

Leukemia: The price of living close to an oil refinery?

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Barregard L, E Holmberg and G Sallsten. 2009. **Leukaemia incidence in people living close to an oil refinery**. *Environmental Research* 109:985-990.

Synopsis by Negin P. Martin, Ph. D

Swedish scientists have discovered a remarkable increase in the incidence of leukemia in people living close to an oil refinery.

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Lysekil is one of the largest and most modern oil refineries in Europe. Yet, during the past 10 years, communities downwind of the refinery had twice as many cases of leukemia as would be expected based on the refinery's low emissions.

But, without further research, the study's authors can only guess as to why the rates vary so much from risk estimates. It could be due to the emissions, an unknown factor or chance.

A number of scientific studies have raised concerns over cancer risks associated with living close to a refinery. This is the first study to compile and analyze information about cancer incidence in a large Swedish population who live near an oil refinery.

Refineries release organic compounds that can cause cancer. For example, the chemical benzene is associated with an increased risk of leukemia.

Regulatory agencies set safe exposure levels for chemicals by testing for effects at high concentrations, then, using statistical extrapolation to determine safe exposure levels. This method assumes that if exposure goes up so do effects and if exposure goes down so will effects. But, research is beginning to show that chemicals do not always follow this rule and may cause different effects at higher and lower levels.

Based on the results, the organic pollutant levels in the exposed areas were well below accepted levels and the incident of cancer should not have increased. But actual measurements showed a doubling in the risk for leukemia in the last 10 years.

The scientists note that more studies are needed to determine why the rates varied so much from predictions. Further research could discern if the increased incidence of leukemia is caused by – rather than just associated with – the refinery's emissions or if some other unknown factor is responsible.

Researchers studied seven parishes in the vicinity of the Lysekil refinery on the west coast of Sweden. Two parishes located 2 to 5 kilometers downwind from the refinery were classified as exposed to refinery fumes. Five other parishes that were greater than 7 kilometers away from the refinery were used for comparison.

The average amount of air pollutants in exposed parishes was estimated from air sample measurements provided by the Swedish Environmental Research Institute. The average exposure was similar to that found in a Swedish city with road traffic, except the levels of propene were five times higher.

The number of refinery employees as well as geological and socioeconomic backgrounds of inhabitants in exposed and unexposed parishes were similar in the exposed and unexposed groups. Within these populations, leukemia cases and total cancer incidence from 1975 – the year that refinery was built – to 2004 were retrieved from the Regional Swedish Cancer Registry.

Reference parishes used as control groups had the expected rates of leukemia and other combined types of cancers. In exposed parishes, the incidence of leukemia was 50 percent higher than expected for the past 30 years – 33 cases were found when only 22 were statistically expected. The highest number of leukemia cases was reported in the last 10 years with 19 cases when only 8.5 would be expected.

The oil refinery and the people in the community were made aware of the study's findings.

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30 January **Mom's pesticide exposure raises risk of infant leukemia.** A mother's exposure to pesticides before, during and after pregnancy may increase the risk of infant leukemia diagnosed before the age of 2, found a study from Brazil. Environmental Health News.

24 November **Chemical used to embalm targeted.** A lawsuit by a New Jersey mortician stricken with leukemia claims his illness was caused by exposure to formaldehyde, an ingredient in embalming fluid. He is suing his workplace and several manufacturers of embalming chemicals. Bergen County Record, New Jersey.

14 November **Chernobyl study shows need for caution in Fukushima.** A study released Thursday by a U.S. research team links protracted exposure to low-level radiation to a higher risk of leukemia among workers engaged in the cleanup of the 1986 Chernobyl nuclear disaster, and points to the need to protect those involved in dealing with the Fukushima crisis. Kyodo News, Japan.

18 October **Special Report: Government has little authority to stop unsafe cosmetics.** Hair stylist Natalija Josimov combed the straightening solution through her client's hair. She snapped on the blow dryer, and a plume of white vapor wrapped them in a toxic cloud. Next came the 450-degree flat iron, letting loose another sharp stink of embalming fluid that burned her eyes and made her nauseous. Every day for months, Josimov performed three or four chemical straightening treatments at a New York City salon until she fell so ill she couldn't even stay in the same room. Josimov is accustomed to odors of peroxide, nail polish and permanent wave solution. But this is different: It's Brazilian Blowout, and its secret ingredient is formaldehyde, a carcinogen linked to nose and throat cancers, leukemia, respiratory problems and other health effects. Environmental Health News.

7 June **CT scans in childhood triple the risk of brain tumors and leukemia.** As few as two CT scans of the head in childhood can triple the risk of developing brain tumors, while five to 10 such scans can triple the risk of leukemia, British researchers reported Wednesday. Los Angeles Times.

7 June **Children's CT scans pose cancer risk.** A new study offers the most solid evidence to date that radiation from CT scans increases children's risk of developing leukemia and head and neck cancer. Wall Street Journal.

7 June **CT scans increase children's cancer risk.** Researchers say the small but significant increases in the risk of leukemia and brain cancer do not mean that CT scans should be avoided entirely, but that the test should be performed only when necessary. New York Times.

5 June **High leukemia rate noted among kids of 2 A-bomb survivors.** A new study shows that children who were born within 10 years of both parents surviving the 1945 atomic bombing of Hiroshima have a higher rate of developing leukemia than children who only had one parent who was a survivor within 10 years of the blast. Asahi Shimbun, Japan.

14 May **Sickness link to pesticides.** A recent assessment shows pesticide residues found on Australian foods may be linked to health problems such as lymphoblastic leukemia in children, behavioural irregularities and low IQ. Lismore Northern Star, Australia.

3 May **Electrical pollution: Are we being poisoned?** Fueled in part by studies that show children exposed to heavy levels of electromagnetic fields have a greater chance of developing leukemia, several countries in the European Union have established strict safety thresholds – limits far below what's commonplace in the United States. Houston KRIV TV, Texas.

14 March **US Senate panel hears about Camp Lejeune water.** The retired Marine who believes contaminated water at Camp Lejeune caused his young daughter to die of leukemia told a U.S. Senate committee Tuesday that both science and victims will suffer if the military wins its fight to delete information from reports about the water. Associated Press.

11 March **Cancer rates up near MTBE-tainted water system.** A draft state Department of Health report has found a higher-than-expected incidence of leukemia among men from Liberty, NY, where the water supply was contaminated with MTBE, a gasoline additive. Middletown Times Herald-Record, New York.

6 February **Carcinogens a problem in chip factories.** Trace amounts of leukemia-linked carcinogens were found in semiconductor-producing factories of Samsung Electronics Co. and other chipmakers, a governmental authority said Monday. Korea Herald, South Korea.

15 December **Children's leukemia risk tied to father's smoking: Study.** Children whose fathers smoked around the time of their conception have at least a 15 percent higher risk of developing the most common form of childhood cancer, a type of leukemia, according to an Australian study. Reuters.

21 November **New Jersey residents desperate to move away from toxic landscape.** Michael Riccio loved the woodworking shop in his basement, although it often flooded during a hard rain. He never knew that the water coated his basement with hexavalent chromium, a deadly carcinogen. He died of leukemia in May 2008. Bergen County Record, New Jersey.

17 August **Leukemia strikes near contaminated U.S. base.** Two teenagers who live near a U.S. military base in Korea are suffering from leukemia and two other locals died of the disease in their 20s about 10 years ago, a member of a civilian fact-finding team said on Tuesday. Seoul Chosun Ilbo, South Korea.

1 August **Will chickens give your kids cancer?** Last week, researchers from New Zealand published a paper that showed that kids raised on livestock farms had an elevated risk of developing blood cancers like leukemia and lymphoma later in life. Mother Jones.

14 July **Samsung consultant study finds no link to Samsung in multiple leukemia cases.** A U.S. environmental specialist Thursday claimed no link was found between six leukemia-stricken former Samsung Electronics employees and their working conditions. Korea Times, South Korea.

6 July **B.C. eyes ban on home use of pesticides.** The British Columbia government is working toward legislation that would ban home use of pesticides for cosmetic purposes, a practice that is linked to childhood leukemia and other cancers. Postmedia News.

27 May **Agent Orange haunts Vietnam veterans decades later.** This past fall, the U.S. Department of Veterans Affairs expanded the definition of diseases associated with Agent Orange exposure to include heart disease, Parkinson's and chronic B-cell leukemia. Diabetes has been on the list for years, as are several types of cancer. Davenport Quad-City Times, Iowa.

18 May **Childhood cancer outbreak possibly caused by mosquitoes.** Something happened to the children of Fallon, Nev., between 1997 and 2003. Fourteen children were diagnosed with childhood leukemia, a rate for that population size that should only occur, by chance, once every 22,000 years, according to epidemiologists. .

7 May **Study finds no leukaemia link to UK nuclear plants.** A 35-year British scientific study has found no evidence that young children living near nuclear power plants have an increased risk of developing leukemia. Reuters.

21 April **Leukemia-type virus may be killing Fraser River salmon.** In B.C.'s Fraser River, a mysterious illness has killed millions of Pacific salmon, and scientists have a new hypothesis about why: The wild salmon are suffering from viral infections similar to those linked to some forms of leukemia and lymphoma, a possible result of warming water temperatures. McClatchy Newspapers.

19 April **Studying life in the shadow of nuclear plants.** Sarah Saurer was seven years old when she was diagnosed

with brain cancer. Her parents soon found out that several other children in their small town – which sat just miles away from two troubled Illinois nuclear power plants – had been diagnosed with brain cancer and leukemia. Agence France-Press.

13 April **Doubting EPA on formaldehyde.** An independent panel of scientific experts is questioning the Environmental Protection Agency's conclusion that formaldehyde causes respiratory cancers, leukemia, and several other health problems, including asthma. Chemical & Engineering News.

21 March **Researcher suggests 'salmon leukemia' is to blame for decline of Fraser sockeye.** Of all the theories heard so far by the Cohen Commission, the most intriguing involves new research by a molecular scientist who is pointing to the possibility of an epidemic of salmon leukemia. Globe and Mail, Ontario.

20 March **Scientists lack complete answers on radiation risk.** Thyroid cancer for sure. Leukemia, probably. Too much radiation can raise the risk of developing cancer years down the road, scientists agree, and the young are most vulnerable. But just how much or how long an exposure is risky is not clear. Associated Press.

8 March **Colo. hospital blew whistle on tainted wipes.** It took fast-acting doctors at a Colorado hospital to flag problems with tainted alcohol wipes now tied to a massive recall and growing reports of potentially deadly infections, including the case of a 10-year-old boy already battling leukemia. MSNBC.

16 January **Men spread word on Camp Lejeune's tainted water at meeting.** The death of his daughter left Jerry Ensminger wondering for 15 years what caused her childhood leukemia. The answer, he says, is buried in papers that detail a North Carolina military camp's contaminated water supply. Lakeland Ledger, Florida.

16 December **Risk of exposure to benzene, other chemicals isn't just at the workplace.** Norman Padfield worked at Delco Electronics for most of his adult life. As a pipefitter, he was exposed to a number of hazardous chemicals over the years. Eventually, he contracted myelodysplastic syndrome, which developed into leukemia. Kokomo Perspective, Indiana.

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