Session 3 - Probabilistic Programming with PyMC3 - Exercises

Consider the `vacince_efficacy.ipynb` notebook.

1. Run the existing code, and add some additional code blocks to the end. Extract out the `e_Pfizer` trace samples as a regular `numpy` array using:

   ```
   data=np.asarray(idata.posterior.get('e_Pfizer')[0])
   ```

   Use `np.shape` to check the length of this array.

2. The content of this array are samples from the posterior efficacy of the Pfizer vaccine. Extract an equivalent array from the trace samples of `e_Moderna` and use them to calculate the probability that the Pfizer vaccine has a higher efficacy than the Moderna vaccine.

3. What is the probability that the Pfizer vaccine has a higher efficacy than the Astra Zeneca Regime 1 vaccine?

4. What was the probability of exposure to the virus in the Pfizer trial?

5. What was the probability of exposure to the virus in the Moderna trials?