

Experiment or Observational Study?

In the 1940s and early 1950s, there was great public concern over epidemics of polio. In an attempt to alleviate this serious problem, Jonas Salk of the University of Pittsburgh developed a vaccine for polio. Various preliminary experiments indicated that the vaccine was safe and potentially effective. Nonetheless, it was deemed necessary to conduct a large-scale study to determine whether the vaccine would truly work. A test involving nearly 2 million grade-school children was devised. All of the children were inoculated but only half were randomly selected to receive the Salk vaccine; the other half were given a placebo, in this case, an injection of salt dissolved in water. Neither the children nor the doctors performing the diagnoses knew which children belonged to which group. Instead an evaluation center kept records of who received the Salk vaccine and who did not. The center found that the incidence of polio was far less among the children inoculated with the Salk vaccine. From that information it was concluded that the Salk vaccine would be effective in preventing polio for all U.S. schoolchildren and, consequently, was then made available for general use.

Approximately 450,000 vasectomies are performed each year in the U.S. In this surgical procedure for contraception, the tube carrying sperm from the testicles is cut. Several studies have been conducted to analyze the relationship between whether a man has had a vasectomy and the incidence of prostate cancer. One such study appeared in a February 1993 issue of The Journal of the American Medical Association. Dr. Edward Giovannucci, leader of the study and epidemiologist at Harvard-affiliated Brigham and Women's Hospital, said that "...we found 113 cases of prostate cancer among 22,000 men who had a vasectomy. This compares to a rate of 70 cases per 22,000 among men who didn't have a vasectomy." Dr. Giovannucci's study shows about a 60% elevated risk of prostate cancer for men who have had a vasectomy, thereby suggesting an association between vasectomy and prostate cancer.

AP Statistics Worksheet
Observational Studies vs. Experiments

Name: _____

Determine if the below situations are observational studies or experiments—and why.

1. Over a 4-month period, among 30 people with bipolar disorder, patients who were given a high dose (10g/day) of omega-3 fats from fish oil improved more than those given a placebo. (*Archives of General Psychiatry* 56 [1999]: 407)
2. The leg muscles of men aged 60 to 75 were 50% to 80% stronger after they participated in a 16-week, high-intensity resistance-training program twice a week. (*Journal of Gerontology* 55A [2000]: B336)
3. Among a group of disabled women aged 65 and older who were tracked for several years, those who had a vitamin B₁₂ deficiency were twice as likely to suffer severe depression as those who did not. (*American Journal of Psychology* 157 [2000]: 715)
4. In 2001 a report in the *Journal of the American Cancer Institute* indicated that women who work at nights have a 60% greater risk of developing breast cancer. Researchers based these findings on the work histories of 763 women with breast cancer and 741 women without the disease.
5. In 2002, the journal *Science* reported that a study of women in Finland indicated that having sons shortened the lifespan of mothers by about 34 weeks per son, but that daughters helped to lengthen the mothers' lives. The data came from church records from the period 1640 to 1870.
6. Some gardeners prefer to use nonchemical methods to control insect pests in their gardens. Researchers have designed two kinds of traps, and want to know which design will be more effective. They randomly choose 10 locations in a large garden and place one of each kind of trap at each location. After a week, they count the number of bugs in each trap.