



9 Galen Street, Watertown, MA 02472
tel (617) 923-7747 fax (617) 926-8246
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Health Economics & Outcomes Research

Does Erectile Dysfunction Improve Cardiovascular Disease Risk Prediction?

Authors: Andre B. Araujo, Ph.D.,* Susan A. Hall, Ph.D.,* Peter Ganz, M.D.,† Gretchen R. Chiu, M.S.,* Raymond C. Rosen, Ph.D.,* Varant Kupelian, Ph.D.,* John B. McKinlay, Ph.D.*

* New England Research Institutes, Watertown, MA 02472, USA

† Division of Cardiology, San Francisco General Hospital, University of California, San Francisco, San Francisco, CA 94110

Source of Funding: This work was supported by the following grants: AG 04673 from the National Institute on Aging; DK 44995, DK 51345 from the National Institute of Diabetes and Digestive and Kidney Disorders; and an unrestricted educational grant to NERI from Bayer Healthcare.

Disclosure: Dr. Rosen reports that he serves as a consultant to Bayer-Schering, Eli Lilly, and Pfizer. Dr. Ganz has reports that he serves as a consultant to GlaxoSmithKline, Genentech, and Pfizer. Dr. Hall is a former employee of and former consultant to GlaxoSmithKline, but has no equity interest in GlaxoSmithKline. All other authors report no conflict of interest.

Andre B. Araujo, Ph.D., aaraujo@neriscience.com, Department of Epidemiology, New England Research Institutes, Inc., Director, 9 Galen Street, Watertown, MA 02472, USA

Susan A. Hall, Ph.D., shall@neriscience.com, Department of Epidemiology, New England Research Institutes, Inc., Research Scientist, 9 Galen Street, Watertown, MA 02472, USA

Peter Ganz, M.D., GanzP@medsfgh.ucsf.edu, Division of Cardiology, San Francisco General Hospital, University of California, San Francisco, Chief, 1001 Potrero Ave., UCSF Box 0846, San Francisco, CA 94110

Gretchen R. Chiu, M.S., gchiu@neriscience.com, Department of Epidemiology, New England Research Institutes, Inc., Statistician, 9 Galen Street, Watertown, MA 02472, USA

Raymond C. Rosen, Ph.D., rrosen@neriscience.com, Department of Epidemiology, New England Research Institutes, Inc., Chief Scientist, 9 Galen Street, Watertown, MA 02472, USA

Varant Kupelian, Ph.D., vkupelian@neriscience.com, Department of Epidemiology, New England Research Institutes, Inc., Research Scientist, 9 Galen Street, Watertown, MA 02472, USA

John B. McKinlay, Ph.D., jmckinlay@neriscience.com, Department of Health Services & Disparities Research, New England Research Institutes, Inc., Senior Vice President, 9 Galen Street, Watertown, MA 02472, USA

ABSTRACT

Introduction and Objective: Erectile dysfunction (ED) and cardiovascular disease (CVD) share pathophysiological mechanisms and often co-occur. It is unknown whether ED improves the prediction of CVD beyond traditional risk factors. We sought to determine whether ED predicts CVD beyond traditional risk factors.

Methods: The Massachusetts Male Aging Study (MMAS) is a population-based, prospective study of 1,709 men aged 40-70 y. ED was measured by self-report. Data on CVD were obtained from 3 sources: questionnaire, linkage of the MMAS database with the National Death Index (NDI), and medical records. CVD was defined by ICD-9/ICD-10 codes 390-459/100-199. Subjects were followed for CVD for an average follow-up of 11.7 years. The association between ED and CVD was examined using the Cox proportional hazards regression model. The reclassification of CVD risk associated with ED was assessed using a method that quantifies net reclassification improvement (NRI). This involved the fitting of two statistical models with CVD as the outcome: one including age and Framingham risk score, and a second that added ED. Based on this, we evaluated changes in risk category classification separately for CVD cases and non-cases that occurred during the first 10 years of follow-up, with results expressed in the NRI.

Results: 1,057 men with complete data who were free of CVD and diabetes at baseline were included. During follow-up, 261 new cases of CVD occurred (200 of these were confirmed by NDI or medical record). ED was associated with CVD incidence controlling for age (Hazard Ratio (HR): 1.42 (95% Confidence Interval (CI)): 1.05, 1.90), age and traditional CVD risk factors (HR: 1.41, 95% CI: 1.05, 1.90), as well as age and Framingham risk score (HR: 1.40, 95% CI: 1.04-1.88). Despite these significant findings, ED did not significantly improve the prediction of CVD incidence beyond traditional risk factors. Specifically, based on the data presented in the Table, the NRI for ED was calculated as 3.1% (95% CI: -2.4%, 8.5%), which was not statistically significant ($p = .27$).

Conclusions: Independent of established CVD risk factors, ED is significantly associated with increased CVD incidence. Nonetheless, ED does not improve the prediction of who will and will not develop CVD beyond that offered by traditional risk factors.

Keywords: erectile dysfunction, cardiovascular disease, longitudinal studies

TABLE. Number of subjects according to CVD risk category, with reclassification of risk category after inclusion of ED status in a multivariate statistical model. Estimates of probabilities using Framingham risk score (rows) and with Framingham risk score plus ED status (columns) are shown among CVD cases and non-cases. Both models were also adjusted for age. Cells with grey shading indicate subjects not reclassified.

10-year CVD probability	10-year CVD probability after inclusion of ED status									
	Non-CVD cases					Cases* of CVD				
	<5%	5 to <10%	10 to <20%	≥20%	Total	<5%	5 to <10%	10 to <20%	≥20%	Total
<5%	27	3	0	0	30	46	2	0	0	48
5 to <10%	1	111	2	0	114	4	37	3	0	44
10 to <20%	0	11	327	12	350	0	2	36	4	42
≥20%	0	0	27	381	408	0	0	2	19	21
Total	28	125	356	393	902	50	41	41	23	155

* N = 106 of the 261 CVD cases had an event > 10 years following baseline. These are considered non-cases in this analysis.