**AP Statistics Name:
Designing Experiments – Statistical Significance**

To see if fish oil can help reduce blood pressure, 14 males with high blood pressure were recruited and randomly assigned to one of two treatments. The first treatment was a 4-week diet that included fish oil, and the second was a 4-week diet that included regular oil. At the end of the 4 weeks, each volunteer’s blood pressure was measured and the reduction in diastolic blood pressure was recorded. The results of the study are shown below. Note that the negative value means that the subject’s blood pressure increased.

Fish oil: 8 12 10 14 2 0 0 $\overbar{x}\_{F}=6.57$

Regular oil: -6 0 1 2 -3 -4 2 $\overbar{x}\_{R}= -1.14$ $\overbar{x}\_{F}-\overbar{x}\_{R}=7.71$

Is there convincing evidence that fish oil is better than regular oil in reducing diastolic blood pressure? In other words, is the difference in mean reduction *statistically significant*? To find out, let’s see what would happen if we randomly assign the 14 people in the experiment to the groups many times, and *assume the two treatments have the same effect on blood pressure*.

1. Shuffle the pieces of paper and deal two piles of 7 each. The first pile will represent the fish oil group and the second pile will represent the regular oil group. Calculate the mean decrease for each group and then find the simulated difference $\overbar{x}\_{F}-\overbar{x}\_{R}$
2. Repeat this process 6 times. Put your results on the class dotplot.

Trial 1: $\overbar{x}\_{F}-\overbar{x}\_{R}=$ Trial 4: $\overbar{x}\_{F}-\overbar{x}\_{R}=$

Trial 2: $\overbar{x}\_{F}-\overbar{x}\_{R}=$ Trial 5: $\overbar{x}\_{F}-\overbar{x}\_{R}=$

Trial 3: $\overbar{x}\_{F}-\overbar{x}\_{R}=$ Trial 6: $\overbar{x}\_{F}-\overbar{x}\_{R}=$

1. From the class dotplot, how often did we observe a difference greater than 7.71? What does this tell us about the results of the experiment?

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| --- | --- | --- | --- |
| 8 | 12 | 10 | 2 |
| 0 | 0 | 14 | -6 |
| 0 | 1 | 2 | -3 |
| -4 | 2 |