

BIASES IN EHR DOCUMENTATION AND IMPACT ON CLINICAL CARE

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CONFLICTS OF INTEREST

• I have no conflicts to declare



AGENDA









CLINIC-LEVEL: EHR ADOPTION

- Near universal adoption after Federal incentive program
- **Digital divide**: low resource settings less likely to adopt...^{1,2}
 - Advanced clinical decision support (CDS)
 - Patient engagement functions

1. Adler-Milstein J, et al.. Electronic health record adoption in US hospitals: the emergence of a digital "advanced use" divide. Journal of the American Medical Informatics Association 2017:24:1142-8. 2. Kruse CS, et al. Barriers to electronic health record adoption: a systematic literature review. Journal of Medical Systems 2016;40:252.



CLINIC-LEVEL: CDS OPTIMIZATION

- CDS governance and optimization
 - Critical for optimal functioning and effectiveness^{1,2}
- **Digital divide**: Low resource settings have low capacity to implement CDS governance / optimization
 - Able to adopt if technical assistance is provided
 - Example: CDC's Colorectal Cancer Prevention Program (CRCCP)³

1. Kawamanto K, et al. A Pragmatic Guide to Establishing Clinical Decision Support Governance and Addressing Decision Support Fatigue: a Case Study. AMIA Annu Symp Proc. 2018:624-633. PMID: 30815104; PMCID: PMC6371304. 2. Wright A, et al. Governance for clinical decision support: case studies and recommended practices from leading institutions. J Am Med Inform Assoc. 2011;18(2):187-94. PMID: 21252052; PMCID: PMC3116253.

3. https://www.cdc.gov/cancer/crccp/index.htm



UTAH CRCCP

Evidence-based interventions

- Provider CDS reminders
- Patient reminders
- Provider assessment & feedback
- Referral support

CENTER FOR HOPE HEALTH OUTCOMES & POPULATION EQUITY









PATIENT-LEVEL: HEALTH DATA POVERTY¹

"Inability for individuals, groups, and populations to benefit from digital health advances due to health data disparities, which can perpetuate or amplify existing and known health care disparities affecting marginalized and historically underserved populations"¹

- **Representativeness** bias
 - Groups disproportionately <u>underrepresented</u> in the EHR
- Information presence bias
 - Groups with disproportionately less complete and/or accurate data in the EHR

1. Ibrahim H, et al. Health data poverty: an assailable barrier to equitable digital health care. Lancet Digit Health. 2021 Apr;3(4):e260-e265. PMID: 33678589.



EXAMPLE: BRIDGE TRIAL

- Family health history
 - Tailor prevention strategies for a variety of conditions
- ~13% at elevated risk for hereditary cancer (Scheuner, 2010)
 - Most are unaware of risk / have not received genetic testing
- BRIDGE Trial
 - Population-based algorithm to identify eligible patients
 - Automated chatbot for education and access to genetic testing



(Scheuner, 2010

tients genetic

BRIDGE TRIAL





HEALTH UNIVERSITY OF UTAH Kaphingst K et al. Comparing models of delivery for cancer genetics services among patients receiving primary care who meet criteria for genetic evaluation in two healthcare systems: BRIDGE randomized controlled trial. BMC Health Serv Res. 2021;21(1):542. PMID: 34078380; PMCID: PMC8170651.



EHR Family History

n=22,208 (5.0%)

DISPARITIES IN BRIDGE TRIAL

- Family health history information presence bias
 - Historically marginalized groups less likely to...
 - Have family history documentation¹
 - Meet algorithm criteria²
- Patient portal representativeness bias
 - Historically marginalized groups less likely to...
 - Have a patient portal account (improved with COVID pandemic)
 - Access portal messages
 - Use chatbot
 - **Receive genetic testing**

1. Chavez-Yenter D, et al. Association of Disparities in Family History and Family Cancer History in the Electronic Health Record With Sex, Race, Hispanic or Latino Ethnicity, and Language Preference in 2 Large US Health Care Systems. JAMA Netw Open. 2022;5(10):e2234574. PMID: 36194411; PMCID: PMC9533178.

2. Bradshaw RL, et al. Enhanced family history-based algorithms increase the identification of individuals meeting criteria for genetic testing of hereditary cancer syndromes but would not reduce disparities on their own. J Biomed Inform. 2024;149:104568. PMID: 38081564; PMCID: PMC10842777.



DIGITAL INCLUSION: A "SUPER" SOCIAL DETERMINANT OF HEALTH

Sieck CJ, et al. Digital inclusion as a social determinant of health. NPJ Digit Med. 2021;4(1):52. PMID: 33731887; PMCID: PMC7969595.





Health Care System

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Wearable Sensors Health Coverage Tele-Health Patient Portals Health Apps

Community and Social Context Support Systems

Community Engagement

News



Food Banks Safety Net Programs

Food

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Fresh Food Delivery

DELIBERATE STRATEGIES TO REDUCE INEQUITIES

- Digital inclusion interventions
 - Digital health screening, digital navigators
 - Low cost/subsidized broadband access
 - Access to patient portal
 - Low tech patient engagement (97% have phone with SMS)
- Proactive patient outreach & connection with services via patient portal, text messaging, chatbots
 - Educate & collect data
 - Offer at-home/telehealth services



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NIH PRAGMATIC CLINICAL TRIALS COLLABORATORY EHR CORE



Contemporary Clinical Trials Volume 130, July 2023, 107238



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Short Communication

Equity and bias in electronic health records data

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Boyd AD, et al. Equity and bias in electronic health records data. Contemp Clin Trials. 2023 Jul;130:107238. Epub 2023 May 22. PMID: 37225122; PMCID: PMC10330606.



<u>J Am Med Inform Assoc.</u> 2023 Sep; 30(9): 1561–1566. Published online 2023 Jun 26. doi: <u>10.1093/jamia/ocad115</u>

Potential bias and lack of generalizability in electronic health record data: reflections on health equity from the National Institutes of Health Pragmatic Trials Collaboratory

Andrew D Boyd,^{III} Rosa Gonzalez-Guarda, Katharine Lawrence, Crystal L Patil, Miriam O Ezenwa, Emily C O'Brien, Hyung Paek, Jordan M Braciszewski, Oluwaseun Adeyemi, Allison M Cuthel, Juanita E Darby, Christina K Zigler, P Michael Ho, Keturah R Faurot, Karen L Staman, Jonathan W Leigh, Dana L Dailey, Andrea Cheville, Guilherme Del Fiol, Mitchell R Knisely, Corita R Grudzen, Keith Marsolo, Rachel L Richesson, and Judith M Schlaeger

Boyd AD, et al. Potential bias and lack of generalizability in electronic health record data: reflections on health equity from the National Institutes of Health Pragmatic Trials Collaboratory. J Am Med Inform Assoc. 2023;30(9):1561-1566. PMID: 37364017; PMCID: PMC10436149.



PMCID: PMC10436149 PMID: <u>37364017</u>