**Data (3 points)**

The BRFSS is a continuous, cross sectional survey focused on health. It is conducted annually across all states in America, as well some participating US territories. The survey consists of one core module, plus rotating modules that change each year. The core module is asked in all areas, and each area also has its own rotating module it may ask.

Data collection is handled by each area separately. Areas must follow the BRFSS protocols, but may opt to contract a private company, university or conduct the interviews internally themselves. Care is taken with the interview schedule, designed to ensure a representative sample. For example, there is a 20% limit on the number of weekday interviews that can be collected, and the schedule is altered to accommodate National holidays, and special events.

Surveys within each area are conducted via telephone, with two samples: 80% landline and 20% cellular, each with their own sampling design. Many areas design these samples within substate geographical regions such as county or public health district., with telephone numbers sampled based on substate regions. The landline sample is designed using a disproportionate stratified sample (DSS). The sample is divided into 2 groups – the first with a high proportion of target numbers, the second with a low proportion of target numbers. A 1:1.5 landline sampling ratio is applied, which results in a more efficient sampling method than simple random sampling. The cellular sample is randomly generated from a sample frame of confirmed geographical codes. Each area conducts 4000 interviews a year. A random sample of 5% of interviews are called back to verify data quality.

The data is weighted, to account for any bias resulting from the sampling method. Design weighting takes into account the number of phones and adults within each household. While iterative proportional weighting is used to ensure the sample is representative by several demographic characteristics including sex, age, race, education, marital status, home ownership, phone ownership (landline telephone, cellular telephone or both) and sub-state region. Note – in this exploration of the data, we will use unweighted data for simplicity.

The BRFSS is an observational study, using random sampling. That means we can generalise our conclusions to the population of American adults. However random assignment was not used. So although we can observe interesting relationships between different factors, and hypothesise what they might mean – we will not be able to prove causation (whether or not one factor drives another).

**Research questions (11 points)**

NB. For the sake of this analysis the data has not been weighted.

Must involve 3 variables per question

HEALTH IN LAST 30 DAYS - mental and physical - is there a correlation between the 2? How does this differ by demographic? Is there a connection with time of the month?

Prevalenace of mental health vs. physical, then the overlap

Connection between mental health and physcial? Prevalence of mental vs. physical? The impact of mental vs. physical? Overlap?

Link in attitudes to mental health?

People are more likely to be suffering from an illness in the winter months. But there is not a clear correlation between mental health and time of year.

PICK out states with bigger changes in temperature – overlay temperature! And overlay state, and demographic, and see if there’s anything interesting.

THEN look at the overlap between the two

**Reference materials**

Info on weighting: <https://www.cdc.gov/brfss/data_documentation/pdf/UserguideJune2013.pdf>

**Question 1 – mental vs. physical health over the past 30 days**

**Cut out the “by month” element**

Cut out people who say 30??

Difference between Physical and mental health

Cut by age, gender

And then cut through to the impact this had???? (poorhlth)

**This could have consequences for working population and should be monitored over time would be interesting to compare this to a time series**

This exploratory analysis of the BFRSS data set, will focus on the physical and mental health of the US population, and seek to answer the following questions:

**Q1: How healthy is the US population?**

In this study respondents identified the number of days in the past 30 when their health was not good. This was recorded for physical and mental health separately. Here we are interested to see the average number of unwell days, and how physical and mental health compare. We’ll start by looking at the distribution of our two variables in figure X.

**Distribution of key variables**

Both variables show a prominent spike at zero days, showing a clear majority of those who did not have any unwell days. The data drops off steeply, but has a long right skew up to 10 days, and spikes at 20 and 30 days, suggesting a minority suffering from longer term health issues.

**Summary stats**

To explore this further we’ll group our numeric variable in to bands – focusing on 0 days, 1-9 days, and 10+ days unwell. Comparing physical and mental health in chart X, shows the average number of unwell days is higher for physical than mental health. This could suggest that physical health problems are more prevalent than mental health problems. Although we should be careful with these self-reported statistics – from other studies we see there remains a stigma around mental health, and arguably it is less well understood.

**Chart showing bands – of both physical and mental health – first show the 50% who have at least 1 health problem, then show the overlap**

When we consider both physical and mental health, we see that 50% had at least one day in the past 30 where they have felt either physically or mentally unwell. This figure seems high, especially when you consider the potential impact on the US working population, if these unwell days translate to days off work. Therefore, in question 3 we’ll explore how this varies by demographic - particularly focusing on differences between working age, and retired age groups. Possibly make this question 2!!!

coffee4wifi

**Chart showing overlap**

**Q2: Is there a relationship between mental and physical health issues?**

In particular, we’ll explore if those who have had felt physically unwell in the last 30 days more likely to have also felt mentally unwell.

Exploring figure X further shows a strong overlap between physical and mental health, with 17% of the population having been unwell both physically and mentally unwell at least once in the last 30 days.

Using the same variables we explored in Q1 we can see that as the number of physical unwell days increases, so does the proportion of those who also had a mentally unwell day, also increases. This starts to suggest a relationship between the two, and that perhaps being physically unwell, could increase someone’s chances of being mentally unwell.

We should also consider the relationship the other way round, and in figure 5, we can see as the number of mentally unwell days increases, so does the proportion of those people who were also physically unwell.

**Q3: Are there certain demographic groups experiencing better or worse health?**

YES – interesting to see that physical health gets worse with age, while mental health actually does not increase at such a fast rate, and gets better in older life.