

**ARIC Manuscript Proposal # 2964**

**PC Reviewed:** 04/11/17  
**SC Reviewed:** \_\_\_\_\_

**Status:** \_\_\_\_\_  
**Status:** \_\_\_\_\_

**Priority:** 2  
**Priority:** \_\_\_\_\_

**1.a. Full Title:** Television Watching and Incident Venous Thromboembolism: the Atherosclerotic Risk in Communities Study

**b. Abbreviated Title (Length 26 characters):** Watching TV and VTE

**2. Writing Group:**

Writing group members: Yasuhiko Kubota, Mary Cushman, Wayne D. Rosamond, Aaron Folsom

I, the first author, confirm that all the coauthors have given their approval for this manuscript proposal. YK [please confirm with your initials electronically or in writing]

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**ARIC author** to be contacted if there are questions about the manuscript and the first author does not respond or cannot be located (this must be an ARIC investigator).

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**3. Timeline:**

Data analysis: 1-2 months from manuscript approval date.

First draft of the manuscript: 2-3 months from manuscript approval date.

**4. Rationale:**

Television (TV) watching is the most common sedentary behavior in many populations around the world (1). Sedentary behaviors such as prolonged TV watching have been suggested to be associated with health impairments including major cardiovascular diseases, independent of physical activity (1–6). In recent decades, an increase in the

number of TV sets and hours spent watching TV has been in parallel with increasing obesity (6).

Venous thromboembolism (VTE), manifested by deep venous thrombosis (DVT) and pulmonary embolism (PE), is a common medical problem with a substantial increase in the incidence rate of VTE, mostly due to an increasing incidence of PE (7). Patients who develop VTE have high mortality rates of 11–30% per annum (8). Thus, VTE is an important public health concern and is very important to prevent. A recent study reported a positive association between TV watching and risk of mortality from pulmonary embolism in an Asian population (9). To date, however, there is no prospective study investigating the association between TV watching and VTE risk in Western populations. VTE incidence is higher in Western populations than in Asian populations (7), and thus, there may be a great deal of interest in a study of TV watching and VTE in Western populations.

Therefore, we sought to test the hypothesis that the frequency of TV watching in ARIC is positively associated with incident VTE risk independent of other VTE risk factors.

#### **5. Main Study Questions:**

Greater frequency of TV watching is associated with increased incident VTE risk independent of other VTE risk factors.

#### **6. Design and analysis (study design, inclusion/exclusion, outcome and other variables of interest with specific reference to the time of their collection, summary of data analysis, and any anticipated methodologic limitations or challenges if present).**

##### Design

Prospective cohort (ARIC)

##### Inclusion/exclusion criteria

Inclusion: Participants who provided information on TV watching in the Baecke questionnaire at visit 1.

Exclusion: Those who had prevalent VTE or used anti-coagulants at visit 1.

##### Main exposure

TV watching (never, seldom, sometimes, often, very often) at visit 1.

##### Covariates

Potential confounders: Age, sex, race/ARIC field center, smoking status, physical activity (AHA recommendation levels), estimated GFR, and prevalent cardiovascular disease (coronary heart disease, heart failure and stroke).

Potential mediators: body mass index, hypertension, and diabetes mellitus at visit 1.

##### Endpoints

Incident VTE from visit 1 through 2011, which are validated.

### Statistical analysis

Firstly, covariates will be presented according to frequency of TV watching.

Secondly, hazard ratios and their 95% confidence intervals for incident VTE will be calculated using Cox proportional hazard models in relation to frequency of TV watching.

- Model 1: adjustment for age, sex, race, and ARIC study site.
- Model 2 (main model): Model 1 + adjustment for smoking status, physical activity, estimated GFR, and prevalent cardiovascular disease.
- Model 3 (mediator analysis): Model 2 + adjustment for potential mediators.

We will also check joint associations and test interactions between physical activity and TV watching and between body mass index and TV watching with the outcome of VTE (5, 6).

### Limitation

ARIC measured frequency of TV watching qualitatively, but not actual time spent during TV watching.

**7.a. Will the data be used for non-CVD analysis in this manuscript?**

Yes  No

**b. If Yes, is the author aware that the file ICTDER03 must be used to exclude persons with a value RES\_OTH = “CVD Research” for non-DNA analysis, and for DNA analysis RES\_DNA = “CVD Research” would be used?**  Yes  No

(This file ICTDER has been distributed to ARIC PIs, and contains the responses to consent updates related to stored sample use for research.)

**8.a. Will the DNA data be used in this manuscript?**

Yes  No

**8.b. If yes, is the author aware that either DNA data distributed by the Coordinating Center must be used, or the file ICTDER03 must be used to exclude those with value RES\_DNA = “No use/storage DNA”?**

Yes  No

**9. The lead author of this manuscript proposal has reviewed the list of existing ARIC Study manuscript proposals and has found no overlap between this proposal and previously approved manuscript proposals either published or still in active status.** ARIC Investigators have access to the publications lists under the Study Members Area of the web site at: <http://www.csc.unc.edu/ARIC/search.php>

Yes  No

**10. What are the most related manuscript proposals in ARIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)?**

**Multiple ARIC papers on individual outcomes. For example:**

#616: Associations of television watching with physical activity, diet, and weight status

#708: Cardiovascular risk factors and venous thromboembolism incidence: The Longitudinal Investigation of Thromboembolism Etiology (LITE) Study (PMID: 22782466)

**11.a. Is this manuscript proposal associated with any ARIC ancillary studies or use any ancillary study data?  Yes  No**

**11.b. If yes, is the proposal**

**A. primarily the result of an ancillary study (list number\* 2006.16)**  
 **B. primarily based on ARIC data with ancillary data playing a minor role (usually control variables; list number(s)\* \_\_\_\_\_ )**

\*ancillary studies are listed by number at <http://www.csc.unc.edu/aric/forms/>

**12a. Manuscript preparation is expected to be completed in one to three years. If a manuscript is not submitted for ARIC review at the end of the 3-years from the date of the approval, the manuscript proposal will expire.**

**12b. The NIH instituted a Public Access Policy in April, 2008** which ensures that the public has access to the published results of NIH funded research. It is **your responsibility to upload manuscripts to PUBMED Central** whenever the journal does not and be in compliance with this policy. Four files about the public access policy from <http://publicaccess.nih.gov/> are posted in <http://www.csc.unc.edu/aric/index.php>, under Publications, Policies & Forms. [http://publicaccess.nih.gov/submit\\_process\\_journals.htm](http://publicaccess.nih.gov/submit_process_journals.htm) shows you which journals automatically upload articles to Pubmed central.

**13. Per Data Use Agreement Addendum for the Use of Linked ARIC CMS Data, approved manuscripts using linked ARIC CMS data shall be submitted by the Coordinating Center to CMS for informational purposes prior to publication.**

Approved manuscripts should be sent to Pingping Wu at CC, at [pingping\\_wu@unc.edu](mailto:pingping_wu@unc.edu). I will be using CMS data in my manuscript  Yes  No.

**References:**

1. Grøntved A, Hu FB. Television viewing and risk of type 2 diabetes, cardiovascular disease, and all-cause mortality: a meta-analysis. *JAMA*. 2011 Jun 15;305(23):2448-55. doi: 10.1001/jama.2011.812.
2. Wilmot EG1, Edwardson CL, Achana FA, Davies MJ, Gorely T, Gray LJ, Khunti K, Yates T, Biddle SJ. Sedentary time in adults and the association with diabetes, cardiovascular disease and death: systematic review and meta-analysis. *Diabetologia*. 2012 Nov;55(11):2895-905. doi: 10.1007/s00125-012-2677-z. Epub 2012 Aug 14.
3. Biswas A, Oh PI, Faulkner GE, Bajaj RR, Silver MA, Mitchell MS, Alter DA. Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: a systematic review and meta-analysis. *Ann Intern Med*. 2015 Jan 20;162(2):123-32. doi: 10.7326/M14-1651.
4. Chomistek AK, Manson JE, Stefanick ML, Lu B, Sands-Lincoln M, Going SB, Garcia L, Allison MA, Sims ST, LaMonte MJ, Johnson KC, Eaton CB. Relationship of sedentary behavior and physical activity to incident cardiovascular disease: results from the Women's Health Initiative. *J Am Coll Cardiol*. 2013 Jun 11;61(23):2346-54. doi: 10.1016/j.jacc.2013.03.031. Epub 2013 Apr 10.
5. Young DR, Reynolds K, Sidell M, Brar S, Ghai NR, Sternfeld B, Jacobsen SJ, Slezak JM, Caan B, Quinn VP. Effects of physical activity and sedentary time on the risk of heart failure. *Circ Heart Fail*. 2014 Jan;7(1):21-7. doi: 10.1161/CIRCHEARTFAILURE.113.000529.
6. Hu FB, Li TY, Colditz GA, Willett WC, Manson JE. Television watching and other sedentary behaviors in relation to risk of obesity and type 2 diabetes mellitus in women. *JAMA*. 2003 Apr 9;289(14):1785-91.
7. Heit JA. Epidemiology of venous thromboembolism. *Nat Rev Cardiol*. 2015 Aug;12(8):464-74. doi: 10.1038/nrcardio.2015.83.
8. Kubota Y, McAdams-DeMarco M, Folsom AR. Serum uric acid, gout, and venous thromboembolism: The atherosclerosis risk in communities study. *Thromb Res*. 2016 Aug;144:144-8. doi: 10.1016/j.thromres.2016.06.020.
9. Shirakawa T, Iso H, Yamagishi K, Yatsuya H, Tanabe N, Ikehara S, Ukawa S, Tamakoshi A. Watching Television and Risk of Mortality From Pulmonary Embolism Among Japanese Men and Women: The JACC Study (Japan Collaborative Cohort). *Circulation*. 2016 Jul 26;134(4):355-7. doi: 10.1161/CIRCULATIONAHA.116.023671.