

Understanding Science and Scientific Methods:

An Overview for Lawyers

SUMMARY – 3 October 2005

Class on 26 September 2005 Covered Topics 2.c.ii. (part) and 2.c.iii. on the Syllabus

I. Cohort Studies – Figure 2-3 -- Look Forward in Time

- A. Data are gathered in standardized fashion and you start with a population *that is not diseased*.
- B. **Problems:** a) Sample selection; b) Loss to follow-up; c) change in habits; d) Surveillance bias.
- C. **The 1999 *Journal of the National Cancer Institute* article on TCDD exposure and disease at American Chemical plants.**
 - 1. Sample – 5,132 workers at 12 U.S. plants that produced chemicals contaminated with TCDD 1942 – 1984.
 - 2. Control – General Population.
 - 3. The rate of **All Cancers** and **Lung Cancer** increase with exposure.
 - 4. **Bottom Line – Pretty good evidence that TCDD causes cancer in humans.**
- D. The 2003 article *Cancer Risk for Chemical Workers Exposed to 2,3,7,8-tetrachlorodibenzo-p-dioxin* by the **Dow Chemical Scientists**.

1. Sample – 2,187 Dow Chemical Workers who were likely exposed to high levels of Dioxin on or before 1983. **(Note that these 2,187 were part of the previous study.)**
2. Control groups – U.S. White Male Population and Local Dow Workers not exposed to Dioxin.
3. Conclusion – **Pretty Strong and Favorable to Dow.**

E. The “Ranch Hand” Study (Cohort Study)

1. Cases -- The **1,000** Ranch Hands
2. Controls – **AF Personnel flying C-130s (non-herbicide duty)**
3. Results:
 - a. **The mortality rate of the group is the same as the matched comparison group;**
 - b. Mortality is significantly lower than the rate for the male population of the United States;
 - c. The **number of birth defects among children of Ranch Hand veterans is the same** as the children of the comparison group;
 - d. Some evidence in the Ranch Hand population that dioxin exposure is related to cancer but the results are weak.

Examples of Past Topics

The Status of DNA testing under *Daubert*

The Admissibility of Hair Comparison Evidence

The Status of Polygraph Testing under *Daubert*

The Reliability of Handwriting Analysis

The Scientific Status of Hypnotically Refreshed Memory

The Admissibility of Standard Field Sobriety Tests