




Nigam H. Shah, MBBS, PhD

Associate Professor of Medicine (Biomedical Informatics) and of Biomedical Data Science

Medicine - Biomedical Informatics Research

 Curriculum Vitae available Online

CONTACT INFORMATION

• Alternate Contact

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Bio

BIO

Dr. Nigam Shah is associate professor of Medicine (Biomedical Informatics) at Stanford University, Assistant Director of the Center for Biomedical Informatics Research, and a core member of the Biomedical Informatics Graduate Program. Dr. Shah's research focuses on combining machine learning and prior knowledge in medical ontologies to enable use cases of the learning health system.

Dr. Shah received the AMIA New Investigator Award for 2013 and the Stanford Biosciences Faculty Teaching Award for outstanding teaching in his graduate class on "Data driven medicine". Dr. Shah was elected into the American College of Medical Informatics (ACMI) in 2015 and is 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

- Associate Professor, Medicine - Biomedical Informatics Research
- Associate Professor, Biomedical Data Science
- Member, Bio-X
- Member, Stanford Cancer Institute
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Co-director - Informatics, Stanford Center for Clinical and Translational Research, and Education (Spectrum), (2017- present)
- Assistant Director, Stanford Center for Biomedical Research (BMIR), (2013- present)
- Member, Cancer Institute Informatics Steering Committee, (2011- present)
- 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 Society for Clinical Investigation (April 2016)
- Biosciences Faculty Award recognizing outstanding teaching contributions, Stanford School of Medicine (June 2012)
- Outstanding paper award, Summit on Translational Bioinformatics (March 2008)
- Outstanding paper award, AMIA Summit on Translational Bioinformatics (March 2009)
- Distinguished paper award, AMIA Summit on Translational Bioinformatics (March 2011)
- Ramoni Best paper award, AMIA Summit on Translational Bioinformatics (March 2013)
- New Investigator Award, American Medical Informatics Association (AMIA) (November 2013)
- Fellow, American College of Medical Informatics (November 2015)

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: <http://www.stanford.edu/~nigam/>
- ADRC: <http://med.stanford.edu/adrc.html>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

We develop methods to analyze large unstructured data sets for data-driven medicine. We use ontologies to annotate, index and analyze Big Data in biomedicine for enabling data-driven decision making in medicine and health care. Our research group is part of the Center for Biomedical Informatics Research at Stanford and the National Center for Biomedical Ontology.

Data driven medicine: The goal is to combine machine learning, text-mining, and prior knowledge in medical ontologies to discover hidden trends, build risk models, drive data driven decision making, and comparative effectiveness studies. We have developed methods that transform unstructured patient notes into a de-identified, temporally ordered, patient-feature matrix (Imagine it as row = patient, column = medical concept, 1 = present, 0 = absent). With the resulting high-throughput data, we can monitor for adverse drug events, learn drug-drug interactions, identify off-label drug usage, generate practice-based evidence for difficult-to-test clinical hypotheses, and generate phenotypic fingerprints as well as build predictive models. We have efforts around combining multiple information sources for drug safety surveillance, which were recently the focus of a commentary titled Advancing the Science of Pharmacovigilance.

Annotation Analytics: In order to understand the “gene lists” from analysis of high-throughput data, researchers routinely use Gene Ontology based analyses. With available methods for automated annotation and the existence of over 200 biomedical ontologies, we can stop using just GO and move to enrichment analysis using disease ontologies.

Teaching

COURSES

2019-20

- Data Driven Medicine: BIOMEDIN 215 (Aut)

2018-19

- Data Driven Medicine: BIOMEDIN 215 (Aut)
- Data Driven Medicine: Lectures: BIOMEDIN 225 (Aut)
- Informatics in Industry: BIOMEDIN 206 (Spr)
- Intensive Course in Clinical Research: HRP 245 (Aut)

2017-18

- Data Driven Medicine: BIOMEDIN 215 (Aut)
- Data Driven Medicine: Lectures: BIOMEDIN 225 (Aut)
- Informatics in Industry: BIOMEDIN 206 (Spr)

2016-17

- Data Driven Medicine: BIOMEDIN 215 (Aut)
- Data Driven Medicine: Lectures: BIOMEDIN 225 (Aut)
- Informatics in Industry: BIOMEDIN 206 (Spr)

STANFORD ADVISEES

Med Scholar Project Advisor

Jassi Pannu

Doctoral Dissertation Reader (AC)

Albert Haque

Postdoctoral Faculty Sponsor

Mathew Kiang

Doctoral Dissertation Advisor (AC)

Stephen Pföhl

Master's Program Advisor

Sheun Aluko

Doctoral Dissertation Co-Advisor (AC)

Conor Corbin, Scott Fleming

Doctoral (Program)

Hunter Boyce, E Flynn, Sergio Gonzales, Larry Kalesinskas, Ben Marafino, Ethan Steinberg, Yosuke Tanigawa, Darvin Yi, Alice Yu

Postdoctoral Research Mentor

Mathew Kiang

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

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

Publications

PUBLICATIONS

- **Estimate the hidden deployment cost of predictive models to improve patient care.** *Nature medicine*
Morse, K. E., Bagely, S. C., Shah, N. H.
2020; 26 (1): 18–19
- **Treatment Patterns for Chronic Comorbid Conditions in Patients With Cancer Using a Large-Scale Observational Data Network.** *JCO clinical cancer informatics*
Chen, R., Ryan, P., Natarajan, K., Falconer, T., Crew, K. D., Reich, C. G., Vashisht, R., Randhawa, G., Shah, N. H., Hripcsak, G.
2020; 4: 171–83
- **Ethics of Using and Sharing Clinical Imaging Data for Artificial Intelligence: A Proposed Framework.** *Radiology*
Larson, D. B., Magnus, D. C., Lungren, M. P., Shah, N. H., Langlotz, C. P.
2020: 192536
- **Development and validation of a prognostic model predicting symptomatic hemorrhagic transformation in acute ischemic stroke at scale in the OHDSI network.** *PLoS one*
Wang, Q., Reps, J. M., Kostka, K. F., Ryan, P. B., Zou, Y., Voss, E. A., Rijnbeek, P. R., Chen, R., Rao, G. A., Morgan Stewart, H., Williams, A. E., Williams, R. D., Van Zandt, et al
2020; 15 (1): e0226718
- **Profiling off-label prescriptions in cancer treatment using social health networks.** *JAMIA open*
Nikfarjam, A., Ransohoff, J. D., Callahan, A., Polony, V., Shah, N. H.
2019; 2 (3): 301–5
- **Development and Performance of the Pulmonary Embolism Result Forecast Model (PERFORM) for Computed Tomography Clinical Decision Support.** *JAMA network open*
Banerjee, I., Sofela, M., Yang, J., Chen, J. H., Shah, N. H., Ball, R., Mushlin, A. I., Desai, M., Bledsoe, J., Amrhein, T., Rubin, D. L., Zamanian, R., Lungren, et al
2019; 2 (8): e198719
- **Increased monocyte count as a cellular biomarker for poor outcomes in fibrotic diseases: a retrospective, multicentre cohort study** *LANCET RESPIRATORY MEDICINE*
Scott, M. D., Quinn, K., Li, Q., Carroll, R., Warsinske, H., Vallania, F., Chen, S., Carns, M. A., Aren, K., Sun, J., Koloms, K., Lee, J., Baral, et al
2019; 7 (6): 497–508
- **Finding missed cases of familial hypercholesterolemia in health systems using machine learning** *NPJ DIGITAL MEDICINE*
Banda, J. M., Sarraju, A., Abbasi, F., Parizo, J., Pariani, M., Ison, H., Briskin, E., Wand, H., Dubois, S., Jung, K., Myers, S. A., Rader, D. J., Leader, et al
2019; 2
- **Increased monocyte count as a cellular biomarker for poor outcomes in fibrotic diseases: a retrospective, multicentre cohort study.** *The Lancet. Respiratory medicine*
Scott, M. K., Quinn, K., Li, Q., Carroll, R., Warsinske, H., Vallania, F., Chen, S., Carns, M. A., Aren, K., Sun, J., Koloms, K., Lee, J., Baral, et al
2019
- **It is time to learn from patients like mine** *NPJ DIGITAL MEDICINE*
Gombar, S., Callahan, A., Califf, R., Harrington, R., Shah, N. H.
2019; 2
- **Predicting Future Cardiovascular Events in Patients With Peripheral Artery Disease Using Electronic Health Record Data** *CIRCULATION-CARDIOVASCULAR QUALITY AND OUTCOMES*
Ross, E., Jung, K., Dudley, J. T., Li, L., Leeper, N. J., Shah, N. H.
2019; 12 (3)
- **Predicting Future Cardiovascular Events in Patients With Peripheral Artery Disease Using Electronic Health Record Data.** *Circulation. Cardiovascular quality and outcomes*
Ross, E. G., Jung, K., Dudley, J. T., Li, L., Leeper, N. J., Shah, N. H.
2019; 12 (3): e004741

- **Predicting Need for Advanced Illness or Palliative Care In A Primary Care Population Using Electronic Health Record Data.** *Journal of biomedical informatics*
Jung, K., Sudat, S. E., Kwon, N., Stewart, W. F., Shah, N. H.
2019: 103115
- **Finding missed cases of familial hypercholesterolemia in health systems using machine learning.** *NPJ digital medicine*
Banda, J. M., Sarraju, A., Abbasi, F., Parizo, J., Pariani, M., Ison, H., Briskin, E., Wand, H., Dubois, S., Jung, K., Myers, S. A., Rader, D. J., Leader, et al
2019; 2: 23
- **Key Considerations for Incorporating Conversational AI in Psychotherapy.** *Frontiers in psychiatry*
Miner, A. S., Shah, N., Bullock, K. D., Arnow, B. A., Bailenson, J., Hancock, J.
2019; 10: 746
- **Making Machine Learning Models Clinically Useful.** *JAMA*
Shah, N. H., Milstein, A., Bagley PhD, S. C.
2019
- **The Effectiveness of Multitask Learning for Phenotyping with Electronic Health Records Data**
Ding, D., Simpson, C., Pfohl, S., Kale, D. C., Jung, K., Shah, N. H., Altman, R. B., Dunker, A. K., Hunter, L., Ritchie, M. D., Murray, T., Klein, T. E.
WORLD SCIENTIFIC PUBL CO PTE LTD.2019: 18–29
- **Medical device surveillance with electronic health records.** *NPJ digital medicine*
Callahan, A., Fries, J. A., Ré, C., Huddleston, J. I., Giori, N. J., Delp, S., Shah, N. H.
2019; 2: 94
- **Incorporating Observed Physiological Data to Personalize Pediatric Vital Sign Alarm Thresholds.** *Biomedical informatics insights*
Poole, S., Shah, N.
2019; 11: 1178222618818478
- **The Effectiveness of Multitask Learning for Phenotyping with Electronic Health Records Data.** *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*
Ding, D. Y., Simpson, C., Pfohl, S., Kale, D. C., Jung, K., Shah, N. H.
2019; 24: 18–29
- **The number needed to benefit: estimating the value of predictive analytics in healthcare.** *Journal of the American Medical Informatics Association : JAMIA*
Liu, V. X., Bates, D. W., Wiens, J., Shah, N. H.
2019
- **Early Detection of Adverse Drug Reactions in Social Health Networks: A Natural Language Processing Pipeline for Signal Detection.** *JMIR public health and surveillance*
Nikfarjam, A., Ransohoff, J. D., Callahan, A., Jones, E., Loew, B., Kwong, B. Y., Sarin, K. Y., Shah, N. H.
2019; 5 (2): e11264
- **It is time to learn from patients like mine.** *NPJ digital medicine*
Gombar, S., Callahan, A., Califf, R., Harrington, R., Shah, N. H.
2019; 2: 16
- **Using natural language processing to construct a metastatic breast cancer cohort from linked cancer registry and electronic medical records data.** *JAMIA open*
Ling, A. Y., Kurian, A. W., Caswell-Jin, J. L., Sledge, G. W., Shah, N. H., Tamang, S. R.
2019; 2 (4): 528–37
- **Improving palliative care with deep learning.** *BMC medical informatics and decision making*
Avati, A., Jung, K., Harman, S., Downing, L., Ng, A., Shah, N. H.
2018; 18 (Suppl 4): 122
- **A Second Opinion From Observational Data on Second-line Diabetes Drugs.** *JAMA network open*
Callahan, A., Shah, N. H.
2018; 1 (8): e186119

- **Predicting the need for a reduced drug dose, at first prescription.** *Scientific reports*
Coulet, A., Shah, N. H., Wack, M., Chawki, M. B., Jay, N., Dumontier, M.
2018; 8 (1): 15558
- **An Evaluation of Clinical Order Patterns Machine-Learned from Clinician Cohorts Stratified by Patient Mortality Outcomes.** *Journal of biomedical informatics*
Wang, J. K., Hom, J., Balasubramanian, S., Schuler, A., Shah, N. H., Goldstein, M. K., Baiocchi, M. T., Chen, J. H.
2018
- **Comparative safety and effectiveness of alendronate versus raloxifene in women with osteoporosis**
Tian, Y., Kim, Y., Yang, J., Huser, V., Jin, P., Lambert, C., Park, H., Park, R., Rijnbeek, P., Van Zandt, M., Vashisht, R., Wu, Y., You, et al
WILEY.2018: 184
- **The Impact of Acute Organ Dysfunction on Long-Term Survival in Sepsis.** *Critical care medicine*
Schuler, A., Wulf, D. A., Lu, Y., Iwashyna, T. J., Escobar, G. J., Shah, N. H., Liu, V. X.
2018; 46 (6): 843–49
- **Some methods for heterogeneous treatment effect estimation in high dimensions** *STATISTICS IN MEDICINE*
Powers, S., Qian, J., Jung, K., Schuler, A., Shah, N. H., Hastie, T., Tibshirani, R.
2018; 37 (11): 1767–87
- **Interpretation of biological experiments changes with evolution of the Gene Ontology and its annotations** *SCIENTIFIC REPORTS*
Tomczak, A., Mortensen, J. M., Winnenburger, R., Liu, C., Alessi, D. T., Swamy, V., Vallania, F., Lofgren, S., Haynes, W., Shah, N. H., Musen, M. A., Khatri, P.
2018; 8: 5115
- **U-Index, a dataset and an impact metric for informatics tools and databases** *SCIENTIFIC DATA*
Callahan, A., Winnenburger, R., Shah, N. H.
2018; 5: 180043
- **Implementing Machine Learning in Health Care - Addressing Ethical Challenges** *NEW ENGLAND JOURNAL OF MEDICINE*
Char, D. S., Shah, N. H., Magnus, D.
2018; 378 (11): 981–83
- **Performing an Informatics Consult: Methods and Challenges** *JOURNAL OF THE AMERICAN COLLEGE OF RADIOLOGY*
Schuler, A., Callahan, A., Jung, K., Shah, N. H.
2018; 15 (3): 563–68
- **What This Computer Needs Is a Physician Humanism and Artificial Intelligence** *JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*
Verghese, A., Shah, N. H., Harrington, R.
2018; 319 (1): 19–20
- **Accurate and interpretable intensive care risk adjustment for fused clinical data with generalized additive models.** *AMIA Joint Summits on Translational Science proceedings. AMIA Joint Summits on Translational Science*
Marafino, B. J., Dudley, R. A., Shah, N. H., Chen, J. H.
2018; 2017: 166–75
- **Inferring Physical Function from Wearable Activity Monitors: Analysis of Activity Data from Patients with Knee Osteoarthritis.** *JMIR Mhealth Uhealth*
Agarwal, V., Smuck, M., Tomkins-Lane, C., Shah, N. H.
2018
- **Democratizing Health Data for Translational Research**
Payne, P. O., Shah, N. H., Tenenbaum, J. D., Mangravite, L., Altman, R. B., Dunker, A. K., Hunter, L., Ritchie, M. D., Murray, T., Klein, T. E.
WORLD SCIENTIFIC PUBL CO PTE LTD.2018: 240–46
- **Addressing vital sign alarm fatigue using personalized alarm thresholds**
Poole, S., Shah, N., Altman, R. B., Dunker, A. K., Hunter, L., Ritchie, M. D., Murray, T., Klein, T. E.
WORLD SCIENTIFIC PUBL CO PTE LTD.2018: 472–83
- **Inferring Physical Function From Wearable Activity Monitors: Analysis of Free-Living Activity Data From Patients With Knee Osteoarthritis.** *JMIR mHealth and uHealth*

- Agarwal, V., Smuck, M., Tomkins-Lane, C., Shah, N. H.
2018; 6 (12): e11315
- **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 network open*
Vashisht, R., Jung, K., Schuler, A., Banda, J. M., Park, R. W., Jin, S., Li, L., Dudley, J. T., Johnson, K. W., Shervey, M. M., Xu, H., Wu, Y., Natrajan, et al
2018; 1 (4): e181755
 - **Advances in Electronic Phenotyping: From Rule-Based Definitions to Machine Learning Models** *ANNUAL REVIEW OF BIOMEDICAL DATA SCIENCE, VOL 1*
Banda, J. M., Seneviratne, M., Hernandez-Boussard, T., Shah, N. H., Altman, R. B., Levitt, M.
2018; 1: 53–68
 - **Identifying Cases of Metastatic Prostate Cancer Using Machine Learning on Electronic Health Records.** *AMIA ... Annual Symposium proceedings. AMIA Symposium*
Seneviratne, M. G., Banda, J. M., Brooks, J. D., Shah, N. H., Hernandez-Boussard, T. M.
2018; 2018: 1498–1504
 - **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 Network Open*
Vashisht, R., Jung, ., Schuler, A., Banda, . M., , , , , , , et al
2018
 - **Detecting Chemotherapeutic Skin Adverse Reactions in Social Health Networks Using Deep Learning.** *JAMA oncology*
Ransohoff, J. D., Nikfarjam, A., Jones, E., Loew, B., Kwong, B. Y., Sarin, K. Y., Shah, N. H.
2018; 4 (4): 581–83
 - **Inpatient Clinical Order Patterns Machine-Learned From Teaching Versus Attending-Only Medical Services.** *AMIA Joint Summits on Translational Science proceedings. AMIA Joint Summits on Translational Science*
Wang, J. K., Schuler, A., Shah, N. H., Baiocchi, M. T., Chen, J. H.
2018; 2017: 226–35
 - **Toward multimodal signal detection of adverse drug reactions** *JOURNAL OF BIOMEDICAL INFORMATICS*
Harpaz, R., DuMouchel, W., Schuemie, M., Bodenreider, O., Friedman, C., Horvitz, E., Ripple, A., Sorbello, A., White, R. W., Winnenburg, R., Shah, N. H.
2017; 76: 41–49
 - **A dataset quantifying polypharmacy in the United States** *SCIENTIFIC DATA*
Quinn, K. J., Shah, N. H.
2017; 4: 170167
 - **Androgen Deprivation Therapy and Subsequent Dementia-Reply.** *JAMA oncology*
Nead, K. T., Swisher-McClure, S., Shah, N. H.
2017
 - **Predicting patient 'cost blooms' in Denmark: a longitudinal population-based study.** *BMJ open*
Tamang, S., Milstein, A., Sørensen, H. T., Pedersen, L., Mackey, L., Betterton, J., Janson, L., Shah, N.
2017; 7 (1)
 - **Association Between Androgen Deprivation Therapy and Risk of Dementia** *JAMA ONCOLOGY*
Nead, K. T., Gaskin, G., Chester, C., Swisher-McClure, S., Leeper, N. J., Shah, N. H.
2017; 3 (1): 49-55
 - **Quantifying the relative change in physical activity after Total Knee Arthroplasty using accelerometer based measurements.** *AMIA Joint Summits on Translational Science proceedings. AMIA Joint Summits on Translational Science*
Agarwal, V., Smuck, M., Shah, N. H.
2017; 2017: 463–72
 - **Risk of angioedema associated with levetiracetam compared with phenytoin: Findings of the observational health data sciences and informatics research network.** *Epilepsia*
Duke, J. D., Ryan, P. B., Suchard, M. A., Hripesak, G., Jin, P., Reich, C., Schwalm, M. S., Khoma, Y., Wu, Y., Xu, H., Shah, N. H., Banda, J. M., Schuemie, et al
2017; 58 (8): e101–e106

- **Assessing Screening Guidelines for Cardiovascular Disease Risk Factors using Routinely Collected Data.** *Scientific reports*
Pannu, J., Poole, S., Shah, N., Shah, N. H.
2017; 7 (1): 6488
- **Enhanced Quality Measurement Event Detection: An Application to Physician Reporting.** *EGEMS (Washington, DC)*
Tamang, S. R., Hernandez-Boussard, T., Ross, E. G., Gaskin, G., Patel, M. I., Shah, N. H.
2017; 5 (1): 5
- **Funding and Publication of Research on Gun Violence and Other Leading Causes of Death.** *JAMA*
Stark, D. E., Shah, N. H.
2017; 317 (1): 84–85
- **Research on Gun Violence vs Other Causes of Death.** *JAMA*
Stark, D. E., Shah, N. H.
2017; 317 (13): 1379
- **Toward multimodal signal detection of adverse drug reactions.** *Journal of biomedical informatics*
Harpaz, R., DuMouchel, W., Schuemie, M., Bodenreider, O., Friedman, C., Horvitz, E., Ripple, A., Sorbello, A., White, R. W., Winnenburg, R., Shah, N. H.
2017; 76: 41–49
- **Improving Palliative Care with Deep Learning**
Avati, A., Jung, K., Harman, S., Downing, L., Ng, A., Shah, N. H., Hu, X. H., Shyu, C. R., Bromberg, Y., Gao, J., Gong, Y., Korin, D., Yoo, et al
IEEE.2017: 311–16
- **A Clinical Score for Predicting Atrial Fibrillation in Patients with Cryptogenic Stroke or Transient Ischemic Attack** *CARDIOLOGY*
Kwong, C., Ling, A. Y., Crawford, M. H., Zhao, S. X., Shah, N. H.
2017; 138 (3): 133–40
- **Machine Learning in Healthcare** *KEY ADVANCES IN CLINICAL INFORMATICS: TRANSFORMING HEALTH CARE THROUGH HEALTH INFORMATION TECHNOLOGY*
Callahan, A., Shah, N. H., Sheikh, A., Cresswell, K. M., Wright, A., Bates, D. W.
2017: 279–91
- **Thematic issue of the Second combined Bio-ontologies and Phenotypes Workshop** *JOURNAL OF BIOMEDICAL SEMANTICS*
Verspoor, K., Oellrich, A., Collier, N., Groza, T., Rocca-Serra, P., Soldatova, L., Dumontier, M., Shah, N.
2016; 7
- **Synergistic drug combinations from electronic health records and gene expression.** *Journal of the American Medical Informatics Association*
Low, Y. S., Daugherty, A. C., Schroeder, E. A., Chen, W., Seto, T., Weber, S., Lim, M., Hastie, T., Mathur, M., Desai, M., Farrington, C., Radin, A. A., Sirota, et al
2016
- **The use of machine learning for the identification of peripheral artery disease and future mortality risk.** *Journal of vascular surgery*
Ross, E. G., Shah, N. H., Dalman, R. L., Nead, K. T., Cooke, J. P., Leeper, N. J.
2016; 64 (5): 1515-1522 e3
- **Influence of age on androgen deprivation therapy-associated Alzheimer's disease** *SCIENTIFIC REPORTS*
Nead, K. T., Gaskin, G., Chester, C., Swisher-McClure, S., Dudley, J. T., Leeper, N. J., Shah, N. H.
2016; 6
- **Association Between Androgen Deprivation Therapy and Risk of Dementia.** *JAMA oncology*
Nead, K. T., Gaskin, G., Chester, C., Swisher-McClure, S., Leeper, N. J., Shah, N. H.
2016
- **Evolutionary Pressures on the Electronic Health Record: Caring for Complexity.** *JAMA*
Zulman, D. M., Shah, N. H., Verghese, A.
2016; 316 (9): 923-924
- **Impact of Predicting Health Care Utilization Via Web Search Behavior: A Data-Driven Analysis** *JOURNAL OF MEDICAL INTERNET RESEARCH*
Agarwal, V., Zhang, L., Zhu, J., Fang, S., Cheng, T., Hong, C., Shah, N. H.
2016; 18 (9): 241-253

- **The digital revolution in phenotyping** *BRIEFINGS IN BIOINFORMATICS*
Oellrich, A., Collier, N., Groza, T., Rebholz-Schuhmann, D., Shah, N., Bodenreider, O., Boland, M. R., Georgiev, I., Liu, H., Livingston, K., Luna, A., Mallon, A., Manda, et al
2016; 17 (5): 819-830
- **Reply to R.L. Bowen et al, M. Froehner et al, J.L. Leow et al, and C. Brady et al.** *Journal of clinical oncology*
Nead, K. T., Gaskin, G., Chester, C., Swisher-McClure, S., Dudley, J. T., Leeper, N. J., Shah, N. H.
2016; 34 (23): 2804-2805
- **Characterizing treatment pathways at scale using the OHDSI network** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Hripcsak, G., Ryan, P. B., Duke, J. D., Shah, N. H., Park, R. W., Huser, V., Suchard, M. A., Schuemie, M. J., DeFalco, F. J., Perotte, A., Banda, J. M., Reich, C. G., Schilling, et al
2016; 113 (27): 7329-7336
- **Generalized enrichment analysis improves the detection of adverse drug events from the biomedical literature** *BMC BIOINFORMATICS*
Winnenburg, R., Shah, N. H.
2016; 17
- **Predictive modeling of risk factors and complications of cataract surgery.** *European journal of ophthalmology*
Gaskin, G. L., Pershing, S., Cole, T. S., Shah, N. H.
2016; 26 (4): 328-337
- **Statin Intensity or Achieved LDL? Practice-based Evidence for the Evaluation of New Cholesterol Treatment Guidelines** *PLOS ONE*
Ross, E. G., Shah, N., Leeper, N.
2016; 11 (5)
- **Learning statistical models of phenotypes using noisy labeled training data.** *Journal of the American Medical Informatics Association*
Agarwal, V., Podchiyska, T., Banda, J. M., Goel, V., Leung, T. I., Minty, E. P., Sweeney, T. E., Gyang, E., Shah, N. H.
2016: -?
- **Postmarket Surveillance of Point-of-Care Glucose Meters through Analysis of Electronic Medical Records** *CLINICAL CHEMISTRY*
Schroeder, L. F., Giacherio, D., Gianchandani, R., Engoren, M., Shah, N. H.
2016; 62 (5): 716-724
- **RegenBase: a knowledge base of spinal cord injury biology for translational research** *DATABASE-THE JOURNAL OF BIOLOGICAL DATABASES AND CURATION*
Callahan, A., Abeyruwan, S. W., Al-Ali, H., Sakurai, K., Ferguson, A. R., Popovich, P. G., Shah, N. H., Visser, U., Bixby, J. L., Lemmon, V. P.
2016
- **Comparing high-dimensional confounder control methods for rapid cohort studies from electronic health records** *JOURNAL OF COMPARATIVE EFFECTIVENESS RESEARCH*
Low, Y. S., Gallego, B., Shah, N. H.
2016; 5 (2): 179-192
- **Comparing high-dimensional confounder control methods for rapid cohort studies from electronic health records.** *Journal of comparative effectiveness research*
Low, Y. S., Gallego, B., Shah, N. H.
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