BIOGRAPHICAL SKETCH

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NAME: Staes, Catherine

eRA COMMONS USER NAME (agency login): CATHERINESTAES

POSITION TITLE: Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Georgetown University, Washington DC	BSN	05/1981	Nursing
Johns Hopkins University, Baltimore MD	MPH	06/1987	Epidemiology
Centers for Disease Control and Prevention, Atlanta GA	EIS	06/1992	Public health epidemiology
University of Utah, School of Medicine, UT	PhD	05/2006	Biomedical Informatics

A. PERSONAL STATEMENT

For this proposal, I will be a program mentor. I bring a wealth of experience related to informatics, nursing and 'shoe leather' epidemiology and public health. I have mentored 26 trainees in the Department of Biomedical Informatics (DBMI), including 5 NLM trainees and as the chair for 4 PhD committees. I was an NLM PhD trainee myself, so I understand the needs and goals of the students. My public health informatics trainees have gone on to have successful careers in health departments, at the CDC and in industry. I am committed to education, and have co-taught the foundational course related to Standards and Terminology in DBMI for the past 10 years, continually enhancing course content and delivery. In addition, I taught the Public Health Informatics course for 10 years (2007-17) and co-taught the Clinical Decision Support course for the past three years.

Since 2018, I have been the Director of the Nursing Informatics Specialty track at the University of Utah's College of Nursing, and mentored 34 students as the chair of their Masters committee. I teach a seminar in clinical informatics and co-direct the Capstone practicum course which allows me to collaborate with informaticists at the University of Utah and Intermountain Healthcare and elsewhere as we guide students through real-world experiences. We are nurturing a growing pipeline where students are sought out to work on projects and everyone benefits from the relationship. In addition, I am committed to educating the public health workforce as well. Recently, I was invited to be an Advisory Committee Member for the Data Modernization Workshop Vision and Design Committee, sponsored by the CDC. The purpose of this committee is to convene thought leaders to create a dynamic, future-oriented workshop that supports effective state-local data modernization planning and implementation.

My research is highly collaborative with faculty in the Department of Biomedical Informatics and primarily focuses on clinical decision support and the development and use of standards to enable electronic health records to meet population and public health goals. Concerning public health, I have undertaken longstanding operational research to improve public health case reporting, as well as research to automate death certification and implement guidelines and public health recommendations within clinical systems. As shown below, most of my research is grounded in public health practice and decision support. Recently, I have led a research team developing a predictive model to support shared decision making when end of life is within 6 months for patients with advanced cancer. Most of my research efforts involve trainees as I highly value training the next generation of informaticists. Trainees are identified with an *. The following paper exemplifies my efforts to perform impactful research to address a health threat. The results of this study were used by the FDA in congressional testimony

a) **Staes C**, Jacobs J*, Mayer J, Allen J (2013). Description of outbreaks of health-care-associated infections related to compounding pharmacies, 2000-12. *Am J Health Syst Pharm*, *70*(15), 1301-12.

B. POSITIONS AND HONORS

Positions and Employment

1981 - 1985	Pediatric ICU Nurse, Denver General Hospital and The Children's Hospital, Denver, CO
1985 - 1986	Infectious disease/oncology nurse, AIDS Clinic, Denver City/County Health Department, Denver, CO
1988 - 1990	Epidemiologist/Head, Communicable Disease & Surveillance, North Carolina Department of Environment, Health, Natural Resources, Raleigh, NC
1990 - 1993	Epidemic Intelligence Service Officer & Epidemiologist, Lead Poisoning Prevention Branch, Centers for Disease Control, Atlanta, GA
1995-2000	Public Health Epidemiologist, Salt Lake Valley Health Department, Salt Lake City, Utah
2006-2010	Assistant Professor (Lecturer), University of Utah School of Medicine, Department of Biomedical Informatics, Salt Lake City, Utah
2010-2016	Assistant Professor, University of Utah School of Medicine, Department of Biomedical Informatics, Salt Lake City, Utah
2016-2018	Research Associate Professor, University of Utah School of Medicine, Department of Biomedical Informatics, Salt Lake City, Utah
2018-Present	Professor (Clinical), University of Utah College of Nursing, Department of Nursing, Salt Lake City, Utah
2018-Present	Adjunct Professor, University of Utah School of Medicine, Department of Biomedical Informatics, Salt Lake City, Utah

Other Experience and Professional Memberships

2011-2019	Editorial Board, Editorial Board, JAMIA - Journal of American Medical Informatics Association
2017-2020	Editor, Associate Editor, JAMIAOpen (Gold Open Access sibling to JAMIA)
2021-Present	Editorial Board, JAMIAOpen
2009-2019	Member, Health Level Seven International
2018-Present	Member, American College of Medical Informatics
2019-Present	Member, American Nurses Association
2007-2018	Member, Council of State and Territorial Epidemiologists
2000-Present	Member, American Medical Informatics Association
2021-Present	Advisory Committee Member, Data Modernization Workshop Vision and Design Committee, CDC

Honors

1993-1993	Alexander D. Langmuir Prize (Best paper presented at annual CDC Epidemic Intelligence Service (EIS) Conference)
1993-1993	Achievement Medal - Commissioned Corps
2000-2003	Pre-doctoral fellowship in Medical Informatics
2010-2013	Invited Faculty, Medical Informatics MBL/NLM week-long Certificate Course - Woods Hole
2013-2013	Reed M. Gardner Award for Faculty Excellence in teaching and mentoring.
2014-2015	AAMC Learning Health System Research Award: *"Development of a standardized and accepted process for creating, implementing, and evaluating value-driven care process models within an Academic Health Enterprise"*
2018-2018	Alumni Award for 'Relationships'. Each year the alumni vote graduates who have made exceptional impact in the three areas valued by the Department (Relevance, Relationships or Leadership).
2018-Present	FACMI. Elected to be a Fellow in the American College of Medical Informatics (FACMI). Awarded to those who have made significant and sustained contributions to the field of biomedical informatics.
2018-Present	FAMIA. Awarded Fellowship for the American Medical Informatics Association (FAMIA). This award is to recognize members who apply informatics skills and knowledge within their professional setting, who have demonstrated professional achievement and leadership, and who have a sustained commitment to the betterment of AMIA.

C. Contribution to Science

a) **Electronic Public Health Case Reporting**. The national infrastructure for electronic case reporting of COVID-19 infections is dependent on the standards-based knowledge management system I co-led with Centers for Disease Control and prevention (CDC) colleagues from 2009 to 2018. In 2009, I was funded by CDC to perform research for the 'Just-in-time delivery of dynamically maintained public health knowledge' and collaborated with others to publish the first standard Implementation Guide for electronic public health case reports (HL7 CDA® R2 Implementation Guide: Public Health Case Report, Release 1 - US Realm). This early work led to ongoing research, over ## conference and development and collaborations with the CDC, Council of State and Territorial Epidemiologists (CSTE), and epidemiologists in local and state health departments throughout the US. I co-authored the first HL7 electronic case reporting Implementation Guide The ideas I proposed are now operational on a national scale, namely as the Reportable Condition Knowledge Management System (RCKMS) that is a critical component of the electronic Case Reporting infrastructure required for reporting COVID-19 and other conditions (https://ecr.aimsplatform.org/).
   a) Abellara J, Kesarinath G, Staes CJ, Altamore R, Giannone G, Dolin R. (2009). Development of a Public Health Case Report Implementation Guide: Enabling the Exchange of Electronic Health Record data using HL7 Clinical Document Architecture format. *AMIA Fall 2009 Symposium*, Bethesda: American Medical Informatics Association, 753.
   b) Eilbeck KL, Lipstein J, McGarvey S, Staes CJ (2014). Evaluation of need for ontologies to manage domain content for the Reportable Conditions Knowledge Management System. *AMIA Annu Symp Proc*, *2014*, 496-505.
   c) Staes C, McGarvey S, He S, Arnold R, Conn L (11/14/2016). Electronic Case Reporting: 360 perspective by public heath, informatics, and healthcare stakeholders. *AMIA 2016 Annual Symposium*, Chicago: AMIA.
   d) Loonsk JW, **Staes C**, Hartsell J, Stamm J, Conn L (11/05/2018). Informatics Challenges, Solutions, and Opportunities for Public Health Electronic Case Reporting. *AMIA 2018 Annual Symposium*, Washington DC: AMIA.
   e) Loonsk J, Conn L, Lane S, **Staes C**. eCR Now: A Webinar Describing the Effort to Scale Electronic Case Reporting (eCR) Nationwide for COVID-19. AMIA COVID19 webinar series LINK (2020)

b) **Informatics Training of Researchers and Public Health Workforce.** My overall education goal is to help students understand how informatics research and practice can contribute to the wider goal of enhancing population health. I continually improve curriculum and course delivery to ensure students have foundational knowledge and skills to engage in population health informatics research and practice, or at least to understand how their area of interest fits into the broader domain. I introduce students to the world of public health, population and prevention principles, and terminology and standards required for interoperability between clinical and public health settings. I use new methods ('flipping the classroom') and online pedagogy principles to design engaging learning activities. In 2013, I was awarded the *Reed M. Gardner Award for Faculty Excellence in teaching and mentoring,* the highest teaching award offered by the Department of Biomedical Informatics. I have mentored as the chair or member of the committee a total of 61 graduate students at the University of Utah, and have a continual parade of post-docs, students at other institutions, or new faculty that seek out mentorship and collaboration on research as part of their training. In addition, I am regularly requested to provide training for the public health workforce (see Active Funding).
   a) Staes C (March 1, 2017). Public Health Informatics. In Ramona Nelson and Nancy Staggers (Eds.), Health Informatics: An Interprofessional Approach. (2nd Edition). Philadelphia: Elsevier. Selected by the American Journal of Nursing (AJN) as 2017 Book of the Year.
   b) Borbolla D, Staes C, Heermann-Langford L, Nguyen V. Education on FHIR: multi-disciplinary perspectives to incorporate FHIR in health informatics training initiatives. AMIA 2020 Annual Meeting.
   c) Staes C. Opportunities at the intersection of Nursing & Public Health Informatics: Case study to address opioid surveillance. AMIA 2019 Informatics Educators Forum. June 2019.
   d) LaVenture M, Ross D, Staes C Yasnoff WA, (in press - 2021). Public Health Informatics. In Shortliffe EH and Cimino JJ (Eds.), Biomedical Informatics: Computer Applications in Health Care and Biomedicine (5th). Springer.

c) **Knowledge Management for Clinical Decision Support (CDS) to Meet Public Health Goals.** Public health goals can be achieved through CDS applied in the clinical environment using public health knowledge resources that are accessible, implementable, and actionable. I have engaged in numerous

collaborative team-science efforts that were funded or opportunistic in the context of an outbreak, but all are aligned with CDC's efforts to adapt clinical guidelines for the digital age. The two papers (b) and (c) below involved five graduate students from four Universities, illustrating my success as a sought-after mentor. In fact, six additional publications or presentations spun out of this work and two more publications are currently in the review and revision process.

a) **Staes C**, Wuthrich A, Gesteland P, et al. (2011). Public health communication with frontline clinicians during the first wave of the 2009 influenza pandemic. *J Public Health Manag Pract*, *17*(1), 36-44.
b) Phengphoo S*, Taber P*, Lam A*, Rocha E*, Del Fiol G, Maviglia SM, Rocha RA, **Staes C** (2020). Linking COVID-19 guidance for healthcare provider's to Ely's taxonomy of generic clinical questions. Learning Health Systems. (12/20/2020). 5(1). https://onlinelibrary.wiley.com/doi/10.1002/lrh2.10256
c) Richesson RL, **Staes C**, Douthit B*, Thoureen T, Hatch D, Kawamoto K, Del Fiol G. (2020). Measuring Implementation Feasibility of Clinical Decision Support Alerts for Clinical Practice Recommendations (DOI:10.1093/jamia/ocz225). J Am Med Inform Assoc, 27(4), 514-521.

d) **Public Health Informatics**. Since 2006, I led the Public Health Informatics track for the Department of Biomedical informatics, which led to several students each year presenting talks or posters at professional conferences, and trainees landing public health informatics related positions at CDC or elsewhere. My research spanned topics beyond case reporting (described above), and concerned how to incorporate occupational information into the EHR for decision support and well as how to use birth records for identify management. In partnership with colleagues at the Utah Department of Health, we evaluated opportunities to strengthen the relationship for research and practice that was mutually beneficial, leading to ongoing partnerships that continue today. While the topic of our collaboration may change, the strong partnership and reseach/practice focus continues.

a) IOM (Institute of Medicine) (2011). *Incorporating Occupational Information in Electronic Health Records: Letter Report*. Washington DC: The National Academies Press. (On the committee that authored this report)
b) Xu W, Pettey W, Livnat Y, Gesteland P, Rajeev D, Reid J, Samore M, Evans RS, Rolfs RT, **Staes C** (2011). Strengthening Partnerships along the Informatics Innovation Stages and Spaces: Research and Practice Collaboration in Utah.LID - 10.5210/ojphi.v3i3.3904 [doi]LID - ojphi.v3i3.3904 [pii]. *Online J Public Health Inform*, *3*(3).
c) Duncan J*, Narus SP, Clyde S, Eilbeck K, Thornton S, **Staes C**. (2014) Birth of identity: understanding changes to birth certificates and their value for identity resolution. J Am Med Inform Assoc. 2015 Apr;22(e1):e120-9. PMID: 25080533

d) **Clinical Decision Support.** As an NLM-funded graduate student myself, I developed a system to manage patients after liver transplantation. The system remained operational for 14 years until Intermountain transitioned to a new EHR. The project resulted in research that impacted patient care, nursing workflow, and the development of standards-based strategies for managing organ donor data within an EHR. I chaired the PhD dissertation research on an NLM-funded trainee who further evaluated the impact of the system. I mentored another PhD trainee on work related to CDS and quality measurement. Both students had their papers nominated for best paper awards at an AMIA Annual Symposium.

a) **Staes C**, Huff SM, Evans RS, Narus SP, Tilley C, Sorensen JB (2005). Development of an information model for storing organ donor data within an electronic medical record. *J Am Med Inform Assoc*, *12*(3), 357-63.
b) **Staes CJ**, Evans RS, Rocha BH, Sorensen JB, Huff SM, Arata J, Narus SP (2008). Computerized alerts improve outpatient laboratory monitoring of transplant patients. *J Am Med Inform Assoc*, *15*(3), 324-32.
c) Jacobs J*, Narus SP, Evans RS, **Staes C** (2015). Longitudinal Analysis of Computerized Alerts for Laboratory Monitoring of Post-liver Transplant Immunosuppressive Care. *AMIA Annu Symp Proc*, *2015*, 1918-26.
d) Wan YJ*, **Staes C** (2016). Melinda - A custom search engine that provides access to locally-developed content using the HL7 Infobutton standard. AMIA Annu Symp Proc, 2016, 2043-2052. (Nominated for student paper award)
e) Kukhareva PV*, Kawamoto K, Shields DE, Barfuss DT, Halley AM, Tippetts TJ, Warner PB, Bray BE, **Staes C** (2014). Clinical Decision Support-based Quality Measurement (CDS-QM) Framework: Prototype Implementation, Evaluation, and Future Directions. *AMIA Annu Symp Proc*, *2014*(2014), 825-834. (Nominated for Best Paper Award)

Complete List of Published Work in My Bibliography:
https://www.ncbi.nlm.nih.gov/myncbi/1N9EbqgofHLAk/bibliography/public/

ACTIVE

212701658 Staes (PI) 02/01/21 – 09/30/21 0.64 cal months
Utah Department of Health $42,716
Opioid-related interoperability: Training and research question exploration
The purpose of this contract is to a) develop and deliver two webinars to fulfill the Opioid Data to Action (OD2A) training requirement for training CDC's grantees across the US about informatics-related topics, and b) to help the Health Informatics Office identify 5-10 key research questions that can be derived from a linked prescription drug monitoring program (PDMP) dataset, based on the literature and key stakeholders.
Role: Principal Investigator
Overlap: None

212701257 Staes (PI) 02/01/20 – 07/01/21 0.80 cal months
Utah Department of Health $22,000
Death Certification Smart of FHIR App. -
In order to develop a SMART-on-FHIR app within the Epic development environment to enable UHealth providers the ability to certify deaths within the Epic EHR, it is pertinent to conduct a detailed analysis of the costs, risks, benefits and limitations involved. Succinctly, the objective of this project is to perform a cost-benefit-risk analysis and assess the technical feasibility of implementing a SMART-on-FHIR app in the EPIC environment. This Contract sets the parties' responsibilities for a) assessing the potential for data access, and health data exchange in an EHR using standards-based application programming interface (API), and b) summarizing the perceived costs, benefits, and risks involved in the development and implementation of a death SMART-on-FHIR app by interviewing technical, clinical, research and public health subject matter experts.
Role on Project: Principal Investigator
Overlap: None

DSS10056344 Staes (PI) 04/01/2021 - 3/30/2022 1.30 cal months
Hitachi, Ltd $120,000
Data Analytics to Improve End-of-Life Care
We aim to help patients with advanced stage solid tumors understand where they are on the disease trajectory, and help clinicians identify patients with an expected survival of six months or less who may benefit from supportive rather than anti-cancer therapies. In this phase 4 of the multi-phase project, we are refining the machine learning model - a tool for predicting end-of-life among patients with advanced cancer to support shared decision-making - and testing a user interface for communicating the predictive information.
Role on Project: Principal Investigator
Overlap: None