

Problem 3: Dietary Survey

Assigned: 12 October

Due: 28 October

Maximum Mark: 10 Points

Maximum Submission Length: 3 pages

As part of a pilot study, the dietary energy consumption (in kcal) of 25 randomly-selected British residents is monitored daily for one week. Results are given in the file `calories.csv`.

1. Estimate the average daily energy consumption for all individuals in Britain from these data. Also provide a 95% confidence interval.

2. Suppose you wish to provide a more accurate estimate: ideally, within 20 kcal of the "true" population average (at 95% confidence). How many more adults do you need to survey?

3. What is the estimated total daily food consumption by all adults in the United Kingdom combined? Express in kcal, and provide a 95% confidence interval. The UK population is approximately 67 million. (Use only the actual data you have now, and use a reasonable number of significant digits.)

4. It has been estimated that the total energy value of all food produced/imported for human consumption in the UK is 84 trillion kcal per year (defining 1 trillion = 10^{12}). What percentage of this food is wasted (not consumed)? Provide a 95% confidence interval.