Building Inferential Reasoning in Statistics
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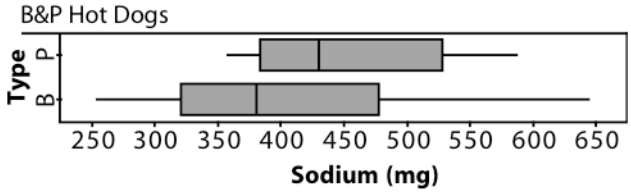
Teacher Discussion Handout

Discussion Part One

Investigators analysed the sodium content of some beef (B) hot dogs and some poultry (P) hot dogs. Here is their graph:



Box plots for sodium content in beef and poultry hot dogs (Franklin et al., 2007)

Discuss in pairs what statements you would make from these plots.

Discussion Part Two

The investigators made the following statements from the plots. Note: for beef hot dogs n=20, for poultry hot dogs n=17.

In pairs decide whether each statement is descriptive or inferential.

Statements from the box plots	**Descriptive or Inferential?**
The median sodium content for poultry hot dogs is 430 mg, almost 50 mg more than the median sodium content for beef hot dogs	
The medians indicate that a typical value for the sodium content of poultry hot dogs is greater than a typical value for beef hot dogs	
The range for the beef hot dogs is 392 mg, versus 231 mg for the poultry hot dogs	
The ranges indicate that, overall, there is more spread (variation) in the sodium content of beef hot dogs than poultry hot dogs	
The IQRs for sodium content are 157.5 mg for beef hot dogs and 156 mg for poultry hot dogs.	
The IQRs suggest that the spread within the middle half of the data for beef hot dogs is similar to the spread within the middle half of the data for poultry hot dogs.	
The box plots also suggest that each distribution is somewhat skewed right.	
Considering the degree of variation in the data and the amount of overlap in the box plots, a difference of 50 mg between the medians is not really that large.	
It is interesting to note that more than 25% of beef hot dogs have less sodium than all poultry hot dogs. On the other hand, the highest sodium levels are for beef hot dogs.	

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Discussion Part Three
In pairs discuss the following questions.

- What statistical game is played in the Year 11 NZ classroom (NCEA Level 1 – pose a question, analyse data, draw a conclusion, justify with evidence)?

    - Is the question about the data collected or is the purpose of the question to make a decision about some wider universe?

    - If Year 11 NZ students posed a question such as "Do poultry hot dogs tend to have a higher sodium content level than beef hot dogs?", **on what basis would your students make a decision?**

    - Are Year 11 NZ students aware of concepts such as sample, population, sample distribution, population distribution, sampling variability?