

BIOGRAPHICAL SKETCH

NAME	Kharrazi, Hadi H.K.		
eRA COMMONS USERNAME	kharrazi		
POSITION TITLE	Professor & Center Co-Director		
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	DATE	FIELD OF STUDY
Dalhousie University, Halifax, Canada	PhD	2008	Interdisciplinary (Clinical Informatics)
Dalhousie University, Halifax, Canada	MHI	2005	Health Informatics
IUMS, Tehran, Iran	MD	2003	Medicine

(A) Personal Statement

Leadership: I am the co-director of the Johns Hopkins Center for Population Health IT (CPHIT) at the Johns Hopkins School of Public Health (JHSPH). My center, CPHIT, focuses on assessing the impact of health IT on care delivery. CPHIT faculty and scientists are considered international leaders in developing and evaluating advanced predictive models of healthcare utilization. I co-direct the development of the Johns Hopkins ACG (hopkinsacg.org), which is a widely used risk prediction solution for population health management (i.e., adopted by 20+ governments internationally). I also direct the DrPH Informatics program at JHSPH; and direct the Health Sciences Informatics PhD and MSc programs at the Johns Hopkins School of Medicine (JHSOM). I serve on the Data Trust governance boards of JHSPH and JHSOM.

Research: I have directed several federal grants and contracts (e.g., NIH, ONC, AHRQ, VHA) as PI. Within the context of population health IT, my research focuses on the application of informatics solutions to advance the science of population health predictive analytics such as: evaluating the added value of new sources of data such as social determinants of health (SDOH) for population health analytics; assessing the challenges of data quality and novel data science methods on population health studies; and, utilizing health information exchange infrastructure to develop population health analytic platforms. My research focuses on population health IT solutions that provide direct population-based decision support to providers, payers, and patients. My current research uses a diverse set of data sources such as electronic health records (EHRs), insurance claims, and SDOH data for suicide death prediction. I am the deputy editor for the Medical Care and JAMIA Open journals and serve on editorial board of the Population Health Management journal.

Teaching: I have an extensive record on education. I have managed two doctoral programs, designed various program-level curriculums in health informatics (both MSc and PhD), and developed and instructed multiple health IT courses. I was the Co-PI of an ONC award to develop a national curriculum for population health informatics and predictive analytics, which was used to train 9000+ healthcare professionals. I am also the co-PI of the NLM T15 training award for JHSOM's divisions of Biomedical Informatics and Data Science.

Proposed Project: Over the last five years, funded by NIMH (R01 and R56), my research team has led the development of a statewide suicide data warehouse in Maryland. The data warehouse includes a variety of data sources such as insurance claims, electronic health records, hospital discharges, medical examiner records, and geo-derived social information. We have developed several predictive models of suicide death and my team is deeply familiar with the practical challenges of such models in various health systems. In this project, led by Dr. Haroz, we plan to utilize deployment-ready predictive models of suicide attempt and death in several Native American tribes. I will closely collaborate and assist the PI on technical/informatics challenges such as data quality issues, data integration barriers, and their effect on the deployment of the predictive models. I and my team will also collaborate with the technical teams of the tribes and their EHR providers to assess the generalizability of suicide death models across all Native American tribes.

Ongoing and recently completed projects that I would like to highlight include:

- NIMH (R01MH124724)** 09/2020 – 09/2024
H. Kharrazi (PI)
Advancing Maryland's Statewide Suicide Data Warehouse to Improve Individual and Population-level Mortality Prediction and Prevention
- NLM (1T15LM013979)** 09/2022 – 09/2027
H. Kharrazi & C. Chute (Co-PIs)
Johns Hopkins Training Program in Biomedical Informatics and Data Science
- AHRQ ACTION-IV (K72AS19.25505)** 09/2020 – 09/2022
H. Kharrazi (PI)
Developing and Assessing the Validity of Claims-based Indicators of Frailty & Functional Disabilities and Testing their Use in Other Data (EHRs and linked EHR-claims)
- FDA CERSI (5U01FD005942)** 08/2020 – 08/2022
H. Kharrazi & J. Weiner (Co-PIs)
Assessing disparities in occurrence and outcomes of type 2 diabetes ADEs in minority populations using real world administrative claims and electronic health records
- NIH CTSA Nexus (UL1 TR001079)** 02/2020 – 09/2021
H. Kharrazi (PI)
Behavioral, Social and Systems Science: Extracting Social Science Data from Epic EHR System
- NIMH (R56MH117560)** 09/2018 – 09/2020
H. Kharrazi (PI), H. Wilcox (Co-PI)
Addressing Suicide Research Gaps: Understanding Mortality Outcomes in the Mid-Atlantic Region
- DST Health & JHMI Solutions** 07/2017 – 07/2020
H. Kharrazi (PI)
Development and Testing the Geo-Social [Risk Prediction and Visualization] Analytic Platform (GSAP)
- Veteran Health Administration** 10/2014 – 10/2019
H. Kharrazi (PI), J. Wiener (Co-PI)
Analytical Framework to Project Utilization for VHA Veteran at the Population Level
- a. Wilcox HC, **Kharrazi H**, Wilson RF, et al. Data linkage strategies to advance youth suicide prevention: a systematic review for a national institute of health pathways to prevention workshop. *Ann Intern Med.* 2016; 165 (11): 779-785. PMID: 27699389
 - b. Haroz EE, Kitchen C, ..., **Kharrazi H**. Comparing the predictive value of screening to the use of electronic health record data for detecting future suicidal thoughts and behavior in an urban pediatric emergency department: A preliminary analysis. *Suicide Life Threat Behav.* 2021; 51(6): 1189-1202. PMID: 34515351

- c. Liu D, Yu M, Duncan J, Fondario A, **Kharrazi H**, Nestadt PS. Discovering the Unclassified Suicide Cases Among Undetermined Drug Overdose Deaths Using Machine Learning Techniques. *Suicide Life Threat Behav.* 2020; 50(2): 333-344. PMID: 31536175
- d. Musci RJ, **Kharrazi H**, Wilson RF, Susukida R, Gharghabi F, Zhang A, Wissow L, Robinson KA, Wilcox HC. The study of effect moderation in youth suicide-prevention studies. *Soc Psychiatry Psychiatr Epidemiol.* 2018; 53(12): 1303-1310. PMID: 30088027

(B) Positions, Scientific Appointments and Honors

Positions and Scientific Appointments

- 2019 – Now Associate Professor
Johns Hopkins School of Public Health, Health Policy and Management (HPM)
Johns Hopkins School of Medicine, Biomedical Informatics and Data Science (BIDS)
Co-Director, Johns Hopkins Center for Population Health IT (CPHIT)
Director, DrPH Informatics training program
Director, PhD Health Informatics training program
- 2021 – Now Deputy Editor, Medical Care
- 2021 – Now Associate Editor, JAMIA Open
- 2012 – 2019 Assistant Professor, Johns Hopkins School of Public Health
- 2012 – Now Member, Academy Health (AH) (HIT Interest Group Advisory Committee)
- 2009 – Now Member, National Institute of Health Informatics (NIHI), Canada
- 2005 – Now Member, American Medical Informatics Association (AMIA) (PHI Executive Committee)

Honors

- 2019 – 2020 Technology Transfer Award #2, Johns Hopkins University
- 2017 – 2018 Technology Transfer Award #1, Johns Hopkins University
- 2013 – 2014 Faculty Innovation Fund Award, Johns Hopkins University
- 2005 – 2009 Canadian Institute of Health Research Award, Dalhousie University (Canada)
- 2003 – 2005 Nova Scotia Graduate Student Award, Dalhousie University (Canada)

(C) Contribution to Science

In addition to predictive analytics and mental health (specifically suicide), my work includes the following topics:

1. Population Health Informatics (PHI) & Risk Stratification

My research focuses on the application and evaluation of informatics solutions within the context of population health. This emerging and rapidly growing domain of research and development is called “Population Health Informatics” (PHI). A key role of PHI is to improve the population health analytic cycle, which starts with data collection, followed by data preparation, data mining, model development & validation, knowledge sharing, and finally closing the process by a learning health system that applies these models and feeds new data back in the loop. I am specifically interested to assess the opportunities and challenges of integrating non-traditional data sources to improve population health analytics and eventually enhance public health interventions and outcomes.

My work has contributed to community health IT solutions, population-based decision support systems, and population-wide predictive models to forecast utilization and specific health outcomes (e.g., suicide death). Some of my work has been devoted to the research and development of the Johns Hopkins ACG (hopkinsacg.org), which is considered one of the top patient-level population-wide risk prediction solutions nationally and globally. The ACG system offers a unique approach to measuring morbidity that improves

accuracy in evaluating provider performance, identifying patients at high risk, forecasting healthcare utilization, and setting equitable payment rates. Billions of dollars per year are now routinely exchanged using ACGs in almost every U.S. State and in 16 + nations. Over 1200+ peer reviewed articles have been published that apply and evaluate ACGs. Following are recent publications led by me further enhancing population risk stratification models:

- a. Pandya C, Chang HY, **Kharrazi H**. Electronic health record-based risk stratification: A potential key ingredient to achieving value-based care. *Popul Health Manag.* 2021; 24(6) 654-656. PMID: 34129398
- b. **Kharrazi H**, Ma X, Chang H-Y, Richards TR, Jung C. Comparing the predictive effects of patient medication adherence indices in EHR and claims-based risk stratification models. *Popul Health Manag.* 2021; 24(5) 601-609. PMID: 33544044
- c. **Kharrazi H**, Chang HY, Heins S, et al. Assessing the impact of body mass index information on the performance of risk adjustment models in predicting health care costs and utilization. *Med Care.* 2018; 56(12) 1042-1050. PMID: 30339574
- d. **Kharrazi H**, Chi W, Chang HY, et al. Comparing population-based risk-stratification model performance using data extracted from electronic health records (EHRs) versus administrative claims. *Med Care.* 2017; 55(8) 789-796. PMID: 28598890

2. Health Disparities & Social Determinants of Health (SDOH)

I have extensively collaborated with experts in the social determinants of health (SDoH) domain. SDoH explains a large variation of healthcare outcomes including utilization and costs. My research has mainly focused on integrating individual or geographical-level SDoH with clinical data (e.g., EHRs or claims data) to improve the prediction of various outcomes such as hospitalization, emergency room admission, and medical cost. These efforts have led our research team to investigate potential biases in our predictive models of care (e.g., models being biased toward a specific race or socio-economic status of patients). We have also started to examine potential bias in our modeling techniques, which may lead to unrecognized disparities. Following are some of the recent publications supporting my work in SDoH and population health:

- a. Belouali A, Bai H, Raja K, Liu S, Ding X, **Kharrazi H**. Impact of social determinants of health on improving the LACE index for 30-day unplanned readmission prediction. *JAMIA Open*; 2022 [in-press]
- b. Madlock-Brown C, Wilkens K, Weiskopf N, Cesare N, Bhattacharyya S, Riches NO, Espinose J, Dorr D, Goetz K, Phuong J, Sule A, **Kharrazi H**, Liu F, Lemon C, Adams WG. Clinical, social, and policy factors in COVID-19 cases and deaths: methodological considerations for feature selection and modeling in county-level analyses. *BMC Public Health.* 2022; 22(1) 747. PMID: 35421958
- c. Hatef E, Nau C, ..., Lyons LJ, **Kharrazi H**, Weiner JP, Abu-Nasser M, Roblin D. Assessing the documentation of social needs in electronic health records' unstructured data: A comparison of three integrated healthcare delivery systems. *JAMIA Open.* 2022; 5(1) ooac006. PMID: 35224458
- d. Vest J, Adler-Milstein J, Gottlieb LM, Bian J, ..., **Kharrazi H**, Khurshid A, Kooreman H, McDonnell C, Overhage M, Pantell M, Parisi W, Shenkman E, Tierney B, Wiehe S, Harle CA. Identification and assessment of structured data elements to support social risk factor computable phenotyping: an expert panel. *Am J Manag Care.* 2021; 28(1) e14-e23. PMID: 35049262

3. New Methods & Data Quality

A major contribution of PHI to population health analytic is providing new methods to extract novel types of data from various data sources. For example, the free text of EHR includes ample information about

individual patients that can be used in risk stratification efforts; however, this extra information is often missing in encoded fields of EHRs. In a prior study we assessed the value of free text in identifying geriatric syndromes (which are predictable for utilization). We also assessed how the physician's mention of frailty in the free text is associated with this information. However, the variable data quality levels of EHRs makes the use of such data for population health analytics a challenging task. We are currently evaluating the added value of free text for social determinants of health as well as predictors of various clinical outcomes (e.g., suicide death, adverse drug events).

- a. Susukida R, Amin-Esmaili M, Ryan TC, **Kharrazi H**, Wilson RF, Musci RJ, Zhang A, Wissow L, Robinson KA, Wilcox HC. Ineligibility for and Refusal to Participate in Randomized Controlled Trials That Have Studied Impact on Suicide-Related Outcomes in the United States: A Meta-Analysis. *J Clin Psychiatry*. 2022; 83(2): 20r13798. doi: 10.4088/JCP.20r13798. PMID: 35172049.
- b. Wang HE, Landers M, Adams R, Subbaswamy A, **Kharrazi H**, Gaskin DJ, Saria S. Identifying bias in health care predictive models: Development of a modeling bias screening checklist and its pilot application for 30-day hospital readmission models. *J Am Med Inform Assoc*. 2022 [in-press]
- c. **Kharrazi H**, Anzaldi L, Hernandez L, Davison A, Boyd CM, Leff B, Kimura J, Weiner JP. Measuring the value of electronic health record's free text in identification of geriatric syndromes. *J Am Geriatr Soc*. 2018; 66(1) 1499-1507. PMID: 29972595
- d. Tan M, Hatef E, Taghipoor E, Vyas K, **Kharrazi H**, Gottlieb L, Weiner JP. Including social and behavioral determinants in predictive models: trends, challenges, and opportunities. *JMIR Med Inform*. 2020; 8(9) e18084. PMID: 32897240

4. Public Health Informatics

Population health IT/informatics overlaps considerably with public health. My research also focuses on the application of health IT innovation within the traditional public health research. My recent work in this area has propelled the notion of "bridging" population health IT efforts and public health IT efforts:

- a. **Kharrazi H**, Gamache R, Weiner JP. Role of Informatics in Bridging Public and Population Health. Forthcoming in Magnuson JA & Dixon BE (Eds.) *Public Health Informatics and Information Systems*; 3rd edition. 2020; 59-79. London UK: Springer-Verlag. ISBN 978-3-030-41215-9
- b. **Kharrazi H**, Lehmann HP. Role of Population Health Informatics in Understanding Data, Information and Knowledge. In Joshi A (Ed.) *Population Health Informatics*. 2017; 65-89. Jones and Bartlett Learning. ISBN: 978-1-28-410396-0
- c. Gamache R, **Kharrazi H**, Weiner JP. Public health and population health informatics: the bridging of big data to benefit communities. *Yearb Med Inform*. 2018; 27(1): 199-206. PMID: 30157524
- d. **Kharrazi H**, Weiner JP. IT-enabled community health interventions: challenges, opportunities, and future directions. *eGEMs*. 2014; 2 (3): 1-9. PMID: 25848627

Complete List of Published Work in My Bibliography

- PubMed (125+): <https://www.ncbi.nlm.nih.gov/myncbi/10eHcnhXecnkr/bibliography/public/>