17th Annual Privacy and Security Conference February 5, 2016

Disruptive Health Technologies-The Impact on Privacy & Security



Panel Session Agenda

- Introductions
- Disruptive Health Technologies
- Securing "Disruptive" Healthcare
- Enhancing Privacy in High Tech Healthcare
- Panel Q&A Session

Moderator: Howard Waldner, CHE & Fellow



Setting the Stage-Disruptive Health Tech

Karina Guy, MAS, PMAHI, CISSP, CISA, CIPP/C Partner, Advisory Services KPMG Canada



Top 5 Disruptive Healthcare Technologies



"The term 'disruptive' is used in business and technology literature to describe innovations that improve a product or service in ways that the market does not expect, typically first by designing for a different set of consumers in a new market and later by lowering prices in the existing market....An innovation that is disruptive allows a whole new population of consumers [at the bottom of a marketl access to a product or service that was historically only accessible to consumers with a lot of money or a lot of skill."

Disruptive Healthcare Technology Institute, Carnegie Mellon University



Privacy Implications of Disruptive Healthcare Technology

Virtual Clinical **Medicine: Decision-Personalized Medicine:** Patient **Support:** Pharmaco-Preferences for Diagnostic Genomics Service Identity Home Health Interactions Exposure **Monitoring: Communities:** Behavioral and "Fitbit" Activity Characteristic Benchmarking Sensors

People Trends (17)



- Provider-side democratization of medical technologies and health information technologies
- Drive toward patient-centered care, inter-provider collaboration and patient self-management
- Population advocacy

Process Trends (\$3)



- Identification of predictive patterns in clinical sub-population requiring large-scale clinical trials and research
- Genomic information systems
- Standardized biobanking (organs, tissue)

Technology Trends



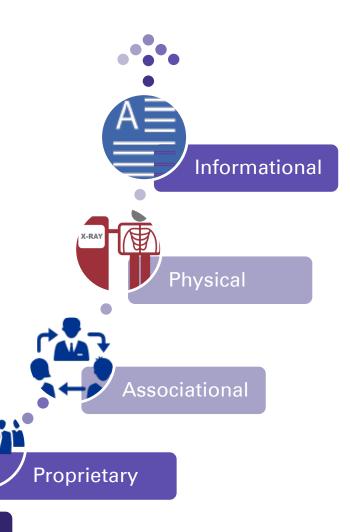
- Rapid commercialization of, and access to health management technologies
- Wearables and convergence of multiple disruptive technologies
- Connected communities



The Convergence of Privacy and Medical Ethics

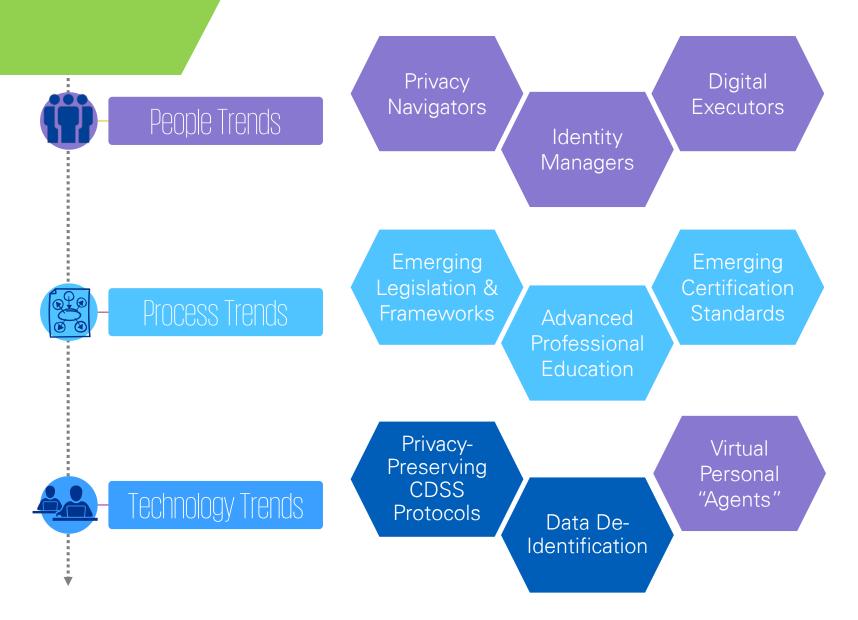
Decisional

- Increased demand for medical anonymity
- The resurgence of "self ownership"
- Autonomy of healthcare decisions
- Pseudonymity "in community"
- Provider conscience clauses
- Medically unhealthy lifestyles
- Genetic discrimination
- Ethics of concealment





The Privacy-Preserving Response to Disruptive HT



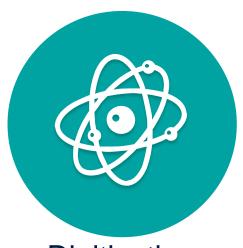
"Several national governments for example, in the United States, Australia and a number of European countries – have taken legislative action to address genetic discrimination. While Canadian human rights laws, insurance laws and privacy laws do contain provisions that seek to minimize unjustifiable discrimination and prevent improper access to or use of personal information, at present no laws in Canada provide specific protection against genetic discrimination."

Library of Parliament Research Publications Julian Walker, Legal and Social Affairs Division September 2014

Securing "Disruptive" Healthcare

Shanti Gidwani RN, MSN, MHA, CHE National Sr Director, Healthcare Cisco Systems Canada

Security Challenges



Digitization and Changing Business Models



Dynamic Threat Landscape



Complexity and Fragmentation



Talent Shortage

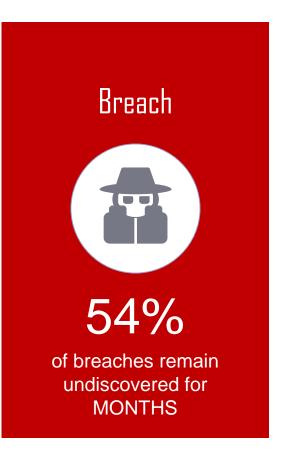
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Complex Challenges for Healthcare







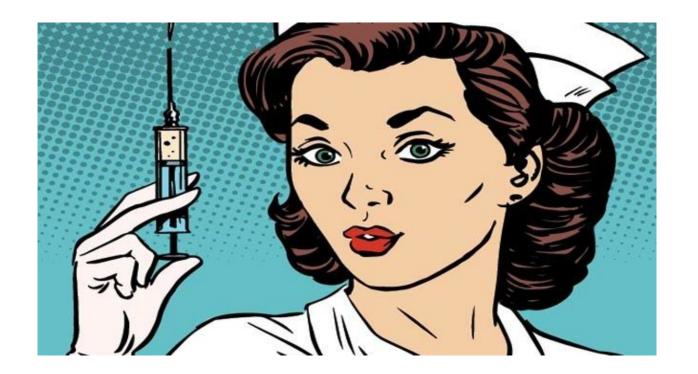


Security is the Top of Mind Concern

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Hackers Abound

"Thousands of 'directly hackable' hospital devices exposed online" "Hackers make 55,416 logins to MRIs, defibrillator honeypots"



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Motivated Threat Actors Behind Breaches

Social Security Ave. \$1~



Credit Card Data \$0.25-\$60



Regular Identity Theft Avg Payout

\$2,000

Bank Account Info \$1000+

depending on account type and balance



33

Full Identity
Profile
\$500~

Medical Record \$50+

Medical Identity Theft Avg Payout

\$20,000



Health
Insurance
Credential
\$20+

You Can't Protect What You Don't See



of point-of-sale intrusions aren't discovered for WEEKS

of breaches remain undiscovered for MONTHS

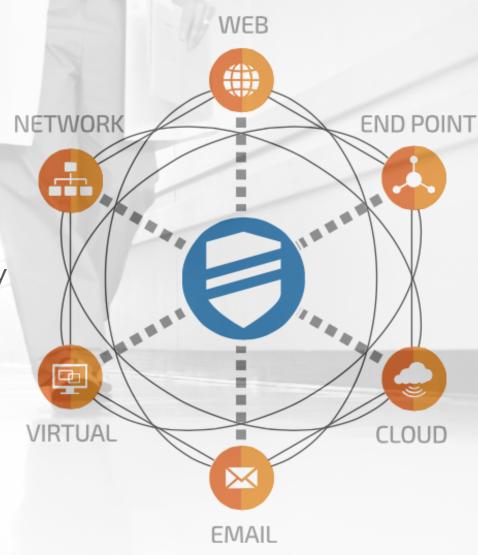


"A community that hides in plain sight avoids detection and attacks swiftly"

- "Cisco Security Annual Security Report"

Healthcare Specific Security Measures

- Need to ACCESS information whenever and wherever by clinicians
- AUTHENTICATION to patient records must be FAST
- Movement towards CLOUD APPLICATIONS expands security risks
- Multitude of MEDICAL DEVICES all connected and all must be secured (EKGs, Heart Monitors, Medicine Cabinets, implants, etc.)
- Use of MOBILE DEVICES and BYOD dissolves the network perimeter



Today's Security Access Scenarios











Remote Physician Clinic Clinician PHI Access Bring Your
Own Device
Mobility/
Medical
Devices

Patient
Experience/
Vendor
Support/
Guest
Services

Virtual Physician

Connected Health Infrastructure—Security Architecture



Healthcare's 'loT' should be the 'SoT'

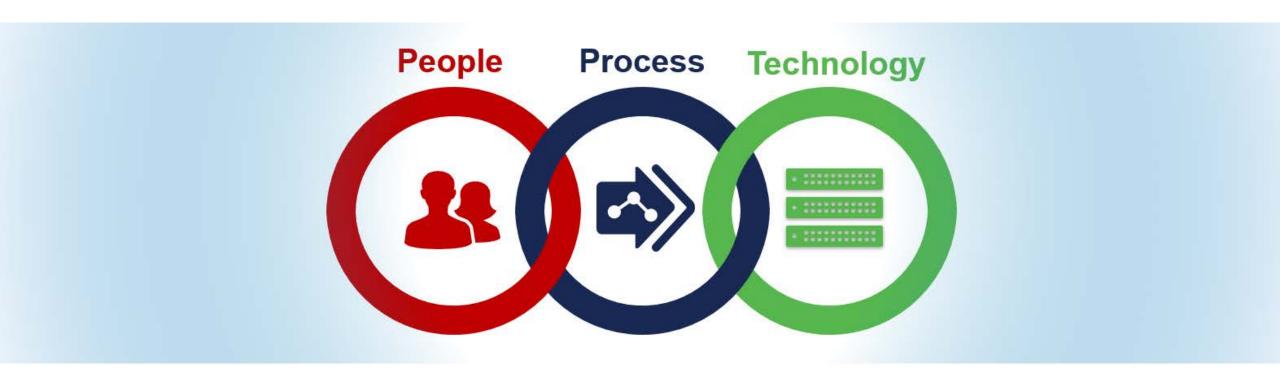
Fundamental Questions about Connected Devices:

- Do the devices store and transmit data securely?
- Do they accept software security updates to address new risks?
- Do they provide a new avenue to unauthorized access of data?
- Do they provide a new way to steal data?
- Do they connect to the institution's existing IT infrastructure in a way that puts data stored there are greater risk?
- Are the APIs through which software and devices connect secure?

Healthcare IT News, 29 May 2015 16



Promoting Cybersecurity Best Practices



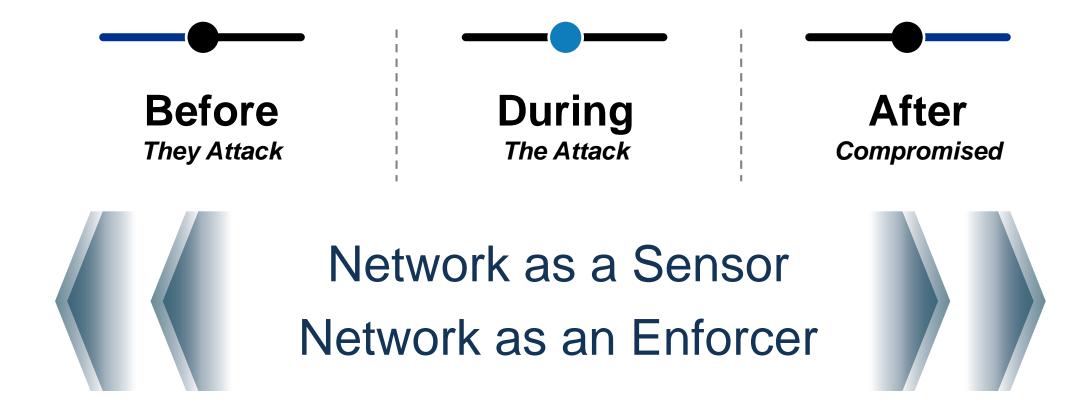
Framework covers all three

Threat Centric Security Model

Aligning with the Framework Core



Visibility and Control Inside Your Network





Enhancing Privacy in High-Tech Healthcare

Khaled El Emam, PhD Chief Executive Officer Privacy Analytics



Learning Health Systems

Information garnered from every patient will allow us to learn and to accelerate progress in treating patients. Achieving this goal will require clinicians to have a robust quality monitoring system, the means to collect and analyze data from all patient encounters, and the ability to learn from every one of them, in order to deliver high-quality care to each patient.





Learning Health Systems cont.

Not only:

- the use of evidence at the point-of-care: on-line guidelines, drug interactions, electronic references
- the integration of patient data across multiple settings over time (e.g., hospital, community clinic, and pharmacy) and making that integrated view available to providers at the point of care
- Matching eligible patients with ongoing clinical trials

But also:

The use of historical data from all patients to make care decisions



Learning from Data & Managing "Similar Patients"

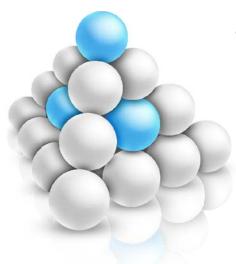
Learnings from Data:

- Integrated data on treatments and (short and long term) outcomes can be queried at the point of care
- Produce reports on the treatments received and prognosis of other similar patients – up-to-date learning from previous experiences

Managing "Similar Patients"

 Matching can be done on multiple variables, including demographics, disease state, treatment history, and genomic information

This information can be pulled automatically from the electronic medical record of the patient





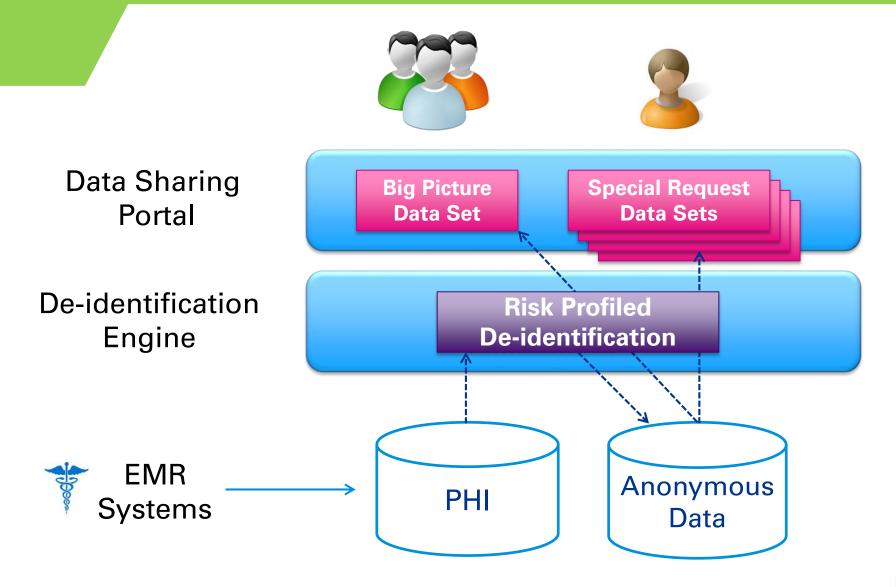
ASCO CancerLinQ

CancerLinQ will organize the explosion of information into usable knowledge, personalized for each and every patient.





ASCO Cancer LINQ De-Identification

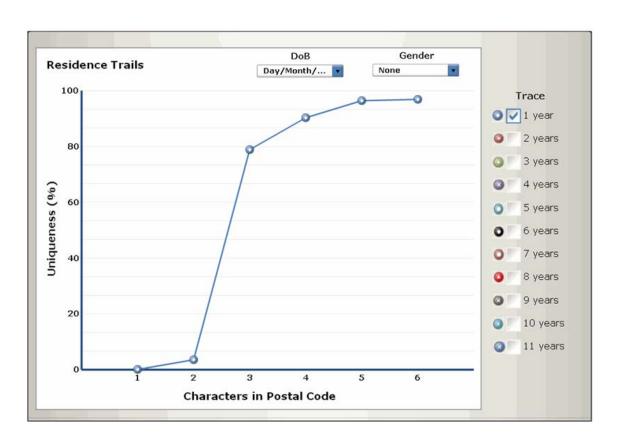






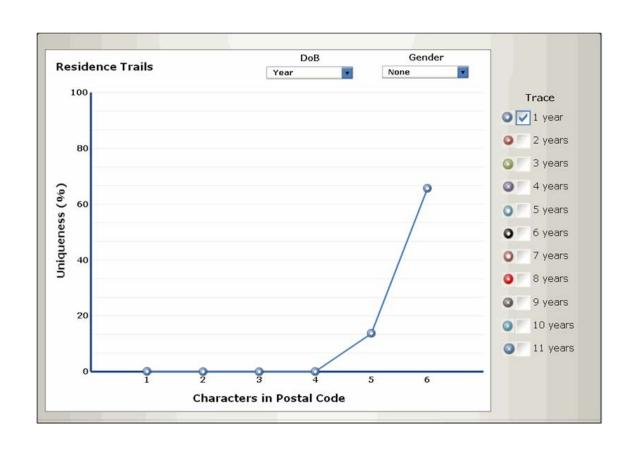
Managing Re-Identification Risk

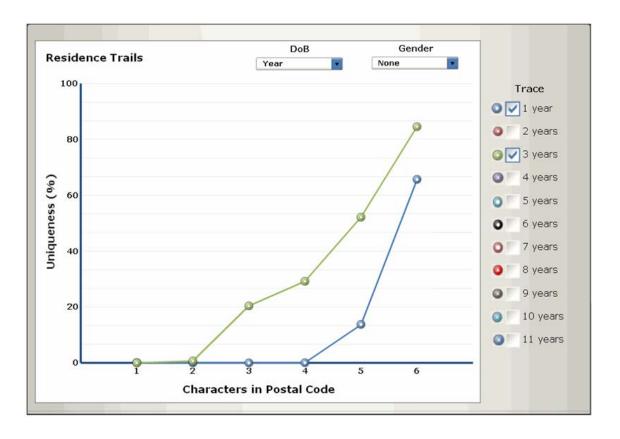






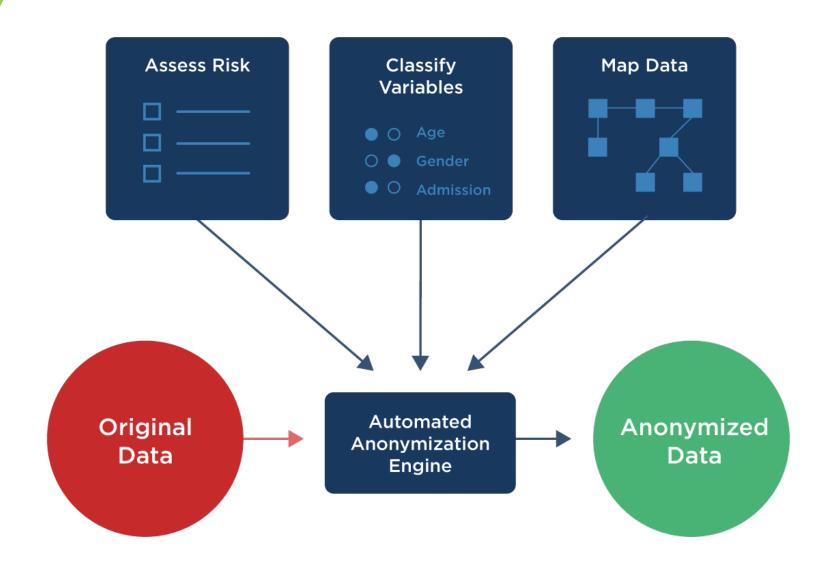
Managing Re-Identification Risk







De-identification at Scale



Panel QGA

Moderator: Howard Waldner