

Matthew A. Davis

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CONTACT INFORMATION	University of Michigan School of Nursing 400 North Ingalls Building, Room 4347 Ann Arbor, MI 48109-5482 <i>Phone:</i> (734) 764-2814 <i>E-mail:</i> mattadav@umich.edu
EDUCATION	PhD, Dartmouth College, Hanover, NH, 2014 <ul style="list-style-type: none">• Area of Study: <i>Quantitative Biomedical Sciences</i>• Thesis Topic: <i>Early Life Exposure to Low-level Arsenic in the US Population</i>• Advisor: Professor Margaret Karagas MPH, Dartmouth Medical School, Hanover, NH, 2010 <ul style="list-style-type: none">• Area of Study: <i>Public Health and Health Services Research</i>• Thesis Topic: <i>Health Behaviors of Complementary and Alternative Medicine Users</i>• Thesis ranked 1st among 64 graduate students in 2010• Advisor: Associate Professor Brenda E. Sirovich DC, New York Chiropractic College, Seneca Falls, NY, 2004 <ul style="list-style-type: none">• <i>Summa cum laude</i>• Area of Study: <i>Chiropractic Care</i> BA, Colby College, Waterville, ME, 2000 <ul style="list-style-type: none">• <i>Magna cum laude</i>, with honors in chemistry• Area of Study: <i>Chemistry</i>• Concentration: <i>Biochemistry and molecular biology</i>
ACADEMIC APPOINTMENTS	<i>Assistant Professor</i> , 2014 to present University of Michigan School of Nursing Ann Arbor, MI <i>Faculty Affiliate</i> , 2016 to present University of Michigan Institute for Social Research Ann Arbor, MI <i>Adjunct Assistant Professor</i> , 2014 to present Department of Epidemiology Geisel School of Medicine at Dartmouth Hanover, NH <i>Adjunct Assistant Professor</i> , 2014 to present The Dartmouth Institute for Health Policy and Clinical Practice, Geisel School of Medicine at Dartmouth Hanover, NH <i>Instructor</i> , 2010 to 2014 The Dartmouth Institute for Health Policy and Clinical Practice, Geisel School of Medicine at Dartmouth Hanover, NH

PROFESSIONAL EXPERIENCE *Medical staff member*, Grace Cottage Hospital, Townshend, VT, 2006 to 2012
Biochemist, Sigma Aldrich Co., St. Louis, MO, 2000 to 2002

MEMBERSHIPS & LICENSURE Institute for Healthcare Policy and Innovation, University of Michigan
Michigan Institute for Data Science, University of Michigan
American Public Health Association
AcademyHealth
University of Michigan School of Nursing DNP Advisory Board
National Board of Chiropractic Examiners, 2004 to present
Vermont Board of Chiropractic Regulation, 2004 to present

ERDÖS NUMBER 5

BIBLIOGRAPHY *Peer-reviewed Original Research Papers*

Davis MA, Kononowech RW, Rolin SA, Spierings EL. Acupuncture for tension-type headache: a meta-analysis of randomized controlled trials. *Journal of Pain* 2008;9:667-677. (PMID 18499526)

Davis MA. Posterior spinal fusion versus anterior/posterior spinal fusion for adolescent idiopathic scoliosis: a decision analysis. *Spine* 2009;34:2318-2323. (PMID 19934812)

Davis MA, Davis AM, Luan JY, Weeks WB. The supply and demand of chiropractors in the United States from 1996 to 2005. *Alternative Therapies in Health and Medicine* 2009;15:36-40. (PMID 19472863)

Davis MA, Sirovich BE, Weeks WB. Utilization and expenditures on chiropractic care in the United States from 1997 to 2006. *Health Services Research* 2010;45:748-761. (PMID 20002763)

Whedon JM, **Davis MA**. Medicare part B claims for chiropractic spinal manipulation, 1998-2004. *Journal of Manipulative and Physiological Therapeutics* 2010;33:558-561. (PMID 21036277)

Davis MA, West, AN, Weeks WB, Sirovich BE. Health behaviors and utilization among complementary and alternative medicine users for treatment versus health promotion. *Health Services Research* 2011;46:1402-1416. (PMID 21554272)

Davis MA, Smith MM, Weeks WB. Influenza vaccination among chiropractic patients and other users of complementary and alternative medicine: Are chiropractic patients really different? *Preventive Medicine* 2012;54:5-8. (PMID 21296107)

Davis MA. An examination of complementary and alternative medicine journals in the Journal Citation Reports. *Alternative Therapies in Health and Medicine* 2012;17:38-42. (PMID 22314675)

Davis MA, Weeks WB. The concentration of out-of-pocket expenditures on complementary and alternative medicine services in the United States. *Alternative Therapies in Health and Medicine* 2012;18:36-42. (PMID 22894889)

Davis MA, Onega TL, Weeks WB, Lurie JD. Where the United States spends its spine dollars: Expenditures on different ambulatory services for the management of back and neck conditions. *Spine* 2012;37:1693-1701. (PMID 22433497)

Whedon JM, **Davis MA**, Song Y, Lurie, JD. Use of chiropractic spinal manipulation in older adults is strongly correlated with supply. *Spine* 2012;37:1771-1777. (PMID 22487711)

- Davis MA**, Mackenzie TA, Cottingham KL, Gilbert-Diamond D, Punshon T, Karagas MR. Rice consumption and urinary arsenic concentrations in US children. *Environmental Health Perspectives* 2012;120:1418-1424. (PMID 23008276)
- Davis MA**, Mackenzie TA, Coulter ID, Whedon JM, Weeks WB. The United States chiropractic workforce: an alternative or complement to primary care? *Chiropractic & Manual Therapies* 2012;20:e35. (PMID 23171540)
- Smith MM, **Davis MA**, Whedon JM, Stano W. Aging baby boomers and the rise of chronic back pain. *Journal of Manipulative and Physiological Therapeutics* 2013;36:2-11. (PMID 23380209)
- Davis MA**, Martin BI, Coulter ID, Weeks WB. Spending on complementary and alternative medicine plateaued; opportunity for savings may be limited. *Health Affairs* 2013;32:45-52. (PMID 23297270)
- Whedon, JM, Song Y, **Davis MA**. Trends in the use of chiropractic care among older adults. *The Spine Journal* 2013;13:1449-1454. (PMID 24310049)
- Sites BD, Beech ML, **Davis MA**. Increases in the use of prescription opioid analgesics and the lack of improvement in disability among users. *Regional Anesthesia & Pain Medicine* 2014;39:6-12. (PMID 24310049)
- Davis MA**, Weeks WB, Sirovich BE, Anthony DL. Did you hear the one about the doctor? An examination of doctor jokes posted on Facebook. *The Journal of Medical Internet Research* 2014;16:e41. (PMID 24550095)
- Davis MA**, Li Z, Gilbert-Diamond D, Mackenzie TA, Cottingham K, Lee JS, Baker ER, Marsit CJ, Karagas MR. Infant toenails as a biomarker of in utero arsenic exposure. *Journal of Exposure Science and Environmental Epidemiology* 2014;24:467-473. (PMID 24896769)
- Davis MA**, Karagas MR, Moore JH, Williams SM, Frost HR. A dietary-wide association study (DWAS) of environmental metal exposures in US children and adults. *PLoS ONE* 2014;9:e104768. (PMID 25198543)
- Sites BD, Barrington MJ, **Davis MA**. Utilizing an international clinical registry of regional anesthesia to identify targets for quality improvement. *Regional Anesthesia & Pain Medicine* 2014;39:487-495. (PMID 25275578)
- Davis MA**, Anthony DL, Pauls SD. Seeking and receiving social support on Facebook for surgery. *Social Science & Medicine* 2015;131:40-47. (PMID 2575328)
- Punshon T, **Davis MA**, Marsit CJ, Theiler SK, Baker ER, Jackson BP, Conway DC, Karagas MR. Placental arsenic concentrations in relation to both maternal and infant biomarkers of exposure in a US cohort. *Journal of Exposure Science and Environmental Epidemiology* 2015;25:599-603. (PMID 25805251)
- Davis MA**, Bynum JP, Sirovich BE. Association between apple consumption and physician visits: Appealing the conventional wisdom that an apple a day keeps the doctor away. *JAMA Internal Medicine* 2015;175:777-783. (PMID 25822137)
- Davis MA**, Higgins J, Li Z, Gilbert-Diamond D, Baker ER, Das A, Karagas MR. Preliminary analysis of *in utero* low-level arsenic exposure and fetal growth using biometric measurements extracted from fetal ultrasound reports. *Environmental Epidemiology* 2015;14:12. (PMID 25971349)
- Davis MA**, Yakusheva O, Gottlieb DJ, Bynum JP. Regional supply of chiropractic care and visits to primary care physicians for back and neck pain. *Journal of the American Board of Family Physicians* 2015;28:481-490. (PMID 26152439)

- Davis MA**, Nallamotheu BK, Banerjee M, Bynum JP. Identification of four unique spending patterns among older adults in the last year of life challenges standard assumptions. *Health Affairs* 2016;35:1316-1323. (PMID 27307350)
- Davis MA**, Guo C, Titler MG, Friese CR. The impacts of advanced practice clinicians as usual source of care. *Nursing Outlook* 2016 (in press)
- Bulka CM, **Davis MA**, Karagas MR, Ahsan H, Argos M. The unintended consequences of a gluten free diet. *Epidemiology* 2016 (in press)
- Davis MA**, Zheng Y, Liu Y, Levy HG. Public response to Obamacare on Twitter. 2016 (under review)
- Davis MA**, Argos M, Slaughter F, Pendergrast C, Punshon T, Gossai A, Ahsan H, Karagas MR. Assessment of human exposure to arsenic through rice. 2016 (under review)
- Karagas MR, Punshon T, **Davis MA**, Gossai A, Bulka CM, Slaughter F, Argos M, Ahsan H. Assessment of human exposure to arsenic through rice. 2016 (under review)
- Other Peer-reviewed Publications (case reports, commentaries, etc.)*
- Davis MA**, Taylor JAM. A case of vertebral metastasis with pathologic C2 fracture. *Journal of Manipulative and Physiological Therapeutics* 2007;30:466-471. (PMID 17693338)
- Davis MA**, Bove GM. A case of pheochromocytoma presenting as low back pain. *Journal of Manipulative and Physiological Therapeutics* 2007;30:598-601. (PMID17996552)
- Davis MA**, McDevitt L, Alin K. Establishing a chiropractic service in a rural primary health care setting. *Journal of Alternative and Complementary Medicine* 2007;13:697-702. (PMID 17931059)
- Davis MA**. A perspective on cultivating clinical empathy. *Complementary Therapies in Clinical Practice* 2009;15:76-79. (PMID 19341984)
- Whedon JM, Bove GM, **Davis MA**. Letter to the editor. Deaths after chiropractic: a review of published cases. *The International Journal of Clinical Practice* 2010;65:105. (PMID 21155948)
- McDevitt L, **Davis MA**. Recognizing the red flags of low back pain. *Nursing Critical Care* 2011;6:25-29.
- Davis MA**, Whedon JM, Weeks WB. Complementary and alternative medicine practitioners and accountable care organizations: The train is leaving the station. *The Journal of Alternative and Complementary Medicine* 2011;17:669-674. (PMID 21732823)
- Davis MA**, Weeks WB, Coulter ID. A proposed conceptual model for studying utilization of complementary and alternative medicine. *Alternative Therapies in Health and Medicine* 2012;17:38-42. (PMID 22314674)
- Lynch CJ, **Davis MA**. The Ithaca free clinic: a multidisciplinary health services delivery model to treat the uninsured and underinsured population. *Alternative Therapies in Health and Medicine* 2012;18:26-29. (PMID 22516849)

RESEARCH
METHODOLOGY I am an empiricist and my specialty is the analysis of large data repositories, particularly those utilizing complex survey design. I have been the primary author on a variety of research projects that analyzed national health survey data including the Medical Expenditure Panel Survey (MEPS), the National Health Interview Survey (NHIS), and the National Health and Nutrition Examination Survey (NHANES). In addition, I have experience with US Census, Medicare administrative claims, and private healthcare data. In regards to study design, I have conducted both cross-sectional and prospective studies as well as systematic review/meta-analysis and decision analysis. More recently, I have led projects that analyzed textual data from online discussions and electronic medical reports. These projects used techniques from natural language processing and entailed handling large sparse matrices through decomposition and other linear algebra operations.

PRESS My research has received national attention on several occasions. Feature articles about my work have appeared on National Public Radio's Marketplace, The Huffington Post, USA Today, the Atlantic, and US News and World Reports. Both the US Department of Health and Human Services and the Environmental Protection Agency have also featured my research on their websites.

LAY
PUBLICATIONS The Vermont Observer (newspaper), bimonthly health column 2005 to 2007
The Brattleboro Reformer (newspaper), monthly health column 2007 to 2009

RESEARCH
FUNDING ***Funded***
Public Service Research National Institutes of Health PA-13-302
(NCCIM R01) NIH Grant Award No. R01AT009003
Title: The Availability of Chiropractic Care and Use of Health Services for Back Pain
Funding Amount: \$1,473,872
Role: Principal Investigator

Public Service Research National Institutes of Health PA-09-072
(NCCAM K01) NIH Grant Award No. 5K01AT006162
Title: The United States Complementary and Alternative Medicine Market
Funding Amount: \$906,050
Role: Principal Investigator

Under Review
Public Service Research National Institutes of Health PA-13-303
(NIA R21) NIH Grant Tracking No. R21AG050974
Title: Primary Care Providers and Variation in Back Pain Management
Requested Funding Amount: \$442,886
Role: Principal Investigator

CONFERENCE
PRESENTATIONS ***Research Conference Oral Presentations***
The supply and demand of US chiropractors from 1996 to 2006: past trends and future ramifications. At the 2009 Association of Chiropractic Colleges and Research Agenda Conference, Las Vegas, Nevada (60 min)

Utilization and expenditures on chiropractic care in the US from 1997 to 2006. At the 2010 Association of Chiropractic Colleges and Research Agenda Conference, Las Vegas, Nevada (20 min).

An analysis of Medicare part B claims for spinal manipulation, 1998-2004. At the 2010 Association of Chiropractic Colleges and Research Agenda Conference, Las Vegas, Nevada (20 min).

Regional variation in the supply of US chiropractors. At the 2011 American Public Health Association Annual Meeting, Washington, DC (20 min).

Influenza vaccination among chiropractic patients and other users of complementary and alternative medicine. At the 2011 Association of Chiropractic Colleges and Research Agenda Conference, Las Vegas, Nevada (20 min).

Research Conference Poster Presentations

The concentration of out-of-pocket expenditures on complementary and alternative medicine in the United States. At AcademyHealth 2011 Annual Research Meeting, Seattle, WA.

Trends in utilization and expenditures on complementary and alternative medicine in the United States. At AcademyHealth 2011 Annual Research Meeting, Seattle, WA.

Direct-to-consumer advertising of integrative medicine clinics at US academic medical centers. At AcademyHealth 2012 Annual Research Meeting, Orlando, FL.

Infant toenails as biomarkers of in utero arsenic exposure. At the 2013 EPA/NIEHS Environmental Health Research Meets Clinical Practice and Public Policy Meeting, National Institutes of Health, Washington, DC.

EDITORIAL
EXPERIENCE

Consulting Statistical Reviewer
• *Regional Anesthesia & Pain Medicine*

Ad Hoc Reviewer
• *American Journal of Public Health*
• *British Medical Journal*
• *Journal of the American Medical Association*
• *Health Services Research*
• *Health Affairs*
• *Journal of General Internal Medicine*
• *Environmental Health Perspectives*
• *Journal of Alternative and Complementary Medicine*

AWARDS

Phi Chi Omega honor society, 2004

The Dartmouth Institute Thesis Commendation Award, 2010

ACCRAC Outstanding Research Paper, Las Vegas, NV, 2010
Medicare part B claims for chiropractic spinal manipulation, 1998-2004

ACCRAC Outstanding Research Paper, Las Vegas, NV, 2011
Immunization status of adult chiropractic patients: Analyses of the National Health Interview Survey

National Institute of Environmental Health Sciences Travel Scholarship: 2012

Recipient of the National Institutes of Health's Extramural Loan Repayment Program, 2012 to 2016

TEACHING

Lead Instructor

Course: Regression and Other Methods (ECS141), 2013
The Dartmouth Institute, Lebanon, NH

Course: Epidemiology for Health Professionals (N802), 2015 to present
University of Michigan School of Nursing, Ann Arbor, MI

Course: Statistics for Advanced Practice (N800), 2015 to present
University of Michigan School of Nursing, Ann Arbor, MI

Course: Introduction to Large Data Analyses, 2016 to present
IHPI Clinician Scholars (National Clinician Scholars Program)
University of Michigan, Ann Arbor, MI

Teaching Assistant

Course: Critical Issues in Health and Health Care (ECS111), 2010
The Dartmouth Institute, Lebanon, NH

Course: Epidemiology and Biostatistics II (ECS141), 2011 & 2012
The Dartmouth Institute, Lebanon, NH

Mentoring

Lyne Morgan, MPH, 2011 to 2012
The Dartmouth Institute, Lebanon, NH

Brian Sites, MD, MS, 2012 to 2013
The Dartmouth Institute, Lebanon, NH

Kayoung Lee, RN, PhDC (predoc), 2015 to present
University of Michigan, Ann Arbor, MI

Jordan Harrison, RN (predoc), 2016 to present
University of Michigan, Ann Arbor, MI

Martin Rivera-Salas, RN (predoc), 2016 to present
University of Michigan, Ann Arbor, MI

Surasak Soonthorn, PhD (NIH D43 postdoc), 2016 to present
University of Michigan, Ann Arbor, MI

Invited Presentations

The Placebo Effect: Friend or Enemy? (60 min), 2010 & 2011
Course: Inferential Methods and Systematic Review: Part 1 (ECS100)
The Dartmouth Institute, Lebanon, NH

Unconventional Health Care in the United States (60 min), 2010 - 2012
Course: Critical Issues in Health and Health Care (ECS111)
The Dartmouth Institute, Lebanon, NH

National Sources of Data on Health and Health Care (60 min) 2010 - present
Course: Survey Research Methods (ECS122)
The Dartmouth Institute, Lebanon, NH

Introduction to Environmental Epidemiology (180 min), 2014
Course: Environmental Health Science and Policy (ECS151)
The Dartmouth Institute, Lebanon, NH

SPECIAL
PROJECTS

Environmental Health Risks of Vermonters Residing near an Abandoned Asbestos Mine
Under supervision of Carolyn Murray, MD, MPH at Dartmouth Hitchcock Medical Center, collaborated with Vermont Department of Health epidemiologists to determine the environmental health risks of Vermonters living near the abandoned asbestos mines in Eden and Lowell, Vermont. The project entailed an extensive review of the literature over 3 months and resulted in a white paper report for Vermont health officials and policymakers.

Implementing Continual Quality Improvement at a Rural Primary Care Office
Three month project in collaboration with Dartmouth faculty, Dartmouth Public Health students, and staff at Grace Cottage Family Health in Townshend, VT. The project focused on ways of creating a culture based on quality improvement at the rural primary clinics at Grace Cottage Hospital and entailed qualitative and quantitative analyses and literature reviews. The project resulted in a 50-page white paper and an hour presentation to the medical staff, support staff, and senior leadership at Grace Cottage Hospital.

A Strategic and Financial Analysis of Otis Health Care Center Inc.
Directed a comprehensive analysis of OHCC, a medical center in southern Vermont, in conjunction with the board of trustees and executive management. The study focused on community trends and OHCC internal data analyses. A full report was disseminated to the medical staff, board of trustees, and administration via a written document and weekend retreat.