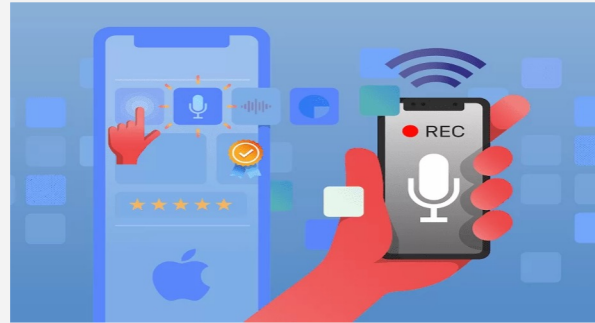# BEWELL: Sleep Diagnosis Research Design

Megan Nguyen, Kelly Short, Mahmoud Ghanem, Ayoade Israel

# Overview

*BeWell, our wellness application, tracks all these key wellness topics, but rather than having to manually input and type information, we leverage wearable technology and voice recordings*





The key focus of our research will be around the topic of sleep.

Insomnia is a prevalent and significant sleep disorder; seen in approximately 33-50% of adults.

# Research Question

**Does mixed use of user voice input and wearable tech data improve the prediction of the quality of sleep based on indicators such as physical activities, caffeine/alcohol intake, and screen time leveraging OpenAI's Whisper and the BeWell Application?**

Sub Questions:
- Does increase in screen time before bed drive worse sleep quality?
- Are highly active people prone to better sleep quality?
- How does alcohol and caffeine affect someone's sleep quality?
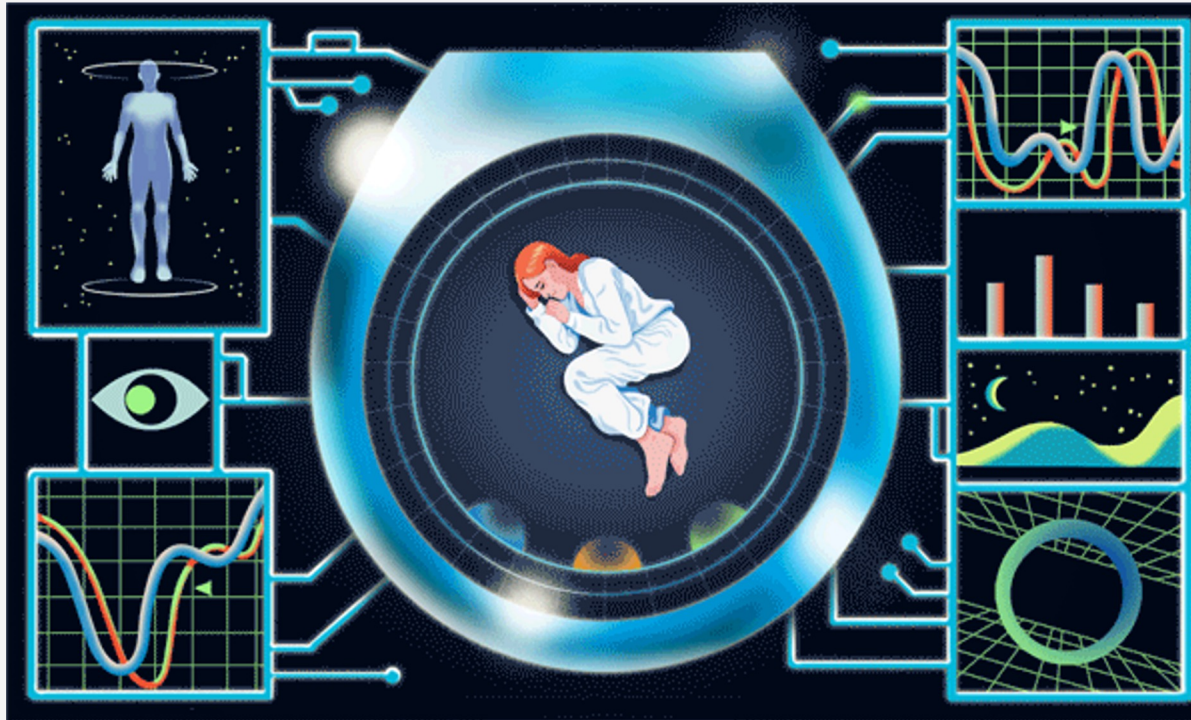- Do age or gender have an affect on someone's sleep quality?

# Study Design

- Quantitative / Observational Study

- Case Control Method
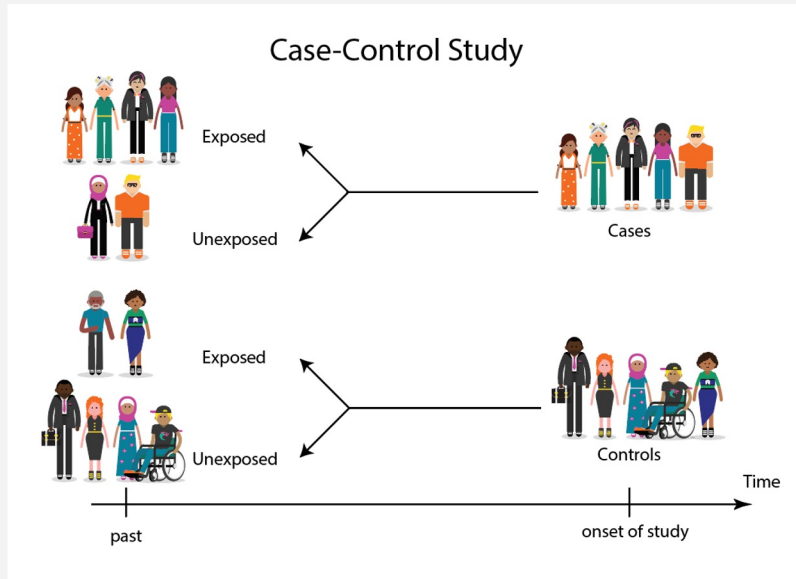


Starts with the outcome of interest (good quality sleep) and looks back in time for exposures that likely caused the outcome of interest (activeness during the day, low screen time, etc.).
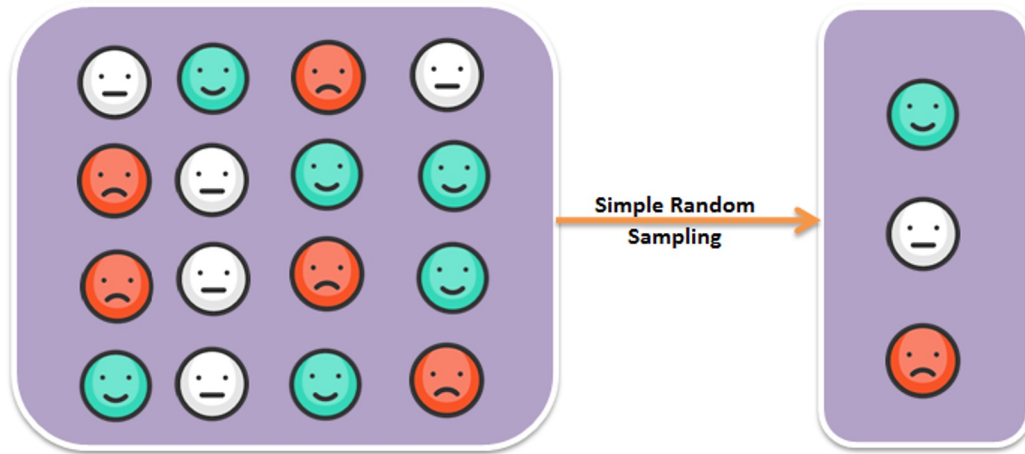
# Data



- **Profile information:**
  - Age.
  - Gender.
- **Daily activities:**
  - Steps.
  - Miles.
  - Standing time.
  - Screen time.
  - Activities.
- **Sleep-related nutrition:**
  - Caffeine.
  - Alcohol.

# Sample



**- Population:**

An equal representation of users in the United States. We want to look at all demographics.

**- Sample Frame:**

All users who use the BeWell Application and record sleep information. This will help target those who are health conscious and care about their sleep.

**- Sample:**

Our Sample will be random users of BeWell app participants enrolled in the study.
We will target collecting a large sample of 5000 users data of (6 months) for both control and treatment groups.

# Variables
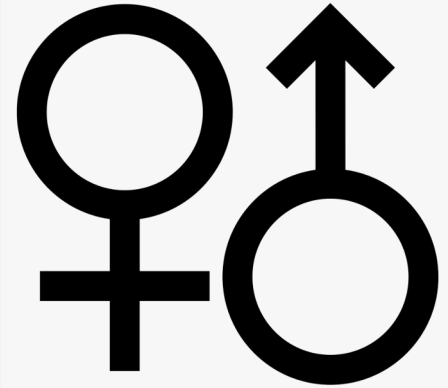
# Statistical Methods

- Case Control Statistical Method will be used
  - Researcher identifies people with existing health problem
  - Compares to similar group without problem
  - Compare with respect exposure

- Example
  - Compare someone who watches television vs someone who doesn't

# Potential Risks

- Privacy
  - Am I being tracked?
- Selection Bias
  - Who opt in vs who doesn't?
- Response Bias
  - Record or not record some data?
- Wearable Technology Bias
  - Is everything automated and accurate?
- Sample Size
  - Are there sufficient volunteers?
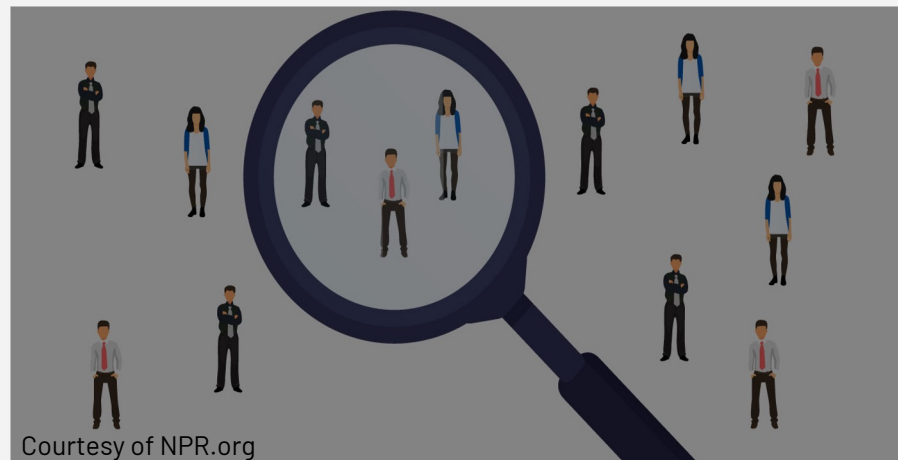
Courtesy of NPR.org

Courtesy of Telusinternational.com

# Deliverables

- This project will take about 11 months to complete. This project will be done in 5 phases which includes:
  - Phase 1 – Conducting sampling and defining the users (1 month)
  - Phase 2 – Reaching out to the user to get consent for data collection and study (1 month)
  - Phase 3 – Data collection and study (6 months)
  - Phase 4 – Research execution (2 months)
  - Phase 5 – Research result and presentation (1 month)

## 11 Months Project Timeline

| Phases: | First 2 Months | | | | | | Next 6 Months | | | | | | | Then 2 months Later | | | | | | | Last Month | | | | | | | Status: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | |
| Phase 1 | Conducting sampling and defining the users | | | | | | | | | | | | | | | | | | | | | | | | | | | completed |
| Phase 2 | | | Outreach and consent request | | | | | | | | | | | | | | | | | | | | | | | | | in progress |
| Phase 3 | | | | | | | | Data collection and study | | | | | | | | | | | | | | | | | | | | not started |
| Phase 4 | | | | | | | | | | | | | | Research execution | | | | | | | | | | | | | | not started |
| Phase 5 | | | | | | | | | | | | | | | | | | | | Research closure | | | | | | | | not started |