



Nigam H. Shah, MBBS, PhD

Professor of Medicine (Biomedical Informatics) and of Biomedical Data Science
Medicine - Biomedical Informatics Research

Bio

BIO

Dr. Nigam Shah is Professor of Medicine at Stanford University, and Chief Data Scientist for Stanford Health Care. His research group analyzes multiple types of health data (EHR, Claims, Wearables, Weblogs, and Patient blogs), to answer clinical questions, generate insights, and build predictive models for the learning health system. At Stanford Healthcare, he leads artificial intelligence and data science efforts for advancing the scientific understanding of disease, improving the practice of clinical medicine and orchestrating the delivery of health care.

Dr. Shah is an inventor on eight patents and patent applications, has authored over 200 scientific publications and has co-founded three companies. Dr. Shah was elected into the American College of Medical Informatics (ACMI) in 2015 and was inducted into the American Society for Clinical Investigation (ASCI) in 2016. He holds an MBBS from Baroda Medical College, India, a PhD from Penn State University and completed postdoctoral training at Stanford University.

ACADEMIC APPOINTMENTS

- Professor, Medicine - Biomedical Informatics Research
- Professor, Biomedical Data Science
- Member, Bio-X
- Member, Cardiovascular Institute
- Faculty Affiliate, Institute for Human-Centered Artificial Intelligence (HAI)
- Member, Wu Tsai Human Performance Alliance
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Chief Data Scientist, Stanford Healthcare, (2022- present)
- Co-director, Center for Artificial Intelligence in Medicine & Imaging (AIMI), (2020- present)
- Associate Dean for Research, School of Medicine, (2019- present)
- Associate Director, Stanford Center for Biomedical Research (BMIR), (2013- present)
- Director, Informatics Core, Stanford Center for Clinical and Translational Research, and Education (Spectrum), (2017-2022)
- Associate CIO, Data Science, Stanford Healthcare, (2018-2022)
- Executive Committee Member, Biomedical Informatics Graduate Program, (2011-2021)

- Member, Cancer Institute Informatics Steering Committee, (2011-2015)
- Scientific Program Chair, AMIA Summit on Translational Bioinformatics, (2011-2012)
- Advisory Committee Member, Stanford Center for Clinical Informatics, (2011-2012)

HONORS AND AWARDS

- Fellow, American College of Medical Informatics (11/2015)
- New Investigator Award, American Medical Informatics Association (AMIA) (11/2013)
- Biosciences Faculty Award recognizing outstanding teaching contributions, Stanford School of Medicine (06/2012)
- Fellow, American Society for Clinical Investigation (04/2016)
- Ramoni Best paper award, AMIA Summit on Translational Bioinformatics (03/2013)
- Distinguished paper award, AMIA Summit on Translational Bioinformatics (03/2011)
- Outstanding paper award, AMIA Summit on Translational Bioinformatics (03/2009)
- Outstanding paper award, Summit on Translational Bioinformatics (03/2008)

PROFESSIONAL EDUCATION

- Postdoctoral, Stanford University , Biomedical Informatics (2007)
- PhD, The Pennsylvania State University , Molecular Medicine (2005)
- MBBS, Baroda Medical College , Medicine (1999)

LINKS

- Lab site: <http://shahlab.stanford.edu/>
- Personal site: <https://web.stanford.edu/~nigam/>
- ADRC: <http://med.stanford.edu/adrc.html>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

In the past, we have developed methods to analyze multiple datatypes for generating insights. Such as: Detecting skin adverse reactions by analyzing content in a health social network, enabling medical device surveillance, discovering drug adverse events as well as drug-drug interactions from clinical notes using novel methods for processing textual documents. Inferring physical function from wearables data, predicting healthcare utilization from Web search logs and understanding information seeking behavior of health professionals.

Our current research is focused on bringing AI into clinical use, safely, ethically and cost effectively. Research on Responsible AI (<https://rail.stanford.edu/>) is translated into practice by the Data Science team at Stanford Healthcare. This work is organized in two broad work-streams.

(1) Creation and adoption of foundation models in medicine: Given the high interest in using large language models (LLMs) in medicine, the creation and use of LLMs in medicine needs to be actively shaped by provisioning relevant training data, specifying the desired benefits, and evaluating the benefits via testing in real-world deployments.

(2) Making machine learning models clinically useful: Whether a classifier or prediction model is useful in guiding care depends on the interplay between the model's output, the intervention it triggers, and the intervention's benefits and harms. Our work stemmed from the effort in improving palliative care using machine learning. Blog posts at HAI summarize our work in easily accessible manner.

Teaching

COURSES

2023-24

- Data Driven Medicine: BIOMEDIN 225 (Spr)
- Data Science for Medicine: BIOMEDIN 215 (Aut)

2022-23

- Data Driven Medicine: BIOMEDIN 225 (Win)
- Data Science for Medicine: BIOMEDIN 215 (Aut)

2021-22

- Data Driven Medicine: BIOMEDIN 225 (Win)
- Data Science for Medicine: BIOMEDIN 215 (Aut)

2020-21

- Data Science for Medicine: BIOMEDIN 215 (Aut)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Hejie Cui, Zepeng Huo

Doctoral Dissertation Advisor (AC)

Suhana Bedi

Master's Program Advisor

Michael Freedman

Doctoral (Program)

Sergio Gonzales, Michael Wornow

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biomedical Informatics (Phd Program)
- Biomedical Informatics (Masters Program)

Publications

PUBLICATIONS

- **External validation of AI models in health should be replaced with recurring local validation.** *Nature medicine*
Youssef, A., Pencina, M., Thakur, A., Zhu, T., Clifton, D., Shah, N. H.
2023
- **The Stanford Medicine data science ecosystem for clinical and translational research.** *JAMIA open*
Callahan, A., Ashley, E., Datta, S., Desai, P., Ferris, T. A., Fries, J. A., Halaas, M., Langlotz, C. P., Mackey, S., Posada, J. D., Pfeffer, M. A., Shah, N. H.
2023; 6 (3): ooad054

- **Creation and Adoption of Large Language Models in Medicine.** *JAMA*
Shah, N. H., Entwistle, D., Pfeffer, M. A.
2023
- **The shaky foundations of large language models and foundation models for electronic health records.** *NPJ digital medicine*
Wornow, M., Xu, Y., Thapa, R., Patel, B., Steinberg, E., Fleming, S., Pfeffer, M. A., Fries, J., Shah, N. H.
2023; 6 (1): 135
- **Discrepancies Between Clearance Summaries and Marketing Materials of Software-Enabled Medical Devices Cleared by the US Food and Drug Administration.** *JAMA network open*
Shah, N. H., Mello, M. M.
2023; 6 (7): e2321753
- **DEPLOYR: a technical framework for deploying custom real-time machine learning models into the electronic medical record.** *Journal of the American Medical Informatics Association : JAMIA*
Corbin, C. K., Maclay, R., Acharya, A., Mony, S., Punnathanam, S., Thapa, R., Kotecha, N., Shah, N. H., Chen, J. H.
2023
- **EHR foundation models improve robustness in the presence of temporal distribution shift.** *Scientific reports*
Guo, L. L., Steinberg, E., Fleming, S. L., Posada, J., Lemmon, J., Pfohl, S. R., Shah, N., Fries, J., Sung, L.
2023; 13 (1): 3767
- **A framework to identify ethical concerns with ML-guided care workflows: a case study of mortality prediction to guide advance care planning.** *Journal of the American Medical Informatics Association : JAMIA*
Cagliero, D., Deutch, N., Shah, N., Feudtner, C., Char, D.
2023
- **Assessing the net benefit of machine learning models in the presence of resource constraints.** *Journal of the American Medical Informatics Association : JAMIA*
Singh, K., Shah, N. H., Vickers, A. J.
2023
- **Clinical utility gains from incorporating comorbidity and geographic location information into risk estimation equations for atherosclerotic cardiovascular disease.** *Journal of the American Medical Informatics Association : JAMIA*
Xu, Y., Foryciarz, A., Steinberg, E., Shah, N. H.
2023
- **APLUS: A Python Library for Usefulness Simulations of Machine Learning Models in Healthcare.** *Journal of biomedical informatics*
Wornow, M., Gyang Ross, E., Callahan, A., Shah, N. H.
2023: 104319
- **Investigating real-world consequences of biases in commonly used clinical calculators.** *The American journal of managed care*
Yoo, R. M., Dash, D., Lu, J. H., Jenkins, J. Z., Rabbani, N., Fries, J. A., Shah, N. H.
2023; 29 (1): e1-e7
- **Merlin: A Vision Language Foundation Model for 3D Computed Tomography.** *Research square*
Blankemeier, L., Cohen, J. P., Kumar, A., Veen, D. V., Gardezi, S., Paschali, M., Chen, Z., Delbrouck, J. B., Reis, E., Truys, C., Bluethgen, C., Jensen, M., Ostmeier, et al
2024
- **A multi-center study on the adaptability of a shared foundation model for electronic health records.** *NPJ digital medicine*
Guo, L. L., Fries, J., Steinberg, E., Fleming, S. L., Morse, K., Aftandilian, C., Posada, J., Shah, N., Sung, L.
2024; 7 (1): 171
- **Ethical and regulatory challenges of large language models in medicine.** *The Lancet. Digital health*
Ong, J. C., Chang, S. Y., William, W., Butte, A. J., Shah, N. H., Chew, L. S., Liu, N., Doshi-Velez, F., Lu, W., Savulescu, J., Ting, D. S.
2024
- **Scalable Approach to Consumer Wearable Postmarket Surveillance: Development and Validation Study.** *JMIR medical informatics*
Yoo, R. M., Viggiano, B. T., Pundi, K. N., Fries, J. A., Zahedivash, A., Podchiyska, T., Din, N., Shah, N. H.

2024; 12: e51171

- **Ensuring useful adoption of generative artificial intelligence in healthcare.** *Journal of the American Medical Informatics Association : JAMIA*
Jindal, J. A., Lungren, M. P., Shah, N. H.
2024
- **Characterizing the limitations of using diagnosis codes in the context of machine learning for healthcare.** *BMC medical informatics and decision making*
Guo, L. L., Morse, K. E., Aftandilian, C., Steinberg, E., Fries, J., Posada, J., Fleming, S. L., Lemmon, J., Jessa, K., Shah, N., Sung, L.
2024; 24 (1): 51
- **Health AI Assurance Laboratories-Reply.** *JAMA*
Shah, N. H., Halamka, J. D., Anderson, B.
2024
- **Clinfo.ai: An Open-Source Retrieval-Augmented Large Language Model System for Answering Medical Questions using Scientific Literature.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*
Lozano, A., Fleming, S. L., Chiang, C., Shah, N.
2024; 29: 8-23
- **A Nationwide Network of Health AI Assurance Laboratories.** *JAMA*
Shah, N. H., Halamka, J. D., Saria, S., Pencina, M., Tazbaz, T., Tripathi, M., Callahan, A., Hildahl, H., Anderson, B.
2023
- **Organizational Factors in Clinical Data Sharing for Artificial Intelligence in Health Care.** *JAMA network open*
Youssef, A., Ng, M. Y., Long, J., Hernandez-Boussard, T., Shah, N., Miner, A., Larson, D., Langlotz, C. P.
2023; 6 (12): e2348422
- **Beta-2 adrenergic receptor agonism alters astrocyte phagocytic activity and has potential applications to psychiatric disease.** *Discover mental health*
Bowen, E. R., DiGiacomo, P., Fraser, H. P., Guttenplan, K., Smith, B. A., Heberling, M. L., Vidano, L., Shah, N., Shamloo, M., Wilson, J. L., Grimes, K. V.
2023; 3 (1): 27
- **President Biden's Executive Order on Artificial Intelligence-Implications for Health Care Organizations.** *JAMA*
Mello, M. M., Shah, N. H., Char, D. S.
2023
- **Lessons Learned from a Multi-Site, Team-Based Serious Illness Care Program Implementation at an Academic Medical Center.** *Journal of palliative medicine*
Seevaratnam, B., Wang, S., Fong, R., Hui, F., Callahan, A., Chobot, S., Gensheimer, M. F., Li, R. C., Nguyen, D., Ramchandran, K., Shah, N. H., Shieh, L., Zeng, et al
2023
- **Multinational patterns of second line antihyperglycaemic drug initiation across cardiovascular risk groups: federated pharmacoepidemiological evaluation in LEGEND-T2DM.** *BMJ medicine*
Khara, R., Dhingra, L. S., Aminorroaya, A., Li, K., Zhou, J. J., Arshad, F., Blacketer, C., Bowring, M. G., Bu, F., Cook, M., Dorr, D. A., Duarte-Salles, T., DuVall, et al
2023; 2 (1): e000651
- **Using public clinical trial reports to probe non-experimental causal inference methods.** *BMC medical research methodology*
Steinberg, E., Ignatiadis, N., Yadlowsky, S., Xu, Y., Shah, N.
2023; 23 (1): 204
- **Ranitidine Use and Incident Cancer in a Multinational Cohort.** *JAMA network open*
You, S. C., Seo, S. I., Falconer, T., Yanover, C., Duarte-Salles, T., Seager, S., Posada, J. D., Shah, N. H., Nguyen, P. A., Kim, Y., Hsu, J. C., Van Zandt, M., Hsu, et al
2023; 6 (9): e2333495
- **Self-supervised machine learning using adult inpatient data produces effective models for pediatric clinical prediction tasks.** *Journal of the American Medical Informatics Association : JAMIA*
Lemmon, J., Guo, L. L., Steinberg, E., Morse, K. E., Fleming, S. L., Aftandilian, C., Pfohl, S. R., Posada, J. D., Shah, N., Fries, J., Sung, L.
2023

- **Characterizing subgroup performance of probabilistic phenotype algorithms within older adults: a case study for dementia, mild cognitive impairment, and Alzheimer's and Parkinson's diseases.** *JAMIA open*
Banda, J. M., Shah, N. H., Periyakoil, V. S.
2023; 6 (2): ooad043
- **Use of Electronic Health Record Data for Drug Safety Signal Identification: A Scoping Review.** *Drug safety*
Davis, S. E., Zobotka, L., Desai, R. J., Wang, S. V., Maro, J. C., Coughlin, K., Hernández-Muñoz, J. J., Stojanovic, D., Shah, N. H., Smith, J. C.
2023
- **Principled estimation and evaluation of treatment effect heterogeneity: A case study application to dabigatran for patients with atrial fibrillation.** *Journal of biomedical informatics*
Xu, Y., Bechler, K., Callahan, A., Shah, N.
2023: 104420
- **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.** *EclinicalMedicine*
Voss, E. A., Shoaibi, A., Yin Hui Lai, L., Blacketer, C., Alshammari, T., Makadia, R., Haynes, K., Sena, A. G., Rao, G., van Sandijk, S., Fraboulet, C., Boyer, L., Le Carrouer, et al
2023; 58: 101932
- **Evaluation of Feature Selection Methods for Preserving Machine Learning Performance in the Presence of Temporal Dataset Shift in Clinical Medicine.** *Methods of information in medicine*
Lemmon, J., Guo, L. L., Posada, J., Pfohl, S. R., Fries, J., Fleming, S. L., Aftandilian, C., Shah, N., Sung, L.
2023
- **Standardizing Multi-site Clinical Note Titles to LOINC Document Ontology: A Transformer-based Approach.** *AMIA ... Annual Symposium proceedings. AMIA Symposium*
Zuo, X., Zhou, Y., Duke, J., Hripcsak, G., Shah, N., Banda, J. M., Reeves, R., Miller, T., Waitman, L. R., Natarajan, K., Xu, H.
2023; 2023: 834-843
- **Efficient Diagnosis Assignment Using Unstructured Clinical Notes**
Blankemeier, L., Fries, J., Tinn, R., Preston, S., Shah, N., Chaudhari, A., Boyd-Graber, J., Okazaki, N., Rogers, A.
ASSOC COMPUTATIONAL LINGUISTICS-ACL.2023: 485-494
- **EHRSHOT: An EHR Benchmark for Few-Shot Evaluation of Foundation Models**
Wornow, M., Thapa, R., Steinberg, E., Fries, J. A., Shah, N. H., Oh, A., Neumann, T., Globerson, A., Saenko, K., Hardt, M., Levine, S.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2023
- **A computational approach to measure the linguistic characteristics of psychotherapy timing, responsiveness, and consistency.** *Npj mental health research*
Miner, A. S., Fleming, S. L., Haque, A., Fries, J. A., Althoff, T., Wilfley, D. E., Agras, W. S., Milstein, A., Hancock, J., Asch, S. M., Stirman, S. W., Arnow, B. A., Shah, et al
2022; 1 (1): 19
- **Developing medical imaging AI for emerging infectious diseases.** *Nature communications*
Huang, S., Chaudhari, A. S., Langlotz, C. P., Shah, N., Yeung, S., Lungren, M. P.
2022; 13 (1): 7060
- **Use of Machine Learning and Lay Care Coaches to Increase Advance Care Planning Conversations for Patients With Metastatic Cancer.** *JCO oncology practice*
Gensheimer, M. F., Gupta, D., Patel, M. I., Fardeen, T., Hildebrand, R., Teuteberg, W., Seevaratnam, B., Asuncion, M. K., Alves, N., Rogers, B., Hansen, J., DeNofrio, J., Shah, et al
2022: OP2200128
- **Perspective Toward Machine Learning Implementation in Pediatric Medicine: Mixed Methods Study.** *JMIR medical informatics*
Alexander, N., Aftandilian, C., Guo, L. L., Plenert, E., Posada, J., Fries, J., Fleming, S., Johnson, A., Shah, N., Sung, L.
2022; 10 (11): e40039
- **A network paradigm predicts drug synergistic effects using downstream protein-protein interactions.** *CPT: pharmacometrics & systems pharmacology*
Wilson, J. L., Steinberg, E., Racz, R., Altman, R. B., Shah, N., Grimes, K.
2022

- **User-centred design for machine learning in health care: a case study from care management.** *BMJ health & care informatics*
Seneviratne, M. G., Li, R. C., Schreier, M., Lopez-Martinez, D., Patel, B. S., Yakubovich, A., Kemp, J. B., Loreaux, E., Gamble, P., El-Khoury, K., Vardoulakis, L., Wong, D., Desai, et al
2022; 29 (1)
- **Assessment of Adherence to Reporting Guidelines by Commonly Used Clinical Prediction Models From a Single Vendor: A Systematic Review.** *JAMA network open*
Lu, J. H., Callahan, A., Patel, B. S., Morse, K. E., Dash, D., Pfeffer, M. A., Shah, N. H.
2022; 5 (8): e2227779
- **Nursing Workflow Change in a COVID-19 Inpatient Unit Following the Deployment of Inpatient Telehealth: An Observational Study Using a Real-Time Locating System.** *Journal of medical Internet research*
Vilendrer, S., Lough, M. E., Garvert, D. W., Lambert, M. H., Lu, J. H., Patel, B., Shah, N. H., Williams, M. Y., Kling, S. M.
2022
- **Evaluating algorithmic fairness in the presence of clinical guidelines: the case of atherosclerotic cardiovascular disease risk estimation.** *BMJ health & care informatics*
Foryciarz, A., Pfohl, S. R., Patel, B., Shah, N.
2022; 29 (1)
- **DLMM as a lossless one-shot algorithm for collaborative multi-site distributed linear mixed models.** *Nature communications*
Luo, C., Islam, M. N., Sheils, N. E., Buresh, J., Reys, J., Schuemie, M. J., Ryan, P. B., Edmondson, M., Duan, R., Tong, J., Marks-Anglin, A., Bian, J., Chen, et al
2022; 13 (1): 1678
- **A comparison of approaches to improve worst-case predictive model performance over patient subpopulations.** *Scientific reports*
Pfohl, S. R., Zhang, H., Xu, Y., Foryciarz, A., Ghassemi, M., Shah, N. H.
2022; 12 (1): 3254
- **Evaluation of domain generalization and adaptation on improving model robustness to temporal dataset shift in clinical medicine.** *Scientific reports*
Guo, L. L., Pfohl, S. R., Fries, J., Johnson, A. E., Posada, J., Aftandilian, C., Shah, N., Sung, L.
2022; 12 (1): 2726
- **Characteristics and outcomes of COVID-19 patients with and without asthma from the United States, South Korea, and Europe.** *The Journal of asthma : official journal of the Association for the Care of Asthma*
Morales, D., Ostropolets, A., Lai, L., Sena, A., Duvall, S., Suchard, M., Verhamme, K., Rjinbeek, P., Posada, J., Ahmed, W., Alshammari, T., Alghoul, H., Alser, et al
1800: 1-14
- **Monitoring Approaches for a Pediatric Chronic Kidney Disease Machine Learning Model.** *Applied clinical informatics*
Morse, K. E., Brown, C., Fleming, S., Todd, I., Powell, A., Russell, A., Scheinker, D., Sutherland, S. M., Lu, J., Watkins, B., Shah, N. H., Pageler, N. M., Palma, et al
2022; 13 (2): 431-438
- **Predicting patients who are likely to develop Lupus Nephritis of those newly diagnosed with Systemic Lupus Erythematosus.** *AMIA ... Annual Symposium proceedings. AMIA Symposium*
Bechler, K. K., Stolyar, L., Steinberg, E., Posada, J., Minty, E., Shah, N. H.
2022; 2022: 221-230
- **Characteristics and outcomes of COVID-19 patients with COPD from the United States, South Korea, and Europe.** *Wellcome open research*
Moreno-Martos, D., Verhamme, K., Ostropolets, A., Kostka, K., Duarte-Sales, T., Prieto-Alhambra, D., Alshammari, T. M., Alghoul, H., Ahmed, W., Blacketer, C., DuVall, S., Lai, L., Matheny, et al
2022; 7: 22
- **Building a Learning Health System: Creating an Analytical Workflow for Evidence Generation to Inform Institutional Clinical Care Guidelines.** *Applied clinical informatics*
Dash, D., Gokhale, A., Patel, B. S., Callahan, A., Posada, J., Krishnan, G., Collins, W., Li, R., Schulman, K., Ren, L., Shah, N. H.
2022; 13 (1): 315-321
- **Considerations in the reliability and fairness audits of predictive models for advance care planning** *Frontiers in Digital Health*
Lu, J., Sattler, A., Wang, S., Khaki, A. R., Callahan, A., Fleming, S., Fong, R., Ehlert, B., Li, R., Shieh, L., Ramchandran, K., Gensheimer, M., Chobot, et al
2022: 943768

- **Unraveling COVID-19: A Large-Scale Characterization of 4.5 Million COVID-19 Cases Using CHARYBDIS.** *Clinical epidemiology*
Kostka, K., Duarte-Salles, T., Prats-Urbe, A., Sena, A. G., Pistillo, A., Khalid, S., Lai, L. Y., Golozar, A., Alshammari, T. M., Dawoud, D. M., Nyberg, F., Wilcox, A. B., Andryc, et al
2022; 14: 369-384
- **Characteristics and outcomes of patients with COVID-19 with and without prevalent hypertension: a multinational cohort study.** *BMJ open*
Reyes, C., Pistillo, A., Fernandez-Bertolin, S., Recalde, M., Roel, E., Puente, D., Sena, A. G., Blacketer, C., Lai, L., Alshammari, T. M., Ahmed, W., Alser, O., Alghoul, et al
1800; 11 (12): e057632
- **Predictors of diagnostic transition from major depressive disorder to bipolar disorder: a retrospective observational network study.** *Translational psychiatry*
Nestsiarovich, A., Reps, J. M., Matheny, M. E., DuVall, S. L., Lynch, K. E., Beaton, M., Jiang, X., Spotnitz, M., Pfohl, S. R., Shah, N. H., Torre, C. O., Reich, C. G., Lee, et al
1800; 11 (1): 642
- **Unsupervised Learning for Automated Detection of Coronary Artery Disease Subgroups.** *Journal of the American Heart Association*
Flores, A. M., Schuler, A., Eberhard, A. V., Olin, J. W., Cooke, J. P., Leeper, N. J., Shah, N. H., Ross, E. G.
2021: e021976
- **An informatics consult approach for generating clinical evidence for treatment decisions.** *BMC medical informatics and decision making*
Lai, A. G., Chang, W. H., Parisinos, C. A., Katsoulis, M., Blackburn, R. M., Shah, A. D., Nguyen, V., Denaxas, S., Davey Smith, G., Gaunt, T. R., Nirantharakumar, K., Cox, M. P., Forde, et al
2021; 21 (1): 281
- **A quality assessment tool for artificial intelligence-centered diagnostic test accuracy studies: QUADAS-AI.** *Nature medicine*
Sounderajah, V., Ashrafian, H., Rose, S., Shah, N. H., Ghassemi, M., Golub, R., Kahn, C. E., Esteva, A., Karthikesalingam, A., Mateen, B., Webster, D., Milea, D., Ting, et al
2021
- **Exploring Workplace Testing with Real-Time Polymerase Chain Reaction SARS-CoV-2 Testing.** *Journal of the American Board of Family Medicine : JABFM*
Fuentes, L., Shah, N., Kelly, S., Harnett, G., Schulman, K. A.
2021; 35 (1): 96-101
- **Computational drug repositioning of atorvastatin for ulcerative colitis.** *Journal of the American Medical Informatics Association : JAMIA*
Bai, L., Scott, M. K., Steinberg, E., Kalesinskas, L., Habtezion, A., Shah, N. H., Khatri, P.
2021
- **Summarizing Patients Like Mine via an On-demand Consultation Service** *PROCEEDINGS OF THE VLDB ENDOWMENT*
Shah, N.
2021; 14 (13): 3417
- **A survey of extant organizational and computational setups for deploying predictive models in health systems.** *Journal of the American Medical Informatics Association : JAMIA*
Kashyap, S., Morse, K. E., Patel, B., Shah, N. H.
2021
- **Learning decision thresholds for risk stratification models from aggregate clinician behavior.** *Journal of the American Medical Informatics Association : JAMIA*
Patel, B. S., Steinberg, E., Pfohl, S. R., Shah, N. H.
2021
- **Systematic Review of Approaches to Preserve Machine Learning Performance in the Presence of Temporal Dataset Shift in Clinical Medicine.** *Applied clinical informatics*
Guo, L. L., Pfohl, S. R., Fries, J., Posada, J., Fleming, S. L., Aftandilian, C., Shah, N., Sung, L.
2021; 12 (4): 808-815
- **Heterogeneity and temporal variation in the management of COVID-19: A multinational drug utilisation study including 274,719 hospitalised patients from, the United States of America, China, Spain, and South Korea**

Prats-Urbe, A., Sena, A. G., Lai, L., Ahmed, W., Alghoul, H., Alser, O., Alshammari, T. M., Areia, C., Carter, W. A., Casajust, P., Dawoud, D., Golozar, A., Jonnagaddala, et al
WILEY.2021: 78-79

- **Characteristics and outcomes of over 300,000 COVID-19 individuals with history of cancer in the United States and Spain.** *Cancer epidemiology, biomarkers & prevention : a publication of the American Association for Cancer Research, cosponsored by the American Society of Preventive Oncology*
Roel, E., Pistillo, A., Recalde, M., Sena, A. G., Fernandez-Bertolin, S., Aragon, M., Puente, D., Ahmed, W., Alghoul, H., Alser, O., Alshammari, T. M., Areia, C., Blacketer, et al
2021
- **Characteristics and outcomes of 627 044 COVID-19 patients living with and without obesity in the United States, Spain, and the United Kingdom.** *International journal of obesity (2005)*
Recalde, M., Roel, E., Pistillo, A., Sena, A. G., Prats-Urbe, A., Ahmed, W., Alghoul, H., Alshammari, T. M., Alser, O., Areia, C., Burn, E., Casajust, P., Dawoud, et al
2021
- **30-Day Outcomes of Children and Adolescents With COVID-19: An International Experience.** *Pediatrics*
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