




Achieving Value from the Electronic Medical Record

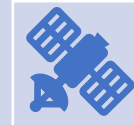
- Trevor Jamieson
- CMIO, Unity Health Toronto
- Medical Director Partnerships/KT, CDHE, Women's College Hospital
- Assistant Professor, University of Toronto



In 1991, the Institute of Medicine listed 4 ways the electronic health record could positively impact care



Quality/Availability of Data



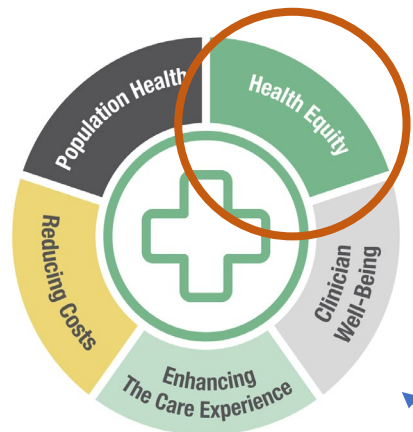
Integrating Data over Time/Space



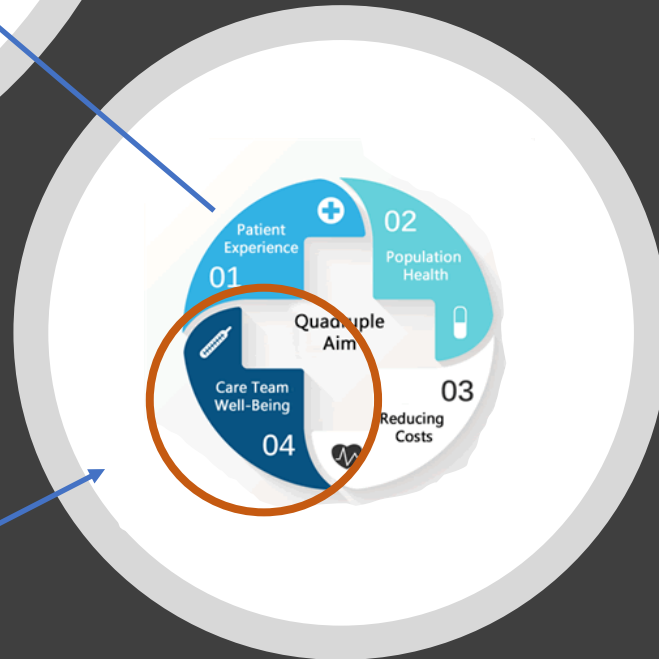
Making Knowledge Available



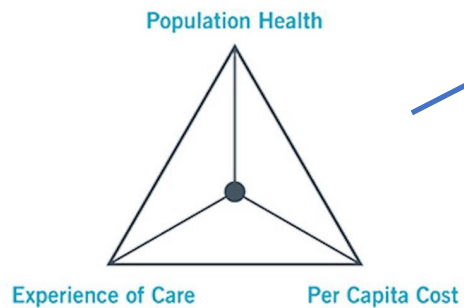
Providing Clinical Decision Support



Many of us conceptualize value in terms of the Triple... er... Quadruple... er... Quintuple Aim or variants of these



The IHI Triple Aim



Unity Health Toronto's 8 Domains of Quality

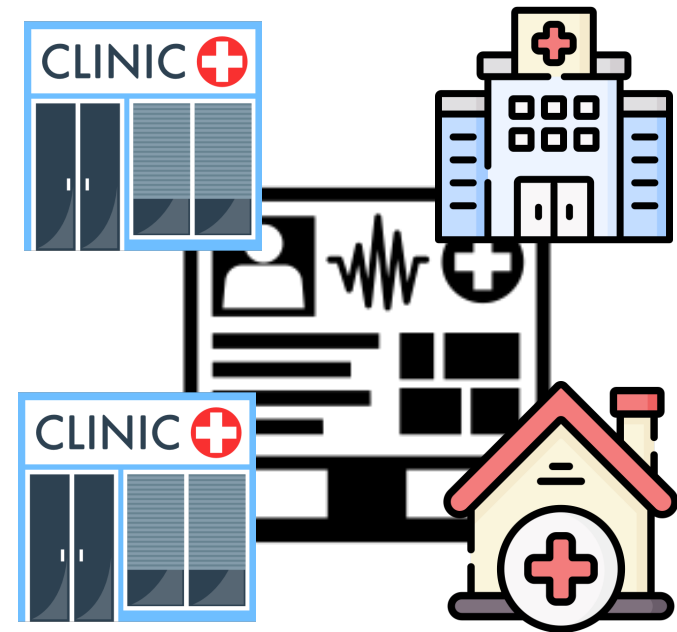
The terms EPR, EMR and EHR are used inconsistently



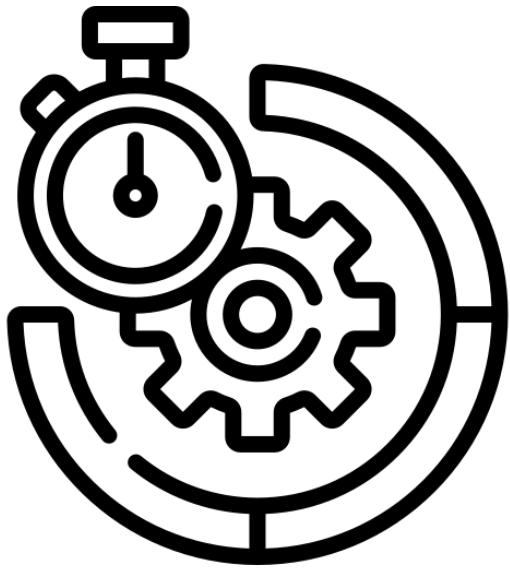
Electronic Patient Record



Electronic Medical Record/
Hospital Information System



Electronic Health Record



The initial promise of the EMR was largely framed around costs and efficiencies

Over time we've seen a shift from cost-predominant outcomes to *some* clinical outcomes (against a policy backdrop largely focused on adoption)

1966-

(Uslu & Stausberg, 2008)

2004

- 80% cost focused
- 0/4 clinical showed value

2004-

(Uslu & Stausberg, 2011)

2010

~85%  ed

2011-

(Uslu & Stausberg, 2021)

2019

- 22% cost focused
- 14/18 clinical showed value

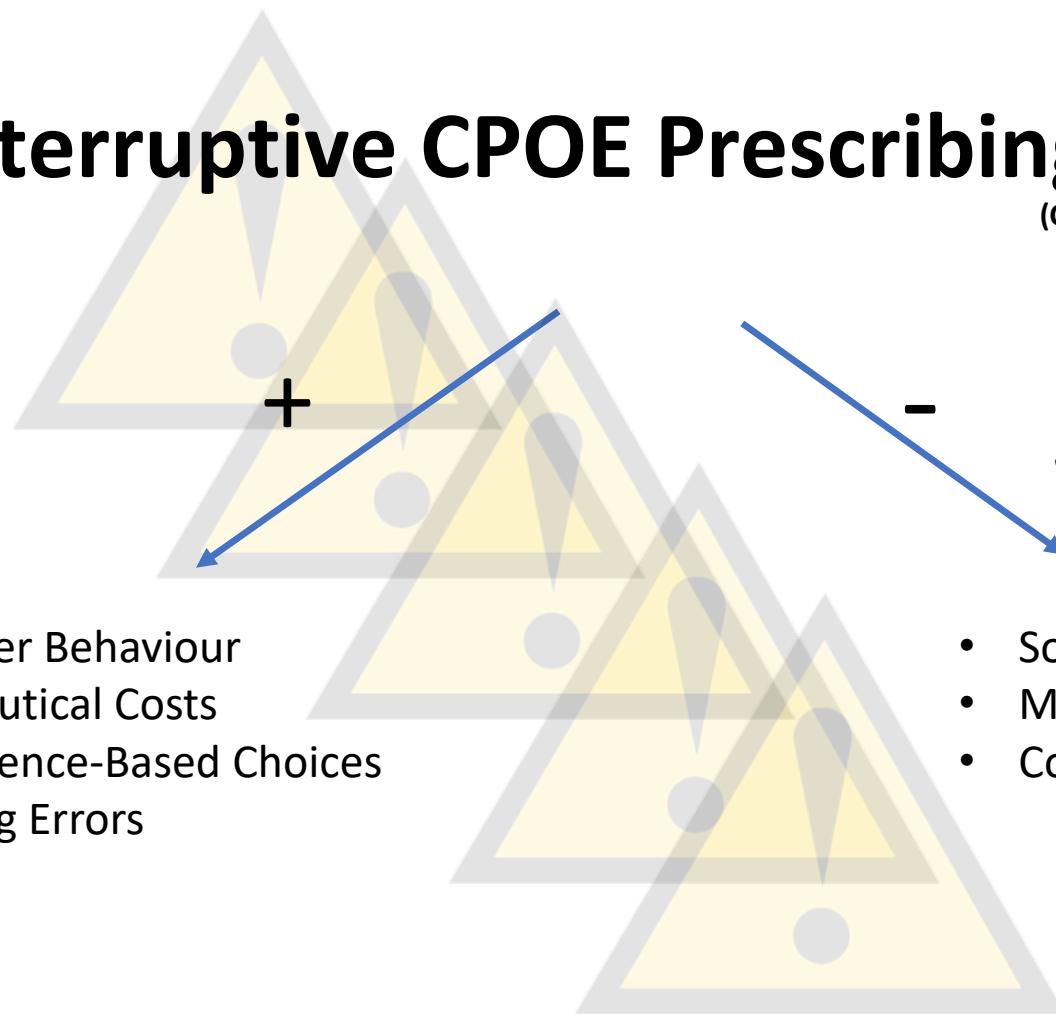
HIS Adoption in the US (due to HITECH)

9.4% (2008) -> 15.6% (2010) -> 97% (2014)

Some of the things we assumed would be easy wins for care quality haven't panned out...

Interruptive CPOE Prescribing Alerts

(Cerqueira et al, 2021)



93-100% Overridden!!

(Bryant et al, 2014, Shah et al 2021)

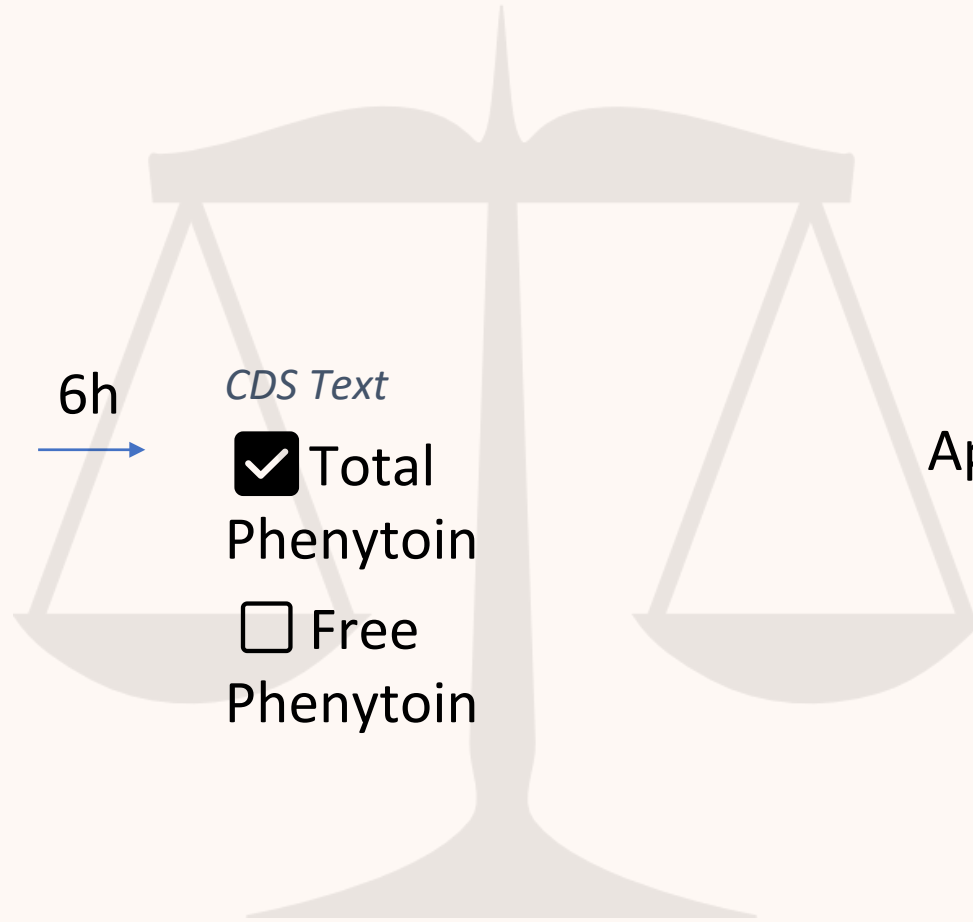
- Influenced Practitioner Behaviour
- Decreased Pharmaceutical Costs
- Steered towards Evidence-Based Choices
- Decreased Prescribing Errors

- Source of burnout
- May not improve outcomes (Ho 2022)
- Context/User Dependent (Jani 2021)

Are they disrupting cognition (bad)
or
Helping it get to the right place (good)?

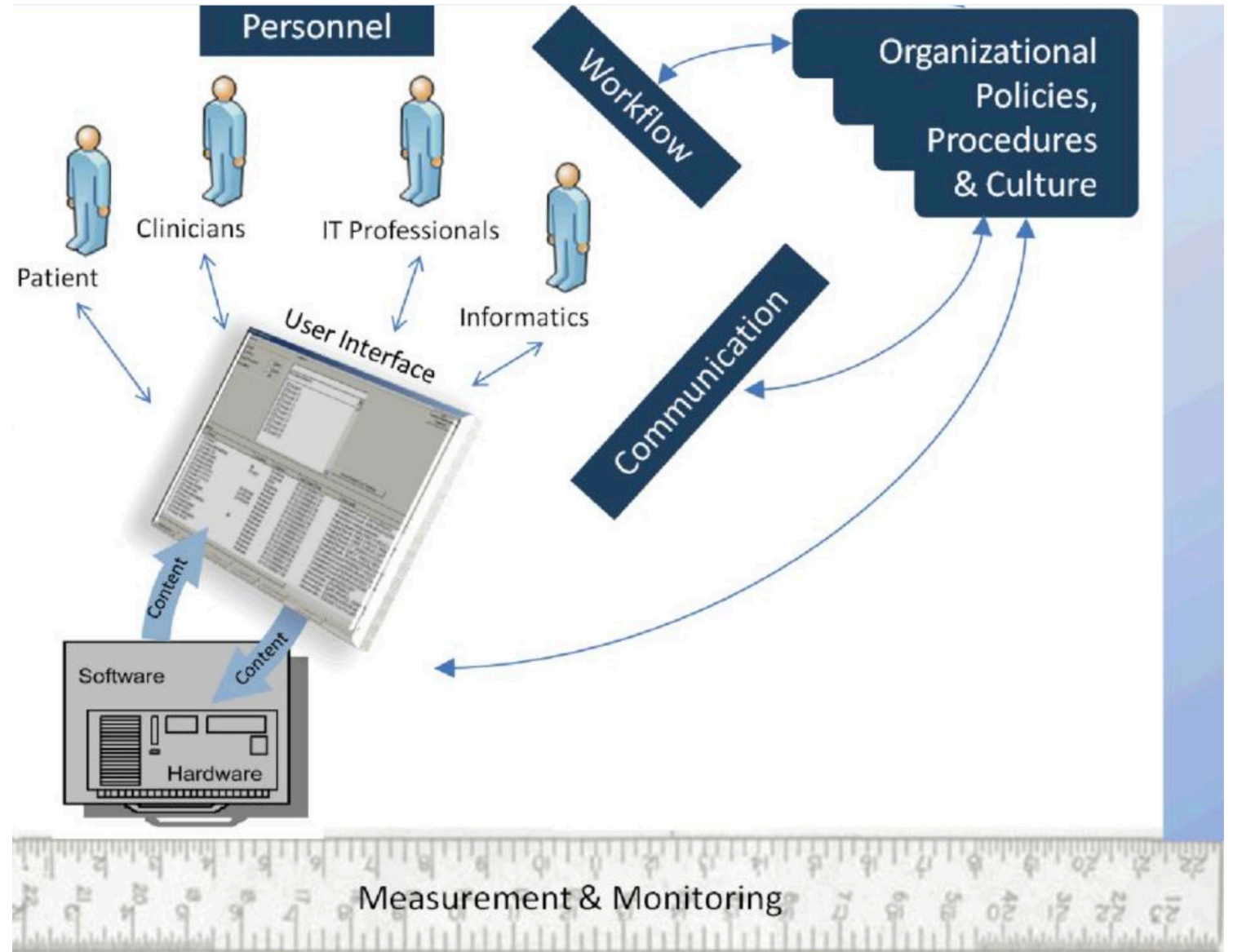
One of the places there has been some success is to focus on “choice architecture”: making the right stuff easy and the wrong stuff hard...

Free Phenytoin
Total Phenytoin



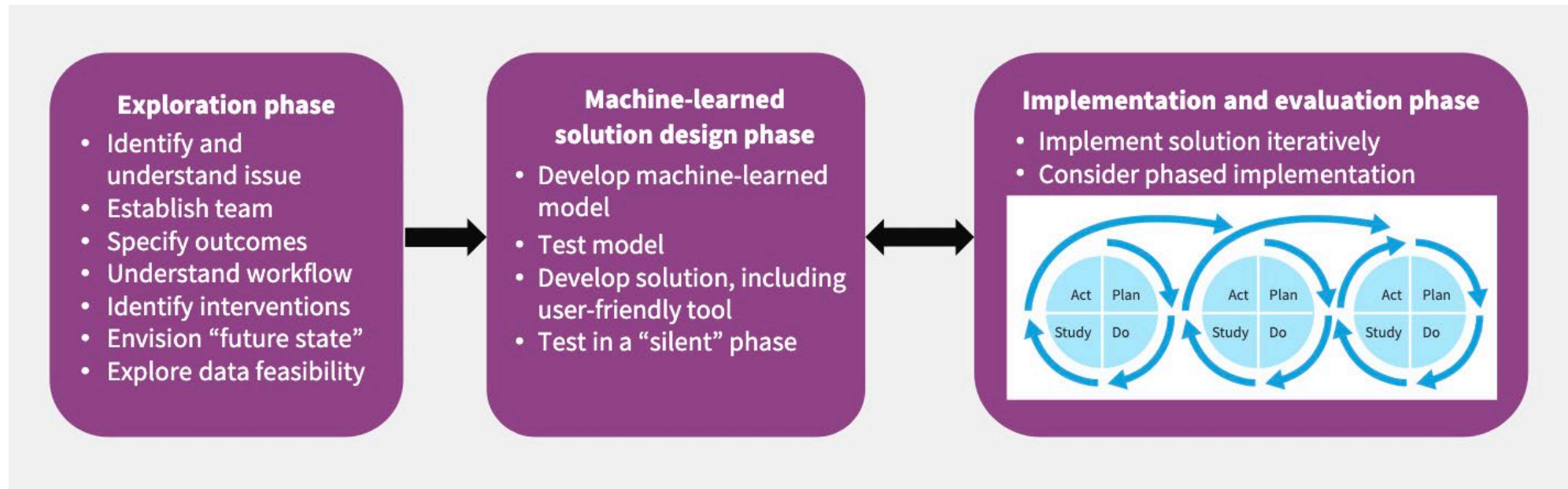
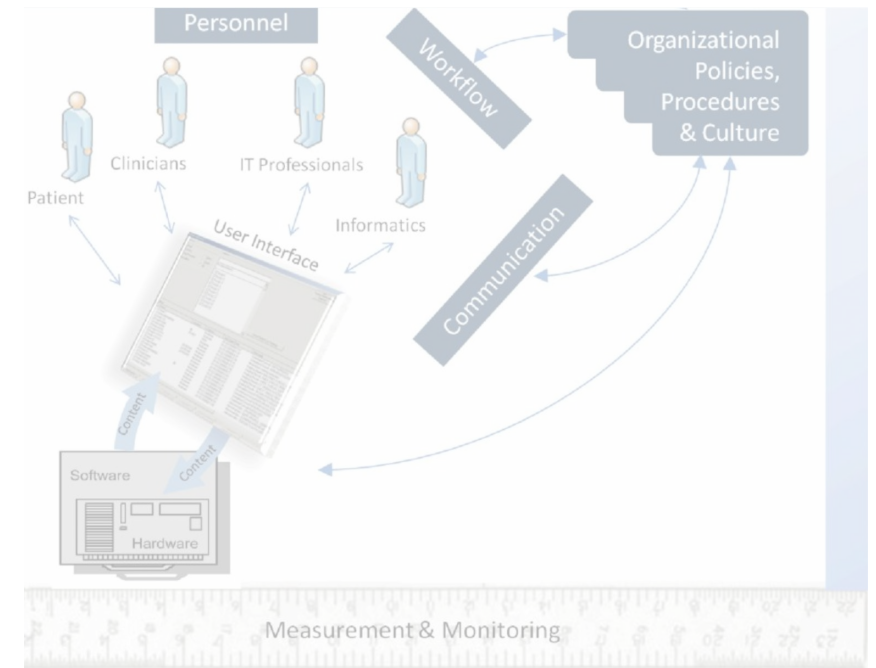
Appropriate orders: 92->100%
(Grouse et al, 2022)

Increasingly we see, appropriately, healthcare being thought of as a complex system – with value that is highly context-dependent



Example: Artificial Intelligence

Verma AA, Murray J, Greiner R, Cohen JP, Shojania KG, Ghassemi M, Straus SE, Pou-Prom C, Mamdani M. Implementing machine learning in medicine. *Cmaj*. 2021 Aug 30;193(34):E1351-7.



So what were the issues with our initial implementations of EMRs?

We used instruments like alerts in a blunt and cookie cutter way that trivialized workflow

Assumed healthcare was far more black-and-white and predictable than it is

Marginalized the social aspects of care in favour of the administrative ones

We ignored the downsides of information overload as we tried to tackle information deficiency

Critical in the complex system framing is a deep understanding of how these systems impact people

Techno-complexity (new skills, jargon, time)

Techno-uncertainty (possible

“I do think there is a pressure to be more complete, because you can access EMRs anytime”

Techno-overload (more data

(Hefner et al, 2023)

Techno-insecurity (will the more tech savvy push them out?)

Techno-invasion (longer hours, expectation to be tech support)

(Ye, 2021)

An interesting avenue for improving workflow might be EMR “audit log” data




Perspective

Using electronic health record audit log data for research: insights from early efforts

Thomas Kannampallil ^{1,2} and Julia Adler-Milstein³

Research and Applications

Characterizing physician EHR use with vendor derived data: a feasibility study and cross-sectional analysis

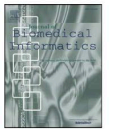
Edward R. Melnick ¹, Shawn Y. Ong,¹ Allan Fong ², Vimig Socrates ³, Raj M. Ratwani,² Bidisha Nath,¹ Michael Simonov,¹ Anup Salgia,⁴ Brian Williams,⁵ Daniel Marchalik,⁶ Richard Goldstein,⁵ and Christine A. Sinsky⁷



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Commentary

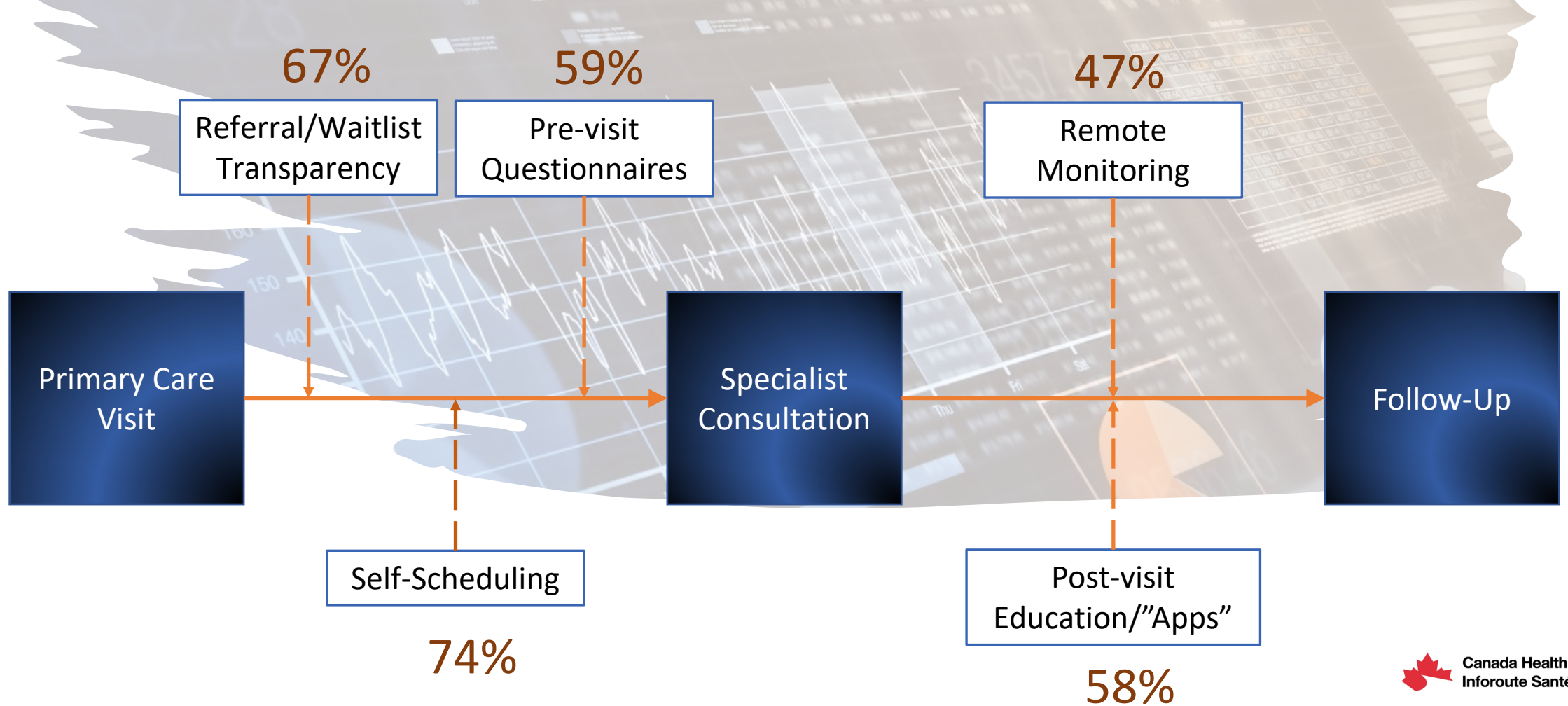
EHR audit logs: A new goldmine for health services research?

Julia Adler-Milstein^{a,*}, Jason S. Adelman^b, Ming Tai-Seale^c, Vimla L. Patel^d, Chris Dymek^e




A key challenge to doing quality improvement, including building better tools to improve workflow, is the lack of good standardized measures, strong data governance and interoperability





A number of features are in high demand by patients, but their linkage back to “hard” outcomes is poor



Patient's Access to their data aids self care, informed decision-making, enhanced adherence and trust between patients and physicians

Tapuria A, Porat T, Kalra D, Dsouza G, Xiaohui S, Curcin V. Impact of patient access to their electronic health record: systematic review. *Informatics for Health and Social Care*. 2021 Jun 2;46(2):194-206.

The language in EMRs can be highly problematic

- **Black patients were 2.54 times more likely than white patients to have at least one negative descriptor** such as “resistant” or “noncompliant”
 - Sun M, Oliwa T, Peek ME, Tung EL. Negative Patient Descriptors: Documenting Racial Bias In The Electronic Health Record: Study examines racial bias in the patient descriptors used in the electronic health record. *Health Affairs*. 2022 Feb 1:10-377.
- MD notes **routinely question patient credibility, express disapproval of their reasoning/self-care, stereotype by race/class, portray them as “difficult” and emphasize MD authority** over the patient
 - Park J, Saha S, Chee B, Taylor J, Beach MC. Physician use of stigmatizing language in patient medical records. *JAMA Network Open*. 2021 Jul 1;4(7):e2117052-.
- **Stigmatizing language** in hospital notes varied by medical condition and was **more often used to describe non-Hispanic Black patients**.
 - Himmelstein G, Bates D, Zhou L. Examination of Stigmatizing Language in the Electronic Health Record. *JAMA Network Open*. 2022 Jan 4;5(1):e2144967-.



There are significant challenges as well with access

Goedhart NS, Zuiderent-Jerak T, Woudstra J, Broerse JE, Betten AW, Dedding C. Persistent inequitable design and implementation of patient portals for users at the margins. *Journal of the American Medical Informatics Association*. 2021 Feb;28(2):276-83.

Crossing the value “chasm” with EMRs...

Safe and Secure
Data Access

Interoperability
& Data
Governance

Quality
Measures

(Adler-Milstein et al, 2017)

So what is to be done?

1. Recognize that cost windfalls are going to be harder and harder to achieve
2. Look at this as a QI exercise: define metric that matter, leverage things like audit trails and other data to get good measurement, refine, repeat
3. Improve access to information that allows for better tools (interoperability, data governance)
4. Get patients their data and use it to drive interoperability
5. Always have an eye on equity