
BIOGRAPHICAL SKETCH

NAME: Lewis A. Lipsitz, MD

POSITION TITLE: Chief of Gerontology, Beth Israel Deaconess Med Center; Professor of Medicine, Harvard Medical School; Director, Institute for Aging Research and Vice President for Academic Medicine, Hebrew SeniorLife

eRA COMMONS USER NAME: LIPSITZ

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Franklin & Marshall College, PA	B.A.	06/1973	Chemistry
University of Pennsylvania, School of Medicine, PA	M.D.	06/1977	Medicine
Harvard University, MA	M.A.	05/2000	Medicine
Harvard School of Public Health		02/1999	Program for Chiefs of Clinical Services
Amer. Political Sci. Assoc. and Atlantic Philanthropy		09/2013	Health Care Policy

A. Personal Statement

Dr. Lipsitz was one of the first geriatricians to be trained in the Harvard Geriatric Fellowship Program. He subsequently became a National Institute on Aging Academic (K23) Awardee, with Hebrew SeniorLife (formerly the Hebrew Rehabilitation Center for Aged) as his primary clinical and research site. As a fellow, he began a systematic series of epidemiologic and physiologic studies evaluating syncope and abnormal blood pressure regulation, discovered postprandial hypotension in the elderly, and subsequently acquired funding for his studies through an NIA-funded Program Project, which he directed for 20 years. In this capacity he provided on-site management and established strong working relationships with project directors from multiple Harvard-affiliated institutions. This program project supported the prospective, observational MOBILIZE Boston Study, which has elucidated numerous novel risk factors for falls over the past 10 years. Dr. Lipsitz's research has been quite productive, resulting in 250 original articles in peer-reviewed journals, many of which involve clinical trials and translational research.

During his career, Dr. Lipsitz has received continuous NIA funding for his research, directed an Older Americans Independence Center, led a T32 training program and the Hartford Center of Excellence in Geriatric Medicine at Harvard Medical School (HMS), and acquired two D.W. Reynolds Grants for geriatric education at HMS. He has mentored 34 successful postdoctoral trainees, including 2 Beeson Scholars and 4 T32 trainees, and received the prestigious "William Silen Lifetime Achievement" award for mentoring. His research into various function promoting therapies, access to Harvard-wide resources, academic leadership experience, skills in mentoring, and familiarity with NIA Center Grants and Boston's academic geriatric community all make him ideally suited to lead the Boston OAIC and its Research Education Component.

B. Positions and Honors

Positions:

1980-1982 Research Fellowship, Administration on Aging Gerontology Fellowship, Harvard Medical School and Beth Israel Hospital

1984- Ad Hoc Study Section Reviewer, National Institute on Aging

1986-96 Director, Harvard Geriatrics Fellowship Program, Harvard Medical School

1988-11 Principal Investigator, HRCA/Harvard Teaching Nursing Home,

1988-15 Director, Hartford Foundation Center of Excellence in Geriatric Medicine at Harvard Medical School

1991-10 Co-Director, Institute for Aging Research, Hebrew SeniorLife

1997-00 Physician-in-Chief, Hebrew Rehabilitation Center for Aged, Boston, MA

- 2000- Chief of Gerontology Division, Beth Israel Deaconess Medical Center, Boston, MA
- 2000- Professor of Medicine, Harvard Medical School
- 2001-02 Chair, Clinical Medicine Section, Gerontological Society of America
- 2005-12 Advisory Committee and Reviewer, K-Beeson Career Development Awards, NIA and AFAR
- 2005- Director, Interdisciplinary Center on Aging, Beth Israel Deaconess Med Ctr/Harvard Medical School
- 2005- Geriatric Research & Education Clinical Center Advisory Committee, Boston Veterans Administration
- 2010- Director, Institute for Aging Research, Hebrew SeniorLife
- 2014- Senior Advisor, Center for Medicare and Medicaid Services, Baltimore, MD

Awards and Honors:

- 1983-88 Academic Award, National Institute on Aging
- 1991- Irving and Edyth S. Usen Family Chair in Geriatric Medicine, Hebrew SeniorLife, Boston, MA
- 2006-15 NIA Merit Award R37 AG25037
- 2007-09 Hartford Foundation Senior Leadership Scholar, Association of Directors of Geriatric Academic Programs
- 2009-10 Recipient, William Silen Lifetime Achievement in Mentoring Award, Harvard Medical School
- 2010 Recipient, Joseph T. Freeman Award, Gerontological Society of America

C. Contributions to Science

Cardiovascular Causes and Treatments of Falls and Syncope: Dr. Lipsitz's research has focused on abnormal blood pressure regulation and its relationship to the development of falls and syncope in elderly people. His initial prospective clinical investigations led to the recognition that nearly one-third of syncopal episodes in frail elderly patients are related to hypotensive responses to common daily stresses such as posture change, meals, and preload-reducing medications. He was the first to identify postprandial hypotension in the elderly, probe its underlying mechanisms, and demonstrate its relationship to syncope. In randomized, double-blind, placebo-controlled trials he found that 3,4-DL-threo-dihydroxy-phenylserine was an effective treatment, but caffeine was not.

In several elderly populations, Dr. Lipsitz observed a relationship between systolic hypertension and the susceptibility to hypotension. He found that both orthostatic and postprandial hypotension are related to supine BP elevation, independent of medication use, due to the additive adverse effects of age and systolic hypertension on baroreflex function and diastolic ventricular filling. In a randomized, double-blind, cross-over trial he showed that treatment of BP elevation with a calcium channel blocker, ameliorated postprandial hypotension.

In addition to cardiac and peripheral vascular mechanisms of falls in elderly people, Dr. Lipsitz has shown that abnormalities in cerebral vascular function are also associated with falls, probably through ischemic injury to frontal subcortical circuits that control gait. With his K23-Beeson mentee, Dr. Farzaneh Sorond, he has shown relationships between abnormal cerebral vasoreactivity and falls, and between abnormal neurovascular coupling and slow gait speed in the MOBILIZE Boston population.

- a. Lipsitz LA, Nyquist RP, Wei JY, Rowe JW. Postprandial reduction in blood pressure in the elderly. *N. Engl J Med* 1983; 309: 81-83.
- b. Lipsitz LA, Ryan SM, Parker JA, Freeman R, Wei JY, Goldberger AL. Hemodynamic and autonomic nervous system response to mixed meal ingestion in healthy young and old subjects, and dysautonomic patients with postprandial hypotension. *Circulation* 1993;87:391-400.
- c. Sorond FA, Galica A, Serrador JM, Kiely DK, Iloputaife I, Cupples LA, Lipsitz LA. Cerebrovascular Hemodynamics, Gait and Falls in an Elderly Population: MOBILIZE Boston Study. *Neurology*, 2010;74;1627-1633. PMC2875129
- d. Sorond F, Kiely DK, Galica A, Moscufo N, Serrador JM, Iloputaife I, Egorova S, Dell'Oglio E, Meier D, Newton E, Milberg WP, Guttmann C, Lipsitz LA. Neurovascular Coupling is Impaired in Slow Walkers: The MOBILIZE Boston Study. *Annals of Neurology*. 2011 Aug;70(2):213-20. PMC3152682.

A Novel Aging Phenotype of Slow Gait, Impaired Executive Function, and Depressive Symptoms: In 2 population-based studies, Dr. Lipsitz and his mentee, Dr. Ihab Hajjar, have shown that 11% (Cardiovascular Health Study) to 17% (MOBILIZE Boston Study) of elderly people have concurrent abnormalities in executive cognitive dysfunction, gait speed, and depression measures. This phenotype is strongly associated with hypertension, other cardiovascular risk factors, and white matter hyperintensities (WMH) on brain MRI scans, suggesting it is a manifestation of cerebral microvascular disease. Dr. Lipsitz and colleagues showed that hypertension itself is strongly associated with executive cognitive impairment, abnormal cerebral blood flow regulation, and WMH, and that its relationship to cognitive impairment is probably mediated through ischemic damage to frontal subcortical white matter. Moreover, he has shown that the treatment of hypertension increases cerebral blood flow in elderly hypertensive patients. He and Dr. Hajjar found that antihypertensive therapy with an angiotensin receptor blocker in patients with mild cognitive impairment improves executive function, suggesting that early blood pressure control may prevent the development of this phenotype of aging.

- a. Hajjar I, Yang F, Sorond F, Jones RN, Milberg W, Cupples LA, **Lipsitz LA**. A Novel Aging Phenotype of Slow Gait, Impaired Executive Function, and Depressive Symptoms: Relationship to Blood Pressure and Other Cardiovascular Risks. *J Gerontol A Biol Sci Med Sci*, 2009, 64 (9): 994-1001. PMC2720888
- b. Hajjar I, Quach L, Yang F, Chaves PH, Newman AB, Mukamal K, Longstreth W Jr, Inzitari M, **Lipsitz LA**. Hypertension, white matter hyperintensities, and concurrent impairments in mobility, cognition, and mood: the cardiovascular health study. *Circulation*. 2011 Mar 1; 123(8):858-65. PMC308166.
- c. Hajjar I, Hart M, Chen YL, Mach W, Milberg W, Chui H, **Lipsitz L**. Effect of Antihypertensive Therapy on Cognitive Function in Early Executive Cognitive Impairment: A Double-Blind Randomized Clinical Trial. *Arch Intern Med* 2012 March; 172: (5):442-444. PMC3536822.
- d. Purkayastha S, Fadar O, Mehregan A, Salat DH, Moscufo N, Meier DS, Guttmann CR, Fisher ND, **Lipsitz LA**, Sorond FA. Impaired cerebrovascular hemodynamics are associated with cerebral white matter damage. *Journal of Cerebral Blood Flow & Metabolism*. 2014 Feb; 34(2):228-134. PMID: 24129749. PMC3915198

Loss of Complexity in Aging: Building upon his observations that physiological measures such as blood pressure and heart rate are highly variable with beat-to-beat fluctuations that resemble nonlinear dynamical processes, Dr. Lipsitz applied the principles of nonlinear dynamics to his work. He proposed that healthy physiologic function is characterized by the nonlinear interaction of multiple control processes and feedback loops that produce highly complex outputs - such as the beat-to-beat irregularity of the normal sinus cardiac rhythm, or the moment-to-moment adjustments in center-of-pressure during quiet standing. Using a variety of mathematical techniques derived from Fourier analysis and complexity science, he was the first to demonstrate that aging is associated with a loss of complexity in the dynamics of these systems and that this loss of complexity impairs adaptive capacity and predisposes elderly people to frailty, falls, injury, and disease.

- a. **Lipsitz LA**, Goldberger AL. Loss of “complexity” and aging: potential applications of fractals and chaos theory to senescence. *JAMA* 1992;267:1806-1809.
- b. **Lipsitz LA**. The dynamics of stability: the physiologic basis of functional health and frailty. *J Gerontol Biol Sciences* 2002;57A(3):B115-B125.
- c. Kang HG, Costa M, Priplata A, Starobinets O, Goldberger A, Peng CK, Kiely D, Cupples LA, **Lipsitz L**, Frailty and the Degradation of Complex Balance Dynamics during a Dual Task Protocol. *J Gerontol Med Sci*, Dec 2009; 64(12):1304-1311. PMC2781784
- d. Manor B, Costa MD, Hu K, Newton E, Starobinets OV, Kang HG, Peng CK, Novak V, **Lipsitz LA**. Physiological complexity and system adaptability: Evidence from postural control dynamics of older adults. *J Appl Physiol*, 2010. Vol 109 (6): 1786 -91. PMC3006415

Applying Stochastic Resonance to Improve Balance and Gait: One promising therapeutic intervention to prevent falls in the elderly is based on the physical principal of stochastic resonance, in which noise is used to enhance the detection of a weak signal. Dr. Lipsitz and colleagues have shown that mechanical noise delivered to the feet using vibratory insoles, can improve postural control and gait in elderly people and patients with strokes, diabetic neuropathy, or falls.

- a. Priplata A, Niemi J, Salen M, Harry J, **Lipsitz LA**, Collins JJ. Noise-enhanced human balance control. *Phys Rev Letters* 2002;89:238101.
- b. Costa M, Priplata A, **Lipsitz LA**, Wu Z, Huang NE, Goldberger AL, Peng CK. Noise and poise: enhancement of postural complexity in the elderly with a stochastic resonance-based therapy. *Eur Phys Letters*, 2007, 77:68008.1-68008.5. PMC1949396.
- c. Galica, AM, Kang HG, Priplata AA, D'Andrea SE, Starobinets OV, Sorond FA, Cupples LA, **Lipsitz LA**. Subsensory Vibrations to the Feet Reduce Gait Variability in Elderly Fallers. *Gait & Posture*, 2009, 30: 383-387. PMC2745077
- d. **Lipsitz LA**, Lough M, Niemi J, Trivison T, Howlett H, Manor B. A Shoe Insole Delivering Subsensory Vibratory Noise Improves Balance and Gait in Healthy Elderly People. *Archives of Physical Medicine and Rehabilitation*, 2015;96:432-9. ARCHIVES-PMR-D-14-01019R1.

Improving Quality of Care in Nursing Homes: Recognizing the critical need to translate basic and clinical research into policies and practices that improve the quality of life and care of older individuals, Dr. Lipsitz became a Health and Aging Policy Fellow in 2011, supported by Atlantic Philanthropies. Since then he has been learning how health care policies are made and implemented by assisting the HHS Medicare and Medicaid Coordination Office with a nation-wide demonstration project to prevent avoidable hospitalizations among nursing home residents. He is currently helping to develop a novel payment model that will be incorporated into the Demonstration and formally tested for its ability to promote the management of several acute conditions in nursing facilities, rather than in hospitals and emergency rooms. Another innovative project entitled ECHO-AGE, uses remote video communication technology to teach front-line nursing home caregivers how to manage behavior disorders associated with dementia by linking them to an inter-professional team of consultants in geriatrics, geropsychiatry, neurology, and social work at the academic medical center.

- a. **Lipsitz LA**. The 3-Night Hospital Stay and Medicare Coverage for Skilled Nursing Care. *JAMA*. 2013 Oct 9;310(14):1441-1442. PMID: 24042212
- b. Lipsitz LA. Understanding Health Care as a Complex System: The Foundation for Unintended Consequences. *JAMA*. 2012 July 18; 308(3):243-244. PMC3511782
- c. Catic AG, Mattison ML, Bakaev I, Morgan M, Monti SM, Lipsitz L. ECHO-AGE: An Innovative Model of Geriatric Care for Long-Term Care Residents with Dementia and Behavioral Issues. *J Am Med Dir Assoc*.
- d. 2014 Dec;15(12):938-42. doi: 10.1016/j.jamda.2014.08.014. Epub 2014 Oct 11. PMID:25306294

For full list of publications see: <https://www.ncbi.nlm.nih.gov/myncbi/lewis.lipsitz.1/cv/28879/>

D. Research Support

Ongoing:

- 1) John A. Hartford Foundation 07/01/06-6/30/16
 "Harvard Medical School Center of Excellence in Geriatric Medicine"
 The Center's focus is on the development of new leaders in geriatric medicine who are equipped with the research, clinical, teaching, and administrative skills necessary to meet the future health care needs of our elderly population.
 Role: Principal Investigator

- 2) T32 AG023480 05/01/10-04/30/16
 National Institute on Aging Translational Research in Aging Training Grant
 The specific aims of this training program are: 1) to provide a 2-year training program basic and clinical aging research for 6 postdoctoral trainees each year, 2) To provide an 8-12 week short-term research training experience for 6 pre-doctoral candidates each year in basic and clinical aging research, and 3) to bring together scientists across a broad range of basic and clinical research through seminars, didactic sessions, shared laboratory experiences, and collaborative projects.
 Role: Principal Investigator

- 3) RX Foundation 01/01/12-12/31/15
 "Echo-Age: Health Security for the Elderly in New England's Rural and Under-Resourced Communities"

This project supports the development and implementation of a web-based video consultation program to educate nursing home providers who are relatively isolated from geriatric expertise about the management of behavior problems in residents with dementia.

Role: Principal Investigator

- 4) R01 HS021495 DHHS/AHRQ (Safran, Charles) 04/01/13-03/31/18
InfoSAGE: Information Sharing Across Generations and Environments
We will study the information needs of elders and their adult children who are involved in their care and home needs. We will build a "living laboratory" which we are calling InfoSAGE (Information Sharing Across Generations and Environments).
Role: Principal Investigator
- 5) Donald W. Reynolds Foundation 07/01/13-06/30/17
"Echo-Care Transitions"
ECHO-CT uses remote video-consultation technology to improve transitions of care for vulnerable elderly patients by bridging communication gaps between acute and postacute care providers, reducing knowledge deficits, and ensuring health equity for elderly patients. This award also aims to educate hospitalists, medical residents, and medical students in principles of transitions of care.
Role: Co-Principal Investigator
- 6) 1R01AG041785-01A1 09/15/13-06/30/18
"Cerebrovascular Mechanisms of Slow Gait and Falls"
This study examines the relationships between cerebral blood flow regulation, neurovascular coupling, cerebral microvascular disease and the development of slow gait and falls in 100 elderly participants of the MOBILIZE Boston Study.
Role: Principal Investigator
- 7) P30AG048785 (Lachman, Margie) 09/30/14-05/31/19
Boston Roybal Center Pilot Studies
The Pilot Core will support a group of innovative and scientifically rigorous pilot studies each year that will enable the Center to develop and test behavior change strategies that promote healthy aging, especially for persons at high risk for poor health outcomes. The work of the Core will ultimately lead to interventions to achieve health-promoting behavior change in vulnerable, at-risk populations.
Role: CORE Leader
- 8) The Partner Foundation of University of Limoges 12/22/14-12/21/17
"Prevention of the Interruptions of People's Autonomy Over the Places Where They Live"
To resolve problems for the continuation of autonomy through a multidisciplinary approach that combines cutting-edge research in different fields, such as health, technology and its appropriation by users, law, ethics and, finally, the economics of ageing.
Role: Principal Investigator
- 9) Falk Foundation Medical Research Trust 01/01/15–12/31/15
Treatment of cerebral microvascular disease using noninvasive brain stimulation
This seed grant aims to conduct a pilot study to establish the feasibility of deployment of transcranial direct current stimulation (tDCS) in large populations of individuals with cerebral microvascular disease, and to obtain preliminary evidence for a causal effect of the intervention on mobility, executive function and depressive symptoms in this population
- 10) 2R01AG025037-09A1 02/01/15-01/31/20
National Institute on Aging
Health Outcomes of Tai Chi In Subsidized Senior Housing
This study aims are to determine the effects of Tai Chi exercises conducted at least twice weekly over a 1-year period on 1) functional performance measured by the Short Physical Performance Battery and 2) health care utilization and costs determined from Medicare claims data in poor, multiethnic, elderly residents of low income housing facilities.