Creating the Data-Driven World: An Ethnographic Study of Maternal/Child Health Performance Measurement

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Big Data: The Management Revolution

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"You can't manage what you don't measure."

There's much wisdom in that saying, which has been attributed to both W. Edwards Deming and Peter Drucker, and it explains why the recent explosion of digital data is so important. Simply put, because of big data, managers can measure, and hence know, radically more about their businesses, and directly translate that knowledge into

People analytics: ‘Moneyball’ for human resources

The promise of data

It's always say about a college degree was that it led to better jobs because it
High stakes for Healthcare

January 26th 2015 HHS Secretary Sylvia Burwell announces Medicare payment reforms
Data-driven accountability

• Relies on performance measures in some form
• Hinges on capacities of information technologies & drives influx of hardware and software applications into organizations
• Expands the number of dimensions along which organizations & workers are evaluated
• Shifts the temporality of audit to bring it closer to practice

(Sauder & Espeland, 2009; Dickersin & Manheimer, 1998; Wiener, 2000; Ratnayake, 2009)
Context: audit society

Social, cultural, and political forces are compelling unprecedented “audit explosion” for public organizations

(Dunleavy, Margetts, Bastow & Tinkler, 2005; Power, 1997; Pentland, 2000)
Research questions

Qualitative work of quantitative measurement: What are the situated practices of creating data and doing performance measurement?

What are the consequences for providers, patients, and organizations of creating a ‘data-driven’ world?

How might we develop sociotechnical infrastructure for data driven accountability in organizations?
Methods

• Ethnographic data collection
  – Multi-sited ethnography
  – Interviews, interactive observation, informal conversation
  – in-depth engagement with field sites
    • 15 months and counting in the field
Three main issues I will discuss today

1. General issues related to developing information infrastructure for data-driven accountability
2. Data re-use: the case of birth certificates
3. Attributing low-risk cesarean sections to individual clinicians
Cyberinfrastructure

• Technical, social, and organizational components enabling knowledge work
• Inherently relational
• Inclusive of the individuals (designers, users, mediators, managers, administrators) associated with information infrastructure
• Much literature focuses on large-scale science

(see for example Bowker, Baker, Millerand, and Ribes, 2010; Bietz & Lee, 2009; Star & Ruhleder, 1996)
Adequate infrastructure is a far-off goal

Left Evolving data ecosystem

Below proposed classes of data in a perinatal datamart

Classes of OB/Neo Data Data Warehouse
Different nature of the scientific activity

• Performance measurement deals with multiple levels of abstraction—not with measuring things, but the things related to things (i.e. proxies for “quality”)
  – Often doesn’t adhere to statistical standards applied in other scientific disciplines such as construct validity
  – Performance measurement is a discipline unto itself
  – But, it is inherently an applied science and many involved are not statisticians or scientists but other types of professionals (i.e. managers) mobilizing a secondary skill set
Some considerations in building infrastructure for data-driven accountability
Data have multiple encumbrances

- For example, coding data is used for billing and performance measurement
  - Maximizing “clinical truth” vs. fiscal effectiveness
  - Different workers have different stakes in data
  - Easy to lose site of data’s provenance
Upstream and Downstream Data

• First order = clinical data entry
• Second order = capturing data from medical charts for organizational and administrative purposes
• Third order = analyses that occur using second order data (i.e. administrative data)
Emergent seams

Constantly shifting ends to which data are put means “seams” are revealed on an ongoing basis; what used to be good enough one day is not good enough the next.

“We’d like to get to the point where we are proactive with our data, not just reactive.”

Executive Director, Data Strategy & Reporting
External vs. internal

The promise of data driven accountability is internal process improvement, external regulation

– Internally, performance measurements are integrally embedded in management
– Externally, high-stakes public and regulatory sanction is tied to results
– How to design infrastructure for both?
– Privacy/transparency concerns

Top: health system’s visibility board
Bottom: publicly reported Leapfrog safety ratings
Data Reuse

Taking data collected for one purpose by one entity and mobilizing it for a different purpose and/or use by a different entity.
“If the rewards of the data deluge are to be reaped, then researchers who produce those data must share them, and do so in such a way that the data are interpretable and reusable by others.” (Borgman, 2012)

This involves:
• Collaborative, iterative, and intensive labor
• Conditions of trust
• Understanding of context of origin

Birth certificate data
Birth Certificates

- Upper portion—copy stored in family homes
- Long form, data collected for public health
- Clerks collect data through a combination of medical chart review and direct data collection from patients
- Clerks enter data into a computer program maintained by CA Vital Records, AVSS
A Moving Target

• Accurate gestational age is now of paramount importance
• Wide variations between Small, Medium, and Large
  – Small clerks rely on default calculator rather than “wheeling it out”

“We are constantly playing a game of catch up.”

Chief of Data Analytics
“...what I found as I was going around so many administrators are sure it’s a birth recorders fault, right? ...The last one I did... the clinical nurse specialist, when I showed her that their fetal presentation didn’t match, that their delivery route didn’t match. She went through their birth records. And birth recorders say, ‘No, it’s not always there’...when the clinical nurse specialist pulled up the first chart, she actually pulled up the patient chart looking for fetal presentation, there was none in the doctors note. She goes, “It can’t be missing that often...And she just sat there and goes, “Oh my God, this is horrible!”

Birth Certificate Training Program Director
Exercising Clinical Judgment

“So you are looking...to see what it is on the worksheet. And then you look in Epic [electronic health record software]...If it is in the worksheet and it is in Epic, you go with Epic. But again, if it’s like completely off, you have to go by the pregnancy wheel because...I know it’s a little weird. Pregnancy wheel trumps everything now...It’s one thing I hate about it.

Birth Certificate Clerk
Human infrastructure & social capital

Effectively managing emergent reuse requires explicit attention to occupations & labor

– Not just the *work of reuse*, but the *social capital to effectively get the work done*

– Data quality improvement efforts suffer when they target low-status occupational groups
Educator looking up NTSV c-section rate of individual clinicians in the maternal data center

Professional autonomy, authority, discretion:

Development of a statewide (and growing) maternal data center has made provider-level measurements of cesarean section feasible
How good is good enough data?

It depends on the stakes:

“We can’t go public with things like publishing the docs c-section rates until we know we have accurate data.”

“It’s excruciatingly difficult work to figure all of those system issues out.”

—mother/baby educator in Large Hospital
Concluding thoughts

• There is a large need both to build infrastructure to support data-driven accountability in healthcare organizations...

• AND to critically interrogate the abstractions, rationales, and values being naturalized in the calculative technologies of performance measurement and materialized in infrastructure developed to undergird accountability practice
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