



The History of Health Information Technology in 45 Minutes

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Agenda

- Where We are With Health Information Technology and Where We are Going
- The Alphabet Soup of Health Information Technology
- How This all Ties Into Quality

During the Presentation, we will see how skilled you are in your History!

Presented by **Jason Goldwater**, MA, MPA, Senior Director, National Quality Forum. No conflicts to disclose.

Who Is This and What Is Her Significance?



The Evolution of Health Information Technology (Health IT)

- Health information technology provides a mechanism for refocusing care delivery around consumers without substantial regulation and industry upheaval.
- Information technology can result in better care (care that is higher in quality, safer, and more consumer responsive) and at the same time, more efficient (care that is appropriate, available, and less wasteful).



Moving to an Electronic Health Environment

Standards

- Data
- Communications

Health Info Systems

- Electronic Health Records Systems (EHRs)
- Personal Health Record Systems (PHRs)
- Info Exchange

Adoption by health organizations & persons of affordable, high quality & standards-based EHRs, PHRs & Health Information Exchange (HIE)

Improved Health

Paperless (IOM)

This graphic inspired by discussions at a Kaiser-Permanente and IOM sponsored meeting in October 2001

The Evolution of Hospital Information Systems

1960s

HEALTHCARE DRIVERS	IT DRIVERS	RESULTING HIT
Medicare/Medicaid	<ul style="list-style-type: none"> • Expensive mainframes • Expensive storage 	Shared hospital accounting systems



Slides from "Healthcare Information Systems: From Past to Present by Health Catalyst

The Evolution of Hospital Information Systems (con't)

2000s

HEALTHCARE DRIVERS	IT DRIVERS	RESULTING HIT
<ul style="list-style-type: none"> • More integration • Beginnings of outcomes-based reimbursement 	<ul style="list-style-type: none"> • More of everything • Mobility • Emerging cloud computers 	<ul style="list-style-type: none"> • Emerging, broad-based clinical decision support • Broad operational departmental systems with EMR integration • Emerging data warehousing and analytics solutions



Slides from "Healthcare Information Systems: From Past to Present by Health Catalyst

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What Hospital Is This and What Is Its Significance?



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The Health Information Technology for Economic and Clinical Health Act (HITECH)

- American Recovery and Reinvestment Act 2009 (ARRA)
 - Health Information Technology for Economic and Clinical Health (HITECH) Act
 - Formal establishment of the Office of the National Coordinator for Health Information Technology (ONC)
- Funding to support regional and state initiatives to promote the adoption of electronic health record (EHR) technology and best practices
- Estimated \$17-\$19 billion in Medicare and Medicaid incentive funds for eligible hospitals and providers that adopt EHR technology before 2015
- Directed the ONC to issue regulations

"Meaningful Use" Entered the Lexicon

- "Meaningful Use" is described in the Act as:
 - *Use of "EHR technology in a meaningful manner" (which for physician incentives shall include the use of e-prescribing)*
 - *Electronic exchange of health information to improve the quality of care such as promoting coordination of care*
 - *Reporting on clinical quality measures (which shall become more stringent over time)*



Timeline of Meaningful Use

2011 → 2013 → 2015

Capture/Share Data

- Prescribing / 10% of all orders through CPOEs
- Drug-drug, -allergy, -formulary checks; medication lists/ reconciliations
- Lab results delivery
- Patient e-copies of their health information
- Claims and eligibility checking
- Quality and immunization reporting

Advanced Care Processes with Decision Support

- CPOE for all order types
- Evidence-based order sets
- Clinical decision support at the point of care
- Record all clinical documentation in EHR
- Health summaries for continuity of care
- Registry reporting and reporting to public health
- Populate PHRs

Improved Outcomes

- Achieve minimal levels of performance on quality, safety, efficiency measures
- Implement clinical decision support for national high priority conditions
- Access comprehensive data from all available sources
- Experience of care reporting
- Medical device interoperability
- Dynamic/ad hoc quality reports
- Real-time surveillance

Telemedicine Gains More Momentum



- Telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve patients' health status.
- Telemedicine is not a separate medical specialty.
- Telemedicine includes consultation, diagnosis and treatment
 - Improves patient care
 - Increases patient access
 - Reduces medical costs for payers and patients

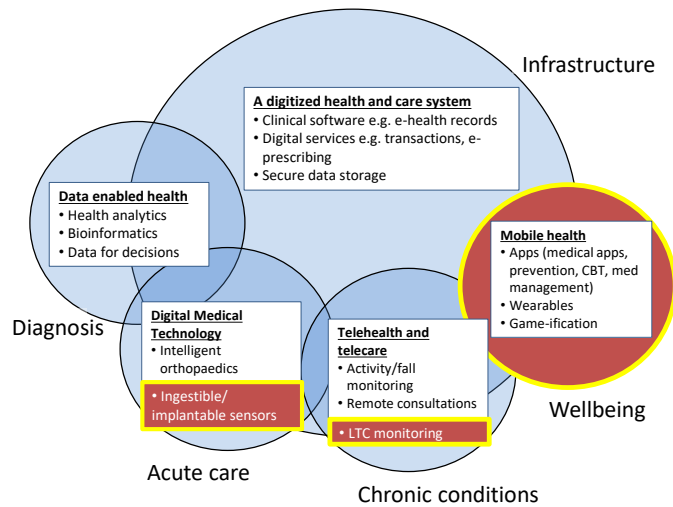
Why Has Telemedicine Grown in Importance?

- 70% of doctors office appointments could have been treated through telehealth
- 66% of ER visits are Non- Emergencies
- 33% of patients report difficulty in timely doctor appointments
- 25% of patients report they cannot take time from work to see a doctor
- 28% of Pediatric ER visits could have been handled with telehealth
- 42% of the 354M annual acute care visits are treated by personal physicians the rest are made to:
 - » 28% Emergency Room
 - » 20% Specialists
 - » 7% Outpatient clinics

When Was This Released and By What Company?



The Digital Health Revolution



The Alphabet Soup of Health Information Technology

Clinical Reminders

Reminder Resolution: Pneumococcal vaccine (pneumovax)

ORDER PNEUMOCOCCAL IMMUNIZATION:

☐ Order for pneumococcal vaccine placed.

☐ Order for influenza vaccine entered.

PRIOR IMMUNIZATION:

☒ Patient indicated that the pneumococcal vaccine was received previously.

Date/Time: 1937 Location: East Orange, NJ

Comment:

REFUSAL/CONTRAINDICATION:

☐ Patient indicates a history of contraindication to pneumococcal vaccination.

☐ Pt. has an acute illness. Vaccinations will be delayed until recovery from this illness.

☐ Patient has a life expectancy of less than 3 months. Evaluation and treatment of patient's condition is the priority.

☐ Patient refuses pneumococcal immunization.

☐ Patient refuses all immunizations at this time.

Clear < Back Next > Finish Cancel

Pneumococcal vaccine (pneumovax):

Patient indicated that the pneumococcal vaccine was received previously.

Location: East Orange, NJ

Immunizations: PNEUMO-VAC (Historical)

**Links Reminder
With the Action
With Documentation**

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Laboratory Orders and Results

Visit CPBS in use by: Ferguson, Lee (testserver)

File Edit View Action Options Tools Help

MULTER, CHARLES W AEC Jun 12, 2002 12:40 GREEN / Ferguson, Lee

377-30-7036 Dec 06, 1932 (B) Provider: FERGUSON, LEE

Jun 12, 2002 12:40 Jun 12, 2002 12:40

PCCL - ESTABLISHED - PROBLEM FOCUSED
PNEUMOCOCCAL VACCINE

Ferguson, Lee Change

All Signed Notes

New Note in Progress

Jun 12, 2002 PCC - ESTABLISH

All signed notes

Jun 26, 01 INTERVENTION PF

May 16, 01 AEC-FOCUS-MINC

May 16, 01 AMBULATORY ED

May 16, 01 PCC - ESTABLISH

May 16, 01 Preventive Medicor

Apr 30, 01 PCC - ESTABLISH

Apr 13, 01 PCC - ESTABLISH

Apr 05, 01 PCC - ESTABLISH

Apr 05, 01 PRIMARY CARE NI

Feb 20, 01 ADVICE LINE, PRI

Dec 21, 00 PSYCH MEDICATI

Dec 21, 00 NURSING NOTE

Order a Lab Test

Available Lab Tests

LIPOPROTEIN ANALYSIS FASTING

LIPOPROTEIN ANALYSIS FASTI

LIPOPROTEIN ANALYSIS AND

LITHIUM

LIVER FUNCTION

LP (A) (APOLOPROTEIN, HDL)

LYMPHOCYTE ANTICORRELANT

LUTEINIZING HORMONE

LYME ELISA

Collect Sample [BLOOD (SERUM)]

Specimen: [SERUM]

Urgency: [ROUTINE]

Collection Type: [Ward Collect]

Collection Date/Time: [Now]

How Often? [ONCE]

How Long? []

REQUIRES DOCUMENTATION THAT SPECIMEN IS TAKEN AFTER A 12 HOUR FAST. HOSPITAL INPATIENTS MUST PROVIDE APPROVAL BY HEAD

Accept Order Out

Encounter

No encounter information entered

Cover Sheet Problems Meds Orders Notes Consults QCC Summ Labs Reports

LOCK

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Medication Administration

Vista CPRS in use by: Ferguson, Lee (Reserve)

DEMO BILL GLENN 46A MED 46226-26 BLUE / Attending: Helbers, Jacque

0000000000 Jun 17 14:01:01 Provider: FERGUSON, LEE Jun 12, 2000 09:12:48 Ferguson, Lee Change

All Signed Notes: PCC: ESTABLISHED - PROBLEM FOCUSED
 ADM: 02/25/02 46A MED

New Note in Progress: All signed notes

Mar 01 02 ADVERSE REACTI
 Feb 26 02 RESEARCH ENDR
 Feb 13 02 PSYCH. AIMS, PSY
 Feb 13 02 PSYCHIATRIC PS
 Feb 13 02 PTSD: PCT PATIE
 Feb 12 02 Preventive Medic
 Feb 11 02 PSYCHOLOGY NO
 Feb 11 02 PATIENT EDUCAT
 Feb 08 02 PTSD: PCT PATIE
 Feb 08 02 PTSD: PCT PATIE
 Feb 08 02 PTSD: PCT PATIE
 Feb 08 02 PTSD: PCT AFTEF
 Feb 08 02 PTSD: PCT AFTEF

Templates: Y Reminders

Use: Prostate Cancer Screening
 TOBACCO USE SCREEN
 TOBACCO USE COUNSELING
 HTN Lifestyle Education
 IHD Elevated LDL
 Applicable
 Other Categories

Encounter

Cover Sheet / Problems / Meds / Orders / Notes / Consults / J.O.C. Summary / Lab / Reports

CLINICAL PERFORMED ACTIVITY
 IHD Elevated LDL:
 Ordered Simvastatin for initial lipid lowering therapy.

Medication Order

SIMVASTATIN TAB

Dosage	Complex	Route	Schedule	PRN
20MG	0.1852	ORAL	DHS	<input type="checkbox"/>
20MG	0.1462	ORAL	QD	<input type="checkbox"/>
20MG	0.2811		QD TPN	<input type="checkbox"/>
20MG	0.4142		QD WARFARIN	<input type="checkbox"/>
20MG	1.1724		QD WARFARIN	<input type="checkbox"/>
40MG	0.2111		QD WARFARIN	<input type="checkbox"/>

Comments:

Days Supply: Quantity: Refills: Pick Up: ☐ Obs: ☐ Mail: ☐ Window: Priority: ROUTINE

Simvastatin TAB
 TAKE BY MOUTH AT BEDTIME ~ FOR CHOLESTEROL ~

Quantity: 0 Refills: 0

PROSTATECTOMY SPECIFIC ANTIBODY: 2000 2/14/2000 08:15:24:05

Assessment/Plan:

Returns to Clinic:

Health Factor: LIPID LOWERING MEDS INITIAL ORDER

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Who Is This Man and What Is His Significance?

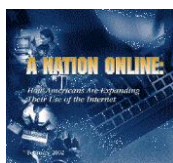


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Opportunity Existed for a Personal Health Record

- 2 million new Internet users/month
- 45% of the population uses email on a regular basis
- 35% of internet users are searching for health information
- 225 million smartphone users

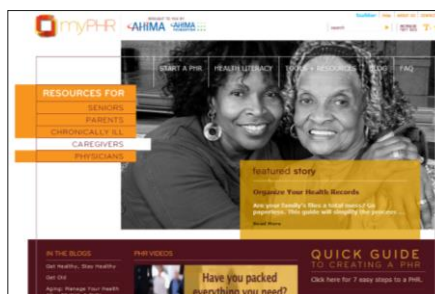


Those who have been the least traditional users –people of lower income levels, lower education levels, or the elderly – are among the fastest adopters of this technology.

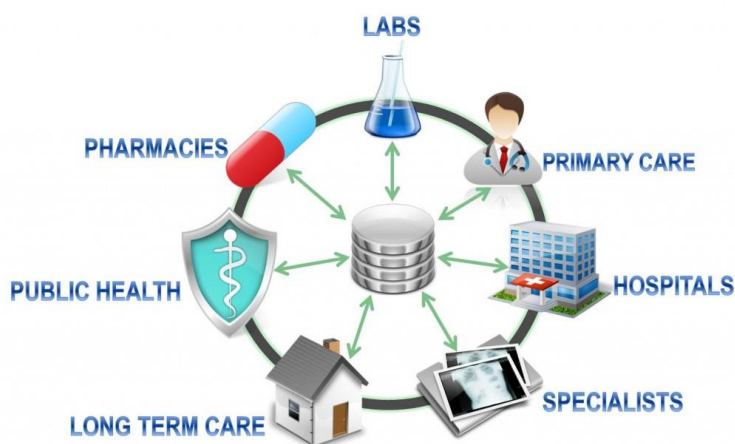
A NATION ONLINE: How Americans Are Expanding Their Use of the Internet
U.S. DEPARTMENT OF COMMERCE February 2002

What Is a Personal Health Record?

- A private, secure application (different from an EHR)
- Data from an EHR or providers accessible to patients, 24/7 from home
- Information from multiple sources entered by the patient
- Driven by patients: access, provide, manage, share personal health information



Interoperability in Health Care



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Standardizing the Data

- “A standard is an agreed, repeatable way of doing something. It is a published document that contains a technical specification or other precise criteria designed to be used consistently as a rule, guideline, or definition.” The British Standard Institution.
- Messaging and Vocabulary Standards
 - *Health Level Seven (HL7)*
 - *Digital Imaging and Communications (DICOM)*
 - *SNOMED-CT*
 - *ICD-10-CM*
 - *CPT*
 - *LOINC*
 - *RxNORM*

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Too Many Standards Can Spoil The Soup



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Health Information Exchange (HIE)

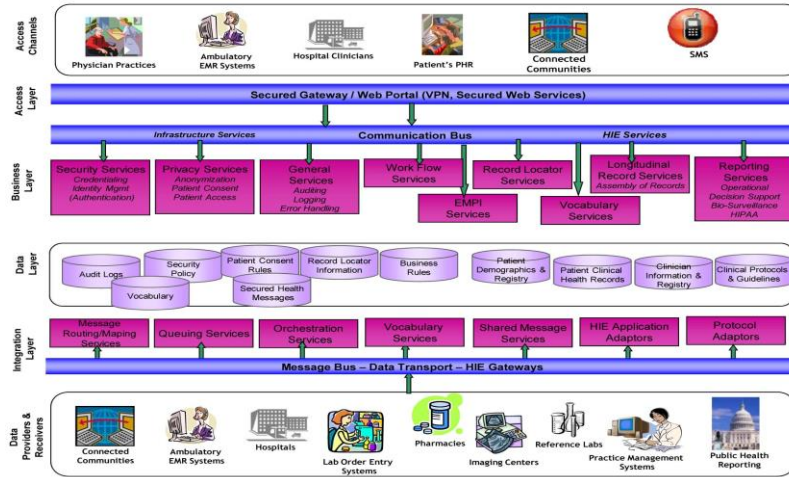


- Electronic movement of health-related information among organizations,
- A process within a state health information organization or a regional health information organization
- A bidirectional sharing of patient health-related information among providers and other authorized healthcare professionals

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Architecture of an HIE



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Who Is This and What Is His Significance?



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How This Ties Into Quality

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The Understanding of Health IT has Changed

- Health IT is an important quality factor, but an enormous cost factor as well. It is also becoming a productivity factor.
- Information through an electronic system should offer a holistic view of the patient and of the hospital.
- A information system can be regarded as the memory and nervous system of a hospital or physician network



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The Benefits of Health IT

■ Clinical Processes

- ▢ Streamline, structure order process
- ▢ Ensure completeness, correctness
- ▢ Supply patient data
- ▢ Redundant test reminders
- ▢ Structured ordering with counter-detailing
- ▢ Consequent or corollary orders
- ▢ Reduced transcription costs
- ▢ Reduced chart pulls
- ▢ Improved clinical messaging and workflow
- ▢ Improved referral coordination
- ▢ Improved patient communication and service

■ Medication Utilization

- ▢ Perform drug interaction checks
- ▢ Check for duplicate medications
- ▢ Brand to generic substitutions
- ▢ Calculate and adjust doses based upon age, weight, renal function
- ▢ Alternative cost-effective therapies
- ▢ Formulary compliance
- ▢ Indication-based ordering

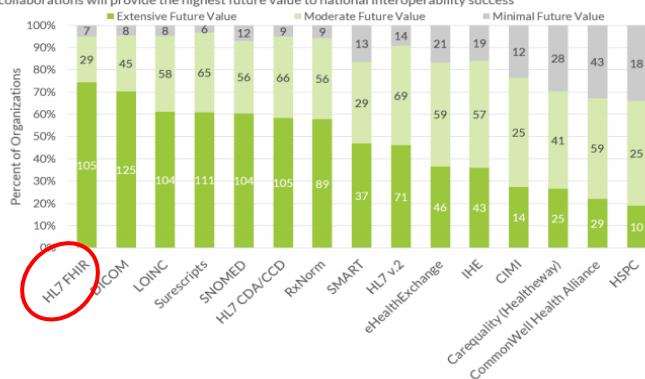
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The Evolution of Fast Healthcare Interoperability Resource (FHIR)

Which Standards, Organizations, Associations, and Collaborations Will Provide Future Interoperability Value?

Provider leaders were asked which standards, organizations, associations, or collaborations will provide the highest future value to national interoperability success



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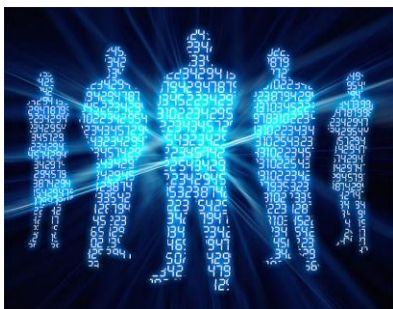
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The Basics of FHIR

- A next generation **standards framework & platform**, built on 30 years' experience, designed for implementation
- RESTful Services technology (used by Facebook, Twitter...)
- Flexible outputs: messages, documents, data, services
- Based on Resources: essential modular information components easily assembled into working systems.

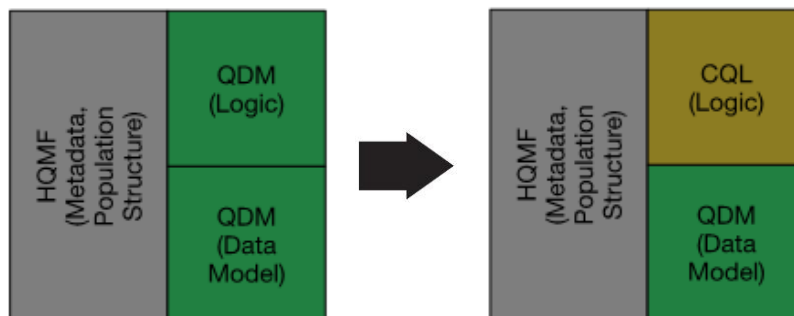


The Principles of FHIR



- Data resides at the source of truth
- APIs access data: *pull* what you need, instead of only getting what's *pushed*
- Focus on implementers
- Include rigorous semantics
- Design for the common 80%; extensions for the rest
- Off-the-shelf security and authorization
- Speed, scalability, ease of understanding
- Everything is human readable and free.

The Transition for Electronic Clinical Quality Measures

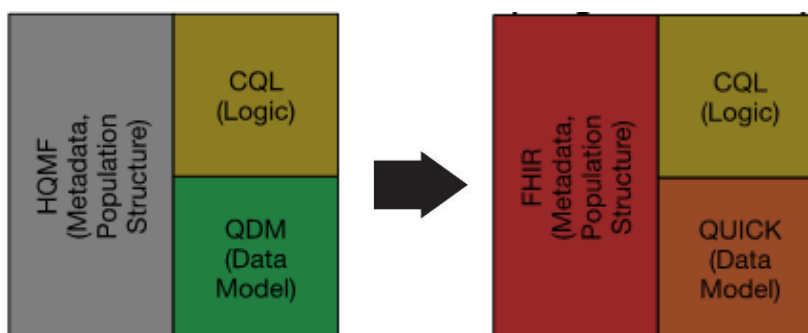


Graphic provided by Julia Skapik, MD from the Office of the National Coordination

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The Potential Future of Electronic Clinical Quality Measures



Graphic provided by Julia Skapik, MD from the Office of the National Coordination

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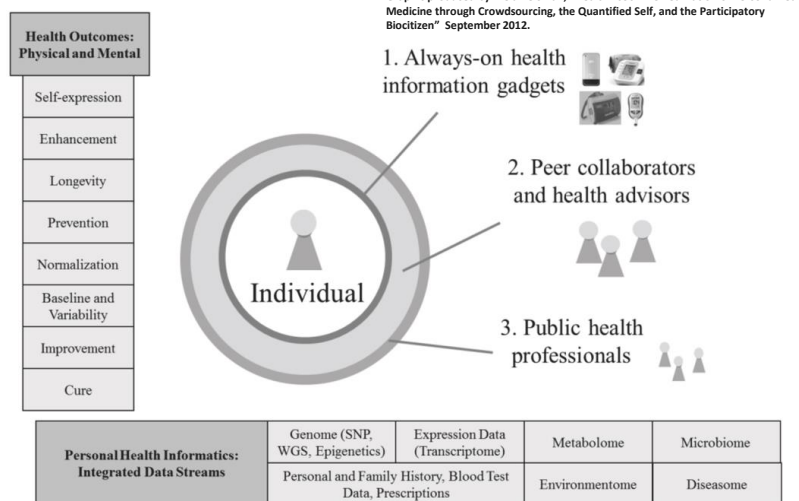
What is This and What Was It Used For?



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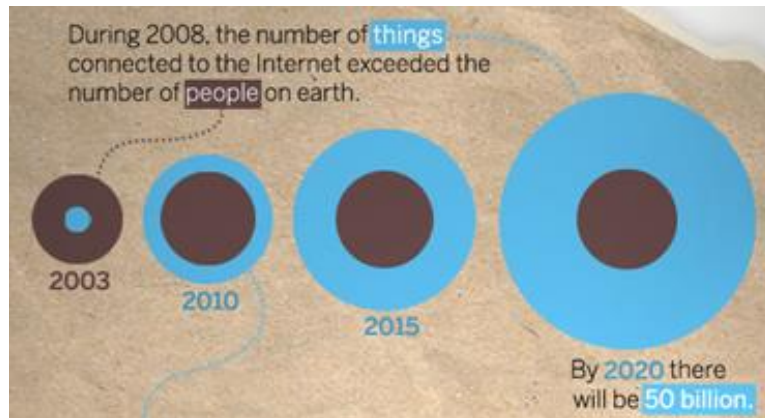
The Rapid Increase in Personal Data Streams



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The Internet of Things (IoT)



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We Are All Connected In Some Way



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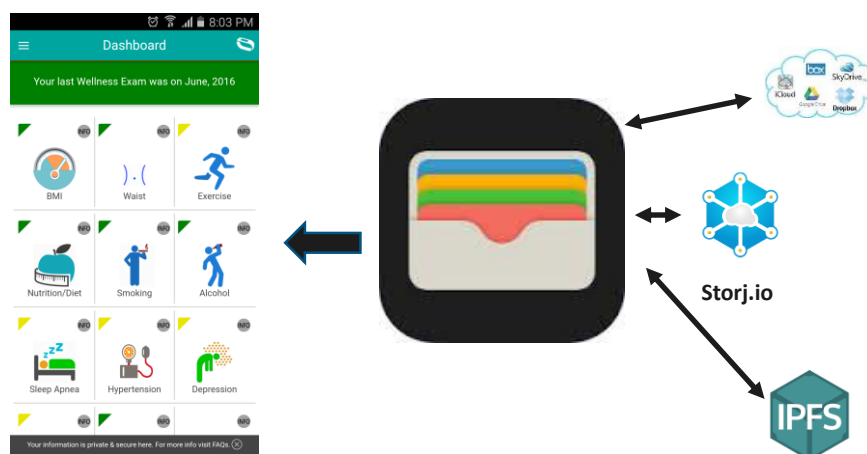
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Potential Implication for Patient-Reported Outcome Measures (PROMs)

- PROM's rely on input from psychometrically-tested instruments
- Devices that are part of the IoT have the potential to provide data to these measures
- Social media platforms provide insight into the types of issues pertinent to patients
- Expands endpoints for measurement



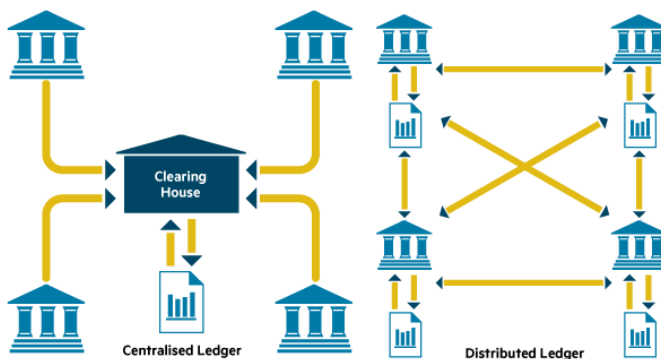
Blockchain Unleashed



How Blockchain Works

Embedding distributed ledger technology

A distributed ledger is a network that records ownership through a shared registry



In contrast to today's networks, distributed ledgers eliminate the need for central authorities to certify ownership and clear transactions. They can be open, verifying anonymous actors in the network, or they can be closed and require actors in the network to be already identified. The best known existing use for the distributed ledger is the cryptocurrency Bitcoin

FT graphic. Source: Santander InnoVentures, Oliver Wyman & Anthemis Partners

Develop of Frameworks to Create New Measures



- NQF has taken on the development of two new frameworks for telehealth and interoperability
- Idea is to create concepts to serve as foundations for measures
- Expands the opportunity for both of these fields
- Expands measures to incorporate these subjects

What Is This and What Did it Do?



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Thank You

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