



# INNOVATIONS IN E-CARE DELIVERY

DIANE J SKIBA, PHD, FACMI, ANEF, FAAN

UNIVERSITY OF COLORADO

[DIANE.SKIBA@UCDENVER.EDU](mailto:DIANE.SKIBA@UCDENVER.EDU)

# GOALS

1

- Examine the concept of connected care

2

- Analyze digital tools to promote connected care

3

- Reflect on the preparation of IP teams for connected care.

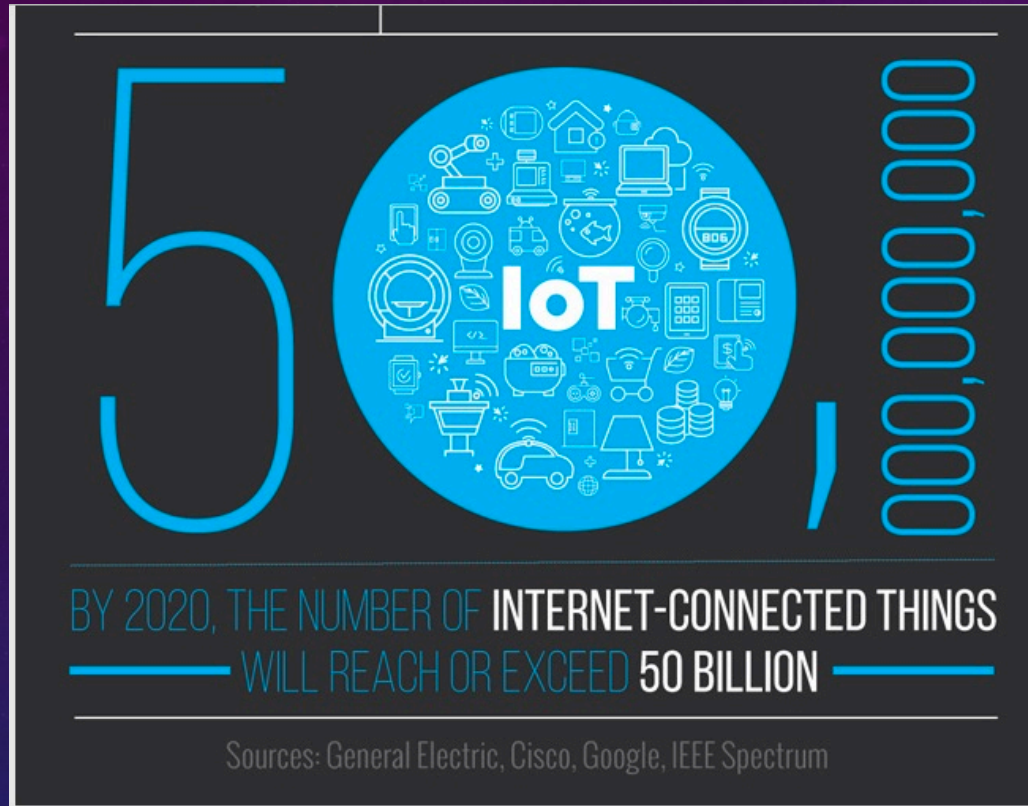
# INTERNET OF THINGS (IOT) AND CONNECTED AGE

We live in a connected age....

IOT and Connected Age, speak to connections to **everything and everyone**.

IOT focuses on those connections with **physical objects** whereas the Connected Age refers to more **virtual connections** especially with people, resources and ideas.

# INTERNET OF THINGS



IEEE Projections

## CONNECTED THINGS



BY 2020 250,000,000

VEHICLES WILL BE CONNECTED TO THE INTERNET

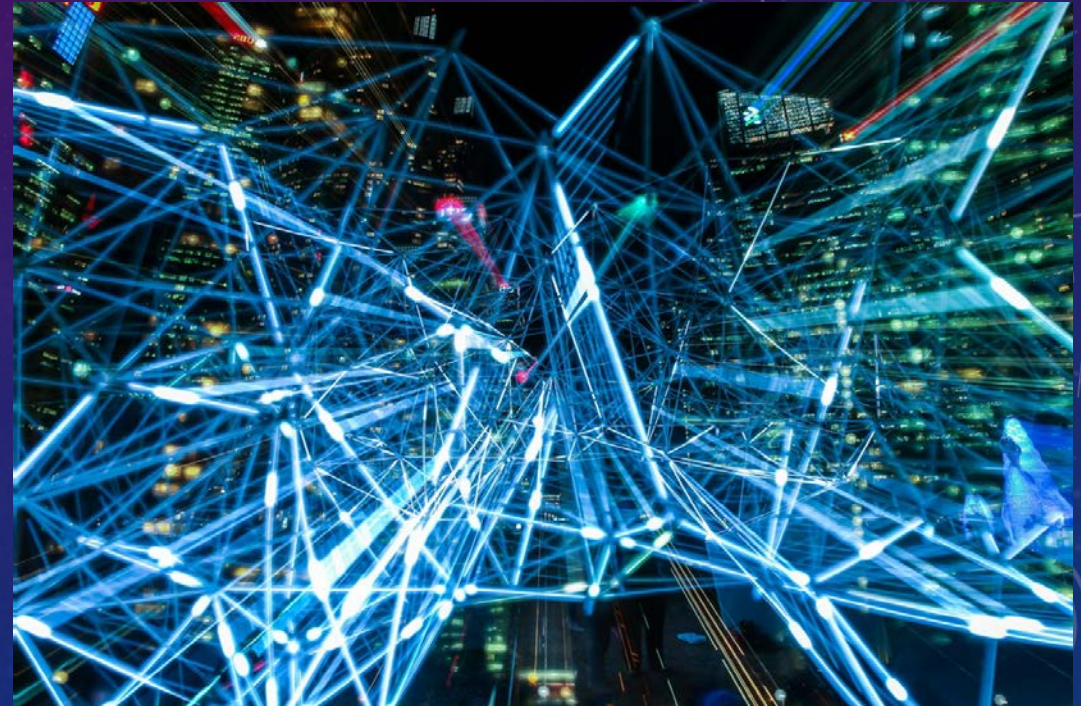
This section shows a hand interacting with a futuristic car dashboard. Below the image, the text 'BY 2020 250,000,000' is displayed, followed by a row of small car icons and the text 'VEHICLES WILL BE CONNECTED TO THE INTERNET'.

# Internet of Things

Current count:

- ✓ Gartner's estimate: 6.4 billion \*
- ✓ International Data Corporation's of 9 billion\*
- ✓ IHS estimates: 17.6 B includes all devices

- ✓ \* doesn't include smartphones, tablets, and computers



# CONNECTED HEALTH

“a conceptual **model** for health management where devices, services or interventions are designed around the patient’s needs, and health related data is shared, in such a way that the **patient** can receive care in the most **proactive and efficient manner** possible. “

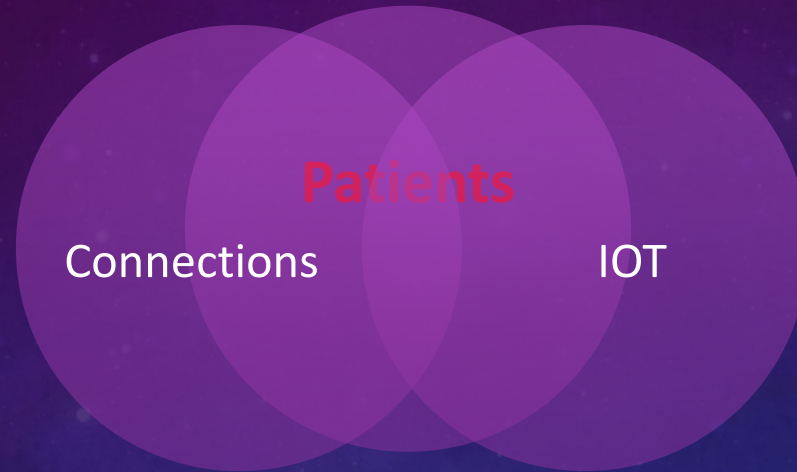
Caulfield & Donnelly (2013) What is Connected Health and why will it change your practice? *QJM: An International Journal of Medicine*. 106(8),703-707.

# CONNECTED HEALTH

“patients, caretakers, and providers are ‘connected’ by means of timely sharing and presentation of accurate and pertinent information regarding patient status through smarter use of data, devices, communication platforms and people.”

Caulfield & Donnelly (2013). What is Connected Health and why will it change your practice? *QJM: An International Journal of Medicine*. 106(8),703-707.

# CONNECTED CARE



**Connected care** blends the **high touch** of connections with the **high tech** of the Internet of Things

# CONNECTED CARE

Is an ecosystem that provides the collaborative care team new ways to connect to health care systems....

People

Experiences

Communities

Diverse Content

Resources

# CONNECTED CARE

is about connecting patients, families and caregivers to the person's health data and their collaborative care team at the point of care. The point of care is now not just within the walls of a healthcare system ...but also through wireless connections that are inclusive of ...

Digital Tools

Social Media

E-Patients

Mobile apps

Patient Portals

PGHD

# The Connected Health Ecosystem

## Food

- Food compliance
- Consumer relationships
- Nutrition and wellness programs

## Transaction services

- Claims processing
- Banks: health savings
- Accounts and payments

## Public & private payers

- Patient education
- Disease management
- Fraud prevention
- Risk management
- Social media data

## Employers

- Benefit plan design
- Health and wellness programs

## Life sciences

- Clinical development
- Clinical trials
- Medication compliance
- Medical devices
- Consumer relationships

## Public health

- Pandemic readiness
- Vaccine inventory and distribution
- Sanitation and public safety
- Healthy lifestyles and diet
- Living with chronic disease

## Patients & consumers

- Social media data
- Personal health records
- Medical device tracking data

## Healthcare providers

- Electronic medical records
- Health information exchange
- Patient ID and eHealth
- Social media data

## Health clubs

- Health and wellness programs

## Medical research centers

- Clinical research
- Cohort studies
- Clinical trials

## Retail clinics

- Consumer services

## Pharmacies

- E-prescribing
- New services

## Regulators

- Healthcare policy
- Medical research
- Regulatory compliance

# CONNECTED CARE- LEARNING HEALTH SYSTEM



Institute of Medicine. Best Care at Lower Cost: The Path to Continuously Learning Health Care in America. Washington, DC: National Academy Press, 2013.

# MEET JOSEPHINE



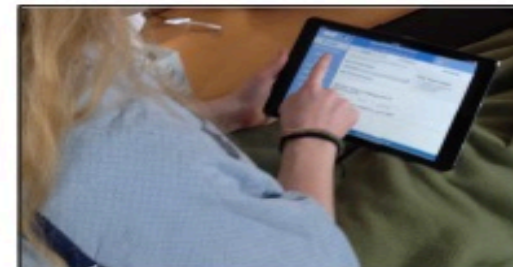
# IP CARE: PATIENT AS TEAM MEMBER



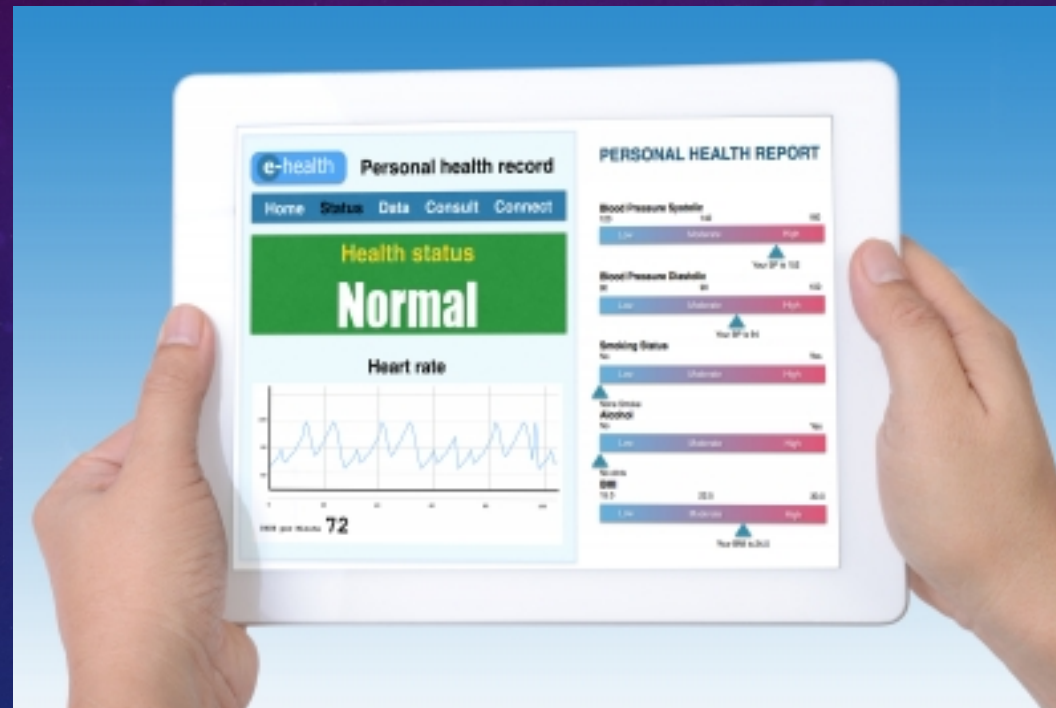


PROSPECT Web-Based Patient-Centered Toolkit (PCTK)

## **PATIENT FACING TOOLS**



# CONSUMER-FACING TOOLS



*Image courtesy of pandpstock001 at FreeDigitalPhotos.net*

# CONNECTED CARE



# PRECISION MEDICINE- AI- WATSON FOR HEALTH CARE

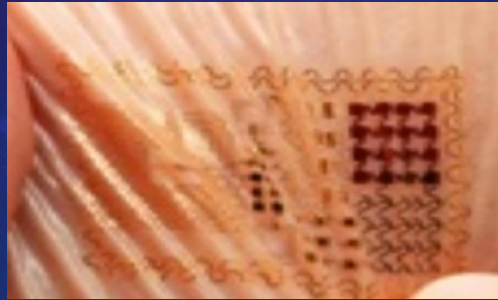


*Image courtesy of cooldesign at FreeDigitalPhotos.net*

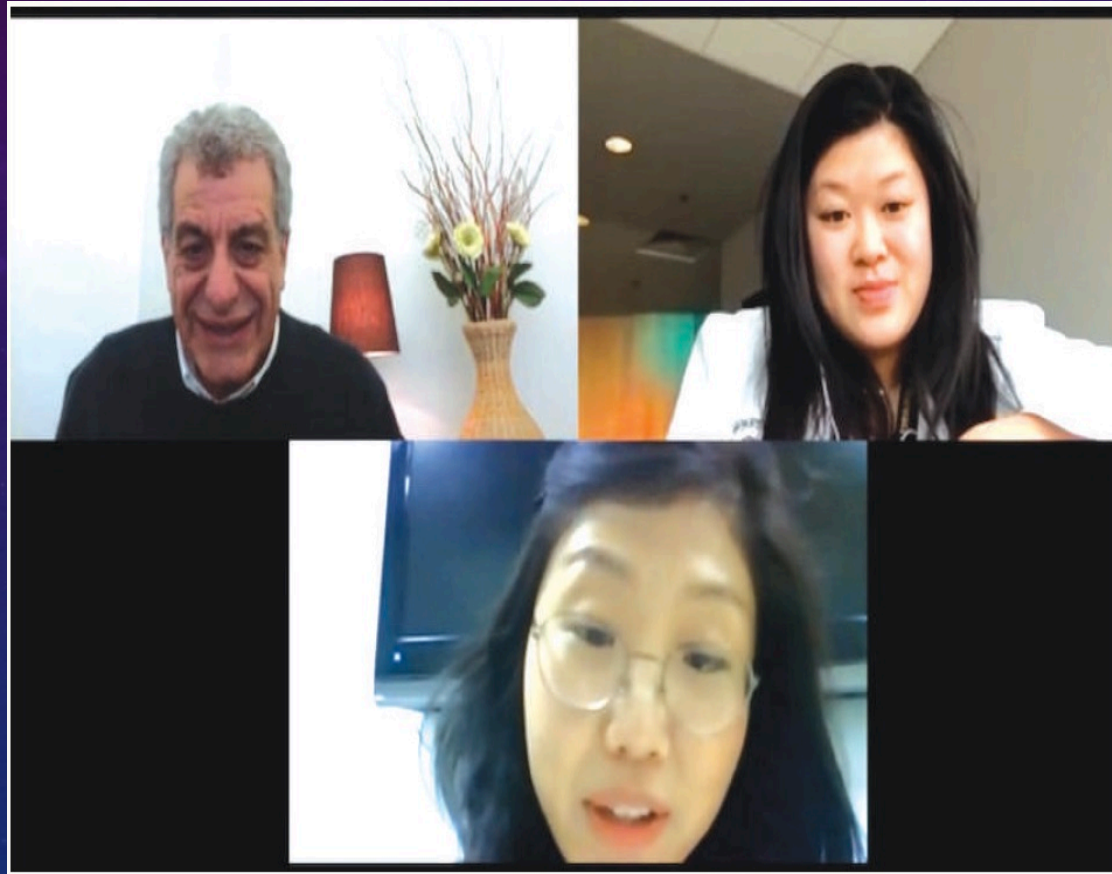
# DISCHARGE TOOLS FOR HOME



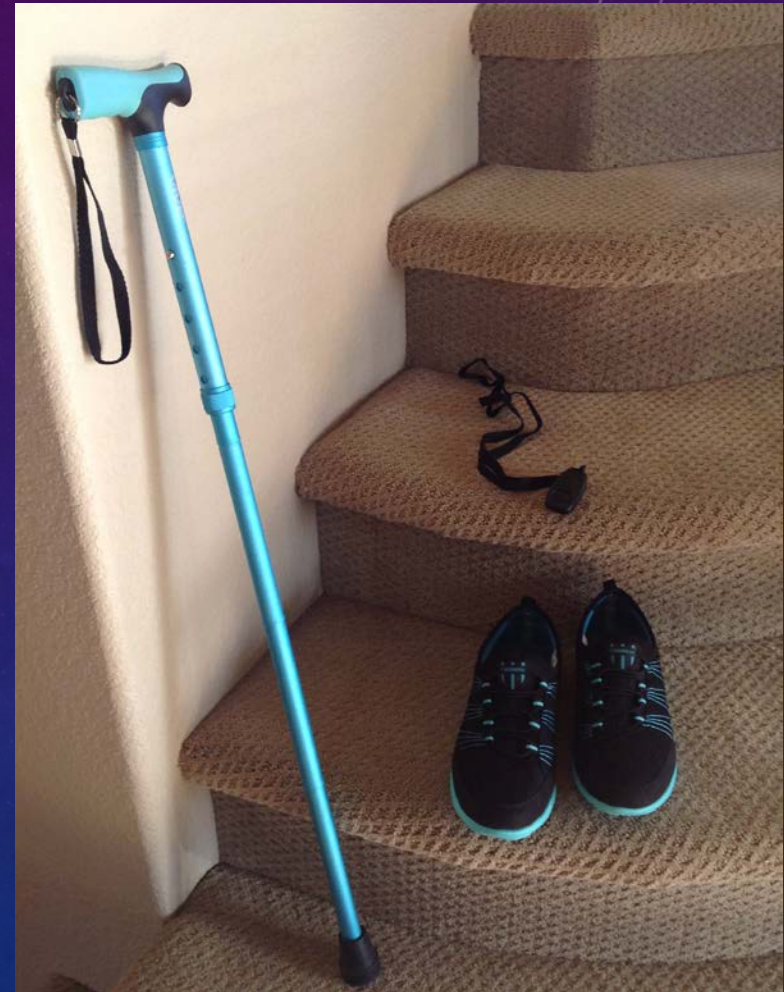
# SMART HOME



# VIRTUAL VISITS



# SMART TOOLS



# RING-ABLE REMINDER & MONITORING SYSTEM



# CONNECT-ABLE OBJECTS



# HEALTH HUB-SMART & CONNECTED REFRIGERATOR

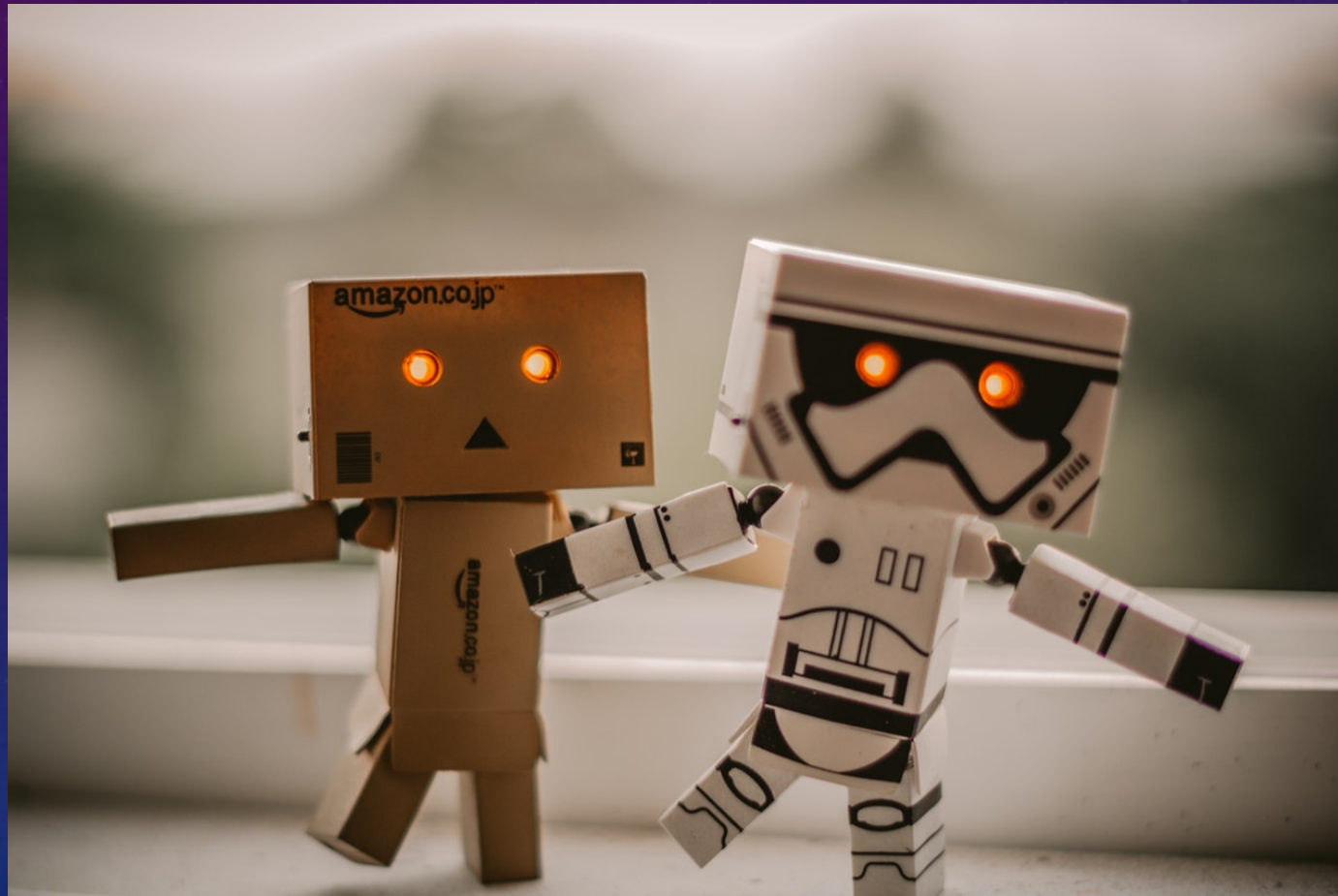
- Reminders & Calendar
- Sensors
- Cameras for food intake and grocery list
- Family connections
- Ring-ables- Front Door Camera
- Connect to Echo for Questions and Refills
- Patient Education
- Recipes



# SOCIAL MEDIA-CONNECTIONS



# MEET YOUR NEW HOSPITAL STAFF & HOME ASSISTANTS





# MEET YOUR NEW HOSPITAL STAFF



## Pepper

<http://www.dailymail.co.uk/sciencetech/article-3641468/Pepper-robot-finds-job-healthcare-friendly-droid-trialled-two-hospitals-Belgium.html>

## RoBear

<http://www.ibtimes.co.uk/japan-meet-robear-robot-bear-nurse-that-can-lift-patients-into-wheelchairs-1489337>

## Zora

<https://www2.deloitte.com/nl/nl/pages/risk/articles/healthcare-robot-zora-personifies-healthcare-digitization.html>

*Image courtesy of digitalart at FreeDigitalPhotos.net*

# ALL OF US—NIH PRECISION MEDICINE

**All of Us**  
THE FUTURE OF HEALTH BEGINS WITH YOU

<https://allofus.nih.gov/>



# WIRED HEALTH



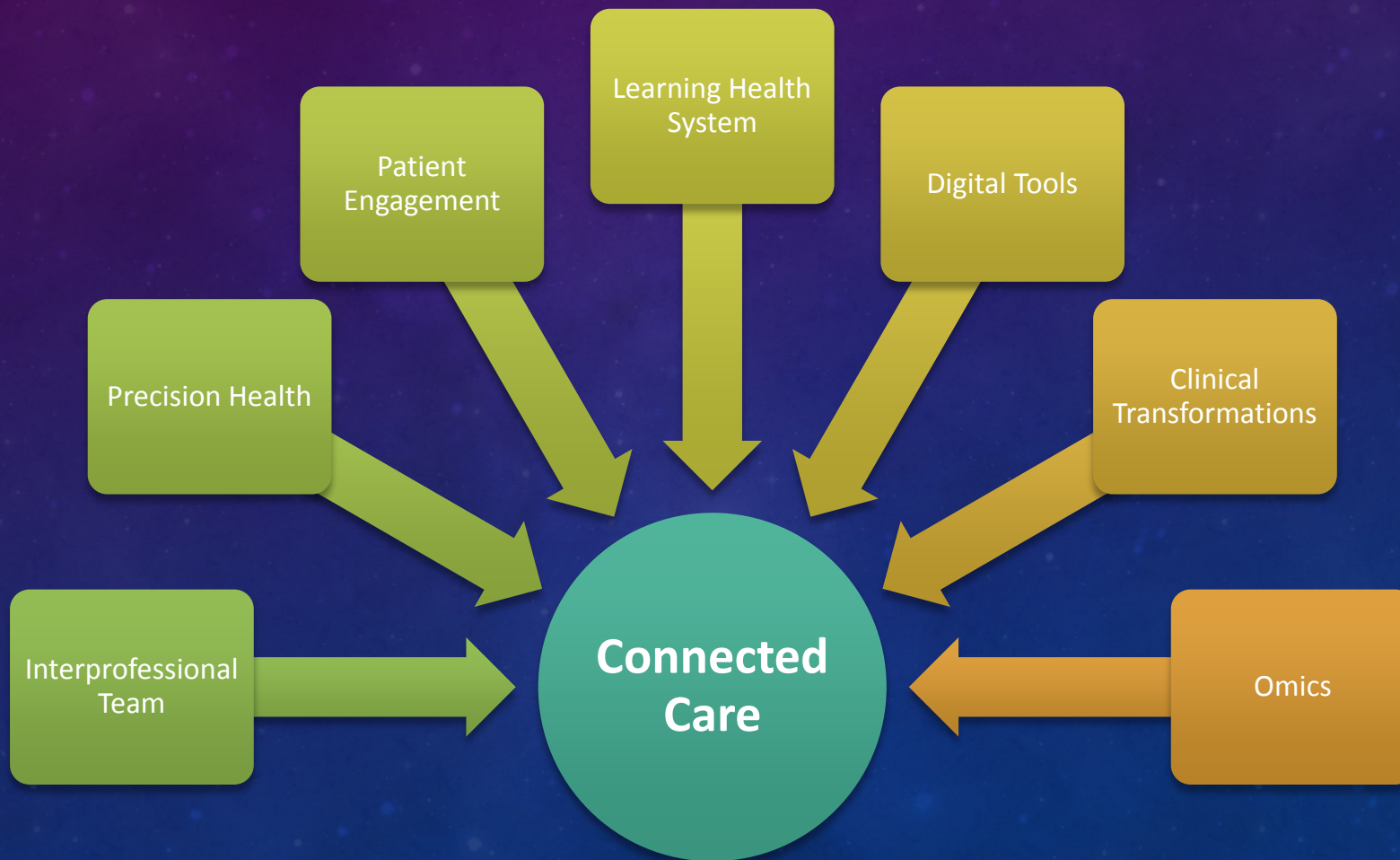
# QUANTIFIED HEALTH



# CONNECTING THE DOTS



# CONNECTED CARE FRAMEWORK



DANIEL KRAFT:

<http://www.wired.co.uk/article/hospital-prescribing-tech>

**Quantified self to quantified health: how tech helps doctors fill gaps in patient records**



# CLINICIANS' TOOL KIT ?



# FUTURE KNOWLEDGE AND SKILLS



*Image courtesy of Pixomar at FreeDigitalPhotos.net*

- Do they have the communications skills—IP team, patient Engagement, robotics, social media?
- Can they process & manage data and use data analytics to provide the best care?

# TRANSFORMATION OF CARE



Lee, T., Campion, E. Morrissey, S. & Drazen, J. (2015). Leading the Transformation of Health Care Delivery — The Launch of NEJM Catalyst. N Engl J Med 2015; 373:2468-2469 December 17, 2015 DOI: 10.1056/NEJMe1515517

# EMERGING TECHNOLOGIES



Padmanabhan, P. (2016) Connected Health and IoT in healthcare delivery: Are we ready? CIO Nov/Dec 2016 Digital Magazine .<http://www.cio.com/article/3039261/healthcare/connected-health-and-iot-in-healthcare-delivery-are-we-ready.html>

# DATA DELUGE-QUANTIFIABLE HEALTH



# HEALTH CARE INNOVATIONS



# CHANGING HEALTH CARE DELIVERY SYSTEM



*Image courtesy of cooldesign at FreeDigitalPhotos.net*



*Image courtesy of Suwit Ritjaroon at FreeDigitalPhotos.net*

# FUTURE COMPETENCIES



# THANK YOU

[Diane.Skiba@ucdenver.edu](mailto:Diane.Skiba@ucdenver.edu)

