

#### Interoperability... so what?

How do interoperable, person-centric mHealth and eHealth systems impact upon population health?

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mHealth Deep Dive

## Who **is** this guy?





Ioint

**LEARNING** 

Network



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Connections	481 connections



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#### Derek Ritz's Summary

Trusted advisor to global public and private sector clients regarding m/eHealth architecture, strategy, implementation and adoption.

Specialties: eHealth technology & strategy, health enterprise architecture, big data analytics, health informatics standards, lean healthcare, patient safety & quality of care, EHR implementation, security, privacy, supply chain management (SCM), BPR, IT systems analysis, SOA



### What the heck is meHealth?



#### *m*Health + *e*Health = *me*Health



### What is the <u>health</u> impact of meHealth?

# Why can't we answer this question?

There is a disheartening dearth of good science regarding the health impact of meHealth projects

But to be fair... It is a hard question!



# What makes it a hard question?

- Healthcare is typically characterised as a complex adaptive system
- □ It is difficult to measure "health"
- The connection between meHealth and the health production function is not well understood



#### So... what should we do?



### Embrace a "WHOLE SYSTEM" approach.





### How are meHealth and health related?



### Seriously... how?!





### Explaining system process control theory in 90 exhausting seconds



























#### Feedback Feedforward Inferential



- If a doctor orders meds, tracks the patient's "readings" (blood pressure, fever, HbA1C), and adjusts the dosage accordingly – that is feedback control
- If Health Canada tracks the flu outbreaks in the southern hemisphere (Australia) to inform next year's flu shot cocktail, that is feedforward control





- We can shamelessly steal mature techniques from other disciplines to help us model a healthcare system
- Feedback and feedforward control may be exerted on any system where there are controlled inputs



### How do we measure health?







After Robberstad, Norsk epidemiologi, 2005





## What do we like about HALE?

- A health adjusted life expectancy is usefully sensitive to morbidity as well as mortality
  - If we increase life expectancy, HALE goes up
  - If we reduce morbidity, HALE goes up
- □ There are numerous HALE indicators
- □ As it turns out, some may be calculated from standards-based meHealth transactional data







- Health adjusted life expectancy is a useful way to characterise population health
- We can calculate a HALE metric from meHealth transactional data





#### After Patton, Developmental Evaluation, 2011

# How do we tie it all together?

- We develop a model that leverages the underlying tools and techniques
- We are working with complex adaptive systems... this affects our choice of an approach
- We must favour sense & adapt over plan & control















## The Role of Interoperability

□ Interoperable meHealth infrastructure, at scale:

- Supports care continuity over time and across different sites of care
- Operationalizes guideline-based care; closes the "knowdo" gap
- □ Standards-based meHealth "transactions":
  - Provide management metrics regarding care delivery
  - May be aggregated to generate population indicators

















### That is the health impact of interoperable meHealth!







### The gamification of interoperability





#### Face cards are "hospitals"



#### The rest are community-based point of care sites.











Twos are special. A TWO represents an index. You can use an index to find health data stored anywhere else within your care delivery network.



Aces are also special. An ACE represents an indexed, shared data repository that can hold everything in the care referral network below it (aces are "high").





Jokers are magic. If two cards are both touching the joker, you can game-play as if the cards are touching each other.

# Setting up a care network...

- □ Care facilities (cards) that have an interface to each other can "touch". An interface costs \$1.
- A finder-card that is touching an index (a TWO) can "find" data stored on any storer-card in that index's suit, as long as the finder is at least indirectly touching the storer. An index costs \$20.
- □ Cards that are touching a repository (an ACE) can access data stored there. A repository costs \$50.
- □ A joker costs \$100.



S2(

Jack can see data in the Queen and in the Ten. The cost is \$3.

Now Jack can see data in the King, Queen, Ten and Nine. The cost is \$26.

Now **K**, **Q**, **J**, **10**, or **9** can see data in any of the other four cards. The cost is \$30.





K, Q, J, 10, or 9 can see data in any of the other four cards. The cost is \$105.



K, Q, J, 10, or 9 can see data from any of the other four cards, which is now stored in the repository (the ACE). The cost is \$156.





- Four cards will be drawn from the deck at random. These are the facilities where our subject, Mosa, has received care.
  - NOTE: You may choose the suit of the black cards; you may choose the suit of the red cards. You cannot change your choice, though, after the 5<sup>th</sup> card is drawn.
- The fifth card indicates the location where Mosa has <u>now</u> presented for care.
- □ The sixth card represents the ICT devil: Murphy. All cards below Murphy in his suit are **inaccessible**.



- You start with \$680.64 CAD to build your network. The money you don't spend is your "pot".
- We will play 3 rounds; you can use your remaining pot to fund changes in your network after each round.
- □ At each round:
  - 1. If you can access <u>all</u> of Mosa's previous data from her present care location, you double your money.
  - 2. If you cannot access <u>all</u> of Mosa's previous data from her present care location, you lose half your money.
- □ After the 3 rounds the team with the most money wins... and shows off their winning network design.





#### 52 x 51 = 2652 > 680.64