Project Overview and Goals:

The current study will examine the relationship between screen-based (hours of television and computer per day) and transport-based (hours of transporting as driver or passenger per day) sedentary behavior with a dichotomous indicator of high cardiovascular disease (CVD) risk based on the 30-year Framingham risk score. Covariates include physical activity, diet, alcohol use and sleep. Data for this investigation has been collected by the United Kingdom Biobank, a prospective cohort-study that is comprised of ~500,000 participants aged 40 to 69 years, who enrolled from 2006 to 2010, and will be prospectively followed for at least 25 years. The specific goal of this project is as follows: Is sedentary behavior associated with cardiovascular risk in the UK Biobank sample?

Introduction (Problem, Significance, Background):

One in three deaths are attributed to CVD, both nationally and globally [1,2]. According to the American Heart Association (AHA), 95% of adult Americans do not satisfy the profile for ideal heart health [2, 3], thus limiting the potential of reaching the AHA 2020 goal of improving the cardiovascular health of all Americans by 20% while reducing death from cardiovascular diseases and stroke by 20%. Reaching this goal requires novel, efficacious, achievable and sustainable CVD prevention measures [4, 5].

Sedentary behavior is now recognized as a separate construct to physical activity [6], and is a demonstrated prognostic indicator of higher triglycerides-high-density lipoprotein cholesterol ratio, as well as higher body mass index, waist circumference, body fat percentage [7-10] and death [11]. Yet, sedentary behavior remains unrecognized as an independent risk factor for CVD as demonstrated by its omission from the most widely used and validated composite CVD risk scores (AHA's "Simple 7"[3], the Framingham Heart Score [12], and the European Heart Score [13]). Sedentary behavior may be more amenable to long-term individual change than other CVD risk factors, such as physical activity. Limiting the development of effective interventions to reduce sedentary behavior is the absence of objective, empirically supported guidelines for adult sedentary behavior.

The current study will address these empirical and theoretical gaps by examining the extent to which two different forms of sedentary behavior (screen-based and transport) predict cardiovascular risk and identify a threshold of sedentary time that is predictive of greater risk, independent of key covariates (including physical activity). This study will be one of the first to examine these questions at the population level using objective, verified data.

An Interdisciplinary Project (why interdisciplinary, fields of contribution, collaborator contributions):

The etiology of health behavior is interdisciplinary, drawing from the fields of epidemiology and biostatistics, medicine and physiology, psychology, public health and public policy. Convergent with this model, the current study poses interdisciplinary research questions that are presented by an interdisciplinary team of collaborators from the fields listed (see Table 1). The range and depth of expertise presented by this team will ensure a rigorous process with meaningful results.

Collaborator	Area of Expertise
Michael A. Grandner, PhD	Clinical Psychology, Sleep and Cardiovascular Health

Alexandra L. Hanlon, PhD	Biostatistics, SPECIFIC MODELING?
Susan K. Malone, PhD., RN	Nursing, Sleep and Cardiometabolic Health
Freda Patterson, PhD	Public Health and Epidemiology, Cardiovascular Risk Behaviors and Multiple Health Behavior Change
Richard Suminiski, PhD	Exercise Physiology, Physical Activity, Built Environment

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