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W241 – Experiments and Causality

Essay 1

Article: https://www.theguardian.com/news/2018/mar/01/bacon-cancer-processed-meats-nitrates-nitrites-sausages

Title: Yes, bacon really is killing us

The authors of this article reference the WHO's study on consuming processed meats. They state that processed meats are now classed as a group 1 carcinogen, and thus, eating more processed meat leads to cancer. They state that if nobody in Britain ate processed meats, there would be 8800 fewer cases of cancer.

There is an obvious bias in that folks who eat processed meats are likely to be less health conscious. In a country like Britain, where processed meats are a dietary staple, individuals who go out of their way to avoid processed meats are doubly likely to be health conscious. It's likely that there are unobserved factors at play here that also reduce the observed risk of cancer for individuals who do not eat processed meats. To avoid this bias, the study would need to control for the remainder of diet, exercise, and even potentially smoking habits. None of these factors are even mentioned. There is another possibility that geographical subsets of Britain eat less or more processed meat (potentially due to access to fresh meat or lack of access to larger supermarkets). Thus, increased incidence of cancer could have geographical correlates as well.

The implicit assumption is that people who eat processed meats are identical to those who do not eat processed meats in all factors other than their consumption of said meats. To get around this implicit assumption, we could design an experiment. We would rely on random assignment to amortize out the effect of unobserved factors. I would sample people from across Britain (ensuring that my sampling covered several regions) and then assign them into a treatment or control group. I would require that the treatment group have children that never eat processed meat, while the control group would be allowed to feed their children whatever they preferred. I would then compare cancer outcomes of the treatment to control group to assess whether a lifetime of eating processed meats had a statistically significant effect on cancer incidence. For simplicity's sake, we could also assign adults of the current generation to treatment or control groups: requiring that the treatment group refrain from eating processed meats from this point on. This would not be able to control for effect of processed meat already consumed: but we note that randomization guarantees an apples to apples comparison, so this may not be an issue given sufficient sample.