The Informatics Pause

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Conflict of Interest

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Has no real or apparent conflicts of interest to report.
Learning Objectives

• Recognize healthcare as a system
• Describe quality in a systems context
• Illustrate the crucial role of Clinical Informatics with respect to quality in healthcare
• Explain how an “Informatics Pause” can lessen the likelihood of “data-driven” dysfunction
Why?
No animals (or people) were harmed in the making of this picture.
Problem Statement

• Only small fraction of healthcare data now analyzed
  • Imbalance likely to increase substantially in near term
  • Big Data, healthcare IoT, consumer healthcare & fitness devices
• Increasing demand for “data-driven” healthcare decisions
  • Individual treatment, population health, public policy
• Can’t we just build pipelines between the two sides and open the valves?
  • If not: why not; what & how instead?
Recognizing Healthcare (or other Enterprise) as a System
In theory, there’s no difference between theory and practice. In practice, there is.

Attributed incorrectly to Yogi Berra; probably originated by Jan van de Snepscheut
Family Feud?

**THEORETICIANS**
- Overcomplicate the simple
  - (turn every shoelace into a Gordian knot)
- Cloistered in 30,000-foot ivory towers
  - (can’t see trees for the forest)
- Often say: “If you really think about it…”
- In popular lore: “The King’s Toaster”

**PRACTITIONERS**
- Oversimplify the complex
  - (pretend every Gordian knot is a shoelace)
- Stuck deeply in the mud
  - (can’t see the forest for the trees)
- Often say: “Hey, let’s not overthink this…”
- In popular lore: “Blind Men & Elephant”

*Individually, they’re the problem. Collectively, they’re the solution.*
Start with “Why”

- Shapes the “what”, “where”, “when”, “how”, even “who”
- Provides context & motivation for prescribed activities
- Suggests when/how to handle variation (“do differently”)
- Suggests when/how to improve (“do better”)
- Essential elements include relevant:
  - Purpose
  - Priorities
  - **Theory**
Systems Theory: Chapter 1

Input → Something happens here → Output

Purpose
Value

• Typically, a system’s purpose involves adding value.
  • From input(s) to output(s)
  • Facilitating or advancing the purpose of the surrounding system

• A system’s value is the total sum of other systems’ experiences from its output, compared to its input.

• Insightful family of questions: “What value…”
  • “... does this add?”
  • “... should this be adding, and why is it not?”
  • “... could this be adding, and how?”
Models

- **Purpose:** conceptual abstraction
  - overall function / operation / behavior
  - primary elements & their interoperation
  - graphical depiction thereof

- **Primary objectives & metrics:**
  - explain the past & present
  - predict the future
  - facilitate the desired

- **Inherent limitations:**
  - Representative but not identical to reality
  - (compression loss)

*Tools to help us to handle big jobs*
The Solar System (early model)
Hospital/Healthcare System
*(early models)*
One common misperception about systems analysis is that it is solely focused on technology...

Current thinking [takes] a broader view of 'the system' that includes the people and the processes in the healthcare organization...

According to systems theory, the environment in which [the technology] resides is itself a complex system...

People, process and technology, [working] together to create value for the healthcare organization...
Hospital/Healthcare as a System

Hospital (or other entity)

Org. Structure
Culture
Process
Training
Tools & Tech

The actual, ultimate “Healthcare Information & Management System”

Input

Output

Purpose (create value)
Describing Quality in a Systems Context
What is “Quality”? 

☒ An arcane, esoteric alchemy that is dependent upon high priests?

☒ A process, position and/or department?

✔ A cultural value and commitment that experience will meet or exceed expectations!
A Qualitative View of Quality

Disappointment - Satisfaction - Delight

Expectations

Experience
Improving Quality

- Ensuring experience ≥ expectations
- Managing expectations
  - identifying, revisiting, validating, adjusting
- Improving experience
  - Clarifying/validating/adjusting objectives/purpose
  - Reviewing/verifying/improving design
  - Reviewing/verifying/improving execution
- Applicable bi-directionally at every interface throughout the system
Wellness Meta-system

Patient experience of “poor quality” can originate anywhere within the meta-system or at any interface deep within the Healthcare-Delivery Enterprise.

Patient experience and healthcare quality are the responsibilities of everyone throughout!
Treating Illness ➔ Promoting Wellness

• Episodic intervention ➔ healthy, preventative lifestyle
• Casts & crutches impose external remedial structure
  • Until inherent, organic wellness is restored
  • If never removed, treatment cannot be “success”

Healthcare-delivery systems (e.g. hospitals) as “patients”:
❌ Episodic intervention & externally imposed structure
✔️ Restoration/nurturing to intrinsically healthy elements
  and healthy interoperation among them
What is a “Quality System”?

- An external, tack-on subsystem to “impose quality” onto the primary system?

- A primary system of inherently high quality!

*How, then, can we improve the inherent quality of a system?*
Improve Quality: Harness disappointment!

- “Check-engine light”: possible quality problem developing
  - Trigger and locator to initiate continuous improvement
- Actively solicit & investigate any/all disappointment
  - Throughout system (internal) & around system (input & output)
- Requires support-structure throughout enterprise
  - Establish comfortable climate for root-cause analysis & appreciative inquiry
  - Provide for facilitation, mediation, escalation, follow-through & follow-up
- Goal: adjust expectations and/or improve experience
  - Eventual side benefit: better workplace morale, less stress
- Some disappointment can be resolved locally, peer-to-peer
  - Some will require troubleshooting of larger scope by skilled team
Quality, in a systems’ context, is:

- ... meeting or exceeding expectations of value in the output
- ... dependent upon the quality of all “internal” transactions
- ... better cultivated inherently than imposed externally
- ... the responsibility of every person within the system
- ... facilitated by “harnessing disappointment”
  - (voicing/addressing/resolving unmet expectations throughout system)
The Crucial Role of Informatics in Healthcare Quality
Needed: More “Disciplined” People

• Multidisciplinary
  • Able to change hats as required

• Interdisciplinary
  • Able to wear more than one hat at a time

• Transdisciplinary
  • Able to take several hats, rip their seams and sew them together to make a single hat to wear always

Future: more interdisciplinary/transdisciplinary workers, equipped with multiple skills and categorized by deliverables (not by skills) to break down silos
Clinical Informatics

- Not just manipulating data: understanding its significance, applications & implications
  - Healthcare, IT, data science, human factors, patient experience, workflows, dataflows, safety, quality, privacy, security, outcomes, availability, usability, cost-effectiveness, efficiency, efficacy

- Decision support: summarization, visualization, analysis, governance, business-case

- Coordination across silos: IT, doctors, nurses, biomedical, pharmacy, respiratory/physical/occupational therapists, financial/business, operations
Healthcare Technology Meta-System

- Technology & Infrastructure
  - Buildings & Grounds
  - Power, Utilities & HVAC
  - Healthcare Technology
  - Telecom
  - Security

- Nurse Call
- Interactive Patient System
- EMR & CPOE
- Medication Administration
- Patient Telemetry

- Dashboards, Reports, Alarm-Management
- Evidence-based Medicine & Care Plans
What will data be when it grows up?

- Stand-alone (in a vacuum), data has minimal value.
- Validated & interpreted within a context, data becomes information.
- Analyzed for patterns, information becomes knowledge.
- Applied to forecasts and/or decision-making, knowledge becomes wisdom.
- *(DIKW: pyramid or circular/recursive accumulation?)*

- If data is flawed, misinterpreted, poorly analyzed or improperly applied, everything downstream is at risk of “data-driven dysfunction.”

- Clinical Informatics can be the transdisciplinary expert & champion to ensure that data “grows up” to be reliable, applicable, actionable.
Without data, you’re just another person with an opinion.

With incomplete, irrelevant, misleading or erroneous data, you’re just another unguided missile.

attributed to Deming

attributed to Nortrup
Metrics ➔ System Feedback

• “Reward & punishment” of system output drive next state of system

• Obvious, readily available metrics can be incomplete, irrelevant or misleading

• Unintended consequences (potentially severely counter-productive) can result
  • “KPIs and Corporate Stupidity”
    • Liz Ryan, Forbes, 2015-Dec-07
Metrics: Be careful what you ask for

- Paying teachers for standard-test results
- Paying programmers for finding/fixing bugs
- Paying executives for “shareholder value”
- Paying salespeople for volume, not for profit
- Paying bounties for vermin (cobras, rats)
- Reward: improvement? results? what else?

- Healthcare: accountability & pay-for-outcome/value
  • must avoid similar unintended consequences
The “Informatics Pause”
Surgical Pause (or “Time-out”)

- Universal Protocol creates time & space to “harness disappointment”
  - elicit & address unmet expectations
  - active, not passive, communication techniques
- Requirement of JCAHO 2003 National Patient Safety Goals
- Before anaesthesia, patient must:
  - confirm identity, site of operation, procedure is to be carried out and consent
- Before first incision, entire surgical team must:
  - take a 'time out' (pause), introduce name/role, reconfirm patient/procedure/site, outline expectations
- Before patient leaves the operating room, team must:
  - Inventory instrument/sponges/needles, check equipment/specimens checked, outline patient recovery
Informatics Pause

Before requesting, generating, supplying or utilizing data, first verify:

• **Purpose of data**
  - To where will this data go and what decisions/actions will it drive?
  - Is that relevant, appropriate and professionally sound use?

• **Provenance of data**
  - From where did this data come? (FDA approval, calibration, etc.)?
  - How was it gathered, stored and relayed?

• **Protection of data**
  - Is it authentic, accurate and available to authorized users?
  - Is it unavailable to unauthorized users?
  - Is it reliable? Has it been backed up?

• “Big-picture”: right data, right communication, right visualization, right analysis, right conclusion, right audience, right responses, right follow-up/through
Be watchful for ...

• Correlation vs. cause/effect
  • Flossing & similar “data-driven decisions”

• Verification vs. validation
  • Verification: was the problem solved correctly?
  • Validation: was the correct problem solved?

• Implications
  • “Half of our students fall below the median score: a disgrace!”
Metrics & Scope

• Can “win battle but lose war” by optimizing:
  • what was requested but not what was needed
  • local/short-term at expense of big-picture/long-term
  • past point of diminishing returns

• “Efficiency-improvement” can be misperceived as eliminating jobs and increasing work-load

• Proper scope lessens likelihood of invalid metrics
Good Scope: Nurse-call

“Pushing the pillow-speaker button shall reliably & consistently initiate a call at the nurse station.”

Patient & Nurse = inputs & outputs to nurse-call system

Nurse-call System

Patient Station

Nurse Station

Pillow Speaker
“The patient shall be able to communicate with a nurse – reliably, consistently & clearly – within 5 seconds of initiation.”

Patient & Nurse = integral subsystems of nurse-call system
Best Scope: Nurse-call

“The nurse-call system shall support the larger clinical-care system: by ensuring that patients consistently receive effective, efficient, responsive & compassionate care; and by ensuring that clinicians consistently have the data, resources & time to provide clinical care in a safe, effective & supportive environment.”
Before automating any process...

- What problem are you trying to solve?
  - Is it the right process?
  - Is it the right data?

- If it’s an unreliable, irrelevant or ill-advised process, automating it will just make the mistakes more quickly.

- The “Informatics Pause” is essential when developing, implementing or testing an automated process!
Summary
Take-aways and Action-items

• Cultivate and utilize a “big-picture” understanding of your workplace, your role and healthcare overall as a system.

• Adopt and utilize a “qualitative view of quality” through which you assess experiences and expectations in all of your transactions with others, and “harness disappointment” in those transactions to drive continuous improvement.

• Recognize the vital role that Clinical Informatics plays with respect to quality in healthcare, particularly as a transdisciplinary bridge across silos, to ensure proper applications and implications of data; and pursue professional development to increase your capabilities.

• Employ the “Informatics Pause” to lessen the likelihood of “data-driven” dysfunction when connecting data-supply to data-demand.
Thank you for attending this session!

• Comments, questions, observations?

• Please complete online session evaluation

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