BIOGRAPHICAL SKETCH

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NAME: Pencina, Karol M.
eRA COMMONS USER NAME: KAROLPENCINA
POSITION TITLE: Instructor, Harvard Medical School. Chief Biostatistician, Section on Men's Health, Aging and Metabolism, Brigham and Women's Hospital.

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Warsaw School of Economics	MSc.	2004	Quantitative Methods
Aarhus School of Business		2003-06	Finance and International Business
Boston University	Ph.D.	2012	Mathematics and Statistics
Boston University	Postdoc	2012-2014	Biostatistics

A. Personal Statement

I have the expertise, experience and dedication to provide statistical support to age-related projects. I have been working with the Framingham Heart Study data for 8 years, first as a Research Assistant and since 2012 as a Postdoctoral Associate in Boston University's School of Medicine. I was involved in multiple projects combining data available through the US Centers of Medicare and Medicaid Services with Framingham data base for older population and also provided high-level statistical support to projects assessing age-related changes in cardiac aging traits. I was leading biostatistician on multiple projects related to cardiovascular adverse events and subclinical atherosclerosis as well as on the assessment of treatment effects in multi-center studies. In 2014 I have joined Section of Men's Health, Aging and Metabolism Unit at the Brigham and Women's Hospital as chief biostatistician where I provide complex analytical support to numerous projects assessing the effects of pharmacological interventions on body composition and physical function. My methodological research is focused on new measures of improvement in model performance and their meaningful interpretations as well as the extensions of the existing metrics that address some of their potential shortcomings.

B. Positions and Employment

2006 – 2012 Research Assistant, Mathematics and Statistics Department, Boston University.
2012 – 2014 Postdoctoral Associate, School of Medicine, Boston University.
2013 – 2014 Consultant Statistician, Harvard Clinical Research Institute, Boston MA.
2014 – Present Instructor, Harvard Medical School. Chief Biostatistician, Section on Men's Health, Aging and Metabolism, Brigham and Women's Hospital, Boston MA.

C. Contributions to science

Incremental effect of sub-clinical disease on model prediction for cardiovascular outcomes. One of the most pressing issues of current research is the extent to which new biomarkers and measures of subclinical disease can improve risk models. Together with Framingham Heart Study investigators (Dr. Polak, Dr. D'Agostino, Dr. O'Donnell) we have answered this question for carotid intima-media thickness, one of the most promising measures of sub-clinical disease in a highly influential report published in the New England Journal of Medicine, where we have shown that carotid intima-media thickness offers only modest promise for stratifying individuals for their cardiovascular risk:

1. Polak JF, Pencina MJ, **Pencina KM**, O'Donnell CJ, Wolf PA, D'Agostino Sr RB. Carotid-wall intima-media thickness and cardiovascular events. New England Journal of Medicine. 2011 Jul;365:213-221. PMCID: PMC3153949

2. Polak JF, Pencina MJ, Meisner A, **Pencina KM**, Brown LS, Wolf PA, D'Agostino Sr RB. Associations of carotid artery intima-media thickness (IMT) with risk factors and prevalent cardiovascular disease comparison of mean common carotid artery IMT with maximum internal carotid artery IMT. Journal of Ultrasound in Medicine. 2010 Dec;29:1759-68. PMCID: PMC3186063

Novel metrics of model performance. I have been working with numerous researchers on developing prediction functions and evaluating the incremental value of new risk factors added to these models. My methodological contributions led to novel ways of addressing the problem and laid the foundations for rigorous statistical approaches which are necessary, but have not been fully developed. They focus on discrimination and reclassification achieved by employing prognostic models and offer simple and intuitive ways to summarize the information. Furthermore, they shift the focus from statistical significance to clinical value offered by the new markers. The methods proposed in my publications have been adopted as the promising statistical tools in the assessment of improvement in model performance.

1. **Pencina KM**, Pencina MJ, D'Agostino RB Sr. What to expect from net reclassification improvement with 3 categories. Statistics in Medicine. 2014 December;33(28):4975-4987. PMID: 25176621

2. Pencina MJ, D'Agostino Sr RB, **Pencina KM**, Janssens CJW, Greenland P. Interpreting Incremental Value of Markers Added to Risk Prediction Models. American Journal of Epidemiology. 2012 Sep 8;176(6):473-81. PMCID: PMC3530349

Identification of new risk factors and developing risk prediction models for new onset cardiovascular disease are at the forefront of prevention. Framingham Heart Study has pioneered this research which has been routinely incorporated in guidelines issued by professional societies around the world, including the American Heart Association and American College of Cardiology.
I have provided complex analytical support to multiple projects exploring these findings. My current research is focused on the distinction between modifiable and non-modifiable risk factors and the impact of statistical modeling on the performance of the resulting algorithm.

1. Dhingra R, Pencina MJ, Schrader P, Wang TJ, Levy D, **Pencina KM**, Siwik DA, Colucci WS, Benjamin EJ, Vasan RS. Relations of matrix remodeling biomarkers to blood

pressure progression and incidence of hypertension in the community. Circulation. 2009 Mar 16;119:1101-7. PMCID: PMC272970

2. Rosenquist KJ, Massaro JM, **Pencina KM**, D'Agostino Sr RB, Beiser A, O'Connor GT, Polak JF, Seshadri S, Fox CS. Neck Circumference, Carotid Wall Intima-Media Thickness, and Incident Stroke. Diabetes Care. 2013 Sep;36(9):153-4. PMCID: PMC3747939

3. Govindaraju DR, **Pencina KM**, Raj DS, Massaro JM, Carnes BA, D'Agostino Sr RB. A Systems Analysis of Age-related Changes in Some Cardiac Aging Traits. Biogerontology. 2014 Apr;15(2):139-52. PMID: 24337960

4. Tsao CW, **Pencina KM**, Massaro JM, Levy D, Vasan RS, Hoffmann U, O'Donnell CJ, Mitchell GF. Cross-sectional relations of arterial stiffness, pressure pulsatility, wave reflection and arterial calcification. Arteriosclerosis, Thrombosis and Vascular Biology. 2014 Nov; 34(11):2495-500. PMCID: PMC4199901

Complete List of Published Work in MyBibliography
http://www.ncbi.nlm.nih.gov/sites/myncbi/1hWUekphphn5y/bibliograpahy/48202709/public/?sort=date&direction=ascending

D. Research Support

7R01AG037547-05 (Bhasin) 09/01/13-05/31/16
NIA / NIH
OPTIMen
Optimizing Protein Intake in Older Americans with Mobility Limitations
Specific Aim: To establish protein requirements for older Americans
(Effort 10%, Payroll 10%)

NIA 1UO1 AG051421-01 Bhasin (PI) 10/1/2015 – 9/30/2017
Muscle Mass and Strength Cutpoints in Persons at Risk of Mobility Disability
NIA
Specific aims: Establishing cut-points for muscle mass and strength measures to define sarcopenia as a biomarker to identify older adults at tisk for physical disability
(Effort 10%)

(I was supported by this grant between July 2012 and July 2014 as biostatistician)
N01-HC-25195-06 (Wolf) 02/01/02-03/31/15
NIH / NHLBI
The Framingham Heart Study
This contract to the Framingham Heart Study (FHS) provides funding for recruiting a third generation and continuing follow up examinations on the first two generations. It also provides funding for research into subclinical disease and for distribution of DNA and data to researchers at large.
(Effort 100%, Payroll 100%)