STAT 231 — Lecture 14

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Last Time

We covered qqplots! A qqplot composes the quantiles with theoretical ones from a $G(0,1)$ distribution. Today we're starting chapter 3.

14.1 Planning and Conducting Empirical Studies

To conduct a typical statistical study, we refer to an algorithm PPDAC:

- **Problem:** a clear statement of the study's objectives. Addresses the questions starting with "what". The **units** and the **target population** or **target process** must also be defined here
- **Plan:** procedures used to carry out a study
- **Data:** the physical collection of the data, as described by plan
- **Analysis:** analyzing the data
- **Conclusion:** a conclusion from the data

We'll refer to a real life study to outline the steps of PPDAC.

Example 14.1.1. *Vitamin D Trial*

Note: *these notes are directly copied from Prof. Wallace's lecture slides. Since these are written summaries of the trial, I figured it'd be simpler to just copy them rather than try to write them in my own words.*

14.1.1 Objective

To investigate the effect of vitamin D supplements on the incidence of seasonal influenza A in schoolchildren.

14.1.2 Study Design

A randomized, double-blind, placebo-controlled trial was conducted comparing vitamin D supplements (1200 IU/d) with placebo in school children. The study was conducted by 12 hospitals and 8doctors in private practice in Japan from December 1, 2008 to March 31, 2009.

14.1.3 Study Population

Schoolchildren aged 6-15 were asked to participate in the study by the pediatricians in charge of outpatient clinics. Children were excluded if they were receiving certain treatments,had allergies to the pills or were unable to swallow pills.Parents and children were asked to provide written informed consent after the pediatrician explained the study to them at the outpatient clinic.

14.1.4 Results

Influenza A occurred in 18 of 167 (10.8%) children in the vitamin D group compared with 31 of 167 (18.6%) children in the placebo group. The reduction in influenza A was more prominent in children who had not been taking other vitamin D supplements and who started nursery school after age 3.

14.1.5 Adherence

Of the 430 children, 334 were followed until the end of the study.Loss to follow-up occurred for 50 children in the vitamin D group and 46 in the placebo group.

14.1.6 Conclusions

This study suggests that vitamin D supplementation during the winter may reduce the incidence of influenza A, especially in specific subgroups of schoolchildren.

14.1.7 Applying PPDAC to our Example

Problem

The **units** are schoolchildren. The **target population** is all children aged 6-15 in Japan. For each child (unit), the **variates** of interest are whether the child received vitamin D or the placebo and whether or not the child contracted influenza A. Other variates of interest defined for each unit were age, sex, and height.

— The other steps will be outlined in the next lecture —