Patient is the answer:
the power of health data

AHHA Data Collaboration Network

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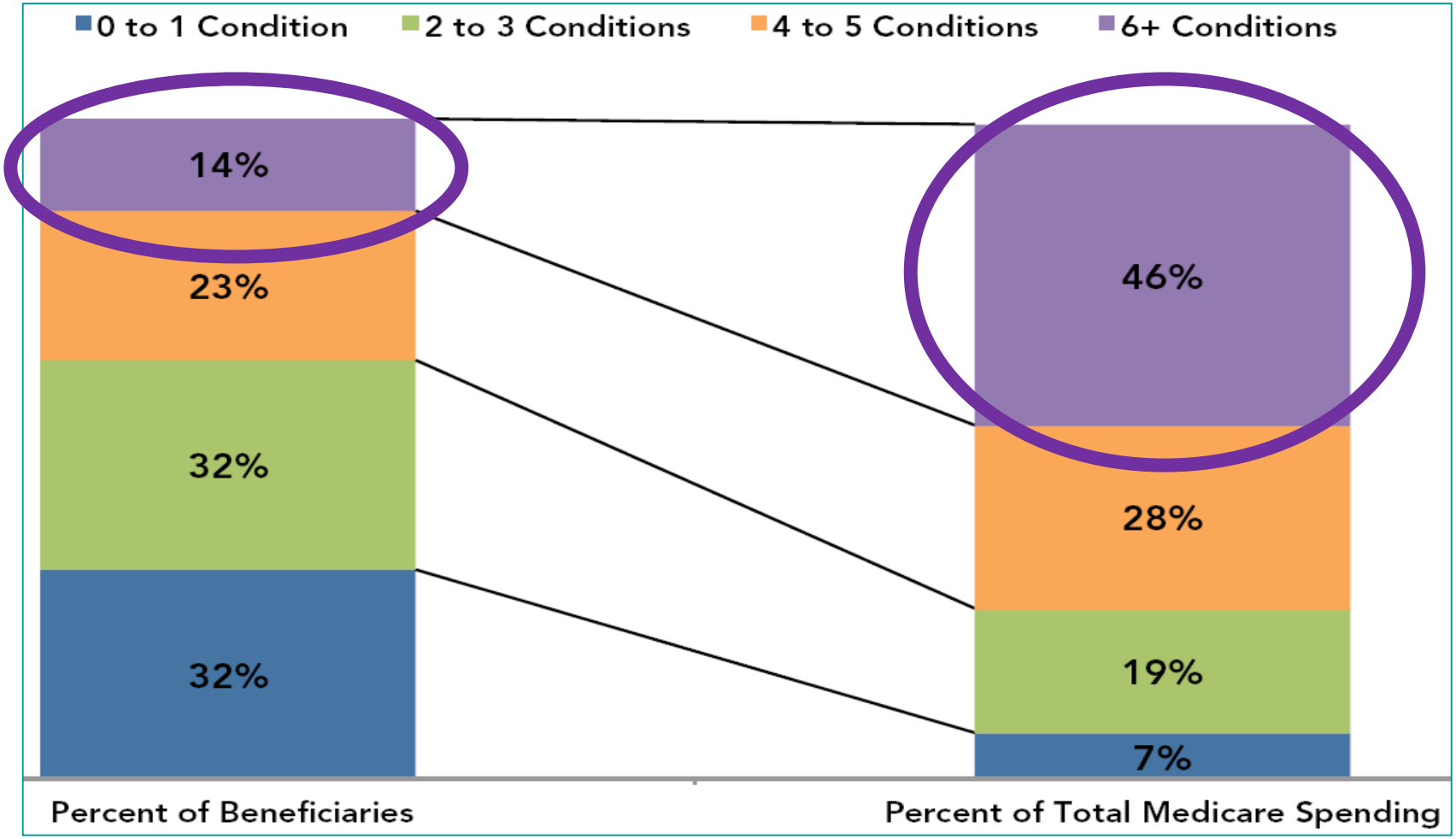
Topics

- Some challenges in healthcare
  - The burdens on healthcare & sustainability
  - How do we measure quality of healthcare
  - How do we make investment, resources decision?
  - … and more …
- How can patients be the answer?
- The power of health data
- The data challenges
- QH Enterprise data strategy

The “14%” = 46% of Annual Cost

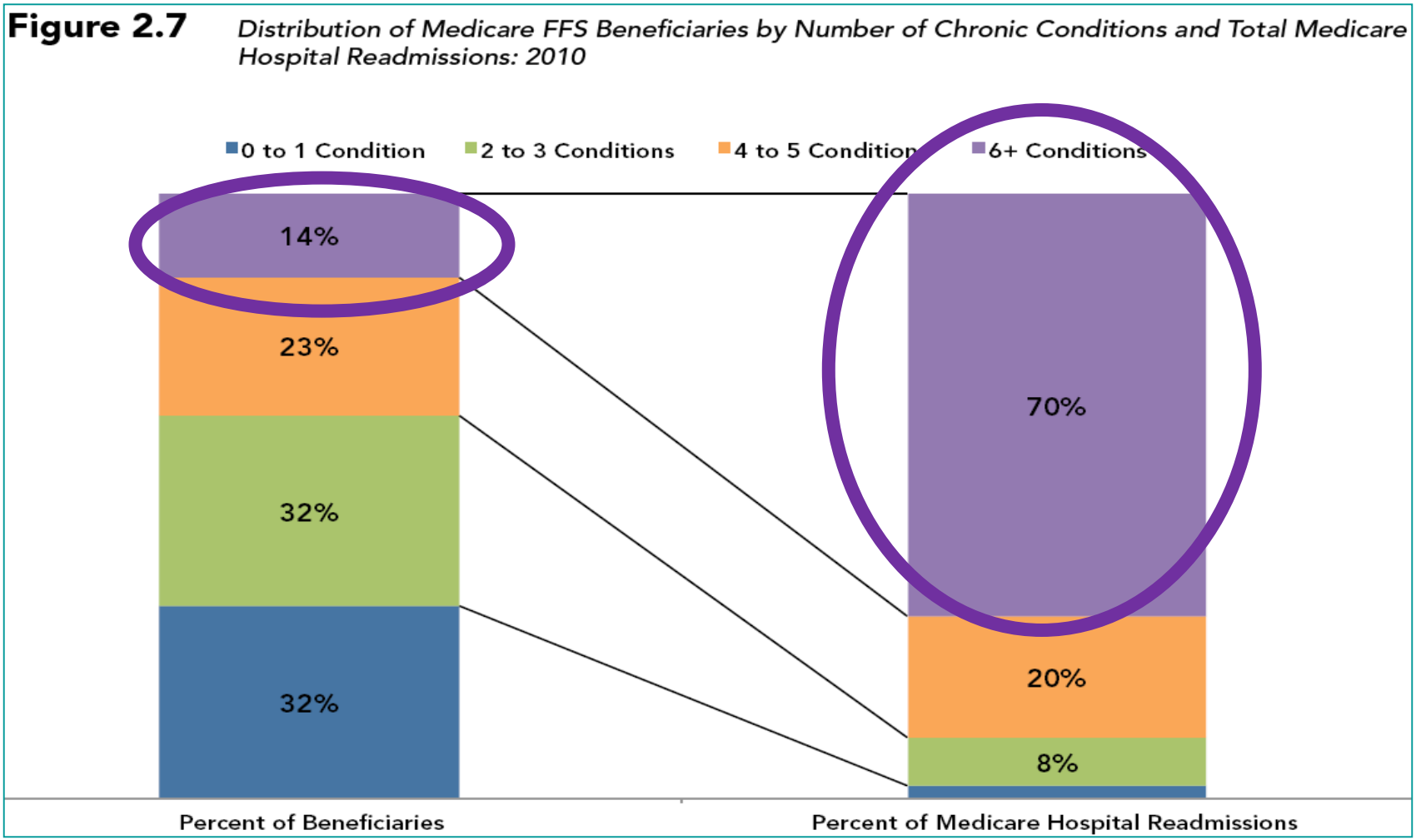
The Burdens on Healthcare



US Medicare statistics: 14% of those >60yo have 6+ chronic conditions

The “14%” = 70% of Hospital Readmissions

The Burdens on Healthcare

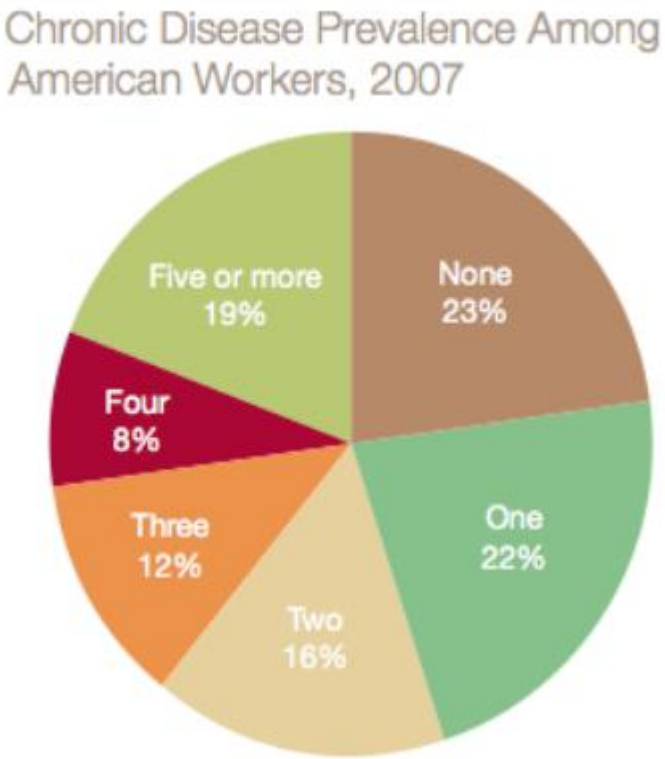


US Medicare statistics: 14% of those >60yo have 6+ chronic conditions

Healthcare Costs & Sustainability

- The burden on healthcare:

Federal Health Minister (Peter Dutton) address to CEDA Conference
(Feb 2014)
A working paper by the AIHW, indicating that in 2012 there were 2,200 children and young people diagnosed with type 2 diabetes, and that on average there are around **400 new cases** of type 2 diabetes in **children** and **young** people **each year**; 2,200 that young people would be diagnosed with a disease that is lifestyle related



Nearly 80% of US workers have at least one chronic condition and 55% have *more* than one chronic condition *

Patients with multiple chronic conditions cost up to 7X as much as patients with only one chronic condition **

* http://www.fightchronicdisease.org/sites/default/files/docs/

** Stanton MW. *The High Concentration of U.S. Health Care Expenditures*. Research in Action, Issue 19. AHRQ Publication No. 06-0060, June 2006

The burden on healthcare

- Question:
  - How can patients be the answer?
- Japan as an example*:
  - Japan has the longest life expectancy on earth
  - Japanese go to see doctors 3x as often as Americans
  - Japanese patients on average stays in hospital longer than USA patients
  - Japan spends half as much as USA on healthcare
  - The **answer is partly from the patient**
    - Diet and lifestyle
  - The other part: universal healthcare system

* http://www.npr.org/templates/story/story.php?storyId=89626309

How can the patients be the answer?

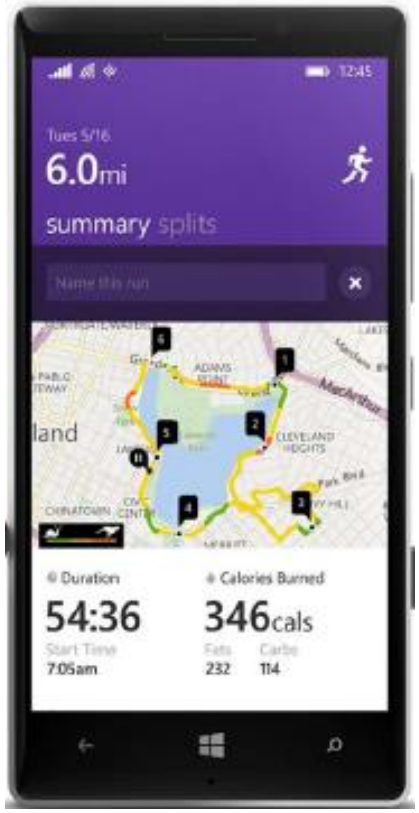
- Patient as “source of truth”
- Using patient/person data to:
  - Better understand the patient as a person
    - Patient profile
  - Improve patient health awareness and health behaviours
  - Inform health management strategies and design
    - Shared informed decisions; improve conformance
  - Measure milestones and outcomes against goals
  - Improve healthcare practices
  - Inform health services investment / purchasing strategies & policies

Tsunami of health data coming …

- By the end of 2015, 500 million smartphone users across the globe will be using a healthcare app
- By 2018, half of the >3.4 billion smart device users will have downloaded mobile health app*
- There are increasing availability of smartphones compatible wearable health devices and apps**
  - weight scales, blood pressure cuffs, thermometer, pulse oximeter, spirometer, glucometer** …
  - patient location, gait and activity sensors***
  - CVS, respiratory and other risk profiles
  - medication usage and conformance
  - lifestyle, diet, health literacy, preferences, social network

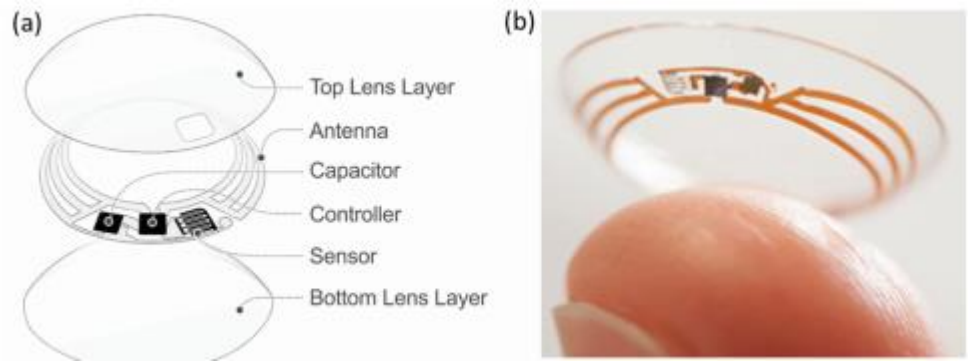
* Margaret A. Hamburg, MD, FDA Commissioner 2013; ** *Virtual Mentor.* November 2013, Volume 15, Number 11: 947-950
*** Jorge Casillas et al (eds), Managing Intelligent Systems: First International Symposium, Springer-Verlag, Berlin, 2012

Patient/Person Health Data



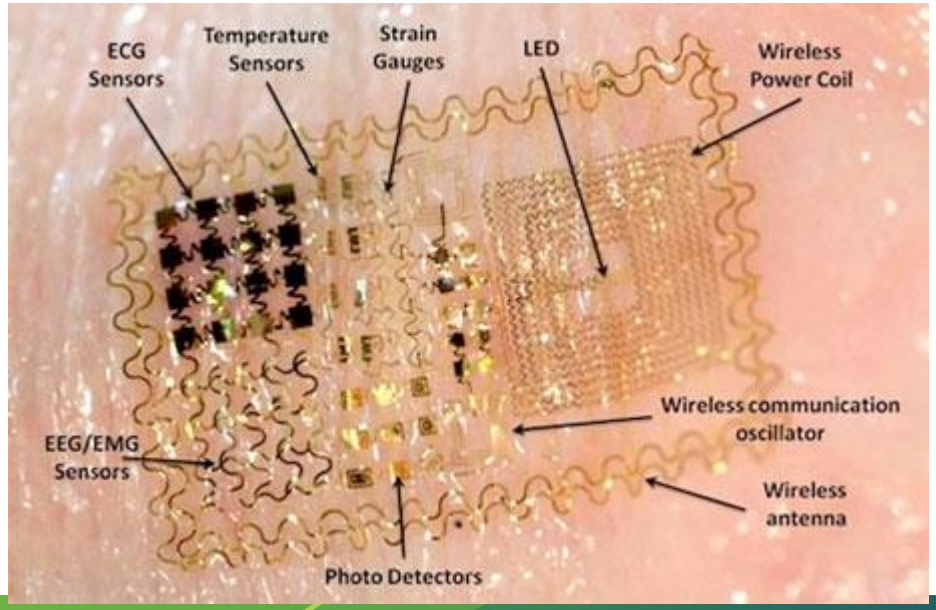
Smart patches and watches that send to smart phones and doctors a person's/patient's heart rate, 6 lead ECG, exercise patterns, location (in case of emergency)

Patient/Person Health Data



Smart contact lens sensor that continuously monitor ocular pressure to detect glaucoma and tear fluids to measure glucose level, etc

Electronic sensor tattoo that can measure skin hydration, glucose level, temperature and electric signals from brain and muscle activity



Patient/Person Health Data

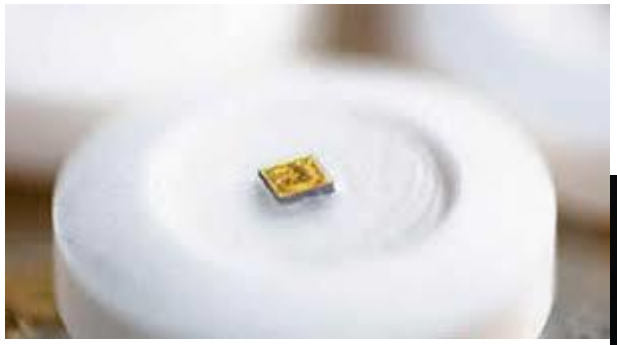
Electronic sensor glove to aid in detection of breast cancer

The sensor finds cancer by detecting tiny metabolic temperature changes caused by cancerous cells in a tumour. The temperature readings are sent to a global library where they're run through a proprietary algorithm. Then the results are sent back to a user's phone

Patient/Person Health Data

Smart garments, belts, shoes with sensors monitors person's movement, posture, gait, breathing, heart rate, temperature:
Helps detect physiological changes, anomaly in movements, gaits, posture and risk of fall

Patient/Person Health Data



Smart pills and pillboxes uses light and sound reminders to signal when it is time to take your medications.
Inside the cap, a chip monitors when the pill bottle is opened and wirelessly relays alerts, through Broadband Network, to you or your caregiver.

Smart pills after ingestion, electronically reaction with gastric juice, sends signals to skin patch patient wears Patch captures and relays body's physiologic signs e.g. heart rate, activities, to bluetooth enabled smart phone

Patient/Person Health Data

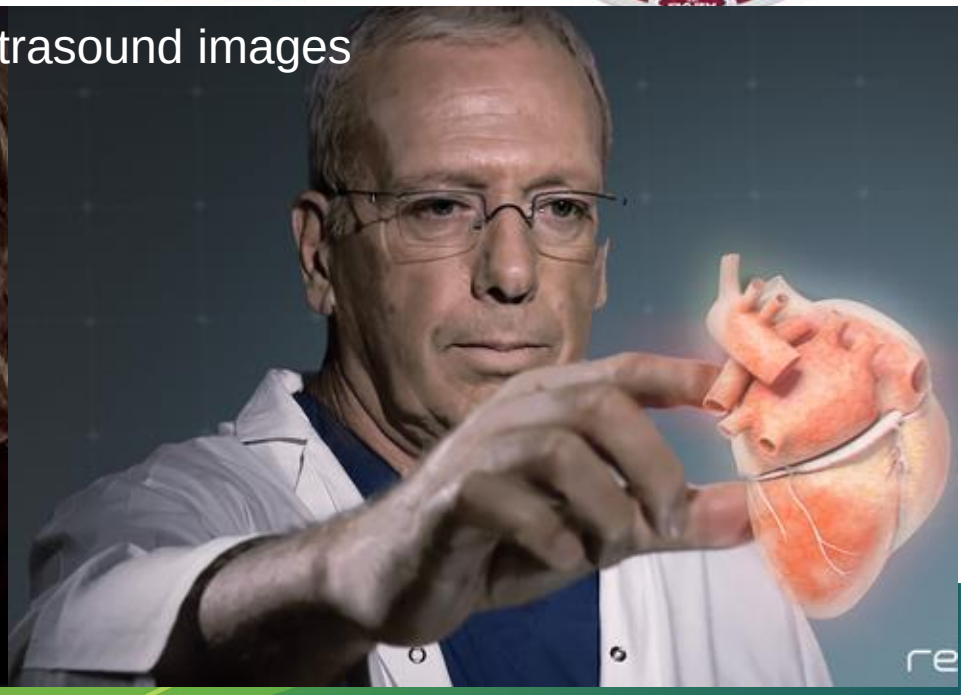
Connected smart basketball for iOS and Android to help improve shooting and ball handling skills – fast.
Tracks makes and misses and learns and adapts to any player's skill level

Shake stabilized spoon for Parkinson disease patients eliminates 70% of the tremor
May also monitor the tremor pattern and severity to support determination of disease progress, effectiveness of treatment …

Can also be adapted for use in stroke, and other brain/neurological disorder rehabilitation

Patient/Person Health Data

Smart sensor helmet and mouth guard monitor vector and force of impacts on the skull to detect and reduce head injuries



Patient/Person Data

Ambulance Drone can send heart rate, ECG data to ED and deliver defibrillation to any patient in a 12 km2 area within 1 minute

At that speed, survival rates can be as high as 80%.

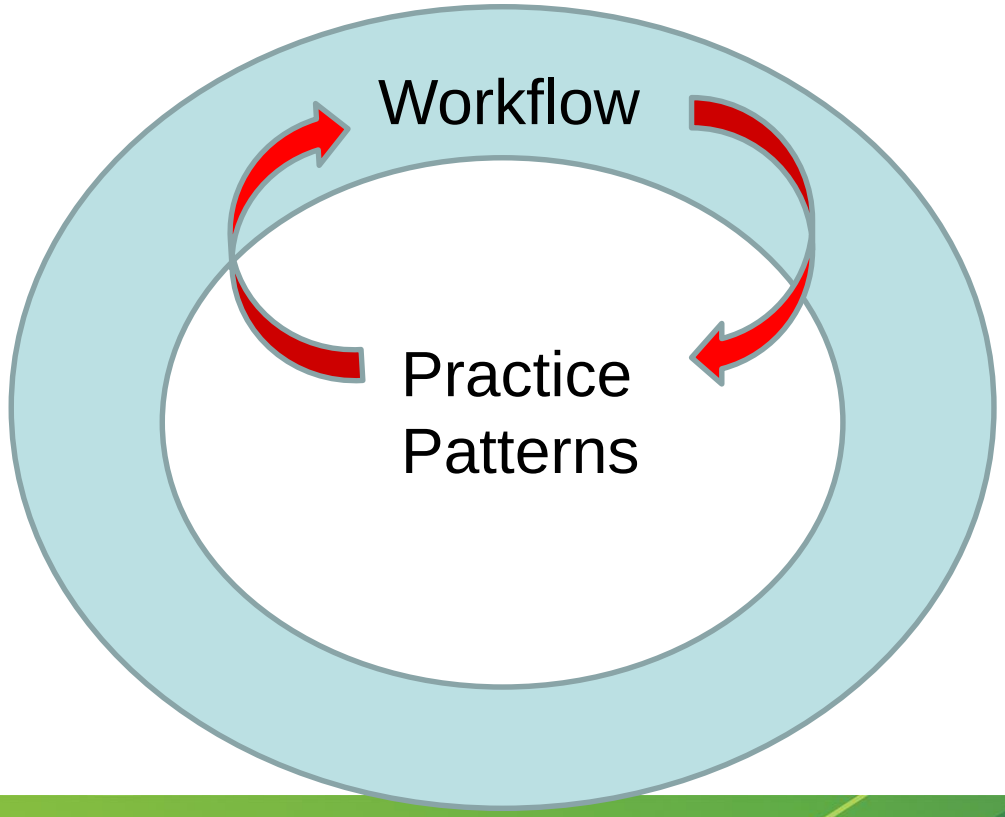
And there are many more examples ….

Unleashing power of patient data

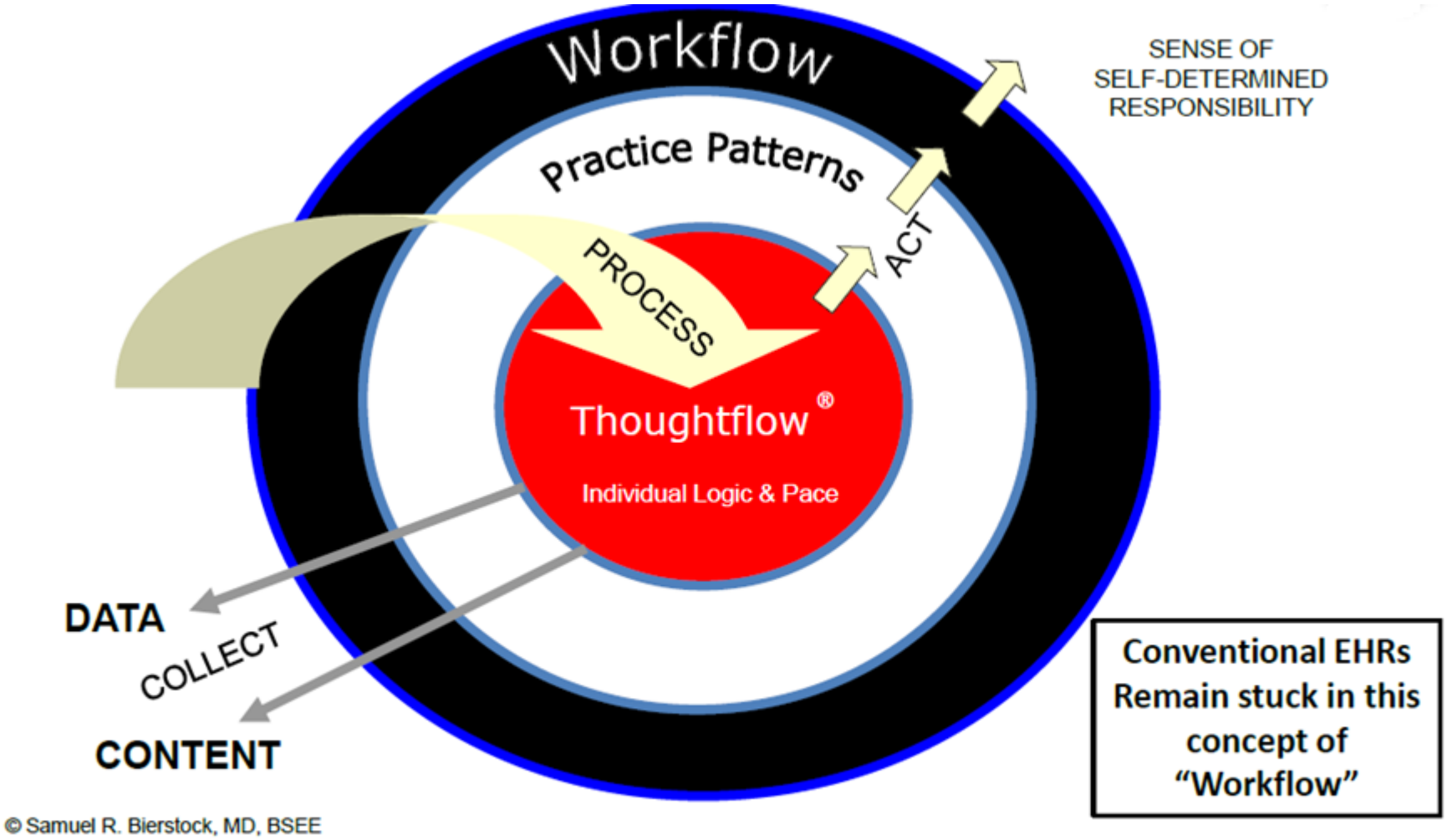
- Establishing partnership btw providers, patient & family
- Accounts for patient profile, including diversity (e.g. racial, ethnicity, preferences, socio-economic, barriers ..)
- Enable patient to conduct personalised assessment of
  - **patient profile** (including lifestyle and compliance profile)
  - Values of treatments
- Support provider-patient (and family) **informed shared decisions** on
  - Continuous health improvement/disease prevention
  - Evidence-based management
  - Personalised treatments
- Support analysis of input, output and outcome of care
- Support investment, resources strategy and decisions

Health data & Thoughtflow

- Clinical practices have focused on workflow and practice patterns



Thoughtflow as core of clinical practice



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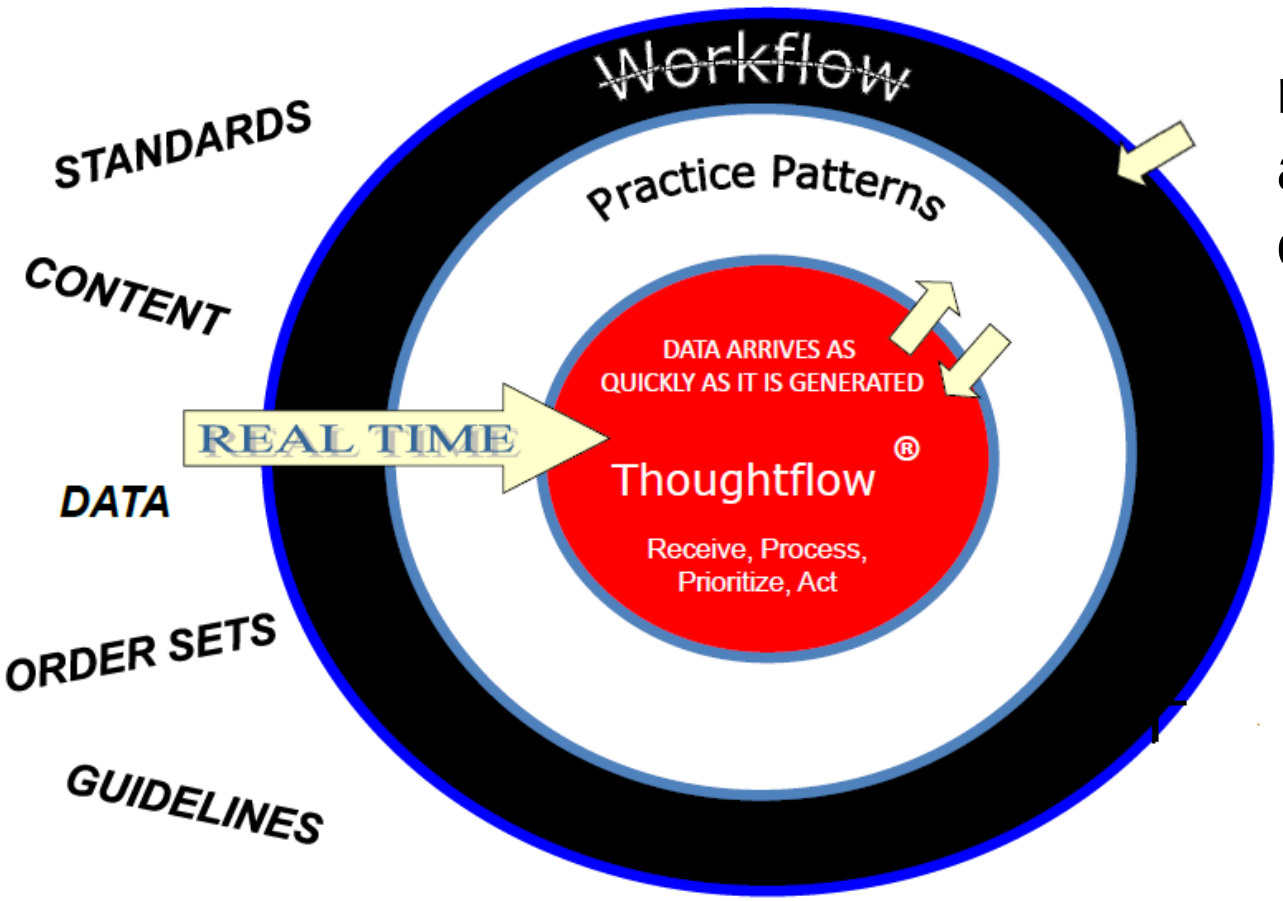


Throughtflow will replace workflow as the driving force of clinical practices

Context specific data / information, trends, evidence-based knowledge are the key ingredients to fuel the thought process and throughtflow

The Power of Patient Data

Workflow (& care coordination)
+ **throughtflow** improvements

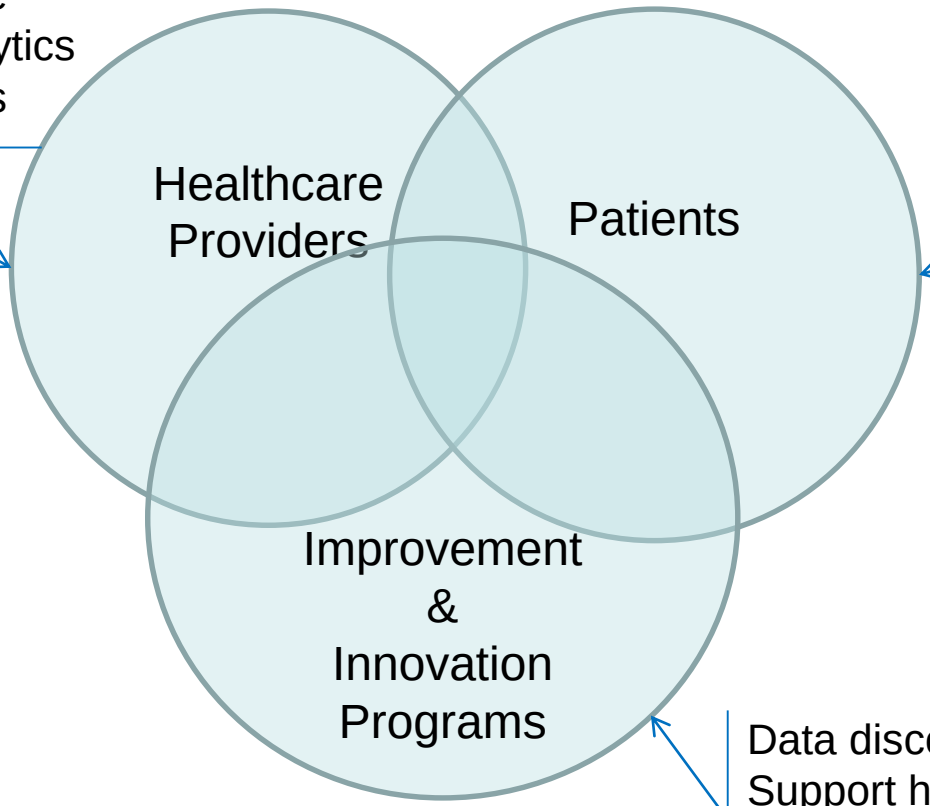
Operational intelligence
Strategic decision analytics
Reporting requirements

↑ services + resources planning
↓ costs of care

Conformance + health improvements

Patient profile data to enable shared decision prevent/↓ risks improves experiences and outcomes

↓ complications
↑ satisfaction



Data discovery to form and Support hypothesis for Health outcomes improvements

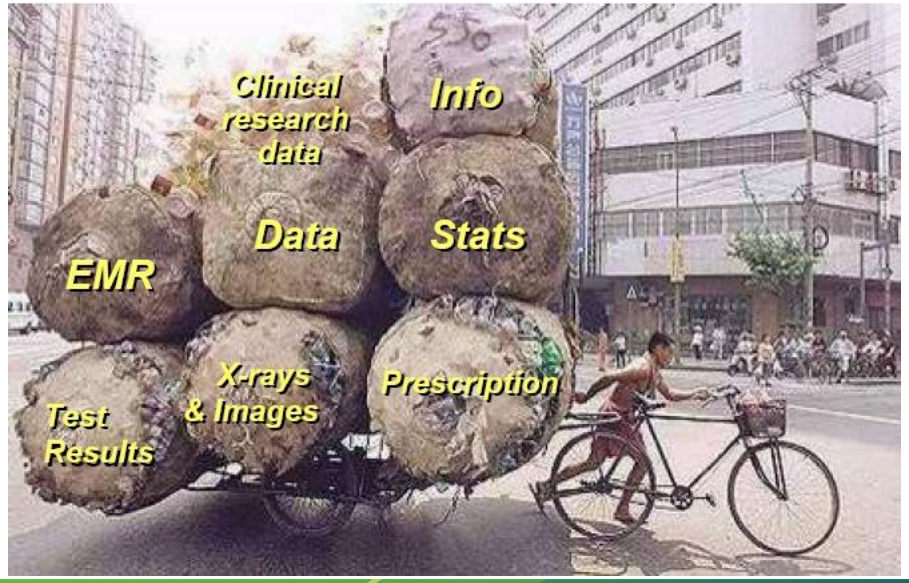
The Challenges

- Data quality
  - Variability: no standard; or too many competing standards
  - Omissions; redundancy
  - Inadequate/inappropriate granularity
  - Repurposing (e.g. in-patient episode as out-patient epsiode and vice versa)

Without quality, interoperable data, no BI and analytic tools can deliver useful intelligence to support useful decisions

The Challenges

- Data collection & access
  - Data silos
    - Collect once/multiple, use once
  - Confusions in ownership, custodianship, governance
  - Power play: “only we know how to use/analyse the data”



Standards

- Types:
  - Syntax, Semantics, process (including, intersystem, interperson/team workflow, thoughtflow)
- Data (content) standards
  - HL7 FHIR (Fast Interoperable Health Resources)
- Exchange format standards
  - Clinical document architecture; HL7 v2/3 messages
- Clinical terminology standards
  - SNOMED CT

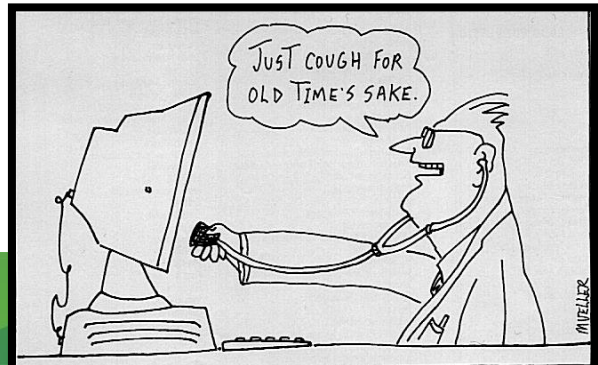
- Critical issue in wearable smart sensor devices

QH Enterprise Data Strategy

- Reduce data collection burden:
  - Harmonization (and rationalisation where appropriate)
  - Collect once, use many
- Improve data access:
  - Single source of **trusted** data
  - Separation of concern: empower users; value add
- Improve data quality:
  - Data standards (collection, persistence, exchange)
  - Improvement at source (collection)
  - Improvement by use
- Strong data governance

Summary

- Heath data are powerful resources to help improve patient health, health care services delivery and quality
  - Patient journeys and experiences
- Data standards, quality, accessibility, shareability and usability issues are significant problems
- Data tsunami will compound these problems
- Enterprise data strategy, roadmap and strong data governance are urgently required to unleash the power of health data



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