

DAVID S. CARRELL

Group Health Research Institute · 1730 Minor Avenue, Suite 1600 · Seattle, Washington 98101
Phone: (206) 287-2705 Fax: (206) 287-2485 Cell: (206) 719-7340 E-mail: carrell.d@ghc.org

EDUCATION

1979 Northwest Nazarene College, Nampa, ID, B.A. Philosophy and Religion
1983 State University of New York, Binghamton, NY, M.S. Political Science
1990 University of Washington, Seattle, WA, Ph.D. Political Science

PROFESSIONAL POSITIONS

1990-1992 Pew Health Policy Fellow, Institute for Health Policy Studies, University of California, San Francisco
1993-1996 Research Assist. Professor, School of Nursing, University of Washington, Seattle, WA
1997-2000 President and owner, Carrell DB Inc., Seattle, WA (private contractor)
2000-2004 Research Scientist, Virology Research Clinic, University of Washington, Seattle, WA
2004-present Multi-Institutional Research Consultant, Group Health Research Institute, Seattle, WA

OTHER EXPERIENCE

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 from nine nationally recognized research institutions)
2011 Conference organizer, "Security Roundtable for Cloud-Deployed Clinical Natural Language Processing," sponsored by the Office of the National Coordinator for Health Information Technology, Group Health Research Institute (www.grouphealthresearch.org/news-and-events/events/nlp_roundtable.html), Seattle, WA, May 23-24, 2011 (attended by representatives of 14 institutions nation wide, including the public and private research sectors and private sector business partners)
2012-present Member, Group Health Cooperative, Information Technology Strategy Council

HONORS AND AWARDS

- 1984 J. Allen Smith Graduate Student Fellowship, Department of Political Science, University of Washington, Seattle, WA
- 1990 National Institute on Aging Fellow, Institute for Health & Aging, University of California San Francisco, San Francisco, CA
- 1990 Pew Health Policy Fellow, Institute for Health Policy Studies, University of California San Francisco, San Francisco, CA

OTHER PROFESSIONAL ACTIVITIES

Membership

2005-present American Medical Informatics Association

Referee

- 2009- Reviewer, American Medical Informatics Association
- 2010- Reviewer, Hawaii International Conference on System Science
- 2011- Reviewer, Journal of the American Medical Informatics Association
- 2014- Reviewer, BMJ
- 2014- Reviewer, Patient Centered Outcomes Research Institute (PCORI)

PEER-REVIEW STUDY SECTIONS

National Heart Lung Blood Institute, "Phenotype finder in data resources-request for applications: A Tool to Support Cross-study Data Discovery Among NHLBI Genomic Studies (UH2/UH3)," March 23, 2011, RFA-HL-11-020 .

National Human Genetics Research Institute, "The Electronic Medical Records and Genomics (eMERGE) Network, Phase II – Pediatric Study Investigators." November 28, 2011, RFA-HG-11-022.

National Institute of Environmental Health Sciences, "Research on Research Integrity," Research Triangle Park, NC, March 29, 2012, RFA-ES-11-009.

Department of Veterans Affairs, Health Services Research and Development (HSR&D) Service Scientific Merit Review Board, ad hoc member (2012-2015).

Patient Centered Outcomes Research Institute (PCORI), Spring 2014 Cycle Merit Review.

Department of Veterans Affairs, Health Services Research and Development (HSR&D) Service Scientific Merit Review Board, standing member (2015-present).

PEER-REVIEWED PUBLICATIONS

1. **Carrell D.** Whither the Revolution? *The Tocqueville Review*. 1987;8:39-92.
2. Bowen DJ, Urban N, **Carrell D**, Kinne S. Comparisons of strategies to prevent breast cancer mortality. *J Soc Issues*. 1993;49(2):35-60.
3. Bowen DJ, Kestin M, McTiernan A, **Carrell D**, Green P. Effects of dietary fat intervention on mental health in women. *Cancer Epidemiol Biomarkers Prev*. 1995;4(5):555-9.
4. Wilkerson JD, **Carrell D**. Money, politics, and medicine: the American Medical PAC's strategy of giving in U.S. house races. *J Health Polit Policy Law*. 1999;24(2):335-55.
5. Wald A, **Carrell D**, 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;34(7):944-8. Epub 2002 Feb 20.
6. Engelberg R, **Carrell D**, Krantz E, Corey L, Wald A. Natural history of genital herpes simplex virus type 1 infection. *Sex Transm Dis*. 2003;30(2):174-7.
7. Wald A, Huang ML, **Carrell D**, 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;188(9):1345-51. Epub 2003 Oct 31.
8. **Carrell D**, Ralston J. Messages, strands and threads: measuring use of electronic patient-provider messaging. *AMIA Annu Symp Proc*. 2005:913. PMC1560601.
9. Meyer JL, Crosby RA, Whittington WL, **Carrell D**, 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;81(4):309-15. PMC1745021
10. Bonomi AE, Thompson RS, Anderson M, Reid RJ, **Carrell D**, Dimer JA, Rivara FP. Intimate partner violence and women's physical, mental, and social functioning. *Am J Prev Med*. 2006;30(6):458-66.
11. Bonomi AE, Thompson RS, Anderson M, Rivara FP, Holt VL, **Carrell D**, Martin DP. Ascertainment of intimate partner violence using two abuse measurement frameworks. *Inj Prev*. 2006;12(2):121-4. PMC2564437.
12. **Carrell D**, 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.
13. Casper C, **Carrell D**, Miller KG, Judson FD, Meier AS, Pauk JS, Morrow RA, Corey L, Wald A, Celum C. HIV serodiscordant sex partners and the prevalence of human herpesvirus 8 infection among HIV negative men who have sex with men: baseline data from the EXPLORE Study. *Sex Transm Infect*. 2006;82(3):229-35. PMC2564745.
14. Ralston JD, Hereford J, **Carrell D**. Use and satisfaction of a patient Web portal with a shared medical record between patients and providers. *AMIA Annu Symp Proc*. 2006:1070. PMC1839721.
15. Thompson RS, Bonomi AE, Anderson M, Reid RJ, Dimer JA, **Carrell D**, Rivara FP. Intimate partner violence: prevalence, types, and chronicity in adult women. *Am J Prev Med*. 2006;30(6):447-57.
16. Bonomi AE, Anderson ML, Reid RJ, **Carrell D**, Fishman PA, Rivara FP, Thompson RS. Intimate partner violence in older women. *Gerontologist*. 2007;47(1):34-41.

17. **Carrell D**, 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.
18. Ralston JD, **Carrell D**, 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;14(6):798-806. PMC2213480.
19. Rivara FP, Anderson ML, Fishman P, Bonomi AE, Reid RJ, **Carrell D**, Thompson RS. Intimate partner violence and health care costs and utilization for children living in the home. *Pediatrics.* 2007;120(6):1270-7.
20. Rivara FP, Anderson ML, Fishman P, Bonomi AE, Reid RJ, **Carrell D**, Thompson RS. Healthcare utilization and costs for women with a history of intimate partner violence. *Am J Prev Med.* 2007;32(2):89-96.
21. Bonomi AE, Anderson ML, Rivara FP, Cannon EA, Fishman PA, **Carrell D**, Reid RJ, Thompson RS. Health care utilization and costs associated with childhood abuse. *J Gen Intern Med.* 2008;23(3):294-9. PMC2359481.
22. Green BB, Cook AJ, Ralston JD, Fishman PA, Catz SL, Carlson J, **Carrell D**, 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;299(24):2857-67. PMC2715866.
23. Green BB, Ralston JD, Fishman PA, Catz SL, Cook A, Carlson J, Tyll L, **Carrell D**, Thompson RS. Electronic communications and home blood pressure monitoring (e-BP) study: design, delivery, and evaluation framework. *Contemp Clin Trials.* 2008;29(3):376-95. Epub 2007 Sep 26. PMC2645352.
24. Grembowski D, Anderson ML, Conrad DA, Fishman PA, Larson EB, Martin DP, Ralston JD, **Carrell D**, 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;17(4):292-303.
25. 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;34(6):478-85.
26. Bonomi AE, Anderson ML, Reid RJ, Rivara FP, **Carrell D**, Thompson RS. Medical and psychosocial diagnoses in women with a history of intimate partner violence. *Arch Intern Med.* 2009;169:1692-7.
27. Ralston JD, Rutter CM, **Carrell D**, 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;24(3):349-55. PMC2642567.
28. Rivara FP, Anderson ML, Fishman P, Reid RJ, Bonomi AE, **Carrell D**, Thompson RS. Age, period, and cohort effects on intimate partner violence. *Violence Vict.* 2009;24(5):627-38.
29. Green BB, Wang CY, Horner K, Catz S, Meenan RT, Vernon SW, **Carrell D**, 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;31(6):589-603. PMC2956868.
30. Schildcrout JS, Basford MA, Pulley JM, Masys DR, Roden DM, Wang D, Chute CG, Kullo IJ, **Carrell D**, 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;43(6):914-23. PMC2991387.

31. **D. Carrell**, "A Strategy for Deploying Secure Cloud-Based Natural Language Processing Systems for Applied Research Involving Clinical Text," *System Sciences (HICSS), 2011 44th Hawaii International Conference on*, Kauai, HI, 2011, pp. 1-11.
32. Conway M, Berg RL, **Carrell D**, 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.
33. Denny JC, Crawford DC, Ritchie MD, Bielinski SJ, Basford MA, Bradford Y, Chai HS, Bastarache L, Zuvich R, Peissig P, **Carrell D**, 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;89(4):529-42. PMC3188836.
34. Floyd JS, Heckbert SR, Weiss NS, **Carrell DS**, Psaty BM. Use of administrative data to estimate the incidence of statin-related rhabdomyolysis. *JAMA.* 2012;307(15):1580-2. PMC3483067.
35. Peissig PL, Rasmussen LV, Berg RL, Linneman JG, McCarty CA, Waudby C, Chen L, Denny JC, Wilke RA, Pathak J, **Carrell D**, Kho AN, Starren JB. Importance of multi-modal approaches to effectively identify cataract cases from electronic health records. *J Am Med Inform Assoc.* 2012;19(2):225-34. PMC3277618.
36. **Carrell D**, 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;20(2):342-8. PMC3638183.
37. 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;22(10):2119-27. PMC3633369.
38. Dublin S, Baldwin E, Walker RL, Christensen LM, Haug PJ, Jackson ML, Nelson JC, Ferraro J, **Carrell D**, Chapman WW. Natural Language Processing to identify pneumonia from radiology reports. *Pharmacoepidemiol Drug Saf.* 2013;22(8):834-41. PMC3811072.
39. Fishman PA, Cook AJ, Anderson ML, Ralston JD, Catz SL, **Carrell D**, Carlson J, Green BB. Improving BP control through electronic communications: an economic evaluation. *Am J Manag Care.* 2013;19(9):709-16. PMC3938103.
40. Gao H, Bowles EA, **Carrell D**, Biust D. PS2-25: Using natural language processing to extract findings from mammography reports. *Clin Med Res.* 2013;11(3):154. PMC3788501.

41. 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.
42. 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.* 2013;8(12):e81503. PMC3861317.
43. Kaminen A, Halgrim S, Gundersen G, Fuller S, Hart G, **Carrell D**, Rutter C. PS2-26: Coordinating heterogeneous data and mixed collection methods to support population-based cancer screening research. *Clin Med Res.* 2013;11(3):154. PMC3788466.
44. **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;179(6):749-758. PMC3939853.
45. **Carrell DS**, Halgrim S, Buist DSM, Chubak, Tran DT. "Response to Invited Commentary "Observational Research in the Age of the Electronic Health Record" by Christopher G. Chute, MD, DrPH." *Am J Epidemiol.* 2014;179(6):762-763. PMC4081638.
46. 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;51:280-6. PMC4194216.
47. 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;96(4):482-9. PMC4169732.
48. Wu S, Miller T, Masanz J, Coarr M, Halgrim S, et al. Negation's Not Solved: Generalizability Versus Optimizability in Clinical Natural Language Processing. *PLoS ONE.* 2014;9(11): e112774. PMC4231086.
49. Li M, **Carrell D**, Aberdeen J, Hirschman L, Malin BA. De-identification of clinical narratives through writing complexity measures. *Int J Med Inform.* 2014;83(10):750-67. PMC4215974.
50. Gao H, Bowles EJA, **Carrell DS**, Buist DS. Using Natural Language Processing to Extract Mammographic Findings. *J Biomed Inform.* 2015;54:77-84. PMC4408241.

51. Crosslin DR, **Carrell DS**, Burt A, Kim DS, Underwood JG, Hanna DS, Comstock BA, Baldwin E, deAndrade M, Kullo IJ, Tromp G, Kuivaniemi H, Borthwick KM, McCarty CA, Peissig PL, Doheny KF, Pugh E, Kho A, Pacheco J, Hayes MG, Ritchie MD, Verma SS, Armstrong G, Stallings S, Denny JC, Carroll RJ, Crawford DC, Crane PK, Mukherjee S, Bottinger E, Li R, Keating B, Mirel DB, Carlson CS, Harley JB, Larson EB, Jarvik GP. Genetic variation in the HLA region is associated with susceptibility to herpes zoster. *Genes Immun.* 2015;16(1):1-7. PMC4308645.
52. Hylan TR, Von Korff M, Saunders K, Masters E, Palmer RE, **Carrell D**, Cronkite D, Mardekian J, Gross D. Automated Prediction of Risk for Problem Opioid Use in a Primary Care Setting. *Pain.* 2015;16(4):380-387. Epub 2015 Jan 29.
53. Wieneke AE, Bowles EJA, Cronkite D, Wernli KJ, Gao H, **Carrell D**, Buist DSM. Validation of natural language processing to extract breast cancer pathology procedures and results. *J Pathol Inform.* 2015;6:38. PMC4485196.
54. Bielinski SJ, Pathak J, **Carrell DS**, Takahashi PY, Olson JE, Larson NB, Liu H, Sohn S, Wells QS, Denny JC, Rasmussen-Torvik LJ, Pacheco JA, Jackson KL, Lesnick TG, Gullerud RE, Decker PA, Pereira NL, Ryu E, Dart RA, Peissig P, Linneman JG, Jarvik GP, Larson EB, Bock JA, Tromp GC, de Andrade M, Roger VL. A robust e-Epidemiology tool in phenotyping heart failure with differentiation for preserved and reduced ejection fraction: the Electronic Medical Records and Genomics (eMERGE Network). *J Cardiovasc Trans Res.* 2015;8(8):475-83. PMC4651838.
55. Li M, **Carrell D**, Aberdeen J, Hirschman L, Malin BA. De-identification of clinical narratives through writing complexity measures. *Int J Med Inform.* 2014;83(10):750-67. PMC4215974. PMID: 25106934
56. Palmer RE, **Carrell DS**, Cronkite D, Saunders K, Gross DE, Masters E, Donevan S, Hylan TR, Von Korff M. The prevalence of problem opioid use in patients receiving chronic opioid therapy: computer-assisted review of electronic health record clinical notes. 2015;156(7):1208-14. PMID: 25760471
57. **Carrell DS**, Cronkite D, Palmer RE, Saunders K, Gross DE, Masters ET, Hylan TR, Von Korff M. Using natural language processing to identify problem usage of prescription opioids. *Int J Med Inform.* 2015;84(12):1057-64. Epub 2015 Sep 25. PubMed PMID: 26456569.
58. Solberg LI, Asche SE, Butler J, **Carrell D**, Norton CK, Jarvik JG, et al. The Effect of Achieving Patient-Reported Outcome Measures on Satisfaction. *J Am Board Fam Med.* 2015;28(6):785-92. PMID: 26546655.
59. Abdul-Baki H, Schoen RE, Dean K, Rose S, Leffler DA, Kuganeswaran E, **Carrell D**, et al. Public reporting of colonoscopy quality is associated with an increase in endoscopist adenoma detection rate. *Gastrointest Endosc.* 2015;82(4):676-82. PMID: 26385276.
60. Gallego CJ, Burt A, Sundaresan AS, Ye Z, Shaw C, Crosslin DR, **Carrell DS**, et al. Penetrance of Hemochromatosis in HFE Genotypes Resulting in p.Cys282Tyr and p.[Cys282Tyr];[His63Asp] in the eMERGE Network. *Am J Hum Genet.* 2015;97(4):512-20. PMID: 26365338.
61. Mo H, Thompson WK, Rasmussen LV, Pacheco JA, Jiang G, Kiefer R, Zhu Q, Xu J, Montague E, **Carrell DS**, et al. Desiderata for computable representations of electronic health records-driven phenotype algorithms. *J Am Med Inform Assoc.* 2015 Nov;22(6):1220-30. doi: 10.1093/jamia/ocv112. Epub 2015 Sep 5. PubMed PMID: 26342218; PubMed Central PMCID: PMC4639716.

62. Crosslin DR, Robertson PD, **Carrell DS**, Gordon AS, Hanna DS, Burt A, et al. Prospective participant selection and ranking to maximize actionable pharmacogenetic variants and discovery in the eMERGE Network. *Genome Med.* 2015;7(1):67. PMID: 26221186.
63. Mosley JD, Shaffer CM, Van Driest SL, Weeke PE, Wells QS, Karnes JH, **Carrell DS**, et al. A genome-wide association study identifies variants in KCNIP4 associated with ACE inhibitor-induced cough. *Pharmacogenomics J.* 2015. PMID: 26169577.
64. Hall MA, Verma SS, Wallace J, Lucas A, Berg RL, Connolly J, **Carrell DS**, et al. Biology-Driven Gene-Gene Interaction Analysis of Age-Related Cataract in the eMERGE Network. *Genet Epidemiol.* 2015;39(5):376-84. PMID: 25982363.
65. Li M, **Carrell D**, Aberdeen J, Hirschman L, Kirby J, Li B, Vorobeychik Y, Malin BA. Optimizing Annotation Resources for Natural Language De-identification via a Game Theoretic Framework. *J Biomed Inform.* 2016 Mar 25. pii: S1532-0464(16)30010-7. doi: 10.1016/j.jbi.2016.03.019. PubMed PMID: 27020263.
66. Kirby JC, Speltz P, Rasmussen LV, Basford M, Gottesman O, Peissig PL, **Carrell DS**, et al. PheKB: a catalog and workflow for creating electronic phenotype algorithms for transportability. *J Am Med Inform Assoc.* 2016. PMID: 27026615.
67. Bush WS, Crosslin DR, Obeng AO, Wallace J, Almoguera B, Basford MA, **Carrell DS**, et al. Genetic Variation among 82 Pharmacogenes: the PGRN-Seq data from the eMERGE Network. *Clin Pharmacol Ther.* 2016. PMID: 26857349.
68. Simonti CN, Vernot B, Bastarache L, Bottinger E, **Carrell DS**, Chisholm RL, et al. The phenotypic legacy of admixture between modern humans and Neandertals. *Science.* 2016;351(6274):737-41. PMID: 26912863.
69. Van Driest SL, Wells QS, Stallings S, Bush WS, Gordon A, Nickerson DA, **Carrell DS**, et al. Association of Arrhythmia-Related Genetic Variants With Phenotypes Documented in Electronic Medical Records. *JAMA.* 2016;315(1):47-57. PMID: 26746457.

UNDER REVIEW

70. **Carrell DS**, Cronkite DJ, Malin BA, Aberdeen JS, Hirschman L. Is the Juice Worth the Squeeze? Costs and Benefits of Multiple Human Annotators for Clinical Text De-identification. *Methods Inf Med.* 2016 (accepted for publication 4/15/2016).

COMPLETED RESEARCH GRANTS (as Principal Investigator or Co-Investigator)

Title: Natural Language Processing for Cancer Research Network Surveillance Studies (RC1 CA146917)
 Agency: National Cancer Institute
 Role: Principal Investigator

Title: Consolidation of Text Mining Resources and Tools (Group Health grant number 210096)
 Agency: Group Health Research Institute Directors Project Resource Fund
 Role: Principal Investigator

Title: Feasibility of Downloading and Aggregating Bone Density Results Directly from GH Clinical Densitometry Machines (PI: Scholes)

Agency: AMGEN Pharmaceuticals
Role: Co-Investigator

Title: Development and Use of Network Infrastructure for High-Throughput Genome-Wide Association (GWA) (PI: Larson)

Agency: National Human Genome Research Institutes
Role: Multi-Institutional Research Consultant

CURRENT RESEARCH GRANTS (as Principal Investigator or Co-Investigator)

Title: Identification of Opioid Misuse and Abuse using Electronic Health Records and NLP Algorithms

Agency: Pfizer
Role: Principal Investigator
Dates: 2014-2015

Title: Scalable and Robust Clinical Text De-Identification Tools (R01 LM011366)

Agency: National Library of Medicine
Role: Principal Investigator
Dates: 2012-2015

Title: Measuring and Improving Colonoscopy Quality Using Natural Language Processing (PI: Mehrotra)

Agency: National Cancer Institute
Role: Co-Investigator
Dates: 2013-2017

Title: Studying Colorectal Cancer: Effectiveness of Screening Strategies (SuCESS): Documentation Unit

Agency: National Cancer Institute
Role: Co-Investigator
Dates: 2011-2016

Title: Development of NLP Algorithms or Other Mechanisms to Capture Molecular Markers from Tumors- CRN4

Agency: National Cancer Institute
Role: Principal Investigator
Dates: 2013-2014

Title: Precursors of First-Episode Psychosis in a Population-Based Sample (PI: Simon)

Agency: National Institute of Mental Health
Role: Co-Investigator
Dates: 2013-2016

Title: Measuring Patient Outcomes from High Tech Diagnostic Imaging Studies (PI: Solberg, Health Partners)

Agency: Patient-Centered Outcomes Research Institute
Role: Site Principal Investigator
Dates: 2012-2014

Title: Prevalence of Binge Eating Disorder (PI: Lynch)
Agency: Shire Pharmaceuticals
Role: Co-Investigator
Dates:

Title: Identification of Opioid Misuse and Abuse using Electronic Medical Records and Natural Language Processing (NLP) Algorithms (PI: VonKorff)
Agency: Pfizer Pharmaceuticals
Role: Co-Investigator
Dates: 2013-2014

Title: Genetic Discovery and Application in a Clinical Setting: Continuing a Partnership (PI: Larson, Jarvik)
Agency: National Human Genome Research Institute
Role: Co-Investigator
Dates: 2011-2015

Title: Pharmacoepidemiology in the Elderly: Medications, Pneumonia Risk and Confounding (PI: Dublin)
Agency: National Institute on Aging
Role: Multi-Institutional Research Consultant
Dates: 2007-2013

Title: Cancer Research Network across Health Care Systems – Infrastructure (PI: Wagner)
Agency: National Cancer Institute
Role: Multi-Institutional Research Consultant
Dates: 2007-2013

Title: Systems of Support to Improve Colorectal Cancer Screening and Follow-up (PI: Green)
Agency: National Cancer Institute
Role: Multi-Institutional Research Consultant
Dates: 2007-2013

Title: Studying Colorectal Cancer: Effectiveness of Screening Strategies (SuCCESS) (PI: Rutter)
Agency: National Cancer Institute
Role: Multi-Institutional Research Consultant
Dates: 2011-2016

Title: Strategic Health IT Advanced Research Projects (SHARP), Research Focus Area (PI: Chute)
Agency: Office of the National coordinator/Health Information Technology
Role: Site Principal Investigator
Dates: 2010-2013

INVITED PRESENTATIONS AND WORKSHOPS

- 2009 National Cancer Institute, "Cancer Surveillance Planning Workshop," member of expert panel identifying future directions for cancer surveillance research, October 22-23, 2009.
- 2010 University of Washington, Computational Linguistics Seminar, "Applied Natural Language Processing for Clinical, Epidemiological and Health Systems Research," Seattle, WA, April 13, 2010.
- 2010 University of Pittsburgh Medical Center, "Cancer Text Information Extraction System (caTIES) User Meeting," invited presentation, Pittsburgh, PA, January 26-28, 2010.
- 2011 Institute of Medicine and the Office of the National Coordinator 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.
- 2011 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.
- 2011 Johns Hopkins University, Institute for Computational Medicine, Cardiovascular Research Grid, invited Webinar presentation on "Automated Extraction of Cardiovascular Findings from Clinical Reports: The Promise, the Challenges, and Ideas for the Future," co-presenter (with Wendy W. Chapman), October 13, 2011.
- 2012 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.
- 2014 High-throughput Clinical Phenotyping using Epic Data. Epic Spring Research Advisory Council, Verona, WI, March 2, 2014.