Patients

Providers
Making Data Useful
Digital Health Investments Continue To Grow

Key Trends

Increase in funding velocity, with average time between seed and Series A rounds dropping to ~15.7 months
Increase in investments outside of Boston, New York and SF, with the Midwest growing in overall funding share
Follow-On investors have larger appetite for late stage digital health deals, with Series B investment volume up and Series C and D round size increases

$14.6B
Total funding in 2018 for digital health startups

Source: Health Insights;
Data as of December 22, 2018;
Total funding includes public deals through December 22, 2018.
Confidential and Proprietary
Opportunities After EMR Implementation

Our Thesis

Once a health system has implemented an EMR, there are a myriad innovative ways to build upon this infrastructure. There are market opportunities at every stage post-implementation from record collection workflow to leveraging the macro-level data to drive better care decisions. At HealthX, we aim to leverage our expertise in EMR systems to fund the next generation of companies that are going to innovate in this post-implementation phase.

Past

In 2009, the Obama administration signed the HITECH Act into law, aimed at stimulating the adoption of electronic medical record (EMR) systems by health providers across the country. The years that followed saw massive projects to modernize medical record collection.

Present

Today, almost all health systems have adopted EMRs. However, the shotgun approach to adoption in the past decade has come with a variety of issues. There is significant room for improvement in provider workflow, standardization of data, intra-system communication and analysis of EMR data.

Future

Where is the market headed?

1) Data Analytics To Improve Care
2) Digital Therapeutics
3) Precision Medicine
4) Drug Discovery & Real-World Evidence
5) Administrative and Clinical Workflow Improvements
An EMR-Centric, Data-Driven Future (1/2)

Future State

With the continued growth in collection of data, the EMR will serve as the key mechanism for connecting disparate data sources and securely housing it in a single location that is accessible to healthcare providers.

Given the EMR’s role as chief data aggregator, we expect a future state where predictive analytics engines driven by AI analyze the data housed in EMRs to produce clinical and operational insights for healthcare stakeholders.

The EMR is the key physician facing digital interface, so we expect many layers of easy to use applications built upon the basic EMR infrastructure to help physicians make better clinical decisions while limiting inefficiencies in their workflows.

EMR’s will speak to and aggregate data from all medical devices, wearables, digital therapeutics, patient engagement applications, genomic testing centers and smart devices. As we shift to an IoT paradigm, the EMR will serve as an aggregator of data.
As the price of whole genome testing becomes comparable to that of SNP testing today, we expect it to become standard to house genetic data on patients within the EMR. Genomic analysis can not only inform preventative care, but help in picking the most appropriate treatments upon onset of illness (e.g., pharmacogenomic screening for cancer patients).

Pharma companies are moving away from a unidimensional view on providing patients care for their disease. We expect most companies to offer patients with therapeutic regimens (e.g., behavioral exercises) through digital avenues. The added benefit of digital therapeutics is easier oversight on adherence and changes in clinical outcomes over time. This data can also be fed into the EMR system in real time, allowing an earlier intervention by an HCP.

Med device manufacturers have already been developing connected devices which allow for continuous monitoring, and we expect the majority of implantable and chronic care devices (i.e., insulin pumps) to be cloud connected and feeding data to HCP's in the next decade. Pairing these with data collected from wearables will help paint a clearer picture of a patient's health and habits outside of what is reported in a clinical visit.

While on one hand there will be digital therapeutics, there will also be a slew of digital tools for patients managing their chronic care and interacting with the health system (e.g., virtual AI chatbots). Data on utilization of these services and insight into metrics such as symptoms a patient may be asking the chatbot about may also help identify issues earlier and inform the physician about appropriate care plans.
Increasingly, the first point of contact for a patient will be an AI-powered, virtual care assistant or chatbot which utilizes natural language processing to accurately triage symptoms and provide relevant information or care plans when a human physician is not available. We expect health systems to adopt these digital services to avoid unnecessary utilization (e.g., ER visits) and provide better care. Additionally, we expect voice to become the primary means of engagement between an individual and said virtual care providers. Patients will also see better actionable insights from the data they collect on their wearables, phones and connected medical devices.

For providers, we see AI powered tools which help reduce administrative burdens and provide pre-populated recommendations to become ubiquitous. While we do not expect physicians or nurses to become obsolete, we expect AI enabled tools to improve diagnosis or treatment accuracy as well as reporting of outcomes. The first area that we expect significant augmentation of physician abilities is in image recognition. Radiologists and pathologists will likely see the earliest mature products which help them better diagnose patients. We expect voice to become the primary means of engaging with EMR’s.

We believe healthcare executives will benefit from tools which provide them clear actionable operational insights. As reporting of clinical variation, spend and patient outcomes becomes better, this data will be analyzed and presented to leadership in digestible form. Our expectation is that AI powered tools will mature enough to significantly reduce man hours required to complete the administrative tasks in hospitals (e.g., billing, scheduling, documentation maintenance). We expect administrative personnel demand to decrease significantly in the coming decade.
We Expect Hyper-Personalization of Care

Genomic Data

There is no doubt that genomic data will be informing HCP and patient decisions from pregnancy planning to end of life care. The ubiquity of genomic data will likely help us move from making therapeutic regimen decisions customized to an individual based off their genetic makeup. Similarly, this data will also inform preventative care based off risk factors for diseases like Alzheimer’s or Breast Cancer.

Custom Tools

As patients continue to interact with the healthcare system through digital channels, we expect there to be a variety of tools which incorporate a patient’s history and customize regimens or activities to match that patient’s risk profile and lifestyle. We think patients will have a toolkit of individualized and adaptive digital health programs that will help keep them healthy.

Scientific Wellness

The combination of personalized behavior coaching, genomic testing, blood testing, vitals tracking and activity tracking will help us make more informed decisions about an individual’s wellness. Combining these data sources to produce a holistic digital view of a patient will help HCP’s strategically intervene earlier and more effectively.
Aligning Incentives

The Quadruple Aim

**Quality**
Enhance how care is provided to help patients to achieve better outcomes

**Cost**
Increase Operational Efficiencies

**Patient-Centered**
Improve patient experience by allowing caregivers to be Patient Centered

**Experience**
Improve the caregiver by improving workflow and empowering care teams
Why the wait?
Healthcare is the only major industry that has yet to be transformed by the digital revolution.

Why digital instead of clinical?
Digital innovation is important because it has strong ties to long term strategy and competitive differentiation.

Well, they kind of go hand in hand
Value driven innovation delivers solutions for real problems with more velocity, precision and lower cost.
Life expectancy vs. health expenditure, 1970 to 2013

Health financing is reported as the annual per capita health expenditure and is adjusted for inflation and price level differences between countries (measured in 2010 international dollars).

We are Failing

We continue to spend more $, without the health outcomes to match.
Understand your stakeholders
Everybody’s invited to dinner! This is NOT just an IT problem.

Identify your focus area
Find an actual and relevant problem. Quadruple Aim.
Measure before and after (use those fancy EHRs!). Seek early wins. Lots of innovation is really change management.

Seek early wins
After all, a lot of innovation is really just change management
Finding an ROI

1. The process must systematically show the value of the innovation process as it unfolds logically.
2. The process must be dynamic, to make adjustments along the way, as enablers and inhibitors are identified.
3. A variety of data is necessary, ranging from qualitative to quantitative, taken from different sources in different time frames.
4. Both financial and non-financial data are needed, which means that the financial ROI must be an important part of the process to be CFO-friendly.
5. The hard-to-measure and hard-to-value measures are still important and need to be an important part of this process.
6. The process must be able to predict success before the innovation project is implemented in a ROI forecast, as well as a follow-up ROI evaluation.
7. The process must be based on sound theories and theoretical frameworks. It must be researcher- and professor-friendly.
8. It must have standards that guide the use of the process and these standards must be conservative for executives to buy into, and support, them.
9. The process must be user-friendly, void of complicated mathematics and long, complicated tasks.
Current Business Model Doesn’t Work

• Patients are finding new care settings - pharmacy retailers (CVS, Walgreens, Walmart, etc.), private urgent care networks, telehealth.
• Growing number of advanced procedures occurring outside of the hospital (in surgery centers)
• The old ways disincentivize information sharing, and patients are demanding better connectivity as a more tech-savvy generation ages.
• Expect payment methods to shift further toward value-based care

Primary Strategy

Incubate and Commercialize
Incentivize innovation from a business standpoint to leverage advances first and distribute your success.

Champion Adoption
Don’t let your IT operation get too bloated. Be nimble and fast when it comes to adopting new technologies quickly into your existing digital ecosystem

Forge Great Partnerships
...of all kinds. Create clinical partnerships to better leverage data and improve continuity of care. Demand excellence from service providers with performance-based pricing and partnership.
Health System Sales Requires Operational Know-How

Sales cycles typically take 12+ months; connecting with a decision-making stakeholder early in the process can significantly decrease time to pilot.

Understanding and empathizing with a healthcare executive’s concerns is critical in picking the right analyses and effectively pitch to convert pilots to paying customers.

Speaking the healthcare executive’s language is key in properly pitching a new digital tool.

Given the myriad digital tools available to health systems, referrals and strong customer references are key to scale up.

Healthcare organizations typically require navigating multiple internal groups before getting even a pilot green-lit.
Stakeholders

Workflow
Training
Champions

Operations & Governance
ROI
Reference sites
Project plan

Legal
BAA
Limit of liability
Indemnification

IT/IS
Data Integrity
Integration Offering
Scope
App readiness
Project Flow
CUSTOMER CASE STUDY

Reaching the Top Quartile: Focused Initiatives Increase Likelihood to Recommend

Cedars-Sinai, 1,016 beds, Los Angeles, CA

- **About**: Cedars-Sinai is a nonprofit academic healthcare organization in the Los Angeles area across 40 locations supported by a network of 4,500+ physicians and nurses.

- **Challenge**: The patient experience team at Cedars-Sinai is tasked with improving care-setting specific ratings score across the health system.

- **Solution**: Through a combination of efforts in conjunction with utilizing insights from NarrativeDx, the organization increased awareness of patient experience data, developed an actionable evidence basis from patients own words, and improved responsiveness of Cedars-Sinai employees.

- **Impact**: Cedars-Sinai saw an increase or maintained a high percentile rank for “Likelihood to Recommend” across their various departments. Inpatient, licensed clinics, medical network clinics, and the emergency department saw an increase from 2017 to 2019.
Patient Satisfaction* Percentile Rank Year over Year

<table>
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<tr>
<th>Category</th>
<th>FY 2017</th>
<th>FY 2018</th>
<th>FY 2019 (YTD)</th>
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<tr>
<td>CSMC Inpatient</td>
<td>85</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Medical Practices</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>CSMC ED</td>
<td>75</td>
<td>75</td>
<td>75</td>
</tr>
</tbody>
</table>

**Impact Highlights**

- All sites of care finished above the 78th percentile in their Likelihood to Recommend score.
- The inpatient setting stayed relatively steady at an impressive 86th percentile rank.
- The Cedars-Sinai medical practices combined for the greatest increase from 64th to 83rd percentile, a 28% increase.
- Starting in 2018, the CSMC ED saw a significant increase to the 78th percentile in 2019.

*Inpatient: Overall rating of hospital, Practices: Overall rating of provider, ED: likelihood to recommend for ED
What’s holding the industry back?

And how can you help?

67% of health care orgs have missed business opportunities as a result of poor integration

59% characterize integration as the “Achilles heel” for their organization
Brigham & Women’s Innovation Hub

Accelerate the evaluation, adoption and deployment of new technology via rapid, integrated pilots

- Advance project timelines by increasing integration project throughput
- Reduce burden on IT (and time spent in IT backlog)
- Enable efficient, informed decision-making regarding new technology before investing in a broader roll-out

Harvard’s 800-bed teaching hospital is on a digital transformation journey.

"Redox will allow us to efficiently and securely share information and data that are essential to supporting the adoption of novel technologies that have the potential to ultimately improve the care of our patients."
Adam Landman, MD
CIO
From Idea to Solution

**Innovation Team**
1. Application Sourcing & Vetting
2. Pipeline Strategy & Prioritization
3. Connectivity, Configuration & Workflow Scoping

**IT/IS Team**
4. Testing & Go-Live
5. 24/7 Monitoring, Support & Maintenance
Trends in Value-Based Care

Payment Model Spectrum

Sources: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5378385/
https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/Value-Based-Programs.html
Benefits to Partners: Financial Value Generated

- **Shared Savings**
  - Percentage of net savings produced in value-based contracts

- **Quality Metrics**
  - Readmissions, ACO Metrics, MA Stars, MIPS, HEDIS, & PCMH

- **Uninsured Cost Avoidance**
  - Reduction in utilization for uninsured patients

- **Staff Productivity**
  - Increasing the number of patients that current staff can actively manage
Proven Clinical Outcomes

- **61% decrease** in hospitalizations for patients with COPD
- **1.15% drop** in HbA1c over 4 months
- **50% improvement** in blood pressure control* over 12 wks
- **28% drop** in PHQ-9 for patients with depression
- **>2.1x increase** in follow-up appointment adherence
- **18.37% decrease** in CHF hospitalizations

9 Positive-Outcome Publications in Peer-Reviewed Medical Journals

- NEJM Catalyst: Substance Use (Case Study)
- Nature Scientific Reports: Dialysis
- SAGE Journals: Cardio and Diabetes
- JMI Research Protocols: COPD
- JMI: Hypertension and Diabetes
- Telemedicine and e-Health: Surgery
- Telemedicine and e-Health: Medication Tracking & Depression
Case Studies: Increasing Staff Capacity, Caseloads, and Satisfaction

1. **1,000 patients managed by 2 RNs**
   - Leading Primary Care Group
   - Primarily CHF, diabetes disease management

2. **2.75x caseload increase:** LPN Care Manager
   - Successful MSSP ACO
   - Providing CCM, DM, and care coordination
   - Caseload (32 -> 88 patients)

3. **10x caseload increase:** RN Disease Manager
   - Large Health System
   - Providing longitudinal disease management
   - Caseload (30 -> 300 patients)

“Epharmix has improved the ability for our providers and care management staff to connect with our chronic disease patients. It should help our patients achieve and maintain their treatment goals and allow us to identify patients needing an acute intervention to prevent ER and hospital visits.”

- Dr. Dominic Meldi, Medical Director for Care Management

“It’s a great benefit to have a program that will assist patients, especially patients who may not have family or friends who can check up on them on a regular basis.”

- Tinika Bunch, Care Manager

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Epharmix COPD Study and Cohort Description

- **Randomized Control Trial**
  - 168 patients
  - 8-month trial
  - Controlled for Hawthorne effect

- **Percentage of patients on disability**: 75%
- **Average patient age was 60 +/- 9.6 years old**: 60
- **Average annual patient income**: $9,700

COPD Study Results: 61% reduction in hospitalizations

Epharmix Dialysis Study and Cohort Description

**Prospective Randomized Control Trial**

- **19 patients**
- **16 week trial with crossover**
- **Washington University School of Medicine at Barnes Jewish Hospital Clinic**

**Key Statistics**

- **Median years on dialysis**: 2.75
- **Average patient age**: 50
- **Average annual patient income**: $12,000

**Additional Information**

- Predominantly a minority population from economically disadvantaged neighborhoods. Approximately 25% were Medicaid recipients.

Reference: [https://www.nature.com/articles/s41598-017-03184-z](https://www.nature.com/articles/s41598-017-03184-z)
Dialysis Study Results: 54% reduction in hospitalizations

% Patients Admitted During EpxDialysis Trial

Missed Sessions – Crossover Trial

Reference: https://www.nature.com/articles/s41598-017-03184-z
Epharmix Diabetes Study and Cohort Description

Prospective Single-Arm QI Study

- 396 patients
- 314 patients consented (79.3%)
- Standard of care pre and post study

Type 2 Diabetes

- HbA1c > 7
- St. Louis
- Community implementation
- Care Managers and Disease Managers

Clinical users

Diabetes Study Results: 1.15% drop in HbA1c in 4 months

Note: A significant change was not observed for patients with A1c <8.0

Reference (7.25.17): http://diabetes.jmir.org/2017/2/e15/