

## CONNECTED HEALTH PROMISING TRIPLE AIM OUTCOMES

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### Objectives

1. Describe how connected health technologies are enabling new care models with significant potential to bend the healthcare cost curve.
2. Explore competencies needed for nurse informatics, educators, researchers.
3. Identify a personal e-health engagement plan to grow experience and advocacy.

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### Engaged Consumers & Pervasive Technologies

Shifting the culture, place and cost of care

- Personal Health Information Technologies**
  - Bi-directional access to health information
  - Secure communications
  - Health data banks
- Shared Decision Making**
  - Patient Generated Health Data
  - Preference sensitive care
  - Shared Care Planning
  - Collaborative Care Teams
- Personal health apps**
  - Sensor/device/home data/wearables
  - F2F and virtual care
  - N = 1, N = many
- Co-Producing Precision Care**
- Consumers Mediating Exchange**

The call to leadership for Nursing Executives and Informatics has never been greater!

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### Super Convergence


**THE POST-EHR MARKET**

- ◆ "More cell phones than toothbrushes"
- ◆ 13,000 health and wellness apps, yet few targeting non-adherence
- ◆ Explosion in-body and on-body health sensors, neighborhood/environmental
- ◆ Interoperability is growing concern
- ◆ The Health IT world is expanding with new players, many **new** to healthcare
- ◆ Large datasets and sophisticated analytics

New technologies leveraging **consumer and provider directed** efforts to manage chronic conditions – and new models for collaborative, coordinated and connected care.

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## Digital Health Revolution



How the Digital Revolution Will Create Better Health Care

- To what extent are consumers empowered?
- Wireless sensors
- Sequencing the genome
- From imaging to printing organs
- The convergence of human data capture
- The impact of HOMO DIGITUS
- Rebooting the Life Science industry
- Rethinking where and how care is delivered
- n=1, n=many

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## Connected health technologies converging

With systems biology, genetics and genomics

- Prediction**
  - New sources of health-related diagnostic data: genetic makeup & protein biomarkers
  - Individual's health future
- Personalization**
  - From impersonal and imprecise to precise preference-sensitive care
  - Contextualizing interventions and outcome evaluation based unique digital profile
- Prevention**
  - Based on each individual's genetic makeup and current blood-protein markers
  - Determine the probability of contracting certain diseases & response
  - Guidance for developing customized therapeutic drugs
- Participation**
  - Secure shared information from BIG health data
  - invites active participation in personal choices about illness and well-being

**Sense making and data visualization tools needed for shared decision making**

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## Mobility is the New Care Model

*The potential for mHealth to lead to the complete re-engineering of healthcare is limited by only two things: our imagination, and more immediately pressing, the need for direct evidence to guide its implementation.*


Steve Steinhubl, (2014)

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## Connected Health

Improving Chronic Disease Self-Care, Clinical Outcomes & Cost

February 2014; Volume 33, Issue 2  
Early Evidence, Future Promise Of Connected Health



By Shantana Nandy, Jonathan J. Diak, Chih-Hung Chen, Robert S. Moxon, Marshall H. Chin, and Monica E. Park

### Mobile Phone Diabetes Project Led To Improved Glycemic Control And Net Savings For Chicago Plan Participants

**8.8%** Savings

The program was associated with a total cost savings of \$32,268 over six months, which was an 8.8 percent savings over pre-project costs.

**ABSTRACT** Even with the best health care available, patients with chronic illnesses typically spend no more than a few hours a year in a health care setting, while their outcomes are largely determined by their activities during the remaining 5,000 waking hours of the year. As a widely available, low-cost technology, mobile phones are a promising tool to use in engaging patients in behavior change and facilitating self-care between visits. We examined the impact of a six-month mobile health (mHealth) demonstration project among adults with diabetes who belonged to an academic medical center's employer health plan. In addition to pre-post improvements in glycemic control ( $p = 0.01$ ) and patients' satisfaction with overall care ( $p = 0.04$ ), we observed a net cost savings of 8.8 percent. These early results suggest that mHealth programs can support health care organizations' pursuit of the triple aim of improving patients' experiences with care, improving population health, and reducing the per capita cost of health care.

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## mHealth & Digital Health

Clinical Trials Underway

**Scripps Translational Science Institute (STSI)**

**Consumer Health Prospective Study**

- **Participant Characteristics**
  - Device & specific parameter usage
  - Use of new technology (Diffusions of Innovations Scale 8-items)
- **Changes in Health Outcomes**
  - Patient Activation (Patient Activation Measure 13-items)
  - Quality of Life (Health Related Quality of Life; SF12)
  - Communication of medical issues (Medical Communication Competence Scale 2-items)
  - Medication Adherence (Morisky 8-Item Medication Adherence Questionnaire)
- **Changes in psychological outcomes**
  - Spielberger State-Trait Anxiety Inventory; STAI Y-6 item)
- **Changes in Lifestyle Outcomes**
  - Food Screener (Fruit and Vegetable Screener 10-items; Fat Screener 15-items)
  - Exercise (GLTEQ 2-items)
- **Perceptions of the the mHealth device**
  - Attitudes toward technology (Computer Attitude Scale; CAS 20-items)
  - Consequences of the device (Negative Consequences of Usage)
  - Satisfaction with technology (Usability and Satisfaction)

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## mHealth & Digital Health

Clinical Trials Underway

**Scripps Translational Science Institute (STSI)**

**Wired for Health initiative**

- Scripps Health Employees
- Three chronic conditions (diabetes, heart disease and high blood pressure)
- Can integrating wireless technologies, online social health networks and medicine impact healthcare spending?

**Meditation effect on the Heart Health**

- Weekend meditation retreat
- Sensors measure blood pressure and markers of stress, including EEG that correlates with emotion
- Consumer Health Study

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## Patients and Providers

Making Sense of Sensors for F2F + Virtual Care

**Let's take a look at how these sensors assist them without her needing to do anything.**

**Making Sense of Sensors: How New Technologies Can Change Patient Care**

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## Wearable Sensors

Flexible, Stretchable Nano-materials Enabled with Smart Phone

**Hydration Sensor**

Hydrate and Conquer.

<http://www.mc10inc.com/consumer-products/sports/hydration-sensor/>

**Smart Contact Lens**

- Tiny wireless chip + miniaturized glucose sensor
- Embedded in between two soft layers
- One reading per second
- Tiny LED lights warn glucose level changes
- Connected to smart phone

<http://googleblog.blogspot.de/2014/01/introducing-our-smart-contact-lens.html>

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**Skullcap Head Impact Sensor**

RESEARCH CHECKLIGHT WITH MC-10 TECHNOLOGY: SPURTS INJURIES HAPPEN, BUT WE'VE GOT YOUR BACK.

<http://www.mc10inc.com/consumer-products/sports/checklight/>

## Bionic Pancreas

2 Pumps (Insulin, Glucagon) + a Monitor + a Smart Phone

June 26, 2014 12:12 AM 15k views of health

Stanford Tests Artificial Pancreas on Children with Diabetes

Photo • Harvard Health Blog • "Bionic pancreas" could help people with type 1 diabetes control blood sugar

Photo: David W. Miller via the Harvard Health Blog. Chief Medical Editor: Howard Leichter, M.D., Chief Medical Editor: Harvard Publishing, Harvard Medical Publications

I love my pancreas for granted. When I eat, it pumps out insulin. This hormone helps blood sugar get into my cells. When I haven't eaten for a while, my pancreas makes another hormone called glucagon that prevents my blood sugar from dropping too low.

People with type 1 diabetes don't have this luxury. But someday they may, thanks to a bionic pancreas—developed at Boston University and Massachusetts General Hospital.

In an early test of the device, reported online this week in the new journal *Diabetes*, it helped control blood sugar levels in 27 adults and 22 teenagers with type 1 diabetes who were asked about their diets without the constant monitoring and injecting that's required with type 1 diabetes.

Right now, this artificial pancreas is essentially an app that runs on an iPhone wirelessly connected to a monitor worn on the abdomen that continually checks blood sugar and two pumps, one for insulin and one for glucagon.

The system works like this: The app on the phone tracks blood sugar. When blood sugar begins to rise, the app signals one pump to release insulin. If blood sugar falls too low, it signals the other pump to release glucagon. This is basically what happens in a healthy body.

Photo participant: Taylor Darr reports from her artificial pancreas activity. [Open in SlideShare](#)

By April Leland

This week seven children are participating in a Stanford research study in a somewhat unusual setting — a hotel in Menlo Park, outside San Francisco. Researchers are testing an "artificial pancreas" on these children who all have Type 1 diabetes. This device is the latest advance in diabetes management technology.

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## Contextualizing Precision Care

Integrated Data Visualization Tools

Integrated data visualization on iPad

3D MRI Imaging

Biomarkers & Genomics

Research Summary

Short video

User data

OCT and MRI Imaging

Individual data

Reference groups of patients

Contextualization

Prediction

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<http://neurology.ucsf.edu/research/ms-bioscreen>

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## mHealth

Expected Impact Next 5 Years

mHealth app impact on healthcare in the next 5 years

No Impact: 0.6%

Impact: 99.4%

- Improve patient outcomes: 48.5%
- Improve prevention and education: 43.4%
- Reduce or slow down increase of healthcare costs: 42.8%
- Improve interaction between patients and doctors: 42.6%
- Enable people to take better care of their own health: 37.3%
- Provide (better) access to healthcare to remote locations: 28.7%
- Improve data quality on diseases to develop improved medications or treatment plans: 14.8%
- Increase health consciousness of the society: 14.6%

Source: [research2guidance mHealth App Developer Economics survey 2014, n= 2032](#)

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## ANI + ANA join ONC Consumer eHealth Pledge Community

“Nurses are the most-trusted health professionals and have a long history of patient advocacy.”

3.1 Million Nurses

Empowered to use eHealth

Touching 18 Million Patients/Yr

Our Pledge

## Resources: ANI Consumer eHealth Toolkit

<http://www.allianceni.org/programs.asp>

**NEW! ANI Consumer eHealth Toolkit**

Nurses are the most-trusted health professionals and have a long history of patient advocacy. We expect nurses to have a significant impact on consumer participation in Health IT to increase use of Personal Health Records and Patient Portals from 10% today to over 25% in the next 2 years. ANI Pledge to Support ONC Consumer eHealth Program

If nurses are to effectively encourage patients to use PHRs and similar health IT tools to engage more fully in their health and health care, we need to set an example by using them ourselves!

**Step 1 Learn**

- Read the Full ANI Pledge [\[PDF\]](#)
- AHRQ Issues New Guide for Use of Interactive Personal Care Records (iPCRs)
- NEW! Accessing Your Health Information With the Blue Button
- Explore the Pledge Partners
- ONC: Understanding Health IT Resources
- ONC: View Patient/Consumer Videos
- PHR Tools & Resources from AHIMA
- PHR Tools & Resources from ANA [\[PDF\]](#)
- PHR Tools & Resources from HIMSS
- Stay tuned for our upcoming webinar series...

**Step 2 Engage**

- Take the Pledge to use PHR now on the ANI Facebook Page
- Post our PHR banners to your organizations website
- Already use a PHR? Tell your story
- Use the ONC Consumer Engagement ppt at your next conference
- Share the ONC Health IT Videos with your patients
- Take the ANI Consumer eHealth Survey
- TEN Steps to Support the ANI eHealth Pledge Intended for National Health IT week but many of the activities can be used all year round

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## New Competencies Needed

Nursing Informatics, Educators and Researchers

### ANI Member Organization Survey (February 2014)

- Nurses' personal experiences (as a patient/family member/caregiver) with:
  - Other consumer tools, including mobile health apps, telehealth, digital health
  - View, Download, and Transmit (VDT) of personal health data
  - Blue Button
  - Patient Generated Health Data
  - Patient Reported Outcomes (e.g., H-CAHPS, PROMIS)
  - Patient Governance (e.g., Shared Care Plan/Decision Making)
- Rates of nurse adoption as individual/family member
- Rates of consumer adoption
- Barriers to adoption as individual/family member
- Barriers to adoption for other consumers
- Barriers to adoption for nurses' employers

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## New Competencies Needed

Nursing Informatics, Educators and Researchers

### ANI Member Organization Survey (February 2014)

- Nurses' knowledge base to support
  - Patient advocacy
    - for a variety of consumer eHealth tools (PHR, Patient Portals, Mobile Health Apps, Telehealth, Digital Health, VDT, Blue Button, PGHD, Shared Care Plan/Decision Making)
- Nursing Informatics knowledge base to support:
  - Design, implementation and evaluation
    - for a variety of consumer eHealth tools (PHR, Patient Portals, Mobile Health Apps, Telehealth, Digital Health, VDT, Blue Button, PGHD, Shared Care Plan/Decision Making)
  - Integration of patient generated health data with provider generated health data
  - Capture and reporting of patient reported outcomes data (e.g., H-CAHPS, PROMIS)
  - Analytics for consumer engagement and population health
  - Strategic planning for consumer eHealth

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## Three Questions

- How well do you know your personal values and preferences and digital health profile?
- Have you Viewed, Downloaded and Transmitted your health information and/or family members?
- How can you leverage personal experience to grow advocacy and competency building?

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