



Exponent[®]
Engineering & Scientific Consulting

Heather Watson, Ph.D.

Managing Scientist | Data Sciences

Bellevue

+1-425-519-8710 | hwatson@exponent.com

Professional Profile

Dr. Watson specializes in biostatistics and has extensive experience in the statistical analysis of hospital discharge databases, medical claims databases, and accident databases. She also has experience in predictive analytics, reliability analysis, sampling methods, experimental design, data mining, and risk analysis.

Dr. Watson has collaborated with biomechanical engineers to create efficient designs for computer simulation experiments and to investigate injury patterns of pedestrians in motor vehicle accidents using the National Automotive Sampling System. She has worked with scientists in health on epidemiologic studies examining the incidence and treatment of glaucoma patients, performing meta-analyses of studies concerning uterine cancer, and looking at treatment patterns of hip or knee replacements. In addition, she has teamed with engineers to inspect failure trends of issued identification cards, to calculate failure rates and projected failures from warranty claims data, and to estimate injury risk from different consumer products. She has experience using large data bases, such as Medicare claim records, warranty claims databases, NASS CDS, NASS GES, FARS, NFIRS, NEISS and NIS.

Before joining Exponent, Dr. Watson attended New York University and served as a graduate assistant in the Division of Biostatistics at New York University, School of Medicine. Her background is in biology and mathematics. Her thesis research includes the application of statistical methods to local clustering of disease, focused clustering of disease near a putative hazard, and disease mapping utilizing Bayesian hierarchical modeling.

Academic Credentials & Professional Honors

Ph.D., Environmental Health Science, New York University, 2008

B.A., Mathematics and Biology, Claremont McKenna College, 2002

Professional Affiliations

American Statistical Association

Institute of Mathematical Statistics

Publications

Dore DD, Kyle M, Burns D, Murray CR, Watson H, Swaney J, Spevack S, Leonhard M, Simon M, Moynihan E, Lapane KL, Wang SV, Longo CL, Ritchey ME. Cardiovascular safety of fixed-dose extended-release naltrexone/bupropion in clinical practice. *Obesity Pillars*. 2025;100169. ISSN 2667-3681. <https://doi.org/10.1016/j.obpill.2025.100169>.

Givens JM, Malkani AL, Ong KL, Watson HN, Harreld KL. Complication rates following reverse and anatomic shoulder replacement in the treatment of glenohumeral arthritis: a 10-year Medicare review study. *J Shoulder Elbow Surg* 2023; Jul 19 [Epub ahead of print].

Sirignano MN, Nessler JM, Rhea EB, Ong KL, Watson HN, Yakkanti MR, Malkani AL. Incidence of instability following primary total hip arthroplasty continues to decline in the Medicare population. *J Arthroplasty* 2023; 38(7S):S89-S94.

Pamela H. Dalton PhD, Christopher Maute EdM, Jeffrey B. Hicks CIH, Heather N. Watson PhD, Anne E. Loccisano PhD, DABT and Brent D. Kerger PhD, DABT. Environmental Chamber Studies of Eye and Respiratory Irritation from Use of a Peracetic Acid-Based Hospital Surface Disinfectant. *Antimicrobial Stewardship & Healthcare Epidemiology* (2023), 3, e71, 1–7

Ong KL, Coppolecchia A, Chen Z, Watson HN, Jacofsky D, Mont MA. Robotic-Arm Assisted Total Knee Arthroplasty: Cost Savings Demonstrated at One Year. *Clinicoecon Outcomes Res.* 2022 May 2;14:309-318.

Parkulo TD, Likine EF, Ong KL, Watson HN5, Smith LS, Malkani AL. Manipulation Following Primary Total Knee Arthroplasty is Associated With Increased Rates of Infection and Revision. *J Arthroplasty.* 2022 Sep 30:S0883-5403(22)00897-X.

Lewis RC, Sheehan PJ, DesAutels CG, Watson HN, Kirman CR. Monitored and Modeled Ambient Air Concentrations of Ethylene Oxide: Contextualizing Health Risk for Potentially Exposed Populations in Georgia. *Int J Environ Res Public Health.* 2022 Mar 12;19(6):3364.

Isaacs, J., Campbel I., Watson, H., Toney-Bolger, M., Head and Neck Loading Trends in IIHS Side Impact Testing, FISITA World Congress, (2021) <https://doi.org/10.46720/F202N-XXX-NNN>

Sheehan, P.J.; Lewis, R.C.; Kirman, C.R.; Watson, H.N.; Winegar, E.D.; Bus, J.S. Ethylene Oxide Exposure in U.S. Populations Residing Near Sterilization and Other Industrial Facilities: Context Based on Endogenous and Total Equivalent Concentration Exposures. *Int. J. Environ. Res. Public Health* 2021, 18, 607. <https://doi.org/10.3390/ijerph18020607>

Tsuji, J.S., Lennox K.P., Watson, H.N., Chang E.T., Essential concepts for interpreting the dose-response of low-level arsenic exposure in epidemiological studies, *Toxicology* 457 (2021).

Hutchinson HL, Jaekel DJ, Lovald ST, Watson HN, Ong KL. Multimodal Pain Management of Femoral Neck Fractures Treated With Hemiarthroplasty. *J Surg Orthop Adv.* 2019 Spring;28(1):58-62.

Etkin CD, Lau EC, Watson HN, Kurtz SM, Gioe TJ, Springer BD, Lewallen DG, Bozic KJ. What Are the Migration Patterns for U.S. Primary Total Joint Arthroplasty Patients? *Clin Orthop Relat Res.* 2019 Jun;477(6):1424-1431

Jonas, R., Crump, C., Brinkerhoff, R., Krake, A., Watson, H., Young, D., "Variability in Circumstances Underlying Pedal Errors: An Investigation Using the National Motor Vehicle Crash Causation Survey," SAE Technical Paper 2018-01-0493, 2018, <https://doi.org/10.4271/2018-01-0493>.

Fordyce TA, Leonhard MJ, Watson HN, Mezei G, Vergara XP, Krishen L. An analysis of fatal and non-fatal injuries and injury severity factors among electric power industry workers. *Am J Ind Med.* 2016 Nov;59(11):948-958. doi: 10.1002/ajim.22621. Epub 2016 Jun 27. PMID: 27345858.

Jonas R, Crump C, Brinkerhoff R, Krake A, Watson H, Young D. Variability in circumstances underlying pedal errors: an investigation using the National Motor Vehicle Crash Causation Survey. SAE Technical Paper, 2018-01-0493, 2018.

Moolgavkar SH, Chang ET, Watson HN, Lau EC. An assessment of the Cox proportional hazards

regression model for epidemiologic studies. *Risk Analysis* 2017 November 23 [Epub ahead of print].

Alexander DD, Bylsma LC, Vargas AJ, Cohen SS, Doucette A, Mohamed M, Irvin SR, Miller PE, Watson H, Fryzek JP. Dairy Consumption and Cardiovascular Disease: A Systematic Review and Meta-Analysis. *British Journal of Nutrition*, 2016 Feb 28;115(4):737-50

Barrington JW, Lovald ST, Ong KL, Watson HN, Emerson RH Jr. Postoperative Pain After Primary Total Knee Arthroplasty: Comparison of Local Injection Analgesic Cocktails and the Role of Demographic and Surgical Factors. *J Arthroplasty*. 2016 Sep;31(9 Suppl):288-92.

Barrington JW, Lovald ST, Ong KL, Watson HN, Emerson RH Jr. How Do Demographic, Surgical, Patient, and Cultural Factors Affect Pain Control After Unicompartmental Knee Arthroplasty? A Multivariable Regression Analysis. *J Arthroplasty*. 2016 Sep;31(9 Suppl):97-101.

Emerson RH, Barrington JW, Olugbode O, Lovald S, Watson H, Ong K. Femoral Nerve Block Compared to Long-acting Wound Infiltration in Total Knee Replacement. Paper accepted to *Orthopedics*, Sept. 2015, 2016 May 1;39(3):e449-55.

Fordyce TA, Leonhard MJ, Watson HN, Mezei G, Vergara XP, Krishen L. An analysis of fatal and non-fatal injuries and injury severity factors among electric power industry workers. *American Journal of Industrial Medicine* 2016 Nov 1; 59(11):948-58.

Edinboro CH, Watson HN, Fairbrother A. Association between a shelter-neuter-return program and cat health at a large municipal animal shelter. *Journal of the American Veterinary Medical Association* 2016; 248(3):298-308.

Emerson RH, Barrington JW, Olugbode O, Lovald S, Watson H, Ong K. Comparison of Local Infiltration Analgesia to Bupivacaine Wound Infiltration as Part of a Multimodal Pain Program in Total Hip Replacement. *J Surg Orthop Adv* 2015 Winter; 24(4):235-41.

Barrington JW, Olugbode O, Lovald S, Ong K, Watson H, Emerson RH Jr. Liposomal bupivacaine: a comparative study of more than 1000 total joint arthroplasty cases. *Orthop Clin North Am* 2015; 46(4):469-477.

Moolgavkar, SH, Chang ET, Luebeck G, Lau EC, Watson HN, Crump SK, Boffetta P, McClellan R. Diesel engine exhaust and lung cancer mortality: Time-related factors in exposure and risk. *Risk Analysis* 2015; doi: 10.1111/risa.12315.

Moolgavkar SH, Chang ET, Watson H, Lau EC. Cancer mortality and quantitative oil production in the Amazon region of Ecuador, 1990-2010. *Cancer Causes & Control* 2014; 25(1): 59-72.

Rodowicz KA, Watson H. Incidence rate of sport-related traumatic brain injury diagnoses in the general population: An analysis of emergency department visits in 2001 and 2010. *ASTM Selected Technical Papers* 2014; 1552:187-195.

Kurtz SM, Lau E, Ong KL, Carreon L, Watson H, Albert T, Glassman S. Infection risk for primary and revision instrumented lumbar spine fusion in the Medicare population. *Journal of Neurosurgery Spine* 2012; 17:342-347.

Kurtz SM, Lau E, Watson H, Schmier JK, Parvizi J. Economic burden of periprosthetic joint infection in the United States. *Journal of Arthroplasty* 2012; 27:61-65 e1.

Lau E, Mowat FS, Kelsh MA, Legg JC, Engel-Nitz NM, Watson HN, Collins HL, Nordyke RJ, Whyte JL. Use of electronic medical records (EMR) for oncology outcomes research: Assessing the comparability of EMR information to patient registry and claims data. *Clinical Epidemiology* 2011; 3:259-272.

Heller MF, Imler SM, Zhao K, Watson HN, Corrigan CF. The effect of frontal collision delta-V and restraint status on injury outcome. Society of Automotive Engineers (SAE) Technical Paper 2010-01-0145, 2010.

Imler SM, Heller MF, Zhao K, Watson HN, Corrigan CF. The effect of side impact collision delta-V, restraint status, and occupant position on injury outcome. Society of Automotive Engineers (SAE) Technical Paper 2010-01-1158, 2010.

Heller MF, Prange MT, Ong KL, Watson HN, Iyer M, Ivarsson BJ, Fisher JL. Injury patterns among special populations involved in pedestrian crashes. Society of Automotive Engineers (SAE) Technical Paper 2010-01-1165, 2010.

Prange MT, Heller MF, Watson HN, Iyer M, Ivarsson BJ, Fisher JL. Age effects on injury patterns in pedestrian crashes. Society of Automotive Engineers (SAE) Technical Paper 2010-01-1164, 2010.

Heller MF, Watson HN, Ivarsson BJ, Prange MT, Fisher JL. Using national databases to evaluate injury patterns in pedestrian impacts. Society of Automotive Engineers (SAE) Technical Paper 2009-01-1209, 2009.

Moore T, Fisher J, Heller M, Lau E, Watson H, Ong K. Occupant injury in motor vehicle collisions: Using field accident data from multiple sources. Society of Automotive Engineers (SAE) Technical Paper 2009-01-0394, 2009.

Yim J, Zhu L-C, Chiriboga L, Watson HN, Goldberg JD, Moreira AL. Histologic features are important prognostic indicators in early stages lung adenocarcinomas. *Modern Pathology* 2007; 20:233.

Book Chapters

Jaekel DJ, Ong KL, Lau EC, Watson HN, Kurtz SM. Epidemiology of total hip and knee arthroplasty infection. In: *Periprosthetic Joint Infection of the Hip and Knee*. Springer BD and Javad P (eds), Springer-Verlag, London, England, November 2013.

Goldberg JD, Watson HN, Friedman, HP. Meta-analysis in clinical risk assessment. *Encyclopedia of Quantitative Risk Assessment*. Melnick E, Everitt BS (eds), John Wiley & Sons, Ltd., Chichester, UK, 2008.

Presentations

Watson, H. Data Visualization in Statistical Consulting Applications, Invited Presentation, Symposium on Data Science and Statistics, American Statistical Association, Reston, VA, 2018.

Goie T, Lau E, Watson H, Etkin C, Lewallen D, Berry D. Is there a Correlation Between Hospital Size and Revision Indication and where TJA Revision Surgery is Performed? Poster, American Academy of Orthopaedic Surgeons (AAOS), New Orleans, LA, 2018.

Kreuzer S, Page C, Ansari F, Watson H, Eason D, Hamed E. Optimizing 3-D Printed Components: A Methodological Approach to Assessing Printed Parameters on Tensile Properties. Presentation, Annual Technical Conference (ANTEC), Anaheim, CA, 2017.

Watson H, Lau E. The Impact of Misclassification of Obesity Coding in Administrative Claims Data on Negative Health Outcomes. Poster, International Conference on Health Policy Statistics, Providence, RI, 2015.

Watson H, Steffey, D. Statistical assessment of injury diagnosis and causation. Presentation, Joint Statistical Meeting, San Diego, CA, 2012.

Patel J, Ong K, Watson H, Helmus M, Kuehn C, Ochoa J. Historical trends in outcomes following aortic

and mitral heart valve replacement procedures: A population-based study of 29,582 Medicare patients from 1997 to 2009. Poster No. 877 (Top 25 Poster), Transcatheter Cardiovascular Therapeutics Conference, Miami, FL, October 22-26, 2012.

Patel J, Ong K, Watson H, Kuehn C, Ochoa J. Trends in revascularization and mortality for BMS and DES coronary stenting procedures: A Medicare study of 156,300 patients. Poster No. 659, Transcatheter Cardiovascular Therapeutics Conference, Miami, FL, October 22-26, 2012.

Ong KL, Patel J, Watson H, Helmus M, Kuehn C, Ochoa J. Historical trends in outcomes following aortic and mitral heart valve replacement procedures: A population-based study of 29,582 Medicare patients from 1997 to 2009. Poster No. PMD1, 17th Annual International Meeting of the International Society for Pharmacoeconomics and Outcomes Research, Washington, DC, June 2-6, 2012.

Ong KL, Patel JP, Watson H, Helmus M, Kuehn CM, Ochoa JA. Historical trends in outcomes following aortic and mitral heart valve replacement procedures: A population-based study of 29,582 Medicare patients from 1997 to 2009. Paper, 4th Annual Joint Scientific Session of the Heart Valve Society of America and Society for Heart Valve Disease, Valves in the Heart of the Big Apple VII: Evaluation & Management of Valvular Heart Diseases 2012, New York, NY, April 12-14, 2012.

Watson H. Using the National Inpatient Sample (NIS) database to identify injury patterns from external causes of injury. Presentation, Joint Statistical Meeting, Vancouver, Canada, 2010.

Watson H, Goldberg JD. Extensions of spatial statistical methods to incorporate spatial dependency and time constraints with application to breast cancer incidence in New York State. Presentation, New York University, School of Medicine, Department of Environmental Health, New York, NY, 2008.

Watson H, Goldberg JD, Liu M. Spatial analysis of breast cancer incidence in Rockland County, New York County, and Western Queens County. Presentation, Joint Statistical Meeting, Salt Lake City, UT, 2007.

Watson H, Goldberg JD, Liu M. Spatial statistical methods for small-area health data with application to the association of breast cancer incidence and local power plant emissions. Presentation, Joint Statistical Meeting, Seattle, WA, 2006.