**Cardiovascular Epidemiology Pedometer Assignment 2025**

We have collected step data from pedometers and Actigraphs worn by students enrolled in this class since 2012. We also collected self-reported physical activity data from students using a physical activity questionnaire.

These data have been entered in a database and provided to you in Stata format (pedometer\_data\_2012\_2025.dta) on the CoursePlus website. Using these data, we would like you to perform analyses and answer the questions below.

A Stata program (“Pedometer Assignment 2025.do”) for figures, summary statistics, and regression models is also provided to help answer the questions. The program contains example codes to generate figures and summary statistics. You do not need to include every result in your write-up but make sure to include what is relevant to help you best answer the question.

**This assignment is due via CoursePlus DropBox before 1:30 pm on Wednesday, February 26.**

Please answer the following questions succinctly:

1. Using figures and/or summary statistics, display data showing the (a) between-person variability, (b) within-person variability, and (c) measurement error related to the pedometer step data. Provide informative titles for each table and/or graph, carefully label each axis, and provide additional information in legends if necessary. Summarize the interpretation of results for (a), (b), and (c) in 1-2 sentences.
2. ***Note: For this question only, we will be using data from the years 2016-2025 (excluding 2021), due to Actigraph data usage limitations.***

Using figures and/or summary statistics, provide data showing measurement error between the types of pedometers (Actigraph and SM-2000/PINGKO pedometers) from data collected in 2016–2025 (excluding 2021). Follow the same procedures for appropriate table and/or graph creation provided above.

* 1. Summarize the interpretation of results in 1-2 sentences.
  2. In another 2-3 sentences, discuss the variability of these data keeping the following questions in mind.
     + What are potential reasons for differences between the pedometers?
     + Which do you think better reflected the true number of steps (Actigraph or SM-2000/PINGKO pedometer)?
     + Which of the two pedometers would you prefer to use and why?

1. We have created two overall physical activity scores based on the 30-day physical activity questionnaire answers from 2012-2025 (the variable “active”, defined in do-file) and the 2-day physical activity questionnaire answers from 2021–25 (the variable “active\_2day”). Physical activity score values range from -1 to 5 points (higher score representing higher activity level) and combine the responses for types of physical activity (walking/biking for errands, vigorous, moderate, and strengthening activity) with a penalty for high television or computer use. You can analyze either the 30-day variable “active” (Option 1) or the 2-day variable “active\_2day” (Option 2) to answer the following questions:
   1. Use a linear regression model to determine whether the overall self-reported physical activity score is associated with the pedometer data (you can use the mean number of steps over two days as the pedometer data outcome). State the null and alternative hypotheses you are testing and summarize the regression results in 1-2 sentences.
   2. Are the results surprising? How might you improve on the study design with the same sample size?
   3. The overall activity score we developed is a simple scoring system accounting for types of self-reported physical activity. How could this variable be improved to better quantify overall physical activity using other data collected in this physical activity questionnaire?
2. Present the results of your analysis in **Question 3a** in a table and summarize your methods, results, and conclusions in a structured abstract (5 sections: Background, Hypothesis, Methods, Results, Conclusions) as if for submission to a scientific meeting (must be 300 words or less for the text; the table is not included as part of this word count). Report the word count.