Data-Based Health & Medicine: A Cognitive Approach

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Sept. 16, 2014
Personal Health Dimension

Kaiser’s Personal Health Record

27% Reduction in Costs for Unnecessary Office Visits

Rise in Home-Based, Mobile Monitoring

Apple “Health Kit”
Sept. 9, 2014
Population Health Dimension

“Asthmapolis:” Data for public health awareness

Public Access for Community Surveillance
Clinical Dimension

Electronic Health Records, Data in Individual Patients

Dashboards for Decisions across Patients
Cognitive Load in Medicine

Data smog

Consequences

- Decisional paralysis
- Confusion
- Risky behaviors
- Frequent errors
- Avoidance

Making Data Talk
Adapting to a World of Ubiquitous Data Systems

Educate

Inform

Support Decisions

LUNG CANCER STATISTICS

Inform

Persuade

BRFSS, 1986
(*BMI ≥ 30, or ~ 30 lbs overweight for 5’ 4” person)

Wisconsin
Dashboard on Health Care Quality Compared to All States

Overall Health Care Quality
Average

Weak

Very Weak

Strong

Very Strong

Performance Heter:
All Measures

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Making Data Talk
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The Fourth Paradigm
Data-Intensive Scientific Discovery

Edited by Tony Hey, Stewart Tansley, and Kristin Tolle

BRFSS, 1986
(*BMI ≥30, or ~30 lbs overweight for 5’ 4” person)

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Performance Heter: All Measures
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THE DECISION TREE
TAKING CONTROL OF YOUR HEALTH
IN THE NEW ERA OF PERSONALIZED MEDICINE

LUNG CANCER STATISTICS
Posted May 7, 2009

BRFSS, 1986
(*BMI ≥ 30, or ~ 30 lbs overweight for 5’4” person)
Cognitive Model

Task Relevant Schemata

Knowledge in the Head*

Knowledge in The World*

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Perceptual Basics

SOURCE: http://alleydog.com/topics/sensation_and_perception.php
- Constructive process
- Gaze goes to center for pattern
- Contiguous labels for meaning
- Left to right tendency in western culture
- Perceptual rules guide meaning

Constructive process
Gaze goes to center for pattern
Contiguous labels for meaning
Left to right tendency in western culture
Perceptual rules guide meaning

• Constructive process
• Gaze goes to center for pattern
• Contiguous labels for meaning
• Left to right tendency in western culture
• Perceptual rules guide meaning
Applying Concepts for Clinical Decision Support

Rule of Thumb* for “Big Data” Systems

• Overview
• Zoom / filter
• Details on demand

*Ben Shneiderman

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Empowering Individuals


Apple Watch, Expected 2015
Portraying trends to policy makers

Choropleth Maps: CDC Obesity Trends, BRFSS 1985

BRFSS, 1986
(*BMI ≥30, or ~30 lbs overweight for 5’ 4” person)
Bottom Line
Data: New “Intel Inside*”

Tim O’Reilly

(by itself) Data ≠ Power
User Centered*

Data = Power

*User Centered* means *made understandable, actionable, accessible.*

CDC Community Commons

DHHS: 2004

*i.e., made understandable, actionable, accessible*
Thank you!

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