Rachel's Environment & Health News
#168 - Munching Peanut Butter In Cancer Alley
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Throughout the 1980s, a debate has raged over the question: are industrial chemicals an important cause of cancer in humans? In 1981, a famous study appeared in print, saying chemicals cause only 2% to 3% of human cancers.[1] In 1987, the U.S. Environmental Protection Agency (EPA) published its own estimate that industrial chemicals account for only 1 to 3% of human cancers.[2] The well-known Dr. Bruce Ames agrees with these small numbers and says diet is by far the most important source of cancer.[3]

We do not have an answer to this question. However, we wonder why cancers seem to cluster in heavily industrialized regions. Could pollution be involved here? If Dr. Ames were correct and our diet were by far the most important cause of cancer, why would cancer clusters occur near heavy industry? Ames says the vast majority of cancers are caused by foods like mushrooms, charred meat, burnt toast and peanut butter. Chemical workers are relatively well paid; they can afford decent food. They probably eat their fair share of roast beef with mushroom sauce; and they probably enjoy as much peanut butter, and toast, as the next person. But why would this diet cause cancer in people who live or work near chemical plants when the same foods, consumed by middle class people who live remote from heavy industry, don't seem to cause so much cancer? No, the Bruce Ames thesis doesn't seem very useful in explaining why cancers cluster near industry, and particularly near petrochemical processing industries.

Is it a fact that cancers cluster near heavy industry? It seems to be so. Greenpeace has published two studies in the past two years revealing that people who live in counties bordering the Mississippi River have a high death rate, compared to the national average, and a high cancer rate.[4] The further south you travel along the river, the worse the statistics become. On a map showing low cancer rates as a light color and high cancer rates as a dark color, the Mississippi River originates in Minnesota surrounded by light-colored counties, but by the time you make your way down through Missouri, Arkansas, Kentucky, to Tennessee, Mississippi and Louisiana, counties that touch the river are darker, darker, darkest. This picture IS worth a thousand words. The Mississippi below St. Louis is a chemical sewer, and people who derive their drinking water from it are twice as likely to get colon and rectal cancer as those who don't drink from it, to cite but one statistic.[5] From Baton Rouge down to New Orleans, 136 major chemical plants discharge into the river. The shadow of the grim reaper lingers near these outfall pipes. The Bruce Ames hypothesis cannot explain this atlas of death, this roadmap of ruin. Clearly, there is something powerful at work along the lower Mississippi, and it is likely not peanut butter or burnt toast.

Other industrialized regions seem to be subject to the same influences, whatever they may be. Take New Jersey. Like Louisiana, New Jersey has a massively developed chemical industry. And, like Louisiana, it has cancer rates that are noticeably elevated above the national average. Furthermore, within New Jersey, the most heavily industrialized counties have the highest cancer rates.

A careful study of New Jersey was published in 1985 by physicians at the state's medical school in Newark.[6] They looked at 194 municipalities, each with a population of 10,000 people or more. They analyzed the occurrence of 13 different kinds of cancer in these communities during the decade 1968-1977. They were looking for communities with cancer clusters, which they defined as two or more cancer death rates that were at least 50% higher than the national average ($p<0.01$) and a number of cancer deaths that was significantly higher than the expected number of deaths, using a strict ($p<0.0005$) measure of statistical significance.

In 23 municipalities (out of the 194), cancer clusters were identified; 73% of these clusters occurred in 16 municipalities that are located in the heavily-industrialized northeast corridor of the state. Of the 23 communities that had cancer clusters, nine communities had 5 or more elevated cancer death rates (out of the 13 studied); of these nine, 30% were located in Hudson County, which is very densely populated (12,963 people per square mile), is particularly heavily industrialized, and has the greatest number of dumps (86) per 100 square miles of area. In contrast to the 23 high-cancer communities, only 3 NJ communities stood out for having cancer death rates significantly below the national average.

Twelve cancers (of the originally-studied 13) were studied in relation to the density of toxic chemical waste dumps (defined as number of dumps per 100 square miles). Eight of the 12 cancers were positively correlated with the density of dumps; and all 12 of the cancers were negatively correlated with income. That is, as the number of dumps increases, cancer deaths from 8 cancers also increase, and income of the local population drops. The cities of Bayonne, Jersey City, and Kearney have the most chemical dumps, and the highest cancer rates. The 10 counties with cancer clusters had a dump density three times higher than the dump density of the other 11 counties in the state, which had no cancer clusters. Of the cancers in the municipalities with clusters, 72% were gastrointestinal (stomach, rectum, and colon).

Does this prove industrial pollution causes cancer? It does not. Does it make you think twice about moving into a high-chemical neighborhood, or a neighborhood with lots of dumps? It does us.

--Peter Montague

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[1] Richard Doll and Richard Peto, "Causes of Cancer: Quantitative Estimates of Avoidable Risks of Cancer in the United States Today," JOURNAL OF THE NATIONAL CANCER INSTITUTE, Vol. 66 (1981), pgs. 1193- 1308.

[2] U.S. Environmental Protection Agency, UNFINISHED BUSINESS: A COMPARATIVE ASSESSMENT OF ENVIRONMENTAL PROBLEMS (Washington, DC: U.S. Environmental Protection Agency, 1987). For more details, see RHWN #16.

[3] Bruce Ames and others, "Ranking Possible Carcinogenic Hazards," SCIENCE, Vol. 236 (april 17, 1987), pgs. 236-271. See the answer to Ames by Samuel Epstein, Joel Schwartz, and 15 others, "Carcinogenic Risk Estimation," SCIENCE Vol. 240 (May 20, 1988), pgs. 1043-1045. See also the answer to Ames by Devra Lee Davis, "Paleolithic Diet, Evolution and Carcinogens," SCIENCE, December 18, 1987, pgs. 1633-34; and see Frederica Perera and Paolo Boffetta, "Perspectives on Comparing Risks of Environmental Carcinogens," JOURNAL OF THE NATIONAL CANCER INSTITUTE, Vol. 80, No. 16 (October, 19, 1988), pgs. 1282-1293.

[4] Ben Goldman [of Public Data Access in New York City] and others, MORTALITY AND TOXICS ALONG THE MISSISSIPPI RIVER (Washington, DC: Greenpeace, 1988); this study represents original work--a statistical analysis of government data on rates of occurrence of death and illness among residents of counties bordering the Mississippi, compared to national average rates. The increases along the river are stark, and cannot reasonably be attributed to chance. Pat Costner, Joe Thornton and others, WE ALL LIVE DOWNSTREAM, THE MISSISSIPPI RIVER AND THE NATIONAL TOXICS CRISIS (Washington, DC: Greenpeace, 1989), reviews many published studies indicating that cancer and general mortality (death) increase as you travel south along the Mississippi. They also catalog the massive (multiple billions of pounds) of toxic chemicals discharged into the air and waters adjacent to the Big Muddy. The Mississippi River mortality (death) map we discussed in our text (above) appears in this second study as a foldout just inside the back cover; it is based on the earlier work by Ben Goldman of Public Data Access.

[5] M. Gottlieb and others, "Cancer and Drinking Water in Louisiana: Colon and Rectum," INTERNATIONAL JOURNAL OF EPIDEMIOLOGY (1981), pg. 117 and following pgs.

[6] G. Reza Najem, Donald B. Luria, and others, "Clusters of Cancer Mortality in New Jersey Municipalities; With Special Reference to Chemical Toxic Waste Disposal Sites and Per Capita Income," INTERNATIONAL JOURNAL OF EPIDEMIOLOGY Vol. 14, No. 4 (1985), pgs. 528- 537.

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