

CURRICULUM VITAE

DAVID S. CARRELL, PHD

EDUCATIONAL AND BIOGRAPHICAL INFORMATION

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Office	<i>Kaiser Permanente Washington Health Research Institute</i> 1730 Minor Avenue, Suite 1600 Seattle, WA 98101
1990	PhD, Political Science, University of Washington, Seattle, WA
1983	MS, Political Science, State University of New York, Binghamton, NY
1979	BA, Philosophy and Religion, Northwest Nazarene College, Nampa, ID

PROFESSIONAL POSITIONS

2021-present	Affiliate Associate Professor, University of Washington School of Medicine, Department of Biomedical Informatics and Medical Education (BIME), Division of Biomedical Health Informatics, Seattle, WA
2020-present	Associate Investigator, *Kaiser Permanente Washington Health Research Institute, Seattle, WA
2017-2020	Assistant Investigator, *Kaiser Permanente Washington Health Research Institute, Seattle, WA
2004-2017	Clinical Data Scientist, *Kaiser Permanente Washington Health Research Institute, Seattle, WA
2000-2004	Research Scientist, Virology Research Clinic, University of Washington, Seattle, WA
1997-2000	President and owner, Carrell DB Inc., Seattle, WA (private contractor)
1993-1996	Research Assistant, Professor, School of Nursing, University of Washington, Seattle, WA
1990-1992	National Institute on Aging Fellow, Institute for Health and Aging, University of California, San Francisco
1990-1992	Pew Health Policy Fellow, Institute for Health Policy Studies, University of California, San Francisco <i>*Formerly Group Health Research Institute</i>

PROFESSIONAL HONORS

1983-1987 J. Allen Smith Graduate Student Scholarship, Department of Political Science, University of Washington, Seattle, WA

MEMBERSHIPS

2005-present **Member**, American Medical Informatics Association

ORGANIZATIONAL SERVICE

2021-present **Coordinator**, KPWHRI scientific seminar series
2021-present **Member**, hiring committee, KPWHRI Computational Linguist
2021 **Member**, hiring committee, KPWHRI IT Senior Manager
2020 **Member**, KPWHRI Equitable Evaluation Hiring Workgroup
2015-present **Member**, KPWHRI Data & Informatics Strategy Committee
2017-2018 **Member**, KPWHRI biostatistician search committee
2012-2015 **Member**, KP Washington, Information Technology Strategy Council

OTHER PROFESSIONAL SERVICE

2019-2020 **Participant**, NLP and Machine Learning Workgroup and CTN Data Science Summary Institute Workgroup, National Institute of Drug Abuse, Clinical Trials Network
2016-2019 **Member**, Women in AMIA Taskforce, American Medical Informatics Association
2014-2015 **Member**, Epic® Research Data Network, Scientific/Clinical Usefulness Workgroup
2013 **Panelist**, Workshop on NLP Methods for Pharmacoepidemiology, ISPE, Montreal, Canada, August 25-28, 2013
2011 **Conference organizer**, "Security Roundtable for Cloud-Deployed Clinical Natural Language Processing," sponsored by the Office of the National Coordinator for Health Information Technology, Seattle, WA, May 23-24, 2011 (attended by representatives of 14 institutions nationwide, including researchers and private sector business partners)
2008 **Conference organizer**, "Developing Clinical Natural Language Processing (NLP) Capacity in Applied Research Settings," Group Health Research Institute, Seattle, WA, December 17-18, 2008 (attended by representatives of nine institutions in the Health Care Systems Research Network)

SPECIAL NATIONAL RESPONSIBILITIES

2021	Reviewer , National Cancer Institute (NCI), Small Business Innovation Research (SBIR) Contract Review Meetings: Software to Address Social Determinants of Health in Oncology Practices (TEP-8B, Topic 423), and Digital Healthcare Platform to Reduce Financial Hardship for Cancer Patients (TEP-8B, Topic 384). March 18, 2021.
2020	Reviewer , National Library of Medicine (NLM), Special Emphasis Panel, Computational Approaches to Curation at Scale for Biomedical Research Assets. May 21, 2020.
2020	Reviewer , National Heart, Lung and Blood Institute (NHLBI), Special Emphasis Panel, Phenotype Finder in Data Resources. March 23, 2020.
2019	Reviewer , NIH Small Business Innovation Research (SBIR) Biotechnology Review Panel.
2015-2017	Standing member , Veteran's Administration, Health Services Research and Development (HSR&D), Healthcare Informatics Review Panel (3-year term).
2012-2015	Ad hoc member , Veteran's Administration, Health Services Research and Development (HSR&D), Healthcare Informatics Review Panel.
2014	Panelist , Patient Centered Outcomes Research Institute Review Panel.
2013	Reviewer , Cancer Research Network, Pilot Fund Proposals.
2012	Panelist , National Institute of Environmental Health Sciences Review Panel.
2011	Reviewer , National Heart, Lung and Blood Institute (NHLBI), Data Discovery Among NHLBI Genomic Studies (UG2/UG3).

EDITORIAL RESPONSIBILITIES

2021-present	Pharmacoepidemiology and Drug Safety, reviewer
2021-present	Frontiers in Digital Health, reviewer
2021-present	Gates open research, reviewer
2021-present	Nature, reviewer
2021-present	Vaccine, reviewer
2020-present	Editorial Board Member, Journal of the American Medical Informatics Association (JAMIA)
2019-present	Applied Clinical Informatics, reviewer
2019-present	Substance Abuse, reviewer
2017-present	International Journal of Medical Informatics, reviewer
2012-present	Journal of the American Medical Informatics Association, reviewer
2013-2020	Journal of Biomedical Informatics, reviewer
2017	Medical Informatics and Decision Making, reviewer
2017	Journal of Medical Internet Research, reviewer
2015	Methods of Information in Medicine, reviewer
2014	American Journal of Epidemiology, reviewer

RESEARCH FUNDING (last updated 12/1/2020)

Project Title	PI	Funder	Direct Costs	Role	Dates	Effort
Completed						
Programmer Support for NLP Software Deployment	Carrell	Internal	\$14,658	PI	8/16/09 - 12/31/09	2%
Natural Language Processing for Cancer Research Network Surveillance Studies (ARRA Challenge Grant) RC1CA146917	Carrell	NCI	\$688,161	PI	9/30/09 - 8/31/12	25%
SHARP Area 4: Secondary Use of EHR Data (Office of the National Coordinator) 90TR0002/01	Chute	ONC	\$373,665	Site-PI	4/1/10 - 12/18/13	20%
Consolidation of Text Mining Resources and Tools	Carrell	Internal	\$81,416	PI	8/1/10 - 12/31/11	5%
eMERGE Network - Genetic Discovery and Application U01HG006375	Larson/ Jarvik	NHGRI	\$2,912,449	Co-I	8/15/11 - 8/31/15	10%
Patient Outcomes for High Tech Diagnostic Imaging Studies (PCORI)	Solberg	PCORI	\$44,530	Site-PI	7/1/12 - 6/30/15	5%
Scalable and Robust Clinical Text De-Identification Tools (R01) R01LM011366	Carrell	NLM	\$703,238	PI	9/1/12 - 8/31/16	20%
Identifying Opioid Misuse and Abuse using EHR data and NLP 8500617525	Von Korff	Pfizer	\$156,149	Co-I	5/1/13 - 6/30/14	15%
Precursors of First-Episode Psychosis in a Population-Based Sample R01MH099666	Simon	NIMH	\$2,056,240	Co-I	7/19/13 - 6/30/17	2%
Measuring and Improving Colonoscopy Quality Using NLP (R01) R01CA168959	Mehrotra	NCI	\$165,402	Site-PI	8/1/13 - 2/28/17	20%
NLP Algorithms to Capture Molecular Markers from Tumors (CRN Pilot) U24CA171524	Kushi	NCI	\$40,441	Site-PI	9/1/13 - 10/31/14	10%
NLP for Identifying Clinical Risk Factors in Pulmonary Nodule Surveillance (CRN Pilot) U24CA171524	Farjah	NCI	\$45,619	Site-PI	9/1/13 - 10/31/14	10%
Identification of Opioid Abuse Using EHR Data and NLP Algorithms 8500617525	Carrell	Pfizer	\$156,166	PI	9/1/14 - 12/31/15	25%
Sustained Implementation of Patient-Centered Care for Alcohol Misuse R18HS023173	Bradley	AHRQ	\$480,400	Co-I	9/1/14 - 8/31/19	2%
U.S. Study of Uterine Fibroids: Case-Finding, Incidence and Patterns of Care	Scholes	Bayer	\$197,132	Co-I	9/15/14 - 9/30/16	2%
Computable Algorithms for Identifying Opioid Abuse and Addiction, Part I STUDY 3B	Carrell	Syneos	\$14,363	PI	4/1/15 - 5/31/15	20%
Computable Algorithms for Identifying Opioid Abuse and Addiction, Part II	Carrell	Syneos	\$1,282,991	PI	5/4/15 - 12/31/17	20%
eMERGE Network - Phase III U01HG008657	Larson/ Jarvik	NHGRI	\$2,725,300	Co-I	9/1/15 - 5/31/19	10%
Incidence and Predictors of Opioid Overdose and Death Using Coded Data and Natural Language Processing	Carrell	Syneos	\$531,100	Site-PI	2/1/16 - 12/31/18	20%
Incidence and Predictors of Opioid Overdose and Death Among ER/LA Opioid Analgesics Users as Measured by Diagnoses and Death Records SOW#5 2065-1B	Carrell	Syneos	\$415,000	Site-PI	2/1/16 - 4/16/19	20%

Project Title	PI	Funder	Direct Costs	Role	Dates	Effort
Endometriosis and Adenomyosis: Incidence, Case-finding and Patterns of Care 439 BAYER PHARMA AG	Scholes	Bayer	\$228,233	Co-I	3/21/16 - 6/30/17	2%
Family Network Approach to Assess Trickle-Down Effects of Genetic Testing	Larson/Jarvik	NHGRI	\$100,000	Co-I	6/1/16 - 5/31/17	2%
Risk of Cognitive Dysfunction and Related Dementias Following General Anesthesia	Penfold	J&J	\$134,545	Co-I	7/1/16 - 10/31/17	10%
ER/LA Opioid PMR Consortium Data Analysis Coordinating Center	Nelson	FDA	\$1,260,000	Co-I	7/1/16 - 6/30/19	20%
PMI Recruitment Partnership in the Urban and Rural Northwest	Simon	NIH	\$621,091	Co-I	9/30/16 - 9/29/17	1%
eMERGE Phenotyping Improvement Supplement	Larson/Jarvik	NHGRI	\$95,000	Co-I	9/30/16 - 9/29/18	20%
Geocoding the eMERGE Consortium U01HG008657	Larson/Jarvik	NHGRI	\$45,000	Co-I	9/30/16 - 9/29/19	10%
Development and Validation of a Tool for Automated Monitoring of Medication Allergies and Side Effects (AMMASE)	Carrell	Internal	\$56,000	PI	1/1/17-12/31/18	7%
Factors Associated with Sustained Opioid Taper 3110021954	Carrell	Purdue	\$245,500	PI	12/1/17-2/28/19	20%
Analysis of the Risk of Motor Vehicle Accidents in Patients with Obstructive Sleep Apnea JA #32369	Hansen	Jazz Pharma	\$214,800	Co-I	2/1/18 - 7/30/19	5%
Current						
Integrating Addiction Research in Health Systems (CTN) UG1DA040314	Campbell/Bradley	NIDA	\$684,900	Co-I	9/1/15 - 5/31/20	5%
Integrating Addiction Research in Health Systems (CTN Supplement) UG1DA040314-06S1	Campbell/Bradley	NIDA	\$895,00	Co-I	9/1/15 - 5/31/20	2%
The Electronic Medical Records and Genomics Network (eMERGE III) U01HG008657	Larson/Jarvik	NHGRI	\$568,500	Co-I	9/1/15 - 3/31/20	10%
Seeing and Sharing What Matters: Personal Health Libraries for Individuals with Multiple Chronic Conditions R01LM012813	Ralston	NLM	\$880,500	Co-I	9/7/17 - 8/31/21	10%
Randomized Trial of Pain Self-Management Training to Support Prescription Opioid Taper R01DA044970	Sullivan	NIDA	\$1,169,500	Co-I	3/15/18 - 12/31/21	5%
Sentinel Operations Center Learning Phenotype Laboratory – Phase I Task Order	Platt/Nelson/Carrell	FDA	\$402,000	Co-PI	7/1/18 - 8/31/20	15%
Assisted Identification and Navigation of Early Mental Health Symptoms in Youth R56MH117767	Penfold	NIMH	\$583,800	Co-I	8/3/18 - 12/31/19	7%
Susceptibility Gene for Erectile Dysfunction R01DK104764	Wessells	NIDDKD	\$57,200	Co-I	12/1/18 - 5/31/20	7%
Detecting Cost-Related Cancer Treatment Conversations in the Electronic Medical Record	Yeung	Internal	\$30,000	Co-I	1/1/19 - 12/31/19	2%
Sentinel Operations Center Learning Phenotype Laboratory – Phase II Task Order 75F40119D10037	Platt/Nelson/Carrell	FDA		Co-PI	4/1/19 - 3/31/21	10%
Predicting Self-Harm, Suicide Attempt and Suicidal Death Using Longitudinal EHR, Claims and Mortality Data	Pathak	NIMH	\$186,300	Co-I	4/1/19 - 3/31/23	2%
The Electronic Medical Records and Genomics Network (eMERGE III), Natural Language Processing Supplement U01HG008657	Larson/Jarvik	NHGRI	\$2,724,000	Co-I	4/25/19 - 3/31/20	20%

Project Title	PI	Funder	Direct Costs	Role	Dates	Effort
FDA Sentinel Innovation Center	Schneeweiss: Contact PI	FDA	\$249,000	Co-I	9/28/19 - 9/27/24	5%
Feasibility Assessment: Post-Marketing Safety Surveillance Among Patients using Tanezumab	Carrell	RUF	\$26,608	Site-PI	2/1/20 - 9/30/20	7%
An Electronic Health Record-Based Tool to Identify Newly Diagnosed Breast Cancer Patients at Risk of Low Social Support	Campbell	NCI	\$456,949	Co-I	7/1/20 - 6/30/24	10%
Implementing Routine Screening for Cannabis and Other Drug Use Disorders in Primary Care R01DA047312-01A1	Carrell	NIDA	\$649,000	PI	8/15/20 - 7/31/23	30%
Pending						
Innovation Project 2: Unstructured EHR Data and Analytic Methods to Improve Signal Identification (Task Order, FDA Sentinel Innovation Center)	Schneeweiss: Contact PI	FDA	TBD	Co-PI	11/1/20 - 10/30/22	20%
Improving Suicide Risk Prediction by Natural Language Processing of Clinical Notes	Carrell	NIMH	\$1,999,082	PI	7/1/21 - 6/30/25	30%

TEACHING AND MENTORING RESPONSIBILITIES

Course Responsibilities

- 1988-1989 **Lecturer**, Introduction to Statistics for Business Majors, University of Washington School of Business, Seattle, WA (lecturer for three consecutive quarters)
- 2014 **Guest lecturer**, “Risks and Opportunities in Secondary Use of Electronic Health Record Data,” Information School, Master’s degree in cyber security students, University of Washington, Seattle, WA

Formal Mentoring of Junior Faculty and Professional Staff

- 2018-present Mentor to Kai Yeung, PharmD, PhD, Assistant Investigator, Kaiser Permanente Washington Health Research Institute, on incorporating clinical natural language processing (NLP) methods into their program of research
- 2017-present Mentor to Vina Graham, Programmer/Analyst, Kaiser Permanente Washington Health Research Institute, on professional and career development
- 2017-2019 Mentor to Lu Chen, PhD, Research Associate I, Kaiser Permanente Washington Health Research Institute, on incorporating clinical natural language processing (NLP) methods into their program of research
- 2016-present Mentor to Arvind Ramaprasan, Programmer/Analyst, Kaiser Permanente Washington Health Research Institute, on professional and career development
- 2015-2017 Recruited and mentored Andrew Baer, MS, Computational Linguist, on career development
- 2012-present Recruited and mentored David Cronkite, MS, Computational Linguist, on development of skills needed in application of clinical NLP in health research, contributing to scientific manuscripts

PUBLICATIONS

Peer-reviewed Publications of Original Work

(* = senior author)

1. **Carrell DS**. Whither the Revolution? *The Tocqueville Review*. 1987;8:39-92.
2. Bowen DJ, Urban N, **Carrell DS**, Kinne S. Comparisons of strategies to prevent breast cancer mortality. *J Soc Issues*. 1993 Summer;49(2):35-60. PMID: 17165234.
3. Bowen DJ, Kestin M, McTiernan A, **Carrell DS**, Green P. Effects of Dietary Fat Intervention on mental health in women. *Cancer Epidemiol Biomarkers Prev*. 1995 Jul-Aug;4(5):555-9. PMID: 7549814.
4. Wilkerson JD, **Carrell DS**. Money, Politics, and Medicine: The American medical PAC's strategy of giving in U.S. house races. *J Health Polit Policy Law*. 1999 Apr;24(2):335-55. PMID: 10321360.
5. Wald A, **Carrell DS**, Remington M, Kexel E, Zeh J, Corey L. Two-day Regimen of Acyclovir for treatment of recurrent genital herpes simplex virus type 2 infection. *Clin Infect Dis*. 2002 Apr;34(7):944-8. PMID: 11880960.
6. Engelberg R, **Carrell DS**, Krantz E, Corey L, Wald A. natural history of genital herpes simplex virus type 1 infection. *Sex Transm Dis*. 2003 Feb;30(2):174-7. PMID: 12567178.
7. Wald A, Huang ML, **Carrell DS**, Selke S, Corey L. Polymerase chain reaction for detection of herpes simplex virus (HSV) DNA on mucosal surfaces: Comparison with HSV isolation in cell culture. *J Infect Dis*. 2003 Nov;188(9):1345-51. PMID: 14593592.
8. Meyer JL, Crosby RA, Whittington WL, **Carrell DS**, Ashley-Morrow R, Meier AS, Harrington RD, DiClemente R, Wald A. The psychosocial impact of serological herpes simplex type 2 testing in an urban HIV clinic. *Sex Transm Infect*. 2005 Aug;81(4):309-15. PMC1745021.
9. Bonomi AE, Thompson RS, Anderson M, Rivara FP, Holt VL, **Carrell DS**, Martin DP. Ascertainment of intimate partner violence using two abuse measurement frameworks. *Inj Prev*. 2006 Apr;12(2):121-4. PMC2564437.
10. Bonomi AE, Thompson RS, Anderson M, Reid RJ, **Carrell DS**, Dimer JA, Rivara FP. Intimate partner violence and women's physical, mental, and social functioning. *Am J Prev Med*. 2006 Jun;30(6):458-66. PMID: 16704938.
11. Rivara FP, Anderson ML, Fishman P, Bonomi AE, Reid RJ, **Carrell DS**, Thompson RS. Intimate partner violence and health care costs and utilization for children living in the home. *Pediatrics*. 2007 Dec;120(6):1270-7. PMID: 18055676.
12. Bonomi AE, Anderson ML, Rivara FP, Cannon EA, Fishman PA, **Carrell DS**, Reid RJ, Thompson RS. Health care utilization and costs associated with childhood abuse. *J Gen Intern Med*. 2008 Mar;23(3):294-9. PMC2359481.

13. Ralston JD, Rutter CM, **Carrell DS**, Hecht J, Rubanowice D, Simon GE. Patient use of secure electronic messaging within a shared medical record: A cross-sectional study. *J Gen Intern Med*. 2009 Mar;24(3):349-55. PMC2642567.
14. Green BB, Ralston JD, Fishman PA, Catz SL, Cook A, Carlson J, Tyll L, **Carrell DS**, Thompson RS. Electronic communications and home blood pressure monitoring (e-BP) study: design, delivery, and evaluation framework. *Contemp Clin Trials*. 2008 May;29(3):376-95. PMC2645352.
15. Green BB, Cook AJ, Ralston JD, Fishman PA, Catz SL, Carlson J, **Carrell DS**, Tyll L, Larson EB, Thompson RS. Effectiveness of home blood pressure monitoring, web communication, and pharmacist care on hypertension control: A randomized controlled trial. *JAMA*. 2008 Jun;299(24):2857-67. PMC2715866.
16. Reid RJ, Bonomi AE, Rivara FP, Anderson ML, Fishman PA, **Carrell DS**, Thompson RS. Intimate partner violence among men prevalence, chronicity, and health effects. *Am J Prev Med*. 2008 Jun;34(6):478-85. PMID: 18471583.
17. Grembowski D, Anderson ML, Conrad DA, Fishman PA, Larson EB, Martin DP, Ralston JD, **Carrell DS**, Hecht J. Evaluation of the Group Health Cooperative access initiative: Study design challenges in estimating the impact of a large-scale organizational transformation. *Qual Manag Health Care*. 2008 Oct-Dec;17(4):292-303. PMID: 19020399.
18. Bonomi AE, Anderson ML, Reid RJ, Rivara FP, **Carrell DS**, Thompson RS. Medical and psychosocial diagnoses in women with a history of intimate partner violence. *Arch Intern Med*. 2009 Oct;169:1692-7. PMID: 19822826.
19. Rivara FP, Anderson ML, Fishman P, Reid RJ, Bonomi AE, **Carrell DS**, Thompson RS. Age, period, and cohort effects on intimate partner violence. *Violence Vict*. 2009;24(5):627-38. PMID: 19852403.
20. Green BB, Wang CY, Horner K, Catz S, Meenan RT, Vernon SW, **Carrell DS**, Chubak J, Ko C, Laing S, Bogart A. Systems of support to increase colorectal cancer screening and follow-up rates (SOS): Design, challenges, and baseline characteristics of trial participants. *Contemp Clin Trials*. 2010 Nov;31(6):589-603. PMC2956868.
21. Schildcrout JS, Basford MA, Pulley JM, Masys DR, Roden DM, Wang D, Chute CG, Kullo IJ, **Carrell DS**, Peissig P, Kho A, Denny JC. An analytical approach to characterize morbidity profile dissimilarity between distinct cohorts using electronic medical records. *J Biomed Inform*. 2010 Dec;43(6):914-23. PMC2991387.
22. Denny JC, Crawford DC, Ritchie MD, Bielinski SJ, Basford MA, Bradford Y, Chai HS, Bastarache L, Zuvich R, Peissig P, **Carrell DS**, Ramirez AH, Pathak J, Wilke RA, Rasmussen L, Wang X, Pacheco JA, Kho AN, Hayes MG, Weston N, Matsumoto M, Kopp PA, Newton KM, Jarvik GP, Li R, Manolio TA, Kullo IJ, Chute CG, Chisholm RL, Larson EB, McCarty CA, Masys DR, Roden DM, de Andrade M. Variants near FOXE1 are associated with hypothyroidism and other thyroid conditions: Using electronic medical records for

- genome-and phenome-wide studies. *Am J Hum Genet.* 2011 Oct;89(4):529-42. PMC3188836.
23. **Carrell DS.** A strategy for deploying secure cloud-based natural language processing systems for applied research involving clinical text. Proceedings of the 44th Hawaii International Conference on System Sciences (HICSS). 2011 Jan 4-7: Kauai, HI. 11.
 24. Floyd JS, Heckbert SR, Weiss NS, **Carrell DS**, Psaty BM. Use of administrative data to estimate the incidence of statin-related rhabdomyolysis. *JAMA.* 2012 Apr;307(15):1580-1582. PMC3483067.
 25. Peissig PL, Rasmussen LV, Berg RL, Linneman JG, McCarty CA, Waudby C, Chen L, Denny JC, Wilke RA, Pathak J, **Carrell DS**, Kho AN, Starren JB. Importance of multi-modal approaches to effectively identify cataract cases from electronic health records. *J Am Med Inform Assoc.* 2012 Mar-Apr;19(2):225-234. PMC3277618.
 26. Mosley JD, Van Driest SL, Larkin EK, Weeke PE, Witte JS, Wells QS, Karnes JH, Guo Y, Bastarache L, Olson LM, McCarty CA, Pacheco JA, Jarvik GP, **Carrell DS**, Larson EB, Crosslin DR, Kullo IJ, Tromp G, Kuivaniemi H, Carey DJ, Ritchie MD, Denny JC, Roden DM. Mechanistic phenotypes: An aggregative phenotyping strategy to identify disease mechanisms using GWAS data. *PLoS ONE.* 2012 Dec 12;8(12): e81503. PMC3861317.
 27. **Carrell DS**, Malin B, Aberdeen J, Bayer S, Clark C, Wellner B, Hirschman L. Hiding in plain sight: Use of realistic surrogates to reduce exposure of protected health information in clinical text. *J Am Med Inform Assoc.* 2013 Mar-Apr;20(2):342-8. PMC3638183.
 28. Crosslin DR, McDavid A, Weston N, Zheng X, Hart E, de Andrade M, Kullo IJ, McCarty CA, Doheny KF, Pugh E, Kho A, Hayes MG, Ritchie MD, Saip A, Crawford DC, Crane PK, Newton K, **Carrell DS**, Gallego CJ, Nalls MA, Li R, Mirel DB, Crenshaw A, Couper DJ, Tanaka T, van Rooij FJ, Chen MH, Smith AV, Zakai NA, Yango Q, Garcia M, Liu Y, Lumley T, Folsom AR, Reiner AP, Felix JF, Dehghan A, Wilson JG, Bis JC, Fox CS, Glazer NL, Cupples LA, Coresh J, Eiriksdottir G, Gudnason V, Bandinelli S, Frayling TM, Chakravarti A, van Duijn CM, Melzer D, Levy D, Boerwinkle E, Singleton AB, Hernandez DG, Longo DL, Witteman JC, Psaty BM, Ferrucci L, Harris TB, O'Donnell CJ, Ganesh SK, Larson EB, Carlson CS, Jarvik GP. Genetic variation associated with circulating monocyte count in the eMERGE Network. *Hum Mol Genet.* 2013 May;22(10):2119-27. PMC3633369.
 29. Dublin S, Baldwin E, Walker RL, Christensen LM, Haug PJ, Jackson ML, Nelson JC, Ferraro J, **Carrell DS**, Chapman WW. Natural language processing to identify pneumonia from radiology reports. *Pharmacoepidemiol Drug Saf.* 2013 Aug;22(8):834-841. PMC3811072.
 30. Fishman PA, Cook AJ, Anderson ML, Ralston JD, Catz SL, **Carrell DS**, Carlson J, Green BB. Improving BP control through electronic communications: An economic evaluation. *Am J Manag Care.* 2013 Sep;19(9):709-16. PMC3938103.
 31. Gao H, Bowles EA, **Carrell DS**, Buist DSM. PS2-25: Using natural language processing to extract findings from mammography reports. *Clin Med Res.* 2013 Sep;11(3):154. PMC3788501.

32. Denny JC, Bastarache L, Ritchie MD, Carroll RJ, Zink R, Mosley JD, Field JR, Pulley JM, Ramirez AH, Bowton E, Basford MA, **Carrell DS**, Peissig PL, Kho AN, Pacheco JA, Rasmussen LV, Crosslin DR, Crane PK, Pathak J, Bielinski SJ, Pendergrass SA, Xu H, Hindorff LA, Li R, Manolio TA, Chute CG, Chisholm RL, Larson EB, Jarvik GP, Brilliant MH, McCarty CA, Kullo IJ, Haines JL, Crawford DC, Masys DR, Roden DM. Systematic comparison of phenome-wide association study of electronic medical record data and genome-wide association study data. *Nat Biotechnol*. 2013;31(12):1102-1110. PMC3969265.
33. **Carrell DS**, Halgrim S, Tran DT, Buist DSM, Chubak J, Chapman WW, Savova G. Using natural language processing to improve efficiency of manual chart abstraction in research: The case of breast cancer recurrence. *Am J Epidemiol*. 2014 Mar 15;179(6):749-758. PMC3939853.
34. Rasmussen LV, Thompson WK, Pacheco JA, Kho AN, **Carrell DS**, Pathak J, Peissig PL, Tromp G, Denny JC, Starren JB. Design patterns for the development of electronic health record-driven phenotype extraction algorithms. *J Biomed Inform*. 2014 Oct;51:280-6. PMC4194216.
35. Rasmussen-Torvik LJ, Stallings SC, Gordon AS, Almoguera B, Basford MA, Bielinski SJ, Brautbar A, Brilliant MH, **Carrell DS**, Connolly JJ, Crosslin DR, Doheny KF, Gallego CJ, Gottesman O, Kim DS, Leppig KA, Li R, Lin S, Manzi S, Mejia AR, Pacheco JA, Pan V, Pathak J, Perry CL, Peterson JF, Prows CA, Ralston J, Rasmussen LV, Ritchie MD, Sadhasivam S, Scott SA, Smith M, Vega A, Vinks AA, Volpi S, Wolf WA, Bottinger E, Chisholm RL, Chute CG, Haines JL, Harley JB, Keating B, Holm IA, Kullo IJ, Jarvik GP, Larson EB, Manolio T, McCarty CA, Nickerson DA, Scherer SE, Williams MS, Roden DM, Denny JC. Design and anticipated outcomes of the eMERGE-PGx project: A multicenter pilot for preemptive pharmacogenomics in electronic health record systems. *Clin Pharmacol Ther*. 2014 Oct;96(4):482-9. PMC4169732.
36. Li M, **Carrell DS**, Aberdeen J, Hirschman L, Malin BA. De-identification of clinical narratives through writing complexity measures. *Int J Med Inform*. 2014 Oct;83(10):750-67. PMC4215974.
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 112. Gruber S, **Carrell DS**, Floyd JS, Nelson JC, Hazlehurst BL, Heagerty PJ. Letter to the Editor re Beachler, et al, 2021. *Pharmacoepidemiol Drug Saf*. 2021;30(12):1735-36 PMID: 34409675. Matson TE, **Carrell DS**, Bobb JF, Cronkite DJ, Oliver MM, Luce C, Ghitza UE, Hsu CW, Campbell CI, Browne KC, Binswanger IA, Saxon AJ, Bradley KA, Lapham GT. Prevalence of medical cannabis use and associated health conditions documented in electronic health records among primary care patients in Washington state. *JAMA Netw Open* 2021 May 3;4(5):e219375. PMC8103224.

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113. **Carrell DS**, Cronkite DJ, Shea M, Oliver MM, Luce C, Matson TE, Bobb JF, Hsu CW, Binswanger I, Brown K, Saxon A, McCormack J, Jelstrom E, Ghitza U, Campbell CI, Bradley KA, Lapham G. Clinical documentation of patient-reported medical cannabis use in primary care: Towards scalable extraction using natural language processing methods. *Subst Abus*. Doi: 10.1080/08897077.2021.1986767. In press 2021.

Submitted papers under review (as of 1/10/2022)

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- source of ambiguity and vagueness in narrative phenotype algorithm definitions. *BMC Med Inform Decis Mak*. Under Review
115. **Carrell DS**, Gruber S, Floyd JS, Bann MA, Cushing-Haugen KL, Johnson RL, Graham V, Cronkite DJ, Hazlehurst BL, Felcher AH, Bejan CA, Kennedy A, Shinde M, Karami S, Ma Y, Stojanovic D, Zhao Y, Ball R, Nelson J. Improving methods of identifying anaphylaxis for medical product safety surveillance using natural language processing and machine learning. *Am J Epidemiol*. Under review (revise & resubmit) 2022.
 116. Penfold RB, **Carrell DS**, Cronkite D, Pabiniak C, Dodd TS, Glass A, Johnson E, Thompson E, Arrighi HM, Stang PE. Development of a natural language processing algorithm to predict mild cognitive impairment. Under review: *BMC Med Inform Decis Mak*. Under review 2022.
 117. Joo YY, Lin FT, Pacheco JA, Thompson WK, Rasmussen-Torvik LJ, Gawron AJ, Rasmussen LV, Peissig PL, Veerappan A, Tromp GC, Borthwick KM, Denny JC, **Carrell DS**, de Andrade M, Pathak J, Bottinger E, Ellis SB, Gottesman O, Smith M, Chisholm RL, Hayes MG, Kho AN. Multi-ancestry genome- and phenome-wide association studies of diverticular disease in electronic health records with natural language processing enriched phenotyping algorithm. *Genet Epidemiol*. Under review 2022.
 118. Shinde M, Rodriguez-Watson C, Zhang T, **Carrell DS**, Mendelsohn AB, Nam YH, Carruth A, Petronis KR, McMahill-Walraven CN, Jamal-Allial A, Nair V, Pawloski PA, Hickman A, Brown MT, Francis J, Hornbuckle K, Brown JS, Mo J. Patient characteristics, pain treatment patterns, and incidence of total joint replacement in a US population with osteoarthritis. *BMC Musculoskelet Disord*. Under review 2022.
 119. Pacheco JA, Rasmussen LV, Wiley K, Person TN, Cronkite DJ, Sohn S, Gundelach JH, Gainer V, Castro VM, Liu C, Mentch F, Lingren T, Sundaresan AS, Eickelberg G, Willis V, Patel R, **Carrell DS**, Deng Y, Walton N, Satterfield BA, Kullo IJ, Dikilitas O, Smith JC, Peterson JF, Shang N, Kiryluk K, Ni Y, Li Y, Nadkarni, GN, Rosenthal EA, Walunas TL, Williams M, Karlson EW, Linder JE, Luo Y, Weng C, Wei W. Evaluation of the portability of natural language processing-based computable phenotypes in the eMERGE Network. *J Am Med Inform Assoc*. Under review 2022.
 120. Glazer AM, Davogustto D, Shaffer CM, Vanoye CG, Desai RR, Farber-Eger EH, Dikilitas O, Shang N, Pacheco JA, Yang T, Muhammad A, Mosley JD, Van Driest SL, Wells QS, Rinke LL, Kalash OR, Wada Y, Bland S, Yoneda ZT, Mitchell DW, Kroncke BM, Kullo IJ, Jarvik GP, Gordon AS, Larson EB, Manolio TA, Mirshahi T, Luo JZ, Schaid D, Namjou B, Alsaied T, Singh R, Singhal A, Liu C, Weng C, Hripcsak G, Ralston JD, McNally EM, Chung WK, **Carrell DS**, Leppig KA, Hakonarson H, Sleiman P, Sohn S, Glessner J, Denny J, Wei J, George Jr. AL, Shoemaker MB, Roden DM. Arrhythmia variant associations and reclassifications in the eMERGE-III sequencing study. *Circulation*. Under review 2022.
 121. Lapham GT, Matson TE, **Carrell DS**, Bobb JF, Luce C, Oliver MM, Ghitza UE, Hsu C, Browne KC, Binswanger IA, Campbell CI, Saxon AJ, Vandrey R, Schauer G, Pacula RL, Horberg MA, Bailey SR, McClure EA, Bradley KA. Prevalence of medical cannabis use among primary care patients: EHR documentation compared to patient report on a confidential survey. *JAMA Open*. Under Review 2022.

122. Floyd JS, Bann MA, Felcher AB, Sapp D, Nguyen MD, Ajao, A, **Carrell DS**, Nelson JC, Hazlehurst BL. Validation of acute pancreatitis among adults in an integrated healthcare system. *Epidemiology*. Under review 2022.

Non-refereed papers/articles

123. **Carrell DS**, Ralston J. Messages, strands and threads: Measuring use of electronic patient-provider messaging. *AMIA Annu Symp Proc*. 2005:913. PMC1560601.
124. **Carrell DS**, Ralston JD. Variation in adoption rates of a patient web portal with a shared medical record by age, gender, and morbidity level. *AMIA Annu Symp Proc*. 2006:871. PMC1839457.
125. Ralston JD, Hereford J, **Carrell DS**. Use and satisfaction of a patient Web portal with a shared medical record between patients and providers. *AMIA Annu Symp Proc*. 2006:1070. PMC1839721.
126. **Carrell DS**, Miglioretti D, Smith-Bindman R. Coding free text radiology reports using the Cancer Text Information Extraction System (caTIES). *AMIA Annu Symp Proc*. 2007 Oct 11;889. PMID 18693990.
127. Ralston JD, **Carrell DS**, Reid R, Anderson M, Moran M, Hereford J. Patient web services integrated with a shared medical record: Patient use and satisfaction. *J Am Med Inform Assoc*. 2007 Nov-Dec;14(6):798-806. PMC2213480.
128. **Carrell DS**, Baldwin D. A method for discovering variant spellings of terms of interest in clinical text. *Clin Med Res*. 2010 Dec;8(3-4):183-198.
129. Conway M, Berg RL, **Carrell DS**, Denny JC, Kho AN, Kullo IJ, Linneman JG, Pacheco JA, Peissig P, Rasmussen L, Weston N, Chute CG, Pathak J. Analyzing the heterogeneity and complexity of electronic health record oriented phenotyping algorithms. *AMIA Annu Symp Proc*. 2011;2011:274-83. PMC3243189.
130. **Carrell DS**, Halgrim S, Buist DSM, Chubak, Tran DT. Carrell et al. respond to "Observational research and the EHR." *Am J Epidemiol*. 2014 Mar 15;179(6):762-763. PMC4081638.
131. **Carrell DS**, Mardekian J, Cronkite DJ, Ramaprasan A, Hansen K, Gross DE, Palmer RE, Masters E, Von Korff M. A fully automated algorithm for identifying patients with problem prescription opioid use using electronic health record data. *Drug Alcohol Depend*. 2017; 100.171: e36

PRESENTATIONS

(* = invited presentation)

1. * National Cancer Institute (NCI), Cancer Surveillance Planning Workshop. Member of expert panel on future directions for cancer surveillance research. Bethesda, MD. October 22-23, 2009.

2. * University of Washington, Computational Linguistics Seminar, "Applied Natural Language Processing for Clinical, Epidemiological and Health Systems Research." Seattle, WA, April 13, 2010.
3. * University of Pittsburgh Medical Center, Cancer Text Information Extraction System (caTIES) User Meeting. Invited presentation "Strategies for Implementing NLP Software in Applied Healthcare Research Settings," Pittsburgh, PA, January 26-28, 2010.
4. * National Academy of Medicine and the Office of the National Coordinator (ONC) for Health Information Technology sponsored workshop on "Electronic Infrastructure for the Learning Healthcare System," expert panel member addressing issues of information extraction from electronic medical record systems. Washington, DC, July 27-28, 2011.
5. * University of California San Diego, workshop sponsored by iDASH (Integrating Data for Analysis, Anonymization and Sharing) on "Overcoming barriers to secondary use of EHR data: Cloud deployed NLP," invited presentation. La Jolla, CA May 2-3, 2011.
6. * Johns Hopkins University, Institute for Computational Medicine, Cardiovascular Research Grid, Webinar presentation on "Automated Extraction of Cardiovascular Findings from Clinical Reports: The Promise, the Challenges, and Ideas for the Future," co-presenter Wendy W. Chapman. October 13, 2011.
7. * Stanford Center For Biomedical Informatics Research, Research Colloquium, "Resources and Tools to Support Collaborative Development and Application of Clinical Natural Language Processing Technologies." Stanford, CA, April 12, 2012.
8. Epic Spring Research Advisory Council, "High-throughput Clinical Phenotyping using Epic Data." Verona, WI. March 2, 2014.
9. *National Heart, Lung, and Blood Institute (NHLBI), "Using Electronic Health Record Data for Large-Scale Research: Successes and Challenges." Workshop on The Future of Genomic Research for the Prevention and Treatment of Heart, Lung and Blood Diseases in Populations and Patients. Bethesda, MD. April 9-10, 2014
10. Developing and Validating Disease-Specific Algorithms Using Electronic Health Data. Health Care Systems Research Network Annual Meeting, San Diego, CA March 21, 2017.
11. Podium presentation: "Is an Algorithm Just an Algorithm? How to Define Clinical Concepts for Use in Comparative Safety and Effectiveness Distributed Research Networks." American Medical Informatics Association (AMIA) Joint Summits. San Francisco, CA, March 28, 2017.
12. * U.S. Food and Drug Administration workshop. "Use of Natural Language Processing to Enhance Clinical Trials and Safety Surveillance of Medical Products" (co-hosted by the UCSF-Stanford Center of Excellence in Regulatory Science and Innovation, and San Francisco State University). Crown Hill, MD, June 15, 2017.

13. Podium presentation: "Automatic Text De-Identification: How and When is it Acceptable?" American Medical Informatics Association (AMIA) Annual Symposium, San Francisco, CA, November 5, 2018.
14. * Margolis Center for Health Policy (Duke University) workshop on Improving the Efficiency of Outcome Validation in the Sentinel System, "Identifying Best Practices for Extracting Standardized Data from Medical Records." Margolis Center for Health Policy, Washington, DC, May 17, 2018.
15. * NIDA Clinical Trials Network workshop on Data Science: "Using machine learning and natural language processing (NLP) to assess substance use disorders." Bethesda, MD, September 18, 2019.
16. * National Cancer Institute workshop on "De-identification of narrative text clinical documents: stakeholders' perspectives and acceptance of machine-based de-identification." Bethesda, MD, February 24-25, 2020.
17. * Sentinel Innovation Center on "Health Outcomes of Interest (HOI) 2.0: Aims, Approach and (Early) Lessons from the Learning Phenotype Lab Pilot Work" (with Jennifer Nelson). March 13, 2020.
18. * US Food and Drug Administration Monthly Seminar Series on "Electronic Health Records (EHR) + Natural Language Processing + Machine Learning = Improved Sentinel Outcome Detection Algorithms" (With Jennifer Nelson and Susan Gruber). November 19, 2020.
19. * International Society for Pharmacoepidemiology (ICPE) 2021 ICPE Skills Course, "Pharmacoepidemiologic Methods used in COVID-19 Research, 1.5 Years into the Pandemic," presentation "Scalable, computable algorithms for identifying patients with health outcomes of interest such as COVID-19 using electronic health record data." August 16, 2021.
20. * International Society for Pharmacoepidemiology (ICPE) 2021 presentation "Improving Outcome Ascertainment by Applying Natural Language Processing and Machine Learning to Electronic Health Record Data: Identifying Anaphylaxis" (Symposium on New frontiers in computable phenotyping for medical product safety evaluation). ICPE 2021 All Access Virtual international meeting. August 24, 2021.
21. * International Society for Pharmacoepidemiology (ICPE) 2021, Methods in Pharmacoepidemiology — Informatics, presentation "Improving Methods of Identifying Anaphylaxis for Medical Product Safety Surveillance Using Natural Language Processing and Machine Learning." ICPE 2021 All Access Virtual international meeting. August 25, 2021.
22. * Great Lakes Pharmacovigilance and Drug Safety Forum invited presentation "Electronic Health Records + Natural Language Processing + Machine Learning = Improved Sentinel Outcome Detection Algorithms" (With Susan Gruber, PhD. October 1, 2021.