BIOGRAPHICAL SKETCH

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NAME: **Christine M. Albert**

eRA COMMONS USER NAME (credential, e.g., agency login): **CALBERT**

POSITION TITLE: **Chair, Department of Cardiology and the Lee and Harold Kapelovitz Chair in Research Cardiology, Cedars-Sinai Medical Center; Visiting Professor of Medicine, Harvard Medical School; Epidemiologist, Brigham and Women's Hospital.**

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Boston University, Boston, MA	B.A.	1986	Biology
Harvard Medical School, Boston, MA	M.D.	1990	Medicine
Harvard School of Public Health, Boston, MA	M.P.H.	1997	Clinical Effectiveness

A. Personal Statement

I am an epidemiologist and a board-certified practicing clinical cardiac electrophysiologist. I am the Chair of the Department of Cardiology and the Lee and Harold Kapelovitz Endowed Chair in Research Cardiology at Cedars-Sinai Medical Center in Los Angeles, CA. I also hold an appointment as an Epidemiologist within the Division of Preventive Medicine at Brigham and Women's Hospital and Visiting Professor at Harvard Medical School, where I maintain and direct my current portfolio of NIH research grants. Until August 30, 2019, I was the Director the Center for Arrhythmia Prevention at the Brigham and Women's Hospital, a research center dedicated to epidemiologic research centered on elucidating factors that predispose patients to heart rhythm disorders with an emphasis on atrial fibrillation and sudden cardiac death. My expertise lies in the in the design and conduct of epidemiologic investigations on modifiable lifestyle, biologic, and genetic determinants of cardiovascular disease with a focus on sudden cardiac death and atrial fibrillation; both in large prospective cohort designs and in multi-center clinical studies. I also have expertise in large, simple randomized trials within cardiovascular disease (WACFAS trial and VITAL trial). Below I highlight four publications which outline recent discoveries from multicenter or randomized trials of cardiovascular disease prevention.

1. **Albert CM**, Cook NR, Gaziano JM, Zaharris E, MacFadyen J, Danielson E, Buring JE, Manson JE. Effect of folic acid and B vitamins on risk of cardiovascular events and total mortality among women at high risk for cardiovascular disease: a randomized trial. JAMA 2008;229:2027-36. PMCID: PMC2684623
2. Chatterjee NA, Moorthy MV, Pester J, Schaecter A, Panicker G, Narula D, Lee DC, Goldberger JJ, Kadish A, Cook NR, **Albert CM**. Sudden Arrhythmic Death in Coronary Heart Disease and Relatively Preserved LV Function. *JAMA Cardiol.* 2018;3:591-600. PMID: PMC6145665
3. Deo R, Safford MM, Khodneva YA, Jannat-Khan DP, Brown TM, Judd SE,McClellan WM, Shlipak MG, Soliman EZ, **Albert CM**. Differences in Sudden Cardiac Death Risk between Blacks and Whites. *J Am Coll Cardiol* 2018 72:2431-2439. PMID: 30442286. PMID:PMC Pending
4. Manson JE, Cook NR, Lee IM, Christen W, Bassuk SS, Mora S, Gibson H, **Albert CM**, Gordon D, Copeland T, D'Agostino D, Friedenberg G, Ridge C, Bubes V, Giovannucci EL, Willett WC, Buring JE, VITAL Research Group. Marine n-3 Fatty Acids and Prevention of Cardiovascular Disease and Cancer. N Engl J Med 2019;380:23-32. PMID: 30415637. PMID:PMC PMC6392053

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B. Positions and Honors

Positions and Employment

1997 – 2002 Instructor in Medicine, Harvard Medical School, Boston, MA

1998 – 1999	Clinical Assistant in Medicine, Massachusetts General Hospital, Boston, MA
1999 – 2006	Assistant in Medicine, Massachusetts General Hospital, Boston, MA
1999 – 2019	Associate Physician, Brigham and Women's Hospital, Boston, MA
2002 – 2007	Assistant Professor of Medicine, Harvard Medical School, Boston, MA
2005 – 2019	Director, Center for Arrhythmia Prevention, Brigham and Women's Hospital, Boston, MA
2007 – 2015	Associate Professor of Medicine, Harvard Medical School, Boston, MA
2015 – 2019	Professor of Medicine, Harvard Medical School, Boston, MA
2019 –	Epidemiologist, Brigham and Women's Hospital, Boston, MA
2019 --	Visiting Professor, Harvard Medical School, Boston, MA
2019 –	Chair of the Department of Cardiology and the Lee and Harold Kapelovitz Endowed Chair in Research Cardiology at Cedars-Sinai Medical Center, Los Angeles, CA

Major Relevant Committees

2009	Strategic Planning and Research Task Force, Heart Rhythm Society
2010	Prevention of Atrial Fibrillation Expert Workshop, National Heart Lung and Blood Institute
2010	Program Committee, National Scientific Sessions, American Heart Association
2010 – 2014	Program Committee, National Scientific Sessions, Heart Rhythm Society
2011	Sudden Cardiac Death Prediction and Prevention Expert Workshop, NHLBI
2014 –	Board of Trustees, Heart Rhythm Society
2017 – 2019	Vice President, Heart Rhythm Society
2019 –	President-Elect, Heart Rhythm Society

Major Editorial Positions

2008 –2016	Associate Editor, Circulation
2011 –	Editorial Board Member, Heart Rhythm
2016 –	Editorial Board Member, Circulation

Honors and Awards

1997	Astra-Merck Cardiovascular Young Investigators Forum: First Prize: Clinical Research
2001	Charles A. Dana Foundation's Brain-Body Invitational Award
2002	Doris Duke Innovation in Clinical Research Award
2003	Trudy Bush Fellowships for Cardiovascular Disease Research in Women's Health
2004	American Heart Association Poster Competition Winner, Population Science
2005	Lerner Research Prize, Brigham and Women's Hospital
2009	American Heart Association Established Investigator Award

C. Contribution to Science

My contributions to science have been in the broad area of epidemiology and prevention of heart rhythm disorders, focusing on sudden cardiac death (SCD) and atrial fibrillation (AF). Below, I highlight some of the areas where my research has had a significant contribution to the state of this broad area of science.

1. Studies examining the role of omega-3 fatty acids in preventing and predicting SCD

Early on in my career, I conducted some of the initial studies examining the role of omega-3 fatty acids in preventing and predicting SCD in healthy populations, which have been highly cited. These publications found that men who consumed fish or had high blood levels of omega-3 fatty acids had significantly lower risks of sudden cardiac death despite having similar risks for MI and other manifestations of heart disease. We later confirmed these findings for other sources of omega-3 fatty acids in women. These data are consistent with experimental data suggesting that omega-3 fatty acids have significant effects on cardiac electrophysiology and may be antiarrhythmic. Based upon this work and other subsequent accumulating supporting evidence, the AHA and Institute of Medicine (IOM) have recommended that adults eat at least two fish meals a week. Other international authorities, including the European Society of Cardiology, World Health Organization/Food and Agriculture Organization, U.K. Scientific Advisory on Nutrition, and the Australian National Health and Medical Research Council, have also found the overall evidence compelling enough to recommend increased EPA and DHA intakes. These discoveries have also led to subsequent randomized trials, including my most recent R01, which will examine the impact of omega-3 fatty acids on primary prevention of AF and SCD.

a. **Albert CM**, Hennekens CH, O'Donnell CJ, Ajani UA, Carey VJ, Willett WC, Ruskin JN, Manson JE. Fish consumption and risk of sudden cardiac death. JAMA. 1998;279(1):23-8. PMID: 9424039
b. **Albert CM**, Campos H, Stampfer MJ, Ridker PM, Manson JE, Willett WC, Ma J. Blood levels of long-chain n-3 fatty acids and the risk of sudden death. N Engl J Med. 2002;346(15):1113-8. PMID: 11948270
c. **Albert CM**, Oh K, Whang W, Manson JE, Chae CU, Stampfer MJ, Willett WC, Hu FB. Dietary alpha-linolenic acid intake and risk of sudden cardiac death and coronary heart disease. Circulation. 2005;112(21):3232-8. PMID: 16301356
d. Chiuve SE, Rimm EB, Sandhu RK, Bernstein AM, Rexrode KM, Manson JE, Willett WC, **Albert CM**. Dietary fat quality and risk of sudden cardiac death in women. Am J Clin Nutr. 2012;96(3):498-507. PMID: 22854398; PMC3417213

2. Identification of modifiable risk factors of importance and impact on heart rhythm disorders

I have had a long standing interest in the identification of modifiable risk factors that have an important and differential impact on heart rhythm disorders (AF and SCD) as compared to other manifestations of heart disease. These most notably include work examining the duality of benefit and risk associated with vigorous exercise and alcohol intake on SCD and AF risk in men and women. With respect to exercise, we found that vigorous exertion can trigger SCD even in healthy individuals who exercise regularly, and this risk is now well recognized, and placement of automatic external defibrillators (AED) at all health/fitness facilities is encouraged by the American Heart Association and the American College of Sports Medicine. However, we also demonstrated that long-term exercise significantly modifies the risk of SCD in men and completely eliminates this risk among women. Based upon these and other data, gradual entry into conditioning/exercise programs for sedentary persons has been recommended to reduce the risk of SCD and other acute coronary heart disease (CHD) events. We also reported on a slightly-elevated risk of AF in men who exercise vigorously on most days of the week. This relationship is contrary to what has been found for coronary heart disease, but has been replicated in multiple studies examining male athletes. With respect to alcohol, as compared to the inverse linear relationship observed with myocardial infarction, we have reported positive associations for atrial fibrillation, which have been replicated in multiple studies, as well as the U-shaped association for sudden cardiac death. In totality, these data suggest that higher levels of alcohol intake at two or more drinks per day may have proarrhythmic properties.

a. **Albert CM**, Mittleman MA, Chae CU, Lee IM, Hennekens CH, Manson JE. Triggering of sudden death from cardiac causes by vigorous exertion. N Engl J Med. 2000;343(19):1355-61. PMID: 11070099
b. Whang W, Manson JE, Hu FB, Chae CU, Rexrode KM, Willett WC, Stampfer MJ, **Albert CM**. Physical exertion, exercise, and sudden cardiac death in women. JAMA. 2006;295(12):1399-403. PMID: 16551711
c. Conen D, Tedrow UB, Cook NR, Moorthy MV, Buring JE, **Albert CM**. Alcohol consumption and risk of incident atrial fibrillation in women. JAMA. 2008;300(21):2489-96. PMID: 19050192; PMC2630715
d. Aizer A, Gaziano JM, Cook NR, Manson JE, Buring JE, **Albert CM**. Relation of vigorous exercise to risk of atrial fibrillation. Am J Cardiol. 2009;103(11):1572-7. PMID: 19463518; PMC2687527

3. Epidemiology of SCD in women

I have published much of the formative literature on the epidemiology of SCD in women. Previously, there had been a paucity of data regarding the epidemiology of SCD in women. At the beginning of my career, I demonstrated that women who had experienced a cardiac arrest were less likely to have underlying coronary heart disease or left ventricular dysfunction than men, Therefore, optimal prevention and treatment of SCD may differ between the sexes. I expanded my investigations on SCD to a large cohort of women in the Nurses' Health Study to obtain adequate power to study this important outcome in women. In this population, the majority of SCDs occurred in women without a history of known cardiac disease (69%); therefore, primary prevention through risk factor modification in women is of the utmost importance. Since then, this research has identified several dietary, lifestyle, and psychological risk factors, which are modifiable, that impact SCD risk in women. Combinations of these favorable lifestyle factors (not smoking, regular exercise, Mediterranean diet, and healthy weight) were associated with dramatic reductions in SCD risk. Therefore, widespread adoption of healthy lifestyle could make a substantial impact on mortality from SCD. These data were incorporated into the 2013 Update of the Cardiac Arrest section of the AHA Heart Disease and Stroke Statistics and are consistent with the American Heart Association's 2020 Impact Goal of further lowering cardiovascular disease (CVD) mortality.

a. **Albert CM**, Chae CU, Grodstein F, Rose LM, Rexrode KM, Ruskin JN, Stampfer MJ, Manson JE. Prospective study of sudden cardiac death among women in the United States. Circulation. 2003;107(16):2096-101. PMID: 12695299
b. Whang W, Kubzansky LD, Kawachi I, Rexrode KM, Kroenke CH, Glynn RJ, Garan H, **Albert CM**. Depression and risk of sudden cardiac death and coronary heart disease in women: results from the Nurses' Health Study. J Am Coll Cardiol. 2009;53(11):950-8. PMID: 19281925; PMC2664253
c. Chiuve SE, Korngold EC, Januzzi JL Jr, Gantzer ML, **Albert CM**. Plasma and dietary magnesium and risk of sudden cardiac death in women. Am J Clin Nutr. 2011;93(2):253-60. PMID: 21106914; PMC3021423
d. Chiuve SE, Fung TT, Rexrode KM, Spiegelman D, Manson JE, Stampfer MJ, **Albert CM**. Adherence to a low-risk, healthy lifestyle and risk of sudden cardiac death among women. JAMA. 2011;306(1):62-9. PMID: 21730242; PMC3210472

4. Understanding the biologic and genetic bases of AF and SCD

With the assistance of national and international collaborators, I have also made major advances in our understanding of the biologic and genetic bases of AF and SCD. I was the first to identify that rare variants in ion channels are associated with SCD among apparently healthy women and, most recently, we identified nine common loci, which predispose to AF and demonstrated how this genetic information may be used to advance AF risk prediction in women. I have also made important discoveries regarding the utility of biomarkers for SCD prediction.

a. **Albert CM**, Ma J, Rifai N, Stampfer MJ, Ridker PM. Prospective study of C-reactive protein, homocysteine, and plasma lipid levels as predictors of sudden cardiac death. Circulation. 2002;105(22):2595-9. PMID: 12045163
b. **Albert CM**, Nam EG, Rimm EB, Jin HW, Hajjar RJ, Hunter DJ, MacRae CA, Ellinor PT. Cardiac sodium channel gene variants and sudden cardiac death in women. Circulation. 2008;117(1):16-23. PMID: 18071069
c. Ellinor PT*, Lunetta KL*, **Albert CM***, Glazer NL*, Ritchie MD*, Smith AV*, Arking DE*, Müller-Nurasyid M*, Krijthe BP*, Lubitz SA*, Bis JC*, Chung MK*, Dörr M*, Ozaki K*…Tanaka T*, Stricker BH*, Felix SB*, Alonso A*, Darbar D*, Barnard J*, Chasman DI*, Heckbert SR*, Benjamin EJ*, Gudnason V*, Kääb S*. Meta-analysis identifies six new susceptibility loci for atrial fibrillation. Nat Genet. 2012;44(6):670-5. PMID: 22544366; PMC3366038 (* authors contributed equally to the work)
d. Everett BM, Cook NR, Conen D, Chasman DI, Ridker PM, **Albert CM**. Novel genetic markers improve measures of atrial fibrillation risk prediction. Eur Heart J. 2013;34(29):2243-51. PMID: 23444395; PMC3730133

Complete list of Published work in MyBibliography
http://www.ncbi.nlm.nih.gov/sites/myncbi/1vw7UFyZn61Qo/bibliography/47778377/public/?sort=date&direction=ascending

D. Research Support

ACTIVE GRANTS

5 R01 HL091069 (Albert) 09/15/08 – 01/31/21 Role: Principal Investigator
NIH/NHLBI
PRE-DETERMINE: Biologic Markers and MRI SCD Cohort Study
The overall goal of the study is to advance SCD risk prediction in patients with CHD and relatively preserved systolic dysfunction through the use of combinations of easily measured biomarker and electrocardiographic parameters to identify patients at higher risk of arrhythmic mortality as opposed to other causes of mortality in this at-risk population.

5 R01 HL116690 (Albert)
NIH/NHLBI 07/09/13 – 06/30/21 Role: Principal Investigator
The VITAL Rhythm Study
In this application, we propose an ancillary study to ascertain and adjudicate atrial fibrillation (AF) outcomes for the primary aim of testing whether omega-3 fatty acid and/or vitamin D supplementation influences AF risk in the general population. We will also examine the impact of these agents on intermediate phenotypes for heart rhythm disorders (electrocardiographic parameters), as well as explore effects on arrhythmic death.

Roche (Albert)
PRE-DETERMINE: Biologic Markers and MRI 06/09/16 –06/08/21 Role: Principal Investigator
SCD Cohort Study
Ancillary funding to support the planned biomarker measurements in the PRE-DETERMINE Cohort Study, which seeks to identify patients at a substantially higher risk of arrhythmic death among CHD patients with preserved left ventricular ejection fractions (LVEF>35%) by combining promising genetic and protein biomarker analyses with advanced substrate imaging with contrast enhanced cardiac MRI.

St. Jude Medical Foundation (Albert) 04/26/16 – 04/25/21 Role: Principal Investigator
Extended and Augmented Follow-up of
PRE-DETERMINE: Biologic Markers and MRI SCD Cohort Study
Ancillary funding for interim support and to augment patient follow-up and endpoint adjudication activities in the PRE-DETERMINE Cohort Study and PRE-DETERMINE Registry, which are seeking to identify patients at a substantially higher risk of arrhythmic death among CHD patients.

Novo Nordisk Foundation 07/01/15-12/31/19 Role: PI of Subcontract
Risk Factors for Sudden Cardiac Death during Acute Myocardial Infarction (MI RISK)
Three prospective studies will be utilized to determining predisposition to ventricular arrhythmia in the presence of AMI as part of a consortium, consisting of 4 internationally recognized complementary research groups with expertise's spanning from patient to animal model to molecular biology to computer simulation

RECENTLY COMPLETED PROJECTS

13SDG14580030 (Hart)
American Heart Association (National) 01/01/13 – 12/31/16 Role: Mentor
Ambient Pollution Exposures and Risk of Sudden Cardiac Death in Women
We will examine the association between long- and short-term exposures to particulate matter and to determine if these associations vary by region of the country.

R01 HL131687 (Djousse) 04/01/17 – 03/31/21 Role: Co-Investigator
NIH/NHLBI
Effects of Vitamin D and Omega 3 Fatty Acids on Incidence Rate of Heart Failure
The goal of this project is to examine the effects of omega-3 fatty acids and vitamin D supplements versus their respective placebos on the incidence of heart failure in a randomized trial of 25,874 adults.

2 U01 CA138962 (Manson/Buring)
NIH/NCI
The VITAmin D and Omega-3 Trial (VITAL) 09/29/09 – 05/31/20 Role: Co-Investigator.
The goal of this study is to conduct a large, cost-effective, randomized, double-blind, placebo-controlled, 2x2 factorial trial of vitamin D (in the form of D3 [Cholecalciferol]) and marine omega-3 fatty acid (eicosapentaenoic acid [EPA] + docosahexaenoic acid [DHA]) supplements in the primary prevention of cancer and cardiovascular disease (CVD).

Abbott (Albert) 06/09/16 –06/08/21 Role: Principal Investigator
Role: Principal Investigator
PRE-DETERMINE: Biologic Markers and MRI SCD Cohort Study
Ancillary funding to support the measurement of Gal-3 and hs-cTnI in the PRE-DETERMINE Cohort Study, to determine the utility of these markers in prediction of arrhythmic death in CHD patients with preserved left ventricular ejection fractions (LVEF>35%).