HIT in Action:
A Maryland Perspective

Richard Bendis
President & CEO
BioHealth Innovation, Inc.

February 6, 2014
1. Expand the availability of telemedicine for patient care
2. Continue to support CRISP HIE services expansion
3. Ensure consumer privacy and security
   - Support harmonization of regulations between neighboring jurisdictions
   - Support efforts to develop a consistent nationwide patient data matching strategy
Maryland’s Triple Aim Roadmap

Reduce Costs | Enhance Quality and Experience | Improve Health

- Limit hospital per capita spending to an annual growth cap of 3.58%
- Reduce total Medicare hospital spending by $330M over five years
- Limit total growth in Medicare spending per beneficiary to no more than national growth
- Reduce the readmissions rate to the national average within five years
- Reduce infections and other hospital-acquired conditions by 30 percent within five years

www.healthaffairs.org/blog/2014/01/28/marylands-triple-aim-roadmap/
State of Maryland: Federal & University Resources

- Population: 5.9 million people

- 59 Federal Laboratories, Centers, & Institutes in Maryland

- Maryland Federal R&D investment exceeding $12 billion annually

JHU and USM represent another $3.5 billion in annual R&D
The Region — Central Maryland

- Unrivaled Research Assets -

- Unfulfilled Commercial Promise -
What is A Regional Innovation Intermediary?

An organization at the center of the Central Maryland region’s efforts to:

- Align local technologies, assets and resources
- Advance Innovation

- Regionally-oriented
- Private-public partnership, 501(c)(3) nonprofit
- Market-driven, private sector-led
- Neither a government initiative, nor a membership organization
BHI: An Innovation Intermediary that Connects

Connects Private, Public and Academic Sectors

Connects Central Maryland Communities

Connects Bio-Health Cluster Industries

Connects Regional, National and Global Markets
# BHI Partners and Sponsors

## Private Sector

- GSK
- AstraZeneca
- BD
- Adventist HealthCare
- SR-one
- MedImmune
- QIAGEN
- Emergent Biosolutions
- VENABLE LLP
- Northrop Grumman
- Kaiser Permanente
- United Therapeutics Corporation
- M&T Bank
- GenVec
- Ernst & Young
- NEA
- Cassidy Turley
- Noble Life Sciences
- SAIC
- ATCC

## Government

- Montgomery County Business Innovation Network
- Montgomery Economic Development
- NIH
- National Institutes of Health Office of Technology Transfer
- NIH National Heart, Lung, and Blood Institute
- BIOxMARYLAND
- INNOVATE Maryland's Innovation Initiative
- EDA
- Land of Opportunity
- Invest Maryland

## Academia

- University of Maryland
- UM Ventures
- University of Maryland BioPark
- Johns Hopkins University
- Maryland Technology Enterprise Institute
- bwtech@UMBC
- Johns Hopkins University
- Montgomery County

## Non-Governmental

- EAGB Economic Alliance of Greater Baltimore
- Tech Council of MD
- TEDCO Technology Development Corporation
BHI Program Structure

** SOURCES **
- NIH
- Universities
- Federal Labs
- Industry
- Entrepreneurs
- Soft Landing
- DreamIt

** BHI Assistance Programs **
- SBIR Program
- Startup Package
- Early-Stage Fund

** CRAB **

** EIR **

** Strategic Programs **
- Soft Landing
- DreamIt Health

** Financial Sponsors **
- NEA
- Adventist HealthCare
- M&T Bank
- Kaiser Permanente
- EAGB
- BD
- Emergent Biosolutions
- EDA
- Johns Hopkins University
- Deloitte
- MedImmune
- Northrop Grumman
- GSK
- SR-One
- United Therapeutics
- Boeing
- PerkinElmer
- CERACOM
- DB Capital

** OUTCOMES **
- Technologies Progressed
- Company Growth
- Risk Capital
- New Startups & Spinoffs
- Partnerships
- Mergers & Acquisitions
- Leveraged $s
- Regional Branding
- Jobs
- Economic Development
Innovation Paradigm Shift

PROOF OF CONCEPT
(Technological Feasibility)
Laboratory Push
“It Works!”

PROOF OF COMMERCIAL RELEVANCE
(Market Pull)
“It Works To Solve A Problem”
“I’ll Buy It”
BHI Technology Focus

- Therapeutics
- Diagnostics
- Medical Devices
- Healthcare Services
- E-Health
- Mobile Health
- Electronic Medical Records
- Health Informatics
- BioHealth Cyber Security
Partnership Intermediary Agreements

PIA between BHI and NIH’s Office of Technology Transfer (OTT) that supports the 27 NIH institutes’ $3 billion intramural research and the Food and Drug Administration to promote and foster cooperative research and accelerate technology commercialization among NIH/FDA, businesses, and universities.

PIA between BHI and the Telemedicine & Advanced Technology Research Center (TATRC) to capture USAMRMC and TATRC research outcomes and promote further research, product development, commercialization, and economic development opportunities. TATRC has funded 241 MD based projects over the last 12 years.
BHI Entrepreneurs-in-Residence

**Todd Chappell (NIH-OTT)**
Todd assists the Office of Technology Transfer (OTT) in the evaluation of existing technologies, provide an entrepreneurial perspective on new licensing proposals from start-up companies, advise on opportunities for new ventures, assist with developmental strategies, and mentor scientists to help ensure their research becomes commercially valuable.

**Ken Malone (UM Ventures)**
Ken has built his career on creating economic value from science. Whether it was developing new business lines for global corporations or spinning out new ventures from universities, he has engaged in the commercialization of hundreds of new products in advanced materials and life sciences.

**Ram Aiyar (NHLBI)**
Ram assists the National Heart Lung and Blood Institute (NHLBI) in translating disruptive science into commercially viable technologies. He works with the relevant stakeholders within the NIH to develop commercial plans and/or develop licensing opportunities such that the NIH technologies can be translated into commercially viable entities that will solve unmet medical needs of patients.

**Rich Moore (NIH-OTT)**
Dr. Moore previously served as the Chief Scientific Officer for OpGen, Inc. In that role, Dr. Moore provided leadership over multiple R&D functions, and led the company's Scientific and Clinical Advisory Boards. Prior to that, he spent 12 years at BD Diagnostics holding various positions, most recently as R&D Director, Systems Integration and Advanced Technology.
# BHI Client Companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BeneVir</td>
<td>Developing a therapeutic platform that can be adapted to target a wide variety of cancers.</td>
</tr>
<tr>
<td>Living Discoveries</td>
<td>Specializes in automatically diagnosing medical conditions in medical scans, tests, and sensors with minimal human support.</td>
</tr>
<tr>
<td>Mumeiras</td>
<td>Developing and marketing Organ-on-a-Chip solutions for the pharmaceutical industry.</td>
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<tr>
<td>Mehr Medical</td>
<td>Developing devices for cardiovascular procedures that will solve high unmet needs in the transcatheter valve replacement space.</td>
</tr>
<tr>
<td>MockV</td>
<td>Developing novel viral clearance kits to be utilized during process development bio therapeutics.</td>
</tr>
<tr>
<td>N5 Sensors, Inc.</td>
<td>Developing sensors that can detect harmful chemicals mixed in air in very small quantities, such as industrial chemicals, and other pollutants.</td>
</tr>
<tr>
<td>Perceptive Navigation</td>
<td>Developing medical devices related to image-guided, minimally-invasive niche markets.</td>
</tr>
<tr>
<td>VLP Therapeutics</td>
<td>Developing a platform vaccine like particle technology that has the potential to be used for various diseases including cancer.</td>
</tr>
</tbody>
</table>
US Venture Capital Investment

<table>
<thead>
<tr>
<th>Year</th>
<th>Deals</th>
<th>Investment</th>
<th>Deal Size</th>
<th>Active VC Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>4,211</td>
<td>$31.9 billion</td>
<td>$5.4 million</td>
<td>410</td>
</tr>
<tr>
<td>2013</td>
<td>2,505</td>
<td>$21.1 billion</td>
<td>$8.4 million</td>
<td>460</td>
</tr>
<tr>
<td>2013 Maryland</td>
<td>71</td>
<td>$663 million</td>
<td>$9.3 million</td>
<td></td>
</tr>
</tbody>
</table>

*VC firms completing 4 or more deals per year
## US Angel Investment

<table>
<thead>
<tr>
<th>Year</th>
<th>Angel Investors</th>
<th>Companies Financed</th>
<th>Angel Investment</th>
<th>Avg. Deal Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>258,200</td>
<td>57,120</td>
<td>$27.3 billion</td>
<td>$478,000</td>
</tr>
<tr>
<td>2013*</td>
<td>134,895</td>
<td>28,590</td>
<td>$9.7 billion</td>
<td>$337,850</td>
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</tbody>
</table>

*For Q1 & Q2
2013 US VC Health IT Investment

$571M
2013 Total Health IT Investment

83
Deals
Global mHealth Market Growth

2012
$1.3B

2018
$10.2B

41.5%
compounded annual growth rate
US Health IT Statistics

- 88% of physicians want patients to be able to monitor their health at home
- Analysts say Consumers are willing to spend $14B on digital health
- # of adults using mobile phones for health info grew from 61M to 75M
- 90% of patients want to self-manage their healthcare

Analysts say consumers are willing to spend $14 billion dollars on certain digital health technology products.
Startup Statistics

- New business owners in 2012: 514,000
- Average founding team age: 35-44
- Avg. Funding per company: $1.5M
- 75% of startups fail
- 90% of products fail
- 18% of entrepreneurs succeed in their first venture

www.slideshare.net/mashable/startup-success-by-the-numbers
DreamIt Health Accelerator

- Help 9 companies achieve critical business milestones in 4 months
- Provide guidance from successful entrepreneurs
- Give companies the chance to tap into the region’s wealth of federal healthcare institutions

120 Applications
32 Semifinalists
25 Finalists

9
A Health IT Accelerator is an intensive 16 week program that admits top-recruited companies and entrepreneurs, provides a curriculum and network of experienced mentors in business, marketing and product development in the Health IT arena to “accelerate” top companies.

- Retain promising high growth HIT entrepreneurs in MD

- **Partners:**
  - BioHealth Innovation, Inc.
  - Johns Hopkins University
  - DreamIt Ventures
  - Economic Alliance of Greater Baltimore
  - Northrop Grumman
  - Kaiser Permanente
  - DBED
Participant Overview

Phobious
www.phobious.com

THE SMARTPHONE PHYSICAL

Aegle

RESPI

Protenus
Moving Healthcare Forward

Cognuse
Neuroscience

Avhana+

Emocha
saving time. saving lives.

Patient Feed
Aegle seeks to solve the problems of collection, analysis, and presentation of biometric information. Currently Aegle is focused on consumer wearable devices and is developing a fitness monitor that helps athletes track their fitness and push their limits with actionable metrics.
Avhana hopes to create a marketplace to facilitate the exchange of clinical decision guidelines so physicians have access to thousands of these guidelines with one click.
Cognuse is developing solutions for the mental healthcare industry. Our core product platform CognuseManager is an evidence-based patient-centric tool for cognitive rehabilitation in the executive functions domain.
Emocha is a mobile health platform that improves medication adherence in clinical trials and disease management. It provides the mobile tools to engage and manage the patient and their health.
Inpatient physicians have complex workflows and information coordination needs. Gaps in these processes lead to slower and worse patient care. **PatientFeed** is a team of physicians and engineers integrating mobile and collaborative technologies so that physician-teams are always in-sync and enabled to deliver the best care possible.

**Location**
Pittsburgh/NYC

Azam Qureshi  
Nadeem Kolia  
Khalid Harun
Phobious develops a mobile technology that creates hyper-realistic environments to treat anxiety disorders by means of systematic desensitization by virtual exposure. Phobious has created a set of tools for professionals and will be developing a self-treatment app for phobias and other pathologies.
Protenus aims to develop smarter, integrated healthcare administrative workflows that prevent wasted clinical time, improve patient satisfaction, and painlessly improve regulatory compliance.
Smartphone Physical is the first e-commerce platform for medical-grade smartphone and tablet devices. SP is integrating these tools so that they can be incorporated into the workflow of clinicians, home health care workers, and other providers.
US Company: Fitbit

- Provides activity trackers and activity tracking software to promote wellness and a healthy lifestyle.

**Fitbit Trackers**
The Tracker measures steps taken and calculates distance walked, calories burned, floors climbed, and activity duration and intensity.
MD Company: WellDoc

- Focused on developing solutions to support diabetes management
- Will hit $50M funding mark with latest funding round

DiabetesManager®
A system for health care providers to coordinate diabetes care, propel self-management and achieve long-term adherence.
MD Company: Strand Life Sciences

- Focused on providing an end-to-end service that offers NGS Diagnostics to hospitals

Molecular Biology Lab Services
Strand uses second generation sequencing instruments, compute clusters, and human brains to sequence, analyze and interpret genome data from a variety of organisms.
MD Company: Vasoptic Medical, Inc.

- An early stage start-up company with a mission to advance healthcare through innovation in medical diagnostics.

XyCAM™ Retinal Imager
A solution for the early diagnosis of Diabetic Retinopathy & other conditions which is designed for primary care & telehealth settings.
Healthcare IT Trends

MOBILE NETWORKING
3 million patients will be monitored via mobile networks by 2016.¹

DATA WILL CONTINUE TO PLAY A ROLE, BIG OR SMALL
10% of hospitals implemented data analytics tools in 2011. 50% are predicted to do so by 2016.²

MOBILITY AT THE PATIENT BEDSIDE
66% of doctors use iPads or other tablets for medical purposes, up from 45% a year earlier.³

TELEHEALTH REINS IN READMISSIONS
A trial using remote video conferencing between nurses and recently discharged patients delivered a 97% success rate in preventing readmissions.⁴

Annual costs associated with preventable readmissions.

17B
$17B

www.hitconsultant.net/2013/04/10/infographic-healthcare-it-trends-transforming-healthcare/
10 Challenges for Health IT

1. First-generation EHR is failing
2. Healthcare industrialization is accelerating
3. Healthcare cloud adoption will flourish
4. The criticality of analytics will grow
5. Personalized clinical decision support
6. Provider consolidation
7. Revenue cycle management
8. Underinvestment in business continuity
9. Security and privacy issues
10. Compliance is expensive