



Publications by CLEAR Center and Affiliated Researchers

Updated 13 January 2025.

1. Gold LS, Heagerty PJ, Hansen RN, Friedly JL, Johnston SK, Deyo RA, Curatolo M, Turner JA, Rundell SD, Wysham K, Jarvik JG, Suri P. *Mortality with concurrent treatment with gabapentin and opioids among people with spine diagnoses in the U.S. Medicare population: a propensity-matched cohort study.* Pain. In press
2. Curl P, Jacob A, Bresnahan B, Cross NM, Jarvik JG. *Cost-effectiveness of AI-based opportunistic compression fracture screening of existing radiographs.* J Am Coll Radiol. 2024 Mar 23:S1546-1440(24)00293-X. doi: 10.1016/j.jacr.2023.11.029. Epub ahead of print. PMID: 38527641.
3. Han CS, Hancock MJ, Downie A, Jarvik JG, Koes BW, Machado GC, Verhagen AP, Williams CM, Chen Q, Maher CG. *Red flags to screen for vertebral fracture in people presenting with low back pain.* Cochrane Database Syst Rev. 2023 Aug 24;8(8):CD014461. doi: 10.1002/14651858.CD014461.pub2. PMID: 37615643
4. Ye C, Leslie WD, Boussein ML, Dufour AB, Guermazi A, Habtemariam D, Jarraya M, Kiel DP, **Suri P**, Samelson EJ. [Association of vertebral fractures with worsening degenerative changes of the spine: a longitudinal study.](#) J Bone Miner Res. 2024 Nov 29;39(12):1744-1751. doi: 10.1093/jbmr/zjae172. PMID: 39418326
5. Suri P, Tsepilov YA, Elgaeva EE, Williams FMK, Freidin MB, Stanaway IB. *A Mendelian randomization study finds no evidence for causal effects of C-reactive protein (CRP) on chronic pain conditions.* Pain Med. 2024 Nov 26:pnae122. doi: 10.1093/pm/pnae122. Online ahead of print. PMID: 39589921
6. Suri P, Naeini MK, Heagerty PJ, Freidin MB, Smith IG, Elgaeva EE, Compte R, Tsepilov YA, Williams FMK. *Outstanding Paper Award 2024: The association of lumbar intervertebral disc degeneration with low back pain is modified by underlying genetic propensity to pain.* Spine J. 2024 Jun 26:S1529-9430(24)00310-3. doi: 10.1016/j.spinee.2024.05.018. Online ahead of print. PMID: 38942297
7. Prusynski RA, Gold LS, Rundell SD. *Utilization and potential disparities in access to physical therapy for spine pain in the long-term care population.* Arch Phys Med Rehabil. 2024;105(11):2089-2096. doi: 10.1016/j.apmr.2024.05.032. PMID: 38866228
8. Suri P, Tanus AD, Stanaway I, Scott H, Brubeck HF, Irimia B, Daniels CJ, Jensen MP, Rundell SD, Timmons AK, Morelli D, Heagerty PJ. *Evaluating the representativeness of a cohort study of low back pain: Using electronic health record data to make direct comparisons of study participants with non-participants from the study population.* J Pain. 2024;26:104730. doi: 10.1016/j.jpain.2024.104730. PMID: 39522852
9. Slanetz PJ, Jarvik JG, Bailey JE, McGinty GB. *Strategies for Radiology to Improve Population Health.* J Am Coll Radiol. 2024;21(4):691-3. Epub 20230724. doi: 10.1016/j.jacr.2023.01.016. PubMed PMID: 37495030.
10. Wang G, Heagerty PJ, Dahabreh IJ. *Using Effect Scores to Characterize Heterogeneity of Treatment Effects.* JAMA.

2024;331(14):1225-6. doi: 10.1001/jama.2024.3376. PubMed PMID: 38501213.

11. Voldal EC, Kenny A, Xia F, Heagerty P, Hughes JP. Robust analysis of stepped wedge trials using composite likelihood models. *Stat Med*. 2024 Jul 30;43(17):3326-3352. doi: 10.1002/sim.10120. Epub 2024 Jun 4. PMID: 38837431; PMCID: PMC11257102.
12. Marsolo KA, Cheville A, Melnick ER, Jarvik JG, Simon GE, Sluka KA, Crofford LJ, Staman KL, Richesson RL, Schlaeger JM, Curtis LH. Impact of Electronic Health Record Updates and Changes on the Delivery and Monitoring of Interventions in Embedded Pragmatic Clinical Trial. *Contemporary Clinical Trials*. In press.
13. Sendaydiego X, Gold LS, Dubreuil M, Andrews JS, Reid P, Liew DFL, Goulabchand R, Singh AG, Hughes GC, Pioro M, Sparks JA, Jarvik JG, Singh S, Liew JW, Singh N. Use of Biologic or Targeted Synthetic Disease-Modifying Antirheumatic Drugs and Cancer Risk. *JAMA Netw Open*. 2024 Nov 4;7(11):e2446336. doi: 10.1001/jamanetworkopen.2024.46336. PMID: 39565623; PMCID: PMC11579790.
14. Cross NM, Perry J, Dong Q, Luo G, Renslo J, Chang BC, Lane NE, Marshall L, Johnston SK, Haynor DR, Jarvik JG, Heagerty PJ. Subject-level spinal osteoporotic fracture prediction combining deep learning vertebral outputs and limited demographic data. *Arch Osteoporos* 19, 87 (2024). <https://doi.org/10.1007/s11657-024-01433-z>
15. Chang BC, Renslo J, Dong Q, Johnston SK, Perry J, Haynor DR, Luo G, Lane NE, Jarvik JG, Cross NM. Using an Ensemble of Segmentation Methods to Detect Vertebral Bodies on Radiographs. *AJNR Am J Neuroradiol*. 2024 Oct 3;45(10):1512-1520. doi: 10.3174/ajnr.A8343. PMID: 39209486; PMCID: PMC11448993.
16. Rundell SD, Karmarkar A, Patel KV. Associations between comorbid chronic conditions and use of rehabilitation services in older adults with back pain: a population-based cohort study. *Phys Ther*. 2024 Aug 16:pzae110. doi: 10.1093/ptj/pzae110. Epub ahead of print. PMID: 39151034.
17. Voldal EC, Kenny A, Xia F, Heagerty P, Hughes JP. Robust analysis of stepped wedge trials using composite likelihood models. *Stat Med*. 2024 Jul 30;43(17):3326-3352. doi: 10.1002/sim.10120. Epub 2024 Jun 4. PMID: 38837431; PMCID: PMC11257102.
18. Green T, Bosworth HB, Coronado GD, DeBar L, Green BB, Huang SS, Jarvik JG, Mor V, Zatzick D, Weinfurt KP, Check DK. Factors Affecting Post-trial Sustainment or De-implementation of Study Interventions: A Narrative Review. *J Gen Intern Med*. 2024 May;39(6):1029-1036. doi: 10.1007/s11606-023-08593-7. Epub 2024 Jan 12. PMID: 38216853; PMCID: PMC11074060.
19. Wang G, Heagerty PJ, Dahabreh IJ. Using Effect Scores to Characterize Heterogeneity of Treatment Effects. *JAMA*. 2024;331(14):1225-6. doi: 10.1001/jama.2024.3376. PubMed PMID: 38501213.
20. Suri P, Heagerty PJ, Timmons A, Jensen MP. Description and initial validation of a novel measure of pain intensity: the Numeric Rating Scale of Underlying Pain without concurrent Analgesic use. *Pain*. 2024. Epub 20240102. doi: 10.1097/j.pain.0000000000003150. PubMed PMID: 38189184.
21. Slanetz PJ, Jarvik JG, Bailey JE, McGinty GB. Strategies for Radiology to Improve Population Health. *J Am Coll Radiol*. 2024;21(4):691-3. Epub 20230724. doi: 10.1016/j.jacr.2023.01.016. PubMed PMID: 37495030.
22. Sears JM, Rundell SD, Fulton-Kehoe D, Hogg-Johnson S, Franklin GM. Using the Functional Comorbidity Index with administrative workers' compensation data: Utility, validity, and caveats. *Am J Ind Med*. 2024;67(2):99-109. Epub 20231119. doi: 10.1002/ajim.23550. PubMed PMID: 37982343; PMCID: PMC10824282.
23. Li F, Chen X, Tian Z, Wang R, Heagerty PJ. Planning stepped wedge cluster randomized trials to detect treatment effect heterogeneity. *Stat Med*. 2024;43(5):890-911. Epub 20231220. doi: 10.1002/sim.9990. PubMed PMID: 38115805.
24. Green T, Bosworth HB, Coronado GD, DeBar L, Green BB, Huang SS, Jarvik JG, Mor V, Zatzick D, Weinfurt KP, Check

- DK. Factors Affecting Post-trial Sustainment or De-implementation of Study Interventions: A Narrative Review. *J Gen Intern Med.* 2024;39(6):1029-36. Epub 20240112. doi: 10.1007/s11606-023-08593-7. PubMed PMID: 38216853; PMCID: PMC11074060.
25. Desai RJ, Wang SV, Sreedhara SK, Zobotka L, Khosrow-Khavar F, Nelson JC, Shi X, Toh S, Wyss R, Patorno E, Dutcher S, Li J, Lee H, Ball R, Dal Pan G, Segal JB, Suissa S, Rothman KJ, Greenland S, Hernan MA, Heagerty PJ, Schneeweiss S. Process guide for inferential studies using healthcare data from routine clinical practice to evaluate causal effects of drugs (PRINCIPLED): considerations from the FDA Sentinel Innovation Center. *BMJ.* 2024;384:e076460. Epub 20240212. doi: 10.1136/bmj-2023-076460. PubMed PMID: 38346815.
26. Curatolo M. Central Sensitization and Pain: Pathophysiologic and Clinical Insights. *Curr Neuropharmacol.* 2024;22(1):15-22. doi: 10.2174/1570159X20666221012112725. PubMed PMID: 36237158; PMCID: PMC10716881.
27. Anderson DB, Beard DJ, Rannou F, Hunter DJ, Suri P, Chen L, Van Gelder JM. Clinical assessment and management of lumbar spinal stenosis: clinical dilemmas and considerations for surgical referral. *Lancet Rheumatol.* 2024. Epub 20240506. doi: 10.1016/S2665-9913(24)00028-6. PubMed PMID: 38723654.
28. Zorkoltseva IV, Elgaeva EE, Belonogova NM, Kirichenko AV, Svishcheva GR, Freidin MB, Williams FMK, Suri P, Tsepilov YA, Axenovich TI. Multi-Trait Exome-Wide Association Study of Back Pain-Related Phenotypes. *Genes (Basel).* 2023;14(10). Epub 20231019. doi: 10.3390/genes14101962. PubMed PMID: 37895311; PMCID: PMC10606006.
29. Tsepilov YA, Elgaeva EE, Nostaeva AV, Compte R, Kuznetsov IA, Karszen LC, Freidin MB, Suri P, Williams FMK, Aulchenko YS. Development and Replication of a Genome-Wide Polygenic Risk Score for Chronic Back Pain. *J Pers Med.* 2023;13(6). Epub 20230610. doi: 10.3390/jpm13060977. PubMed PMID: 37373966; PMCID: PMC10304922.
30. Tanus AD, Nishio I, Williams R, Friedly J, Soares B, Anderson D, Bambara J, Dawson T, Hsu A, Kim PY, Krashin D, Piero LD, Korpak A, Timmons A, Suri P. Combining Procedural and Behavioral Treatments for Chronic Low Back Pain: A Pilot Feasibility Randomized Controlled Trial. *medRxiv.* 2023. Epub 20230605. doi: 10.1101/2023.06.02.23290392. PubMed PMID: 37333215; PMCID: PMC10274974.
31. Suri P, Heagerty PJ, Korpak A, Jensen MP, Gold LS, Chan KCG, Timmons A, Friedly J, Jarvik JG, Baraff A. Improving Power and Accuracy in Randomized Controlled Trials of Pain Treatments by Accounting for Concurrent Analgesic Use. *J Pain.* 2023;24(2):332-44. Epub 20221008. doi: 10.1016/j.jpain.2022.09.017. PubMed PMID: 36220482; PMCID: PMC9898095.
32. Suri P, Elgaeva EE, Williams FMK, Freidin MB, Zaytseva OO, Aulchenko YS, Tsepilov YA. Evidence of causal effects of blood pressure on back pain and back pain on type II diabetes provided by a bidirectional Mendelian randomization study. *Spine J.* 2023. Epub 20230413. doi: 10.1016/j.spinee.2023.04.001. PubMed PMID: 37061135.
33. Suri P, Elgaeva EE, Williams FMK, Freidin MB, Verzun DA, Tsepilov YA. Repurposing Antihypertensive and Statin Medications for Spinal Pain: A Mendelian Randomization Study. *Spine (Phila Pa 1976).* 2023. Epub 20230804. doi: 10.1097/BRS.0000000000004790. PubMed PMID: 37539717.
34. Sterling M, Andersen T, Carroll L, Connelly L, Cote P, Curatolo M, Grant G, Jull G, Kasch H, Ravn SL, MacDermid J, Malmstrom EM, Rebbeck T, Soderlund A, Treleaven J, Walton DM, Westergren H. Recommendations for a core outcome measurement set for clinical trials in whiplash associated disorders. *Pain.* 2023;164(10):2265-72. Epub 20230510. doi: 10.1097/j.pain.0000000000002926. PubMed PMID: 37171189.
35. Singh N, Gold LS, Lee J, Wysham KD, Andrews JS, Makris UE, England BR, George MD, Baker JF, Jarvik J, Heagerty PJ, Singh S. Frailty and risk of serious infections in patients with rheumatoid arthritis treated with biologic or targeted-synthetic DMARDs. *Arthritis Care Res (Hoboken).* 2023. Epub 20231220. doi: 10.1002/acr.25282. PubMed PMID: 38116680.

36. Rodriguez PJ, Heagerty PJ, Clark S, Khor S, Chen Y, Haupt E, Hahn EE, Shankaran V, Bansal A. Using Machine Learning to Leverage Biomarker Change and Predict Colorectal Cancer Recurrence. *JCO Clin Cancer Inform.* 2023;7:e2300066. doi: 10.1200/CCI.23.00066. PubMed PMID: 37963310; PMCID: PMC10681492.
37. Qin ES, Gold LS, Singh N, Wysham KD, Hough CL, Patel PB, Bunnell AE, Andrews JS. Physical function and fatigue recovery at 6 months after hospitalization for COVID-19. *PM R.* 2023;15(3):314-24. Epub 20220806. doi: 10.1002/pmrj.12866. PubMed PMID: 35726518; PMCID: PMC9353339.
38. Prusynski RA, Frogner BK, Rundell SD, Pradhan S, Mroz TM. Is More Always Better? Financially Motivated Therapy and Patient Outcomes in Skilled Nursing Facilities. *Arch Phys Med Rehabil.* 2023. Epub 20230803. doi: 10.1016/j.apmr.2023.07.014. PubMed PMID: 37541357.
39. Mooney SD. Technology Platforms and Approaches for Building and Evaluating Machine Learning Methods in Healthcare. *J Appl Lab Med.* 2023;8(1):194-202. doi: 10.1093/jalm/jfac113. PubMed PMID: 36610427.
40. Mand S, Telfer S. Healthcare Segregation in Orthopaedic Surgery: A Statewide Analysis of American Indian and Alaska Native Patients. *J Orthop Res.* 2023. Epub 20231017. doi: 10.1002/jor.25718. PubMed PMID: 37849417.
41. Li F, Chen X, Tian Z, Esserman D, Heagerty PJ, Wang R. Designing three-level cluster randomized trials to assess treatment effect heterogeneity. *Biostatistics.* 2023;24(4):833-49. doi: 10.1093/biostatistics/kxac026. PubMed PMID: 35861621; PMCID: PMC10583727.
42. Kuznetsov IA, Tsepilov YA, Freidin MB, Williams FMK, Suri P, Aulchenko YS. Genotype-by-environment interactions in chronic back pain. *Spine J.* 2023. Epub 20230418. doi: 10.1016/j.spinee.2023.04.009. PubMed PMID: 37080360.
43. Khor S, Heagerty PJ, Basu A, Haupt EC, Lyons LJJ, Hahn EE, Bansal A. Racial Disparities in the Ascertainment of Cancer Recurrence in Electronic Health Records. *JCO Clin Cancer Inform.* 2023;7:e2300004. doi: 10.1200/CCI.23.00004. PubMed PMID: 37267516; PMCID: PMC10530597.
44. Jujjavarapu C, Suri P, Pejaver V, Friedly J, Gold LS, Meier E, Cohen T, Mooney SD, Heagerty PJ, Jarvik JG. Predicting decompression surgery by applying multimodal deep learning to patients' structured and unstructured health data. *BMC Medical Informatics and Decision Making.* 2023;23(1):2. doi: 10.1186/s12911-022-02096-x.
45. Jujjavarapu C, Suri P, Pejaver V, Friedly J, Gold LS, Meier E, Cohen T, Mooney SD, Heagerty PJ, Jarvik JG. Predicting decompression surgery by applying multimodal deep learning to patients' structured and unstructured health data. *BMC Med Inform Decis Mak.* 2023;23(1):2. Epub 20230106. doi: 10.1186/s12911-022-02096-x. PubMed PMID: 36609379; PMCID: PMC9824905.
46. Han CS, Hancock MJ, Downie A, Jarvik JG, Koes BW, Machado GC, Verhagen AP, Williams CM, Chen Q, Maher CG. Red flags to screen for vertebral fracture in people presenting with low back pain. *Cochrane Database Syst Rev.* 2023;8(8):CD014461. Epub 20230824. doi: 10.1002/14651858.CD014461.pub2. PubMed PMID: 37615643; PMCID: PMC10448864.
47. Gold LS, Suri P, O'Reilly MK, Kallmes DF, Heagerty PJ, Jarvik JG. Mortality among older adults with osteoporotic vertebral fracture. *Osteoporos Int.* 2023;34(9):1561-75. Epub 20230526. doi: 10.1007/s00198-023-06796-6. PubMed PMID: 37233794; PMCID: PMC10718299.
48. Fan Li XC, Zizhong Tian, Denise Esserman, Patrick J Heagerty, Rui Wang. Designing three-level cluster randomized trials to assess treatment effect heterogeneity. *Biostatistics.* 2023;24(4):833-49. doi: <https://doi.org/10.1093/biostatistics/kxac026>.
49. Elgaeva EE, Williams FMK, Zaytseva OO, Freidin MB, Aulchenko YS, Suri P, Tsepilov YA. Bidirectional Mendelian Randomization Study of Personality Traits Reveals a Positive Feedback Loop Between Neuroticism and Back Pain. *J Pain.* 2023. Epub 20230601. doi: 10.1016/j.jpain.2023.05.012. PubMed PMID: 37270142.

50. Dong Q, Luo G, Lane NE, Lui LY, Marshall LM, Johnston SK, Dabbous H, O'Reilly M, Linnau KF, Perry J, Chang BC, Renslo J, Haynor D, Jarvik JG, Cross NM. Generalizability of Deep Learning Classification of Spinal Osteoporotic Compression Fractures on Radiographs Using an Adaptation of the Modified-2 Algorithm-Based Qualitative Criteria. *Acad Radiol.* 2023;30(12):2973-87. Epub 20230710. doi: 10.1016/j.acra.2023.04.023. PubMed PMID: 37438161; PMCID: PMC10776803.
51. Curatolo M, Jarvik JG. Response to the comment by Van Boxem. *Eur J Pain.* 2023. Epub 20230220. doi: 10.1002/ejp.2100. PubMed PMID: 36807393.
52. Curatolo M. Personalized medicine: Somatosensory phenotyping in musculoskeletal pain conditions. *Eur J Pain.* 2023;27(9):1099-106. Epub 20230425. doi: 10.1002/ejp.2119. PubMed PMID: 37096662.
53. Curatolo M. Pain relief after topical capsaicin: does it result from nociceptor degeneration or regeneration? *Pain.* 2023;164(3):461-2. Epub 20220709. doi: 10.1097/j.pain.0000000000002734. PubMed PMID: 35975879.
54. Curatolo M. Is central sensitization relevant in acute low back pain? *Eur J Pain.* 2023. Epub 20230214. doi: 10.1002/ejp.2092. PubMed PMID: 36786347.
55. Chin B, Rundell SD, Sears JM, Fulton-Kehoe D, Spector JT, Franklin GM. Intensity of physical therapy services: Association with work and health outcomes in injured workers with back pain in Washington State. *Am J Ind Med.* 2023;66(1):94-106. Epub 20221112. doi: 10.1002/ajim.23440. PubMed PMID: 36371638.
56. Bronfort G, Delitto A, Schneider M, Heagerty PJ, Chou R, Connett J, Evans R, George S, Glick RM, Greco C, Hanson L, Keefe F, Leininger B, Licciardone J, McFarland C, Meier E, Schulz C, Turk D. Effectiveness of spinal manipulation and biopsychosocial self-management compared to medical care for low back pain: a randomized trial study protocol. *BMC Musculoskelet Disord.* 2023;24(1):415. Epub 20230525. doi: 10.1186/s12891-023-06549-w. PubMed PMID: 37231386; PMCID: PMC10209583.
57. Aaltonen HL, O'Reilly MK, Linnau KF, Dong Q, Johnston SK, Jarvik JG, Cross NM. m2ABQ-a proposed refinement of the modified algorithm-based qualitative classification of osteoporotic vertebral fractures. *Osteoporos Int.* 2023;34(1):137-45. Epub 20221107. doi: 10.1007/s00198-022-06546-0. PubMed PMID: 36336755.
58. Williams RM, Day MA, Ehde DM, Turner AP, Ciol MA, Gertz KJ, Patterson D, Hakimian S, Suri P, Jensen MP. Effects of Hypnosis vs Mindfulness Meditation vs Education on Chronic Pain Intensity and Secondary Outcomes in Veterans: A Randomized Clinical Trial. *Pain.* 2022. Epub 2022/01/28. doi: 10.1097/j.pain.0000000000002586. PubMed PMID: 35082248.
59. Williams FMK, Elgaeva EE, Freidin MB, Zaytseva OO, Aulchenko YS, Tsepilov YA, Suri P. Causal effects of psychosocial factors on chronic back pain: a bidirectional Mendelian randomisation study. *European Spine Journal.* 2022. doi: 10.1007/s00586-022-07263-2.
60. Wang X, Turner EL, Li F, Wang R, Moyer J, Cook AJ, Murray DM, Heagerty PJ. Two weights make a wrong: Cluster randomized trials with variable cluster sizes and heterogeneous treatment effects. *Contemp Clin Trials.* 2022;114:106702. Epub 2022/02/06. doi: 10.1016/j.cct.2022.106702. PubMed PMID: 35123029.
61. Voldal EC, Xia F, Kenny A, Heagerty PJ, Hughes JP. Model misspecification in stepped wedge trials: Random effects for time or treatment. *Stat Med.* 2022. Epub 2022/02/10. doi: 10.1002/sim.9326. PubMed PMID: 35137437.
62. Tan WK HP. Surrogate-guided sampling designs for classification of rare outcomes from electronic medical records data. *Biostatistics.* 2022;23(2):345-61. doi: <https://doi.org/10.1093/biostatistics/kxaa028>.
63. Suri P, Tanus AD, Torres N, Timmons A, Irimia B, Friedly JL, Korpak A, Daniels C, Morelli D, Hodges PW, Costa N, Day MA, Heagerty PJ, Jensen MP. The Flares of Low back pain with Activity Research Study (FLAReS): study protocol for a case-crossover study nested within a cohort study. *BMC Musculoskelet Disord.* 2022;23(1):376. Epub 20220421. doi:

10.1186/s12891-022-05281-1. PubMed PMID: 35449043; PMCID: PMC9022413.

64. Suri P, Heagerty PJ, Korpak A, Jensen MP, Gold LS, Chan KCG, Timmons A, Friedly J, Jarvik JG, Baraff A. Improving Power and Accuracy in Randomized Controlled Trials of Pain Treatments by Accounting for Concurrent Analgesic Use. *J Pain*. 2022. Epub 20221008. doi: 10.1016/j.jpain.2022.09.017. PubMed PMID: 36220482.
65. Shraim MA, Sluka KA, Sterling M, Arendt-Nielsen L, Argoff C, Bagraith KS, Baron R, Brisby H, Carr DB, Chimenti RL, Courtney CA, Curatolo M, Darnall BD, Ford JJ, Graven-Nielsen T, Kolski MC, Kosek E, Liebano RE, Merkle SL, Parker R, Reis FJJ, Smart K, Smeets R, Svensson P, Thompson BL, Treede RD, Ushida T, Williamson OD, Hodges PW. Features and methods to discriminate between mechanism-based categories of pain experienced in the musculoskeletal system: a Delphi expert consensus study. *Pain*. 2022. Epub 20220119. doi: 10.1097/j.pain.0000000000002577. PubMed PMID: 35319501.
66. Rundell SD, Saito A, Meier EN, Danyluk ST, Jarvik JG, Seebeck K, Friedly JL, Heagerty PJ, Johnston SK, Smersh M, Horn ME, Suri P, Cizik AM, Goode AP. The Lumbar Stenosis Prognostic Subgroups for Personalizing Care and Treatment (PROSPECTS) study: protocol for an inception cohort study. *BMC Musculoskelet Disord*. 2022;23(1):692. Epub 20220721. doi: 10.1186/s12891-022-05598-x. PubMed PMID: 35864487; PMCID: PMC9306038.
67. Rundell SD, Patel KV, Phelan EA, Jones BL, Marcum ZA. Trajectories of physical capacity among community-dwelling older adults in the United States. *Arch Gerontol Geriatr*. 2022;100:104643. Epub 20220129. doi: 10.1016/j.archger.2022.104643. PubMed PMID: 35131531.
68. Rodriguez PJ, Veenstra DL, Heagerty PJ, Goss CH, Ramos KJ, Bansal A. A Framework for Using Real-World Data and Health Outcomes Modeling to Evaluate Machine Learning-Based Risk Prediction Models. *Value Health*. 2022;25(3):350-8. Epub 2022/03/02. doi: 10.1016/j.jval.2021.11.1360. PubMed PMID: 35227445.
69. Nuwailati R, Bobos P, Drangsholt M, Curatolo M. Reliability of conditioned pain modulation in healthy individuals and chronic pain patients: a systematic review and meta-analysis. *Scand J Pain*. 2022;22(2):262-78. Epub 20220210. doi: 10.1515/sjpain-2021-0149. PubMed PMID: 35142147.
70. Liu Y, Silva RML, Friedrich JB, Kao DS, Mourad PD, Bunnell AE. Surface Electromyography-Driven Therapeutic Gaming for Rehabilitation of Upper Extremity Weakness: A Pilot Study. *Plast Reconstr Surg*. 2022;150(1):125-31. Epub 20220510. doi: 10.1097/PRS.00000000000009208. PubMed PMID: 35544314; PMCID: PMC9246860.
71. Liu P, Wu Y, Xiao Z, Gold LS, Heagerty PJ, Annaswamy T, Friedly J, Turner JA, Jarvik JG, Suri P. Estimating individualized treatment effects using a risk-modeling approach: an application to epidural steroid injections for lumbar spinal stenosis. *Pain*. 2022. Epub 20220826. doi: 10.1097/j.pain.0000000000002768. PubMed PMID: 36036907.
72. Kolodge G, Gold LS, Jarvik JG, Turner J, Hansen R, Heagerty PJ, Suri P, Friedly J. Treatment with Opioids Is Not Associated with Poor Outcomes Among Older Adults with Lumbar Spinal Stenosis Receiving Epidural Injections. *Spine (Phila Pa 1976)*. 2022. Epub 20221205. doi: 10.1097/BRS.0000000000004558. PubMed PMID: 36729991.
73. Hancock MJ, Maher CG, Jarvik JG, Battie MC, Elliott JM, Jensen TS, Panagopoulos J, Jenkins H, Pardey MC, McIntosh J, Magnussen J. Reliability and validity of subjective radiologist reporting of temporal changes in lumbar spine MRI findings. *PM R*. 2022;14(11):1325-32. Epub 20211019. doi: 10.1002/pmrj.12705. PubMed PMID: 34510774; PMCID: PMC8917240.
74. Gold LS CRJ, Tan WK, Marcum ZA, Meier EN, Sherman KJ, James KT, Griffith B, Avins AL, Kallmes DF, Suri P, Friedly JL, Heagerty PJ, Deyo RA, Luetmer PH, Rundell SD, Haynor DR, Jarvik JG. Osteoporosis identification among previously undiagnosed individuals with vertebral fractures. *Osteoporosis International*. 2022. doi: 10.1007/s00198-022-06450-7.; PMCID: 35654855.
75. Dong Q, Luo G, Lane NE, Lui LY, Marshall LM, Kado DM, Cawthon P, Perry J, Johnston SK, Haynor D, Jarvik JG, Cross

- NM. Deep Learning Classification of Spinal Osteoporotic Compression Fractures on Radiographs using an Adaptation of the Genant Semiquantitative Criteria. *Acad Radiol*. 2022. Epub 20220326. doi: 10.1016/j.acra.2022.02.020. PubMed PMID: 35351363.
76. Curatolo M, Rundell SD, Gold LS, Suri P, Friedly JL, Nedeljkovic SS, Deyo RA, Turner JA, Bresnahan BW, Avins AL, Kessler L, Heagerty PJ, Jarvik JG. Long-term effectiveness of epidural steroid injections after new episodes of low back pain in older adults. *Eur J Pain*. 2022. Epub 20220523. doi: 10.1002/ejp.1975. PubMed PMID: 35604636.
77. Abay RJY, Gold LS, Cawthon PM, Andrews JS. Lean mass, grip strength, and hospital-associated disability among older adults in Health ABC. *Alzheimers Dement*. 2022. Epub 2022/01/04. doi: 10.1002/alz.12527. PubMed PMID: 34978129.
78. Xia F, Hughes JP, Voldal EC, Heagerty PJ. Power and sample size calculation for stepped-wedge designs with discrete outcomes. *Trials*. 2021;22(1):598. Epub 2021/09/08. doi: 10.1186/s13063-021-05542-9. PubMed PMID: 34488848; PMCID: PMC8419932.
79. Tuzzio L, Meyers CM, Dember LM, Grudzen CR, Melnick ER, Staman KL, Huang SS, Richards J, DeBar L, Vazquez MA, Green BB, Coronado GD, Jarvik JG, Braciszewski J, Ho PM, Wells BL, James K, Toto R, D'Onofrio G, Volandes A, Kuklinski MR, Catalano RF, Sterling SA, Morse EF, Curtis L, Larson EB. Accounting for quality improvement during the conduct of embedded pragmatic clinical trials within healthcare systems: NIH Collaboratory case studies. *Healthc (Amst)*. 2021;8 Suppl 1:100432. Epub 2021/06/28. doi: 10.1016/j.hjdsi.2020.100432. PubMed PMID: 34175091.
80. Tong Y, Messinger AI, Wilcox AB, Mooney SD, Davidson GH, Suri P, Luo G. Forecasting Future Asthma Hospital Encounters of Patients With Asthma in an Academic Health Care System: Predictive Model Development and Secondary Analysis Study. *J Med Internet Res*. 2021;23(4):e22796. Epub 2021/04/17. doi: 10.2196/22796. PubMed PMID: 33861206; PMCID: PMC8087967.
81. Thompson MJ, Suchsland MZ, Hardy V, Lavalley DC, Lord S, Devine EB, Jarvik JG, Findlay S, Trikalinos TA, Walter FM, Chou R, Green BB, Wernli KJ, Fitzpatrick AL, Bossuyt PM. Patient-centered outcomes of imaging tests: recommendations for patients, clinicians and researchers. *BMJ Qual Saf*. 2021. Epub 2021/10/08. doi: 10.1136/bmjqs-2021-013311. PubMed PMID: 34615733.
82. Telfer S, Kleweno CP, Hughes B, Mellor S, Brunnuell CL, Linnau KF, Hebert-Davies J. Changes in scapular bone density vary by region and are associated with age and sex. *J Shoulder Elbow Surg*. 2021;30(12):2839-44. Epub 2021/06/13. doi: 10.1016/j.jse.2021.05.011. PubMed PMID: 34118420.
83. Telfer S, Calhoun J, Bigham JJ, Mand S, Gellert JM, Hagen MS, Kweon CY, Gee AO. Biomechanical Effects of Blood Flow Restriction Training after ACL Reconstruction. *Med Sci Sports Exerc*. 2021;53(1):115-23. Epub 2020/07/23. doi: 10.1249/MSS.0000000000002437. PubMed PMID: 32694365; PMCID: PMC8191295.
84. Telfer S, Brunnuell CL, Allen JD, Linnau KF, Zamora D, Kleweno CP. The effect of age and sex on pelvic bone density measured opportunistically in clinical CT scans. *J Orthop Res*. 2021;39(3):485-92. Epub 2020/07/04. doi: 10.1002/jor.24792. PubMed PMID: 32617998.
85. Tao R, Mercaldo ND, Haneuse S, Maronge JM, Rathouz PJ, Heagerty PJ, Schildcrout JS. Two-wave two-phase outcome-dependent sampling designs, with applications to longitudinal binary data. *Stat Med*. 2021;40(8):1863-76. Epub 2021/01/15. doi: 10.1002/sim.8876. PubMed PMID: 33442883; PMCID: PMC8110123.
86. Suri P, Stanaway IB, Zhang Y, Freidin MB, Tsepilov YA, Carrell DS, Williams FMK, Aulchenko YS, Hakonarson H, Namjou B, Crosslin DR, Jarvik GP, Lee MT. Genome-wide association studies of low back pain and lumbar spinal disorders using electronic health record data identify a locus associated with lumbar spinal stenosis. *Pain*. 2021;162(8):2263-72. Epub 2021/03/18. doi: 10.1097/j.pain.0000000000002221. PubMed PMID: 33729212; PMCID: PMC8277660.

87. Suri P, Meier EN, Gold LS, Marcum ZA, Johnston SK, James KT, Bresnahan BW, O'Reilly M, Turner JA, Kallmes DF, Sherman KJ, Deyo RA, Luetmer PH, Avins AL, Griffith B, Heagerty PJ, Rundell SD, Jarvik JG, Friedly JL. Providing Epidemiological Data in Lumbar Spine Imaging Reports Did Not Affect Subsequent Utilization of Spine Procedures: Secondary Outcomes from a Stepped-Wedge Randomized Controlled Trial. *Pain Med.* 2021;22(6):1272-80. Epub 2021/02/18. doi: 10.1093/pm/pnab065. PubMed PMID: 33595635; PMCID: PMC8185556.
88. Schuster NM, Clements ND, Suri P, Stojanovic MP. Is This Spine Pain Facetogenic? Addressing Diagnostic Myths. *Pain Med.* 2021;22(Suppl 1):S31-S5. Epub 2021/07/27. doi: 10.1093/pm/pnab097. PubMed PMID: 34308958.
89. Rundell SD, Karmarkar A, Nash M, Patel KV. Associations of Multiple Chronic Conditions With Physical Performance and Falls Among Older Adults With Back Pain: A Longitudinal, Population-based Study. *Arch Phys Med Rehabil.* 2021;102(9):1708-16. Epub 2021/04/27. doi: 10.1016/j.apmr.2021.03.025. PubMed PMID: 33901438; PMCID: PMC8429055.
90. Muller M, Wuthrich F, Federspiel A, Wiest R, Egloff N, Reichenbach S, Exadaktylos A, Juni P, Curatolo M, Walther S. Altered central pain processing in fibromyalgia-A multimodal neuroimaging case-control study using arterial spin labelling. *PLoS One.* 2021;16(2):e0235879. Epub 2021/02/03. doi: 10.1371/journal.pone.0235879. PubMed PMID: 33529254; PMCID: PMC7853499.
91. Mossa-Basha M, Peterson DJ, Hippe DS, Vranic JE, Hofstetter C, Reyes M, Bombardier C, Jarvik JG. Segmented quantitative diffusion tensor imaging evaluation of acute traumatic cervical spinal cord injury. *Br J Radiol.* 2021;94(1118):20201000. Epub 2020/11/13. doi: 10.1259/bjr.20201000. PubMed PMID: 33180553; PMCID: PMC7934312.
92. Morain SR MD, Geller G, Bollinger J, Weinfurt K, Jarvik JG, May E, Sugarman J. Identification and management of pragmatic clinical trial collateral findings: A current understanding and directions for future research. *Healthc (Amst).* 2021. doi: 10.1016/j.hjdsi.2021.100586; PMCID: PMC8664991.
93. Modarresi S, Lukacs MJ, Ghodrati M, Salim S, MacDermid JC, Walton DM, Group CC. A Systematic Review and Synthesis of Psychometric Properties of the Numeric Pain Rating Scale and the Visual Analog Scale for Use in People With Neck Pain. *Clin J Pain.* 2021;38(2):132-48. Epub 2021/10/27. doi: 10.1097/AJP.0000000000000999. PubMed PMID: 34699406.
94. Marcum ZA, Gold LS, James KT, Meier EN, Turner JA, Kallmes DF, Cherkin DC, Deyo RA, Sherman KJ, Luetmer PH, Avins AL, Griffith B, Friedly JL, Suri P, Heagerty PJ, Jarvik JG. Effects of Including Epidemiologic Data in Lumbar Spine Imaging Reports on Prescribing Non-Opioid Medications for Pain. *J Gen Intern Med.* 2021;36(8):2237-43. Epub 2021/02/10. doi: 10.1007/s11606-021-06627-6. PubMed PMID: 33559061; PMCID: PMC8342684.
95. Liu C, Shaheed CA, Braten LC, Hancock MJ, Underwood M, Jarvik JG, Elliott J, Maher CG, Buchbinder R, Lin C-WC. Antibiotic treatment for low back pain or radicular pain, or both (Protocol). *Cochrane Database of Systematic Reviews.* 2021(9). doi: DOI: 10.1002/14651858.CD014221.
96. Li F, Hughes JP, Hemming K, Taljaard M, Melnick ER, Heagerty PJ. Mixed-effects models for the design and analysis of stepped wedge cluster randomized trials: An overview. *Stat Methods Med Res.* 2021;30(2):612-39. Epub 2020/07/08. doi: 10.1177/0962280220932962. PubMed PMID: 32631142; PMCID: PMC7785651.
97. Kneeman J, Battalio SL, Korpak A, Cherkin DC, Luo G, Rundell SD, Suri P. Predicting Persistent Disabling Low Back Pain in Veterans Affairs Primary Care Using the STarT Back Tool. *PM R.* 2021;13(3):241-9. Epub 2020/09/10. doi: 10.1002/pmrj.12488. PubMed PMID: 32902134.
98. Jujjavarapu C, Pejaver V, Cohen TA, Mooney SD, Heagerty PJ, Jarvik JG. A Comparison of Natural Language Processing Methods for the Classification of Lumbar Spine Imaging Findings Related to Lower Back Pain. *Acad Radiol.* 2021. Epub 2021/12/05. doi: 10.1016/j.acra.2021.09.005. PubMed PMID: 34862122.

99. Hancock MJ, Maher CG, Jarvik JG, Battie MC, Elliott JM, Jensen TS, Panagopoulos J, Jenkins H, Pardey MC, McIntosh J, Magnussen J. Reliability and validity of subjective radiologist reporting of temporal changes in lumbar spine MRI findings. *PM R*. 2021. Epub 2021/09/13. doi: 10.1002/pmrj.12705. PubMed PMID: 34510774.
100. Gurrey CJ, Garbini JL, Bennett SP, Wang HY, Allyn KJ, Friedly JL, Hafner BJ, McLean JB, Larsen BG, Sanders JE. Socket release/relock: An innovative mechanism to maintain residual limb volume. *Med Eng Phys*. 2021;90:100-6. Epub 2021/03/31. doi: 10.1016/j.medengphy.2021.03.002. PubMed PMID: 33781476.
101. Gold LS, O'Reilly MK, Heagerty PJ, Jarvik JG. Complications and healthcare utilization in commercially-insured osteoporotic vertebral compression fracture patients: a comparison of kyphoplasty versus propensity-matched controls. *Spine J*. 2021;21(8):1347-54. Epub 2021/03/31. doi: 10.1016/j.spinee.2021.03.025. PubMed PMID: 33781968; PMCID: PMC8349787.
102. Gold LS, Marcum ZA, Meier EN, Turner JA, James KT, Kallmes DF, Luetmer PH, Griffith B, Sherman KJ, Friedly JL, Suri P, Deyo RA, Johnston SK, Avins AL, Heagerty PJ, Jarvik JG. Patient, Provider, and Clinic Characteristics Associated with Opioid and Non-Opioid Pain Prescriptions for Patients Receiving Low Back Imaging in Primary Care. *J Am Board Fam Med*. 2021;34(5):950-63. Epub 2021/09/19. doi: 10.3122/jabfm.2021.05.210033. PubMed PMID: 34535520.
103. Freidin MB, Tsepilov YA, Stanaway IB, Meng W, Hayward C, Smith BH, Khoury S, Parisien M, Bortsov A, Diatchenko L, Borte S, Winsvold BS, Brumpton BM, Zwart JA, Aulchenko YS, Suri P, Williams FMK, Pain HA-I. Sex- and age-specific genetic analysis of chronic back pain. *Pain*. 2021;162(4):1176-87. Epub 2020/10/07. doi: 10.1097/j.pain.0000000000002100. PubMed PMID: 33021770.
104. Fortney JC, Bauer AM, Cerimele JM, Pyne JM, Pfeiffer P, Heagerty PJ, Hawrilenko M, Zielinski MJ, Kaysen D, Bowen DJ, Moore DL, Ferro L, Metzger K, Shushan S, Hafer E, Nolan JP, Dalack GW, Unutzer J. Comparison of Teleintegrated Care and Telereferral Care for Treating Complex Psychiatric Disorders in Primary Care: A Pragmatic Randomized Comparative Effectiveness Trial. *JAMA Psychiatry*. 2021;78(11):1189-99. Epub 2021/08/26. doi: 10.1001/jamapsychiatry.2021.2318. PubMed PMID: 34431972; PMCID: PMC8387948.
105. Farmer C, O'Connor DA, Lee H, McCaffery K, Maher C, Newell D, Cashin A, Byfield D, Jarvik J, Buchbinder R. Consumer understanding of terms used in imaging reports requested for low back pain: a cross-sectional survey. *BMJ Open*. 2021;11(9):e049938. Epub 2021/09/15. doi: 10.1136/bmjopen-2021-049938. PubMed PMID: 34518265; PMCID: PMC8438839.
106. Desai RJ, Matheny ME, Johnson K, Marsolo K, Curtis LH, Nelson JC, Heagerty PJ, Maro J, Brown J, Toh S, Nguyen M, Ball R, Pan GD, Wang SV, Gagne JJ, Schneeweiss S. Broadening the reach of the FDA Sentinel system: A roadmap for integrating electronic health record data in a causal analysis framework. *NPJ Digit Med*. 2021;4(1):170. Epub 2021/12/22. doi: 10.1038/s41746-021-00542-0. PubMed PMID: 34931012; PMCID: PMC8688411.
107. de Luca K, Chiarotto A, Cicuttini F, Creemers L, de Schepper E, Ferreira PH, Foster NE, Hartvigsen J, Kawchuk G, Little CB, Oei EH, Suri P, Vleggeert-Lankamp C, Bierma-Zeinstra SMA, Ferreira ML. Consensus for statements regarding a definition for spinal osteoarthritis for use in research and clinical practice: A Delphi study. *Arthritis Care Res (Hoboken)*. 2021. Epub 2021/12/08. doi: 10.1002/acr.24829. PubMed PMID: 34874115.
108. Cross NM, Jarvik JG. Beyond the AJR: Lack of Association Between Radiographic Changes and Back Pain Related Disability in the Chingford 1000 Study. *AJR Am J Roentgenol*. 2021. Epub 2021/08/12. doi: 10.2214/AJR.21.26643. PubMed PMID: 34378396.
109. Bresnahan BW, Jarvik JG, Meier EN, James KT, Gold LS, Rundell SD, Turner JA, Suri P, Luetmer PH, Friedly JL, Sherman KJ, Heagerty PJ, Kallmes DF, Avins AL, Griffith BD, Kessler LG. Expected Organizational Costs for Inserting Prevalence Information Into Lumbar Spine Imaging Reports. *J Am Coll Radiol*. 2021;18(10):1415-22. Epub 2021/07/04. doi: 10.1016/j.jacr.2021.06.010. PubMed PMID: 34216559.

110. Bansal A, Heagerty PJ, Inoue LYT, Veenstra DL, Wolock CJ, Basu A. A Value-of-Information Framework for Personalizing the Timing of Surveillance Testing. *Med Decis Making*. 2021;272989X211049213. Epub 2021/11/09. doi: 10.1177/0272989X211049213. PubMed PMID: 34747265.
111. Arean PA, Pratap A, Hsin H, Huppert TK, Hendricks KE, Heagerty PJ, Cohen T, Bagge C, Comtois KA. Perceived Utility and Characterization of Personal Google Search Histories to Detect Data Patterns Proximal to a Suicide Attempt in Individuals Who Previously Attempted Suicide: Pilot Cohort Study. *J Med Internet Res*. 2021;23(5):e27918. Epub 2021/05/07. doi: 10.2196/27918. PubMed PMID: 33955838; PMCID: PMC8138707.
112. Arean P, Hull D, Pullmann MD, Heagerty PJ. Protocol for a sequential, multiple assignment, randomised trial to test the effectiveness of message-based psychotherapy for depression compared with telepsychotherapy. *BMJ Open*. 2021;11(11):e046958. Epub 2021/11/04. doi: 10.1136/bmjopen-2020-046958. PubMed PMID: 34728440; PMCID: PMC8565526.
113. Annaswamy TM, Rizzo JR, Schnappinger A, Morgenroth DC, Engkasan JP, Ilieva E, Arnold WD, Boninger M, Bean AC, Cirstea CM, Dicianno BE, Fredericson M, Jayabalan P, Raghavan P, Sawaki L, Suri P, Suskauer SJ, Wang QM, Hosseini M, Case C, Whyte J, Paganoni S. Evidence-Based Medicine Training in US-based Physiatry Residency Programs. *Am J Phys Med Rehabil*. 2021. Epub 2021/04/15. doi: 10.1097/PHM.0000000000001752. PubMed PMID: 33852491.
114. Andrews JS, Gold LS, Reed MJ, Garcia JM, McClelland RL, Fitzpatrick AL, Hough CL, Cawthon PM, Covinsky KE. Appendicular Lean Mass, Grip Strength, and the Development of Hospital-Associated Activities of Daily Living Disability among Older Adults in the Health ABC Study. *J Gerontol A Biol Sci Med Sci*. 2021. Epub 2021/11/05. doi: 10.1093/gerona/qlab332. PubMed PMID: 34734252.
115. Andrews JS, Gold LS, Nevitt M, Heagerty PJ, Cawthon PM. Appendicular Lean Mass, Grip Strength, and the Development of Knee Osteoarthritis and Knee Pain Among Older Adults. *ACR Open Rheumatol*. 2021;3(8):566-72. Epub 2021/07/11. doi: 10.1002/acr2.11302. PubMed PMID: 34245226; PMCID: PMC8363849.
116. Anderson DB, Luca K, Jensen RK, Eyles JP, Van Gelder JM, Friedly JL, Maher CG, Ferreira ML. A critical appraisal of clinical practice guidelines for the treatment of lumbar spinal stenosis. *Spine J*. 2021;21(3):455-64. Epub 2020/10/31. doi: 10.1016/j.spinee.2020.10.022. PubMed PMID: 33122056.
117. Zigman Suchsland M, Cruz MJ, Hardy V, Jarvik J, McMillan G, Brittain A, Thompson M. Qualitative study to explore radiologist and radiologic technologist perceptions of outcomes patients experience during imaging in the USA. *BMJ Open*. 2020;10(7):e033961. Epub 2020/07/22. doi: 10.1136/bmjopen-2019-033961. PubMed PMID: 32690729; PMCID: PMC7375501.
118. Voldal EC, Hakhu NR, Xia F, Heagerty PJ, Hughes JP. swCRTdesign: An RPackage for Stepped Wedge Trial Design and Analysis. *Comput Methods Programs Biomed*. 2020;196:105514. Epub 2020/06/20. doi: 10.1016/j.cmpb.2020.105514. PubMed PMID: 32554025; PMCID: PMC8559260.
119. Tsepilov YA, Freidin MB, Shadrina AS, Sharapov SZ, Elgaeva EE, Zundert JV, Karssen LC, Suri P, Williams FMK, Aulchenko YS. Analysis of genetically independent phenotypes identifies shared genetic factors associated with chronic musculoskeletal pain conditions. *Commun Biol*. 2020;3(1):329. Epub 2020/06/27. doi: 10.1038/s42003-020-1051-9. PubMed PMID: 32587327; PMCID: PMC7316754.
120. Swanson EC, Friedly JL, Wang RK, Sanders JE. Optical coherence tomography for the investigation of skin adaptation to mechanical stress. *Skin Res Technol*. 2020;26(5):627-38. Epub 2020/04/01. doi: 10.1111/srt.12843. PubMed PMID: 32227371; PMCID: PMC7529920.
121. Starr JB, Gold LS, McCormick Z, Suri P, Friedly J. Repeat procedures and prescription opioid use after lumbar medial branch nerve radiofrequency ablation in commercially insured patients. *Spine J*. 2020;20(3):344-51. Epub

- 2019/10/28. doi: 10.1016/j.spinee.2019.10.005. PubMed PMID: 31654808; PMCID: PMC7060813.
122. Sommer K, Saalbach A, Brosch T, Hall C, Cross NM, Andre JB. Correction of Motion Artifacts Using a Multiscale Fully Convolutional Neural Network. *AJNR Am J Neuroradiol.* 2020;41(3):416-23. Epub 2020/02/15. doi: 10.3174/ajnr.A6436. PubMed PMID: 32054615; PMCID: PMC7077919.
 123. Skelly AC, Chou R, Dettori JR, Turner JA, Friedly JL, Rundell SD, Fu R, Brodt ED, Wasson N, Kantner S, Ferguson AJR. Noninvasive Nonpharmacological Treatment for Chronic Pain: A Systematic Review Update. Rockville (MD)2020.
 124. Shi X, Wellman R, Heagerty PJ, Nelson JC, Cook AJ. Safety surveillance and the estimation of risk in select populations: Flexible methods to control for confounding while targeting marginal comparisons via standardization. *Stat Med.* 2020;39(4):369-86. Epub 2019/12/12. doi: 10.1002/sim.8410. PubMed PMID: 31823406; PMCID: PMC7768802.
 125. Schildcrout JS, Haneuse S, Tao R, Zelnick LR, Schisterman EF, Garbett SP, Mercaldo ND, Rathouz PJ, Heagerty PJ. Two-Phase, Generalized Case-Control Designs for the Study of Quantitative Longitudinal Outcomes. *Am J Epidemiol.* 2020;189(2):81-90. Epub 2019/06/06. doi: 10.1093/aje/kwz127. PubMed PMID: 31165875; PMCID: PMC7298772.
 126. Rundell SD, Resnik L, Heagerty PJ, Kumar A, Jarvik JG. Performance of the Functional Comorbidity Index (FCI) in Prognostic Models for Risk Adjustment in Patients With Back Pain. *PM R.* 2020;12(9):891-8. Epub 2020/01/05. doi: 10.1002/pmrj.12315. PubMed PMID: 31901004.
 127. Ren Y, Hughes JP, Heagerty PJ. A simulation study of statistical approaches to data analysis in the stepped wedge design. *Stat Biosci.* 2020;12(3):399-415. Epub 2021/03/23. doi: 10.1007/s12561-019-09259-x. PubMed PMID: 33747241; PMCID: PMC7971509.
 128. Pratap A, Neto EC, Snyder P, Stepnowsky C, Elhadad N, Grant D, Mohebbi MH, Mooney S, Suver C, Wilbanks J, Mangravite L, Heagerty PJ, Areal P, Omberg L. Indicators of retention in remote digital health studies: a cross-study evaluation of 100,000 participants. *NPJ Digit Med.* 2020;3:21. Epub 2020/03/05. doi: 10.1038/s41746-020-0224-8. PubMed PMID: 32128451; PMCID: PMC7026051.
 129. O'Reilly MK, Heagerty PJ, Gold LS, Kallmes DF, Jarvik JG. Augmented Reality. *AJNR Am J Neuroradiol.* 2020;41(8):E67-E8. Epub 2020/07/18. doi: 10.3174/ajnr.A6587. PubMed PMID: 32675343; PMCID: PMC7658896.
 130. Nevedal AL, Lewis ET, Wu J, Jacobs J, Jarvik JG, Chou R, Barnett PG. Factors Influencing Primary Care Providers' Unneeded Lumbar Spine MRI Orders for Acute, Uncomplicated Low-Back Pain: A Qualitative Study. *J Gen Intern Med.* 2020;35(4):1044-51. Epub 2019/12/14. doi: 10.1007/s11606-019-05410-y. PubMed PMID: 31832927; PMCID: PMC7174262.
 131. Mabotuwana T, Hall CS, Cross N. Framework for Extracting Critical Findings in Radiology Reports. *J Digit Imaging.* 2020;33(4):988-95. Epub 2020/05/31. doi: 10.1007/s10278-020-00349-7. PubMed PMID: 32472318; PMCID: PMC7522156.
 132. Lentz TA, Curtis LH, Rockhold FW, Martin D, Andersson TLG, Arias C, Berlin JA, Binns C, Cook A, Cziraky M, Dent R, Desai M, Emmett A, Esserman D, George J, Hantel S, Heagerty P, Hernandez AF, Hucko T, Khan N, Lee SF, LoCasale R, Mardekian J, McCall D, Monda K, Normand SL, Riesmeyer J, Roe M, Roessig L, Scott R, Siedentop H, Waldstreicher J, Wang L, Weerakkody G, Wolf M, Ellenberg SS. Designing, Conducting, Monitoring, and Analyzing Data from Pragmatic Randomized Clinical Trials: Proceedings from a Multi-stakeholder Think Tank Meeting. *Ther Innov Regul Sci.* 2020;54(6):1477-88. Epub 2020/06/10. doi: 10.1007/s43441-020-00175-7. PubMed PMID: 32514736.
 133. Lavalley DC, Lawrence SO, Avins AL, Nerenz DR, Edwards TC, Patrick DL, Bauer Z, Truitt AR, Monsell SE, Scott MR, Jarvik JG. Comparing three approaches for involving patients in research prioritization: a qualitative study of

- participant experiences. *Res Involv Engagem.* 2020;6:18. Epub 2020/05/08. doi: 10.1186/s40900-020-00196-4. PubMed PMID: 32377376; PMCID: PMC7195769.
134. LaPiana N, Duong A, Lee A, Alschitz L, Silva RML, Early J, Bunnell A, Mourad P. Acceptability of a Mobile Phone-Based Augmented Reality Game for Rehabilitation of Patients With Upper Limb Deficits from Stroke: Case Study. *JMIR Rehabil Assist Technol.* 2020;7(2):e17822. Epub 2020/09/03. doi: 10.2196/17822. PubMed PMID: 32876580; PMCID: PMC7495251.
 135. Jarvik JG, Meier EN, James KT, Gold LS, Tan KW, Kessler LG, Suri P, Kallmes DF, Cherkin DC, Deyo RA, Sherman KJ, Halabi SS, Comstock BA, Luetmer PH, Avins AL, Rundell SD, Griffith B, Friedly JL, Lavalley DC, Stephens KA, Turner JA, Bresnahan BW, Heagerty PJ. The Effect of Including Benchmark Prevalence Data of Common Imaging Findings in Spine Image Reports on Health Care Utilization Among Adults Undergoing Spine Imaging: A Stepped-Wedge Randomized Clinical Trial. *JAMA Netw Open.* 2020;3(9):e2015713. Epub 2020/09/05. doi: 10.1001/jamanetworkopen.2020.15713. PubMed PMID: 32886121; PMCID: PMC7489827.
 136. Jacobs JC, Jarvik JG, Chou R, Boothroyd D, Lo J, Nevedal A, Barnett PG. Observational Study of the Downstream Consequences of Inappropriate MRI of the Lumbar Spine. *J Gen Intern Med.* 2020;35(12):3605-12. Epub 2020/09/30. doi: 10.1007/s11606-020-06181-7. PubMed PMID: 32989711; PMCID: PMC7728897.
 137. Hughes JP, Heagerty PJ, Xia F, Ren Y. Robust inference for the stepped wedge design. *Biometrics.* 2020;76(1):119-30. Epub 2019/06/27. doi: 10.1111/biom.13106. PubMed PMID: 31237680; PMCID: PMC7978491.
 138. Farmer CI, Bourne AM, O'Connor D, Jarvik JG, Buchbinder R. Enhancing clinician and patient understanding of radiology reports: a scoping review of international guidelines. *Insights Imaging.* 2020;11(1):62. Epub 2020/05/07. doi: 10.1186/s13244-020-00864-9. PubMed PMID: 32372369; PMCID: PMC7200955.
 139. Ezeokeke CK, Bobola MS, Selby M, Ko JH, Friedly JL, Mourad PD. Case study of an amputee regaining sensation and muscle function in a residual limb after peripheral nerve stimulation by intense focused ultrasound. *Brain Stimul.* 2020;13(3):527-9. Epub 2020/04/15. doi: 10.1016/j.brs.2020.01.003. PubMed PMID: 32289669; PMCID: PMC7195996.
 140. Dong Q, Luo G, Haynor D, O'Reilly M, Linnau K, Yaniv Z, Jarvik JG, Cross N. DicomAnnotator: A Configurable Open-Source Software Program for Efficient DICOM Image Annotation. *J Digit Imaging.* 2020;33(6):1514-26. Epub 2020/07/16. doi: 10.1007/s10278-020-00370-w. PubMed PMID: 32666365; PMCID: PMC7728983.
 141. Day MA, Ehde DM, Burns J, Ward LC, Friedly JL, Thorn BE, Ciol MA, Mendoza E, Chan JF, Battalio S, Borckardt J, Jensen MP. A randomized trial to examine the mechanisms of cognitive, behavioral and mindfulness-based psychosocial treatments for chronic pain: Study protocol. *Contemp Clin Trials.* 2020;93:106000. Epub 2020/04/18. doi: 10.1016/j.cct.2020.106000. PubMed PMID: 32302791; PMCID: PMC7195020.
 142. Collaborative C, Flum DR, Davidson GH, Monsell SE, Shapiro NI, Odom SR, Sanchez SE, Drake FT, Fischkoff K, Johnson J, Patton JH, Evans H, Cuschieri J, Sabbatini AK, Faine BA, Skeete DA, Liang MK, Sohn V, McGrane K, Kutcher ME, Chung B, Carter DW, Ayong-Chee P, Chiang W, Rushing A, Steinberg S, Foster CS, Schaetzel SM, Price TP, Mandell KA, Ferrigno L, Salzberg M, DeUgarte DA, Kaji AH, Moran GJ, Saltzman D, Alam HB, Park PK, Kao LS, Thompson CM, Self WH, Yu JT, Wiebusch A, Winchell RJ, Clark S, Krishnadasan A, Fannon E, Lavalley DC, Comstock BA, Bizzell B, Heagerty PJ, Kessler LG, Talan DA. A Randomized Trial Comparing Antibiotics with Appendectomy for Appendicitis. *N Engl J Med.* 2020;383(20):1907-19. Epub 2020/10/06. doi: 10.1056/NEJMoa2014320. PubMed PMID: 33017106.
 143. Callen AL, Dupont SM, Price A, Laguna B, McCoy D, Do B, Talbott J, Kohli M, Narvid J. Between Always and Never: Evaluating Uncertainty in Radiology Reports Using Natural Language Processing. *J Digit Imaging.* 2020;33(5):1194-201. Epub 2020/08/20. doi: 10.1007/s10278-020-00379-1. PubMed PMID: 32813098; PMCID: PMC7573053.

144. Barnett PG, Jacobs JC, Jarvik JG, Chou R, Boothroyd D, Lo J, Nevedal A. Assessment of Primary Care Clinician Concordance With Guidelines for Use of Magnetic Resonance Imaging in Patients With Nonspecific Low Back Pain in the Veterans Affairs Health System. *JAMA Netw Open*. 2020;3(7):e2010343. Epub 2020/07/14. doi: 10.1001/jamanetworkopen.2020.10343. PubMed PMID: 32658287; PMCID: PMC7358914.
145. Thompson MJ, Hardy V, Zigman Suchsland M, Devine B, Kurth D, Chou R, Haines GR, Jarvik JG, Group PR. A Secondary Analysis to Identify Patient-Centered Outcomes in the ACR's Appropriateness Criteria. *J Am Coll Radiol*. 2019;16(12):1645-55. Epub 2019/06/08. doi: 10.1016/j.jacr.2019.05.016. PubMed PMID: 31173747.
146. Suri P, Boyko EJ, Smith NL, Jarvik JG, Jarvik GP, Williams FMK, Williams R, Haselkorn J, Goldberg J. Post-traumatic Stress Disorder Symptoms are Associated With Incident Chronic Back Pain: A Longitudinal Twin Study of Older Male Veterans. *Spine (Phila Pa 1976)*. 2019;44(17):1220-7. Epub 2019/04/16. doi: 10.1097/BRS.0000000000003053. PubMed PMID: 30985567; PMCID: PMC7102423.
147. Starr JB, Gold L, McCormick Z, Suri P, Friedly J. Trends in lumbar radiofrequency ablation utilization from 2007 to 2016. *Spine J*. 2019;19(6):1019-28. Epub 2019/01/15. doi: 10.1016/j.spinee.2019.01.001. PubMed PMID: 30639589; PMCID: PMC6534485.
148. Speckman RA, Friedly JL. The Methodology Matters Series: An Introduction. *PM R*. 2019;11(2):201-5. Epub 2019/01/18. doi: 10.1002/pmrj.12077. PubMed PMID: 30653835.
149. Speckman RA, Friedly JL. Asking Structured, Answerable Clinical Questions Using the Population, Intervention/Comparator, Outcome (PICO) Framework. *PM R*. 2019;11(5):548-53. Epub 2019/02/08. doi: 10.1002/pmrj.12116. PubMed PMID: 30729707.
150. Rundell SD, Resnik L, Heagerty PJ, Kumar A, Jarvik JG. Comparing Performance of Comorbidity Indices in Predicting Functional Status, Health-Related Quality of Life, and Total Health Care Use in Older Adults With Back Pain. *J Orthop Sports Phys Ther*. 2019:1-18. Epub 2019/07/25. doi: 10.2519/jospt.2019.8764. PubMed PMID: 31337267.
151. Rundell SD, Patel KV, Krook MA, Heagerty PJ, Suri P, Friedly JL, Turner JA, Deyo RA, Bauer Z, Nerenz DR, Avins AL, Nedeljkovic SS, Jarvik JG. Multi-site Pain Is Associated with Long-term Patient-Reported Outcomes in Older Adults with Persistent Back Pain. *Pain Med*. 2019;20(10):1898-906. Epub 2019/01/08. doi: 10.1093/pm/pny270. PubMed PMID: 30615144.
152. Perez FA, Quinet S, Jarvik JG, Nguyen QT, Aghayev E, Jitjai D, Hwang WD, Jarvik ER, Nedeljkovic SS, Avins AL, Schwalb JM, Diehn FE, Standaert CJ, Nerenz DR, Annaswamy T, Bauer Z, Haynor D, Heagerty PJ, Friedly JL. Lumbar Spinal Stenosis Severity by CT or MRI Does Not Predict Response to Epidural Corticosteroid versus Lidocaine Injections. *AJNR Am J Neuroradiol*. 2019;40(5):908-15. Epub 2019/05/03. doi: 10.3174/ajnr.A6050. PubMed PMID: 31048295; PMCID: PMC7053900.

153. Kosel AE, Heagerty PJ. Semi-supervised neighborhoods and localized patient outcome prediction. *Biostatistics*. 2019;20(3):517-41. Epub 2018/06/19. doi: 10.1093/biostatistics/kxy015. PubMed PMID: 29912289; PMCID: PMC6821385.
154. Fields AJ, Battie MC, Herzog RJ, Jarvik JG, Krug R, Link TM, Lotz JC, O'Neill CW, Sharma A, Group IDSP. Measuring and reporting of vertebral endplate bone marrow lesions as seen on MRI (Modic changes): recommendations from the ISSLS Degenerative Spinal Phenotypes Group. *Eur Spine J*. 2019;28(10):2266-74. Epub 2019/08/26. doi: 10.1007/s00586-019-06119-6. PubMed PMID: 31446492; PMCID: PMC7205555.
155. Bobola MS, Ezeokeke CK, Kuznetslova K, Lahti AC, Loeser JD, Olmstead TA, Friedly JL, Mourad PD. A Pre-clinical Study of the Response Threshold of Intact and Transected Nerves to Stimulation by Transcutaneous Intense Focused Ultrasound. *Ultrasound Med Biol*. 2019;45(8):2094-103. Epub 2019/06/04. doi: 10.1016/j.ultrasmedbio.2019.04.014. PubMed PMID: 31153718.
156. Bansal A, Heagerty PJ. A comparison of landmark methods and time-dependent ROC methods to evaluate the time-varying performance of prognostic markers for survival outcomes. *Diagn Progn Res*. 2019;3:14. Epub 2019/08/02. doi: 10.1186/s41512-019-0057-6. PubMed PMID: 31367681; PMCID: PMC6657082.
157. Zelnick LR, Schildcrout JS, Heagerty PJ. Likelihood-based analysis of outcome-dependent sampling designs with longitudinal data. *Stat Med*. 2018;37(13):2120-33. Epub 2018/03/16. doi: 10.1002/sim.7633. PubMed PMID: 29542170; PMCID: PMC6423957.
158. Truitt AR, Monsell SE, Avins AL, Nerenz DR, Lawrence SO, Bauer Z, Comstock BA, Edwards TC, Patrick DL, Jarvik JG, Lavalley DC. Prioritizing research topics: a comparison of crowdsourcing and patient registry. *Qual Life Res*. 2018;27(1):41-50. Epub 2017/04/07. doi: 10.1007/s11136-017-1566-9. PubMed PMID: 28382522.
159. Tan WK, Hassanpour S, Heagerty PJ, Rundell SD, Suri P, Huhdanpaa HT, James K, Carrell DS, Langlotz CP, Organ NL, Meier EN, Sherman KJ, Kallmes DF, Luetmer PH, Griffith B, Nerenz DR, Jarvik JG. Comparison of Natural Language Processing Rules-based and Machine-learning Systems to Identify Lumbar Spine Imaging Findings Related to Low Back Pain. *Acad Radiol*. 2018;25(11):1422-32. Epub 2018/04/02. doi: 10.1016/j.acra.2018.03.008. PubMed PMID: 29605561; PMCID: PMC6162177.
160. Suri P, Delaney K, Rundell SD, Cherkin DC. Predictive Validity of the STarT Back Tool for Risk of Persistent Disabling Back Pain in a U.S. Primary Care Setting. *Arch Phys Med Rehabil*. 2018;99(8):1533-9 e2. Epub 2018/04/07. doi: 10.1016/j.apmr.2018.02.016. PubMed PMID: 29625095; PMCID: PMC6064386.
161. Skrivankova V, Heagerty PJ. Single index methods for evaluation of marker-guided treatment rules based on multivariate marker panels. *Biometrics*. 2018;74(2):663-72. Epub 2017/08/08. doi: 10.1111/biom.12752. PubMed PMID: 28783868; PMCID: PMC5803489.
162. Skelly AC, Chou R, Dettori JR, Turner JA, Friedly JL, Rundell SD, Fu R, Brodt ED, Wasson N, Winter C, Ferguson AJR. Noninvasive Nonpharmacological Treatment for Chronic Pain: A Systematic Review. Rockville (MD)2018.
163. Schildcrout JS, Schisterman EF, Mercaldo ND, Rathouz PJ, Heagerty PJ. Extending the Case-Control Design to Longitudinal Data: Stratified Sampling Based on Repeated Binary Outcomes. *Epidemiology*. 2018;29(1):67-75. Epub 2017/10/27. doi: 10.1097/EDE.0000000000000764. PubMed PMID: 29068838; PMCID: PMC5718932.
164. Saha-Chaudhuri P, Heagerty PJ. Dynamic thresholds and a summary ROC curve: Assessing prognostic accuracy of longitudinal markers. *Stat Med*. 2018;37(18):2700-14. Epub 2018/04/20. doi: 10.1002/sim.7675. PubMed PMID: 29671890.
165. Mourad PD, Friedly JL, McClintic AM, Olmstead TA, Loeser JD. Intense Focused Ultrasound Preferentially Stimulates Transected Nerves Within Residual Limbs: Pilot Study. *Pain Med*. 2018;19(3):541-9. Epub 2017/10/13.

doi: 10.1093/pm/px188. PubMed PMID: 29025106.

166. Milani CJ, Rundell SD, Jarvik JG, Friedly J, Heagerty PJ, Avins A, Nerenz D, Gold LS, Turner JA, Annaswamy T, Nedeljkovic SS, Suri P. Associations of Race and Ethnicity With Patient-Reported Outcomes and Health Care Utilization Among Older Adults Initiating a New Episode of Care for Back Pain. *Spine (Phila Pa 1976)*. 2018;43(14):1007-17. Epub 2017/12/01. doi: 10.1097/BRS.0000000000002499. PubMed PMID: 29189640; PMCID: PMC5972040.
167. Jarvik JG, Gold LS, Tan K, Friedly JL, Nedeljkovic SS, Comstock BA, Deyo RA, Turner JA, Bresnahan BW, Rundell SD, James KT, Nerenz DR, Avins AL, Bauer Z, Kessler L, Heagerty PJ. Long-term outcomes of a large, prospective observational cohort of older adults with back pain. *Spine J*. 2018;18(9):1540-51. Epub 2018/02/03. doi: 10.1016/j.spinee.2018.01.018. PubMed PMID: 29391206.
168. Huhdanpaa HT, Tan WK, Rundell SD, Suri P, Chokshi FH, Comstock BA, Heagerty PJ, James KT, Avins AL, Nedeljkovic SS, Nerenz DR, Kallmes DF, Luetmer PH, Sherman KJ, Organ NL, Griffith B, Langlotz CP, Carrell D, Hassanpour S, Jarvik JG. Using Natural Language Processing of Free-Text Radiology Reports to Identify Type 1 Modic Endplate Changes. *J Digit Imaging*. 2018;31(1):84-90. Epub 2017/08/16. doi: 10.1007/s10278-017-0013-3. PubMed PMID: 28808792; PMCID: PMC5788819.
169. Gold LS, Hansen RN, Avins AL, Bauer Z, Comstock BA, Deyo RA, Heagerty PJ, Rundell SD, Suri P, Turner JA, Jarvik JG. Associations of Early Opioid Use With Patient-reported Outcomes and Health Care Utilization Among Older Adults With Low Back Pain. *Clin J Pain*. 2018;34(4):297-305. Epub 2017/09/16. doi: 10.1097/AJP.0000000000000557. PubMed PMID: 28915153; PMCID: PMC5837891.
170. Friedly JL, Comstock BA, Heagerty PJ, Bauer Z, Rothman MS, Suri P, Hansen R, Avins AL, Nedeljkovic SS, Nerenz DR, Akuthota V, Jarvik JG. Systemic effects of epidural steroid injections for spinal stenosis. *Pain*. 2018;159(5):876-83. Epub 2018/02/03. doi: 10.1097/j.pain.0000000000001158. PubMed PMID: 29394207.
171. Friedly J, Comstock B, Suri P, Jarvik JG. Reply. *Pain*. 2018;159(12):2678-9. Epub 2018/11/16. doi: 10.1097/j.pain.0000000000001411. PubMed PMID: 30431522.
172. Bansal A, Heagerty PJ. A Tutorial on Evaluating the Time-Varying Discrimination Accuracy of Survival Models Used in Dynamic Decision Making. *Med Decis Making*. 2018;38(8):904-16. Epub 2018/10/16. doi: 10.1177/0272989X18801312. PubMed PMID: 30319014; PMCID: PMC6584037.