Rohit **Vashisht**

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Research Summary

I'm a clinical data scientist at the University of California, San Francisco (UCSF). I work at the Bakar Computational Health Sciences Institute and in the Pediatrics department at the School of Medicine. I'm also affiliated with UCSF Center for Real World Evidence team, working with Prof. Atul Butte. I obtained Ph.D in biomedical science from the Academy of Scientific and Innovative Research in New Delhi, India, and Bachelor of Engineering in Biotechnology from Acharya Institute of Technology in Bangalore, India. I completed post-doctoral work at Stanford University.

My research focuses on using real-world clinical data to create meaningful evidence that supports medical and regulatory decision-making. I develop and apply methods from causal inference and machine learning, including generative AI, to analyze data from electronic health records collected during routine care at UCSF, across the UC Health system (which includes 5 medical centers in California), and across the U.S., including sources like the National COVID Cohort Collaborative (N3C). I lead efforts to develop efficient big-data analytic frameworks harnessing principles of distributed computing for simulating clinical trials that compare the effectiveness and safety of chemical, biological, and digital therapies. This work contributes to building post-market surveillance systems, generating critical real-world evidence, and guiding both medical and regulatory decisions. I collaborate with teams across UC Health, the U.S. FDA, and the California Department of Public Health. With over 9 years of experience working with large-scale clinical data from electronic health records at institutional, state, and national levels, I ensure compliance with HIPAA standards and aspire to develop efficient, and rigorous data analytic methods that would help guide medical and policy-level decision making in clinical care and public health.

Additionally, I help assess and maintain quality standards for the UCSF and UC Health clinical data warehouse, which uses the OMOP (Observational Medical Outcome Partnership) format capturing clinical data from electronic health records of over 9 million patients across California. In the Butte lab, I mentor Ph.D students and postdocs.

My work is currently funded by the Bakar Computational Health Sciences Institute and several FDA offices: the Office of Commissioner, the Center for Biologics Evaluation and Research, the Office of Women's Health, and the Oncology Center of Excellence through UCSF-Stanford Center of Excellence in Regulatory Science and Innovation program.

Education and Training

Professional Researcher Step-4 Ladder Rank   University of California, San Francisco
BAKAR COMPUTATIONAL HEALTH SCIENCES INSTITUTE, SCHOOL OF MEDICINE   2019 -

Data Scientist   Stanford University
IMMUNITY, TRANSPLANT, AND INFECTION & BIOMEDICAL INFORMATICS, STANFORD UNIVERSITY   2018-2019

Post-Doctoral Fellow   Stanford University
BIOMEDICAL INFORMATICS, STANFORD UNIVERSITY   2015-2018

PhD   AcSIR, New Delhi
ACADEMY OF SCIENTIFIC AND INNOVATIVE RESEARCH   2011-2015

Research Fellow   Indian Institute of Science, Bangalore
BIOLOGICAL SCIENCES   2008-2010

Bachalor of Engineering   Acharya Institute of Technology
ACHARYA INSTITUTE OF TECHNOLOGY, BANGALORE   2006-2010

Research Grants

Principal Investigator

Budget period 2024-2026

- Real-world data to improve diversity and inclusion of participants in randomized controlled trials and evidence for post-market safety and effectiveness of targeted therapies in oncology for equitable decision making. 2024-2026. **FDA - Oncology Center of Excellence (UCSF-Stanford CERSI)** ($691,776)

Budget period 2021-2023

- Learning Real-World Sex-Specific Clinical Factors Influencing the Susceptibility to Infection, Immune Response, Treatment Utilization and Outcomes Among Individuals Infected with SARS-CoV-2 Infection. **FDA - Office of Women's Health (UCSF-Stanford CERSI)** ($299,167)

Co-Investigator

Budget period 2022-2023

- The Real-World Effectiveness of COVID-19 Vaccines in the Pediatric Population Across the University of California Health System. **FDA - Center for Biologics Evaluation and Research (UCSF-Stanford CERSI)** ($288,460)

Budget period 2021-2022

- Real-World Population Characteristics, Safety and Effectiveness of COVID-19 Vaccines. **FDA - Center for Biologics Evaluation and Research (UCSF-Stanford CERSI)** ($1,349,120)

Budget period 2021-2022

- A Rapid Query Model to Address Prioritized COVID-19 Questions Using EHR Data 2020-2021. **FDA - Office of the Commissioner (UCSF-Stanford CERSI)** ($300,000)

Selected Publications

Real-World data, causal inference, machine learning, multi-healthcare center studies

- **Vashisht R**, Patel A, Dahm L, et al. Second-Line Pharmaceutical Treatments for Patients with Type 2 Diabetes. **JAMA Netw Open**. 2023;6(10):e2336613. doi:10.1001/jamanetworkopen.2023.36613
- **Vashisht R**, Patel A, Crews BO, et al. Age- and Sex-Associated Variations in the Sensitivity of Serological Tests Among Individuals Infected With SARS-CoV-2. **JAMA Netw Open**. 2021;4(2):e210337.
- **Vashisht R**, Jung K, Schuler A, et al. Association of Hemoglobin A1c Levels With Use of Sulfonylureas, Dipeptidyl Peptidase 4 Inhibitors, and Thiazolidinediones in Patients With Type 2 Diabetes Treated With Metformin: Analysis From the Observational Health Data Sciences and Informatics Initiative. **JAMA Netw Open**. 2018;1(4):e181755.

Systems biology, Tuberculosis genome analytics

- **Vashisht, R**., Brahmachari, S.K. Metformin as a potential combination therapy with existing front-line antibiotics for Tuberculosis. **J Transl Med** 13, 83 (2015).
- Social networks to biological networks: systems biology of Mycobacterium tuberculosis **R Vashisht**, A Bhardwaj, SK Brahmachari **Molecular bioSystems**, 2013.
- **Vashisht R**, Mondal AK, Jain A, Shah A, Vishnoi P, Priyadarshini P, et al. (2012) Crowd Sourcing a New Paradigm for Interactome Driven Drug Target Identification in Mycobacterium tuberculosis. **PLoS ONE** 7(7): e39808.

Invited Talks

- **2024:** Harnessing University of California Health Data Warehouse to Learn Effective and Safe Treatments in Type 2 Diabetes
  Diabetes Technology Meeting, Burlingame, California

- **2023:** Real-World Data Linkage, Harmonization and Quality
  Precision Medicine World Conference, Santa Clara, USA

- **2020:** Emulating Target Trials from Real-World Data
  Department of Epidemiology & Biostatics University of California, San Francisco, CA, USA

- **2018:** What is Observation Data Analysis?
  Taste of Science, Palo Alto, CA, USA

- **2017 (Rising star in data science):** Learning Effective Treatment in Type 2 Diabetes
  The University of Chicago, Il, USA

- **2016:** Learning Effective Treatments if Type 2 Diabetes
  American Medical Informatic Conference, Annual Symposium, Chicago, Il, USA

- **2015:** Learning Effective Treatments if Type 2 Diabetes
  Observational Health Data Science Conference, Washington D.C, USA

- **2013:** In-Silico Growth of Mycobacterium Tuberculosis **Weizmann Institute of Science, Rehovot, Israel**

All Publications

2024
- Characterisation of digital therapeutic clinical trials: a systematic review with natural language processing Miao, M Sushil, A Xu, M Wang, D Arneson The Lancet Digital Health, 2024

2023
- Vashisht R, Patel A, Dahm L, et al. Second-Line Pharmaceutical Treatments for Patients with Type 2 Diabetes. JAMA Netw Open. 2023;6(10):e2336613. doi:10.1001/jamanetworkopen.2023.36613
- Contextualising adverse events of special interest to characterise the baseline incidence rates in 24 million patients with COVID-19 across 26 databases: a multinational retrospective cohort study Voss, Erica A. et al. eClinicalMedicine, Volume 58, 101932
- Rodriguez-Watson CV, Sheils NE, Louder AM, Eldridge EH, Lin ND, Pollock BD, et al. (2023) Real-world utilization of SARS-CoV-2 serological testing in RNA positive patients across the United States. PLoS ONE 18(2): e0281365.
- Rodriguez-Watson CV, Louder AM, Kabelac C, Frederick CM, Sheils NE, Eldridge EH, et al. (2023) Real-world performance of SARS-Cov-2 serology tests in the United States, 2020. PLoS ONE 18(2): e0279956.
- Toward a causal model of chronic back pain: Challenges and opportunities JR Huie, R Vashisht, A Galivanche, C Hadjadj… - Frontiers in Computational Neuroscience, 2023

2022
- Davidson, J.; Vashisht, R.; Butte, A.J. From Genes to Geography, from Cells to Community, from Biomolecules to Behaviors: The Importance of Social Determinants of Health. Biomolecules 2022, 12, 1449.
- Real-world utilization of SARS-COV-2 serological testing in RNA positive patients across the United States CV Rodriguez-Watson, NE Sheils, A Louder PHARMACOEPIDEMIOLOGY AND DRUG SAFETY, 2022

2021
- Androgen-deprivation therapy and SARS-CoV-2 in men with prostate cancer: findings from the University of California Health System registry Kwon, D.H. et al. Annals of Oncology, Volume 32, Issue 5, 678 - 679
- Daniel Kwon et al., Androgen deprivation therapy and risk of SARS-CoV-2 infection in men with prostate cancer: A University of California (UC) Health System registry study.. JCO 39, 37-37(2021).
- Vashisht R, Patel A, Crews BO, et al. Age- and Sex-Associated Variations in the Sensitivity of Serological Tests Among Individuals Infected With SARS-CoV-2. JAMA Netw Open. 2021;4(2):e210337.
- Identification of antiviral antihistamines for COVID-19 repurposing LR Reznikov, MH Norris, R Vashisht, AP Bluhm, D Li… - Biochemical and biophysical research communications, 2021

2020
- Arneson, D., Elliott, M., Mosenia, A. et al. CovidCounties is an interactive real time tracker of the COVID19 pandemic at the level of US counties. Sci Data 7, 405 (2020).
- Kim, Y., Tian, Y., Yang, J. et al. Comparative safety and effectiveness of alendronate versus raloxifene in women with osteoporosis. Sci Rep 10, 11115 (2020).
- Ruijun Chen et al., Treatment Patterns for Chronic Comorbid Conditions in Patients With Cancer Using a Large-Scale Observational Data Network. JCO Clin Cancer Inform 4, 171-183(2020).
- Wang Q, Reps JM, Kostka KF, Ryan PB, Zou Y, Voss EA, et al. (2020) Development and validation of a prognostic model predicting symptomatic hemorrhagic transformation in acute ischemic stroke at scale in the OHDSI network. PLoS ONE 15(1): e0226718.

2019

- Warsinske H, Vashisht R, Khatri P (2019) Host-response-based gene signatures for tuberculosis diagnosis: A systematic comparison of 16 signatures. PLoS Med 16(4): e1002786.
- Impact of integrated psycho-socio-economic support on treatment outcome in drug resistant tuberculosis: A retrospective cohort study R Bhatt, K Chopra, R Vashisht - Indian Journal of Tuberculosis, 2019

2018

- Vashisht R, Jung K, Schuler A, et al. Association of Hemoglobin A1c Levels With Use of Sulfonylureas, Dipeptidyl Peptidase 4 Inhibitors, and Thiazolidinediones in Patients With Type 2 Diabetes Treated With Metformin: Analysis From the Observational Health Data Sciences and Informatics Initiative. JAMA Netw Open. 2018;1(4):e181755.
- Tian, Yuxi, et al. "Comparative safety and effectiveness of alendronate versus raloxifene in women with osteoporosis.PHARMACOEPIDEMIOLOGY AND DRUG SAFETY. Vol. 27. 111 RIVER ST, HOBOKEN 07030-5774, NJ USA: WILEY, 2018.

2017

- Integrated molecular, clinical, and ontological analysis identifies overlooked disease relationships WA Haynes, R Vashisht, F Vallania, C Liu, GL Gaskin- bioRxiv

2016

- Learning effective treatment pathways for type-2 diabetes from a clinical data warehouse R Vashisht, K Jung, N Shah - AMIA Annual Symposium Proceedings, 2016

2015

- Vashisht, R., Brahmachari, S.K. Metformin as a potential combination therapy with existing front-line antibiotics for Tuberculosis. J Transl Med 13, 83 (2015).

2014

- Vashisht, R., Bhat, A.G., Kushwaha, S. et al. Systems level mapping of metabolic complexity in Mycobacterium tuberculosis to identify high-value drug targets. J Transl Med 12, 263 (2014).

2013

- Social networks to biological networks: systems biology of Mycobacterium tuberculosis R Vashisht, A Bhardwaj, SK Brahmachari Molecular bioSystems, 2013
- Software platform for metabolic network reconstruction of Mycobacterium tuberculosis S Ghosh, Y Matsuoka, Y Asai, H Kitano, A Bhardwaj Systems Biology of Tuberculosis, 2013

2012

- Vashisht R, Mondal AK, Jain A, Shah A, Vishnoi P, Priyadarshini P, et al. (2012) Crowd Sourcing a New Paradigm for Interactome Driven Drug Target Identification in Mycobacterium tuberculosis. PLoS ONE 7(7): e39808.

2010

- Bhat, A.G., Vashisht, R. & Chandra, N. Modeling metabolic adjustment in Mycobacterium tuberculosis upon treatment with isoniazid. Syst Synth Biol 4, 299-309 (2010)
- Padiadpu, J., Vashisht, R. & Chandra, N. Protein-protein interaction networks suggest different targets have different propensities for triggering drug resistance. Syst Synth Biol 4, 311-322 (2010)

2009

- Strategies for efficient disruption of metabolism in Mycobacterium tuberculosis from network analysis K Raman, R Vashisht, N Chandra - Molecular BioSystems, 2009

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