

Rachel's Environment & Health News

#313 - Children Born To Women Living Near Old Dumps Have Higher Risk Of Birth Defects

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Pregnant women who live near hazardous waste sites have an increased risk of bearing children with major birth defects, a new study has concluded.[1]

Researchers at the Yale University School of Medicine and the New York State Department of Health (NYDOH) studied 27,115 births and concluded that, overall, women living within a mile of an inactive dump have a 12% greater chance of bearing a child with a major birth defect, compared to women living further than a mile from a dump.

The researchers looked at 590 inactive dump sites in 20 northern New York Counties. Among the 590 sites studied, 90 were ranked as "high risk" sites because there was documented evidence that chemicals had migrated off the sites. The study found that women living within a mile of any of these 90 sites had a 63% greater chance of bearing a child with a major birth defect, compared to women living further than a mile from all of the 90 sites.

The study posed four questions: first, is residential proximity (closeness) to dumps associated with major birth defects? Second, are particular types of birth defects associated with proximity to dumps? Third, do particular characteristics of dumps (for example, documented off-site migration of chemicals) increase a waste site's risk to neighbors' health? Fourth, are specific chemical groups (such as pesticides or metals) associated with particular birth defects as previous studies have shown (for example, pesticides and cleft palate)? The answers to all four questions turned out to be yes.

The Yale/NYDOH study began by examining the New York State Congenital Malformation Registry; they found records of 9,313 infants born in 20 northern New York counties during the two-year period 1983-1984 with major birth defects of the nervous system, muscle and skeletal system, and skin. They omitted New York City.

The researchers then selected 17,802 normal infants from the same 20 counties born during the same time-period, to serve as controls.

The residential locations of the mothers of all 27,115 infants were then converted into latitude and longitude, so they could be plotted on a map, and the distance to the nearest dump was calculated for each residence. (Residential location was determined to be accurate within 200 feet in 80% of the cases, and within 1300 feet in the remaining 20 percent of cases.) Then a comparison was made between the infants born to women who lived within a mile of a dump, versus infants born to women who lived more than a mile from any dump. Infants whose mothers lived a mile or less from a dump had a 12 percent greater chance of being born with a major birth defect.

During the second part of the study, each of the 590 dumps was assigned a numerical hazard score, based on criteria developed by EPA [U.S. Environmental Protection Agency] and modified by NYDOH. Dumps considered most likely to produce toxic exposures of any kind (through breathing, ingestion, or skin contact, via air, water, or soil) received the highest scores. Then each individual woman in the study was assigned an "exposure risk"--a number that combined her proximity to a dump with the hazard score for that dump. Then the women were split into two groups--those with a "high exposure risk" (greater than 30) and those with a "low exposure risk" (less than 30).

Further analysis revealed that specific kinds of birth defects are associated with proximity to dumps, particularly birth defects of the nervous system (29 percent more likely), musculoskeletal system (16 percent more likely), and the skin (also known as the body's integument system) (32 percent more likely). Birth defects of the digestive system and oral clefts were not significantly associated with proximity to dumps.

The danger of birth defects is especially high near dumps where off-site migration of wastes has been documented. Near the 90 dumps

with documented off-site migration, birth defects are 63% more likely to occur, compared to dumps where off-site migration has not been documented.

Lastly, the study revealed that dumps containing specific kinds of toxins were associated with specific kinds of birth defects, thus confirming associations that have been noted in previous studies. For example, pesticides were associated with cleft palate in the Yale/NYDOH study. Pesticides and birth defects of the muscular system were also associated. Metals and solvents were each associated with nervous system birth defects. Plastics were associated with chromosome anomalies.

Strengths of this study

Previous studies have found a connection between a mother's exposure to chemicals and birth defects in her offspring,[2] but the Yale/NYDOH study is the first to examine such a large number of births, and thus is far more convincing than previous studies. This study also did not rely upon information provided by individuals about themselves, so "recall bias" (errors or distortions caused by faulty memory) was eliminated from this study. A previous study[3] of residents near the Stringfellow Acid Pits had shown that people near the Stringfellow dump reported excessive occurrences of ear infections, bronchitis, asthma, angina pectoris [heart-related chest pains], skin rashes, blurred vision, pain in the ears, daily cough for more than a month, nausea, frequent diarrhea, unsteady gait when walking, and frequent urination. However, the Stringfellow researchers were unable to rule out the effects of "recall bias" because they relied entirely on people telling them about their symptoms, so skeptics remained unconvinced that the study revealed anything about real diseases caused by the nearby dump.

As the authors of the Yale/NYDOH study said, their results in this study do not prove a cause-and-effect relationship between birth defects and proximity to dumps, but their results "do exhibit many characteristics of causal associations." Each of the four types of analysis (the four questions discussed previously) showed increased rates of birth defects associated with proximity to dumps. As the analysis became more specific, the associations between dumps and disease remained similar or became even stronger. Rates for certain birth defects associated with chemical exposures in previous scientific studies were statistically elevated, while other defects, with little or no previous data to suggest a relationship with chemical exposure, showed no increases. Finally, a kind of dose-response relationship was apparent between proximity to higher-risk dumps and birth defects. In other words, the closer a woman lived to a high-risk dump, the greater were her chances of bearing a child with a major birth defect.

Limitations of this study

This study may underestimate the number of defective births associated with proximity to dumps for two reasons: The study did not examine spontaneous abortions and fetal deaths--both of which are known to be associated with human exposures to chemicals. Furthermore, there is evidence that about 20 percent of women move their residence during pregnancy. If this were true, it would result in misclassification of subjects, which would weaken the ability of the Yale/NYDOH study to discern the full effect of living near dumps.

Lastly, the Yale/NYDOH study does not prove conclusively that chemicals in the dumps CAUSED the birth defects because no actual chemical exposures of women were measured. Proximity to dumps was used as a surrogate (substitute) for exposure to chemicals. Since no chemical exposures were actually measured, chemicals cannot be definitely fingered as the cause of the birth defects. Furthermore the Yale/NYDOH study did not take into account possible differences in lifestyle (for example, tobacco and alcohol use), occupational exposures to chemicals, and possible exposures to chemicals from nearby industrial operations. Thus the

Yale/NYDOH study is "highly suggestive" but is not sufficient, by itself, to prove cause and effect.

Further studies are now underway to try to remedy the shortcomings of the Yale/NYDOH study. Unfortunately, it will be several years, perhaps a decade, before results of these follow-up studies will be published. In the meantime, does the Yale/NYDOH study give us reason to be concerned about pregnant women living within a mile of a dump? In our opinion, definitely yes. We believe any pregnant woman who can avoid living within a mile of a dump would be well-advised to do so. The further away from industrial poisons, the better.

The authors of the Yale/NYDOH study said their study revealed a "small additional risk" of bearing a child with a major birth defect. To them, a 12 percent increase is "small." But look at it this way: the authors say the "normal" occurrence of major birth defects in the 20 counties they studied in New York is 30 defects per 1000 live births. Among women living within a mile of a dump, the occurrence is 34 defects per 1000 live births--a 12 percent increase. In the period they studied, 1983-1984, there were 506,183 live births in the 20 counties. If NONE of these women lived within a mile of a dump, the number of spontaneous birth defects would be 15,186. On the other hand, if ALL the women lived within a mile of a dump, there would be 17,210 babies with major birth defects born during the 2-year period, or $17,210 - 15,186 = 2024$ excess (dump-related) birth defects in a two-year period in the 20-county area, or about 1000 excess (dump-related) major birth defects each year in the 20-county area.

Would 1000 excess (dump-related) major birth defects each year in a 20-county area be a "small" increase? DURING ONE PERSON'S LIFETIME, THERE WOULD BE 70,000 ADDITIONAL (DUMP-RELATED) MAJOR BIRTH DEFECTS IN THE 20-COUNTY AREA. Viewed this way, it becomes hard to understand how the New York Department of Health can call a 12-percent increase in major birth defects "small." Furthermore, from the viewpoint of any one of the mothers involved, such an increase no doubt seems frighteningly large.

--Peter Montague

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[1] Sandra A. Geschwind and others, "Risk of Congenital Malformations Associated With Proximity to Hazardous Waste Sites," AMERICAN JOURNAL OF EPIDEMIOLOGY, Vol. 135 (1992), pgs. 1197-1207.

[2] For discussion of additional studies, see Anthony B. Miller and others, ENVIRONMENTAL EPIDEMIOLOGY; PUBLIC HEALTH AND HAZARDOUS WASTES (Washington, D.C.: National Academy Press, 1991).

[3] Dean B. Baker and others, "A Health Study of Two Communities [sic] Near the Stringfellow Waste Disposal Site," ARCHIVES OF ENVIRONMENTAL HEALTH Vol. 43 (Sept./Oct., 1988), pgs. 325-334.

Descriptor terms: health; birth defects; ny; landfilling; pesticides; heavy metals; congenital malformations; congenital birth defects; reproductive hazards; stringfellow acid pits; death; death statistics; infant mortality;