

Rachel's Environment & Health News

#273 - To Understand Whether Chemicals Are Dangerous, Ask What Chemists Die Of

February 18, 1992

It has become fashionable to claim that modern synthetic chemicals pose little or no harm to humans. We hear it from learned scholars like Dr. Bruce Ames at Berkeley,[1] and from others less-well-known. Their message is consistent: they say naturally-occurring chemicals, such as peanut butter, are more dangerous to humans than are the billions of tons of toxic chemicals being discharged into the environment each year by Dow, DuPont, Monsanto, Union Carbide and their competitors in the chemical industry.

The arguments are highly technical and obscure. Does damage to a laboratory mouse from a high dose mean there's danger to a human from a low dose? Should chemicals be evaluated one-at-a-time, or the way people actually encounter them, which is in combination? The average person has trouble understanding such debates.

However, there does seem to be one question we can ask that will help us understand whether chemicals pose a hazard to humans: we can ask, what do chemists die of?

In 1969 a study[2] of the causes of death among 3637 members of the American Chemical Society (ACS) who died 1948-1967 revealed that chemists die at unusually high rates from cancer of the pancreas, and cancers of the lymph system (malignant lymphomas). This study also provided the first evidence that chemists tend to commit suicide. Female chemists (of which there were only 115 out of the 3637 ACS members studied) had an elevated risk of breast cancer. The study revealed an excessive number of deaths among young male chemists (aged 20 to 64) compared to non-chemist professionals of the same age (444 deaths observed, 354 expected) and 41 of the 90 excess deaths were from pancreatic cancer. Chemists older than 65 had unusually high rates of malignant lymphoma and pancreatic cancer but also leukemias (cancers of the blood-forming cells).

A series of reports in the 1970s confirmed that Swedish chemists die from malignant lymphomas and blood-related cancers, but also from brain tumors.[3] A brief report also revealed that British chemists tend to suffer from elevated levels of malignant lymphomas.[4] This British study, of death certificates of 1332 members of the Royal Institute of Chemistry who died during 1965-1975 inclusive, revealed a higher-than expected proportion of cancers, with an excess of lymphomas predominating.

An interesting sidelight of these studies was the revelation that chemists tend to commit suicide at rates that exceed the national average. A study[5] of 347 white female members of ACS who died between 1925 and 1979 revealed increases in cancer of the breast, ovary, stomach, pancreas and lymphatic and hematopoietic [blood-forming] system. Suicide was 5 times as prevalent among female chemists as among all U.S. white females.

A study[6] of 3686 male chemists who worked for DuPont and who died during the period 1964-1977 revealed excessive risk of cancer of the colon (large intestine), skin (melanoma) and prostate. The overall cancer rate for these chemists was below the U.S. average for white males, as you would expect because chemists are generally well-off, and sick people generally aren't employed--a phenomenon known as the "healthy worker effect," and the reason workers are almost always found to have fewer ailments than the general public. Notably, the 75 female chemists at DuPont had greater-than-expected mortality for all causes combined and for suicide.

Subsequent study[7] of these same DuPont workers showed a slight increase in disability claims for mental disorders (neuroses, depression, and alcoholism), compared to non-chemists; it is perhaps noteworthy that chemists in DuPont's chemical research-and-development department had a three-fold increase in disability claims for mental disorders. This study also revealed an excessive suicide rate among chemists no longer actively employed by DuPont.

A study[8] of employees of a large pharmaceutical company [826 white production employees and 249 white male sales staff] who died between 1954 and 1976 revealed an increase in the occurrence of several kinds of cancer (lung, skin [melanoma] and brain among males, and leukemia, breast and large intestine among females) among production workers as well as a statistically increased rate of suicide in both male and female production workers.

Why do chemists commit suicide more than other people? No one knows. Perhaps it is merely because they have easy access to deadly chemicals and take advantage of that fact. Perhaps contact with chemicals tends to degrade their mental stability. Perhaps it is because they get more cancer than people in other occupations and, being particularly well-educated, they know what the future holds for someone diagnosed with cancer.

Whatever the reason, there seems to be little doubt that chemists tend to commit suicide, and to get cancer, more than other professionals, and more than the general public.

A recent study[9] of Exxon employees reveals an increased risk of leukemia and lymphatic cancers among scientists, engineers and research technicians, compared to Exxon managerial employees who had the least potential for chemical exposure in the workplace.

A study[10] of 644 male employees who worked for at least one month during the period 1942-1979 in a Swedish chemical factory found a statistically significant increase in malignant lymphoma and myelomatosis (multiple myeloma) and a smaller increase in bronchial cancer.

A study[11] of 8171 Dow Chemical employees found a healthy worker effect but also found significant increases in cancers (unspecified) among plant mechanics, machinists, machine repairmen, welders, and organic chemical production personnel.

There seems to be little doubt that working with chemicals creates a risk of cancer, even among those people who are well-educated, who presumably have a healthy respect for the hazards of their workplace, and whose employers are wealthy companies that can afford to take every precaution against excessive exposure.

--Peter Montague

=====

[1] Bruce Ames and others, "Ranking Possible Carcinogenic Hazards," SCIENCE Vol. 236 (April 17, 1987), pgs. 236-271.

[2] Frederick P. Li and others, "Cancer Mortality Among Chemists," JOURNAL OF THE NATIONAL CANCER INSTITUTE Vol. 43 (1969), pgs. 1159- 1164.

[3] G. Robert Olin, "The hazards of a chemical laboratory environment-- a study of the mortality in two cohorts of Swedish chemists." AMERICAN INDUSTRIAL HYGIENE ASSOCIATION JOURNAL Vol. 39 (July 1978), pgs. 557- 562. And: G. Robert Olin and Anders Ahlbom, "The Cancer Mortality among Swedish Chemists Graduated During Three decades," ENVIRONMENTAL RESEARCH Vol. 22 (1980), pgs. 154-161.

[4] C.E. Searle and others, "Epidemiological Study of the Mortality of British Chemists," BRITISH JOURNAL OF CANCER Vol. 38 (1978), pgs. 192- 193 [an abstract].

[5] Judy Walrath and others, "Causes of Death Among Female Chemists," AMERICAN JOURNAL OF PUBLIC HEALTH (August 1985), pgs. 883-885.

[6] Shelia K. Hoar and Sidney Pell, "A Retrospective Cohort Study of Mortality and Cancer Incidence Among Chemists." JOURNAL OF OCCUPATIONAL MEDICINE Vol. 23 (July 1981), pgs.

[485-494.]485-494.

[7] Shelia K. Hoar and Sidney Pell, "A Retrospective Cohort Study of Disability Among Chemists," JOURNAL OF OCCUPATIONAL MEDICINE Vol. 23 (July 1981), pgs. 495-501.

[8] Terry L. Thomas and Pierre Decoufle, "Mortality Among Workers Employed in the Pharmaceutical Industry: A Preliminary Investigation," JOURNAL OF OCCUPATIONAL MEDICINE Vol. 21 (September 1979), pgs. 619- 623.

[9] Bengt B. Arnetz, "Mortality among Petrochemical Science and Engineering Employees," ARCHIVES OF ENVIRONMENTAL HEALTH Vol. 46 (July/Aug. 1991), pgs. 237-248.

[10] Lars Hagmar and others, "Mortality and cancer morbidity among workers in a chemical factory," SCANDINAVIAN JOURNAL OF WORK, ENVIRONMENT AND HEALTH Vol. 12 (1986), pgs. 545-[551.]551.

[11] M. Gerald Ott and others, "Determinants of Mortality in an Industrial Population," JOURNAL OF OCCUPATIONAL MEDICINE Vol. 18 (March 1976), pgs. 171-177.

Descriptor terms: chemists; american chemical society; chemists death; lymphoma; pancreatic cancer; cancer; suicide; dow chemical; carcinogens; occupational safety and health;