

Testimony of

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**OVERSIGHT HEARING ON DISEASE CLUSTERS AND
ENVIRONMENTAL HEALTH**

Submitted in writing to the
Committee on Environment and Public Works
United States Senate

March 29, 2011

Thank you for the opportunity to submit written testimony to this Committee. I am Gina Solomon, a Senior Scientist at the Natural Resources Defense Council (NRDC) and an Associate Clinical Professor of Medicine at the University of California, San Francisco (UCSF) where I am also the Director of the UCSF Occupational and Environmental Medicine Residency Program. NRDC is a national, nonprofit, public interest organization dedicated to protecting human health and the environment, with over 1.2 million members and online activists in all 50 states. I am a practicing physician and am Board certified in both internal medicine and occupational and environmental medicine, and I have done research, education, and advocacy for over a decade on the links between disease and the environment.

Scientists estimate that of the 30 years added to our average life expectancy since 1900, 25 are attributable to public health programs -- primarily programs such as drinking water disinfection, sewage treatment, better nutrition, safer handling of food, and improved tracking of disease. Tracking of disease is fundamental to saving lives because it allows agencies to identify populations at risk and rapidly respond to outbreaks, clusters, and emerging threats. Investigation of disease and exposure allows scientists to establish relationships between hazards and disease, thereby guiding prevention strategies.

Since the conquest of old scourges such as smallpox, plague, polio, and leprosy, our national public health system has begun to stagnate. Our public health system needs to do better to address current threats such as chronic disease and environmental health. Currently the Centers for Disease Control and Prevention (CDC) tracks and rapidly responds to outbreaks of fifty infectious diseases. This is a fantastic tracking system, but there is no parallel for most chronic diseases.

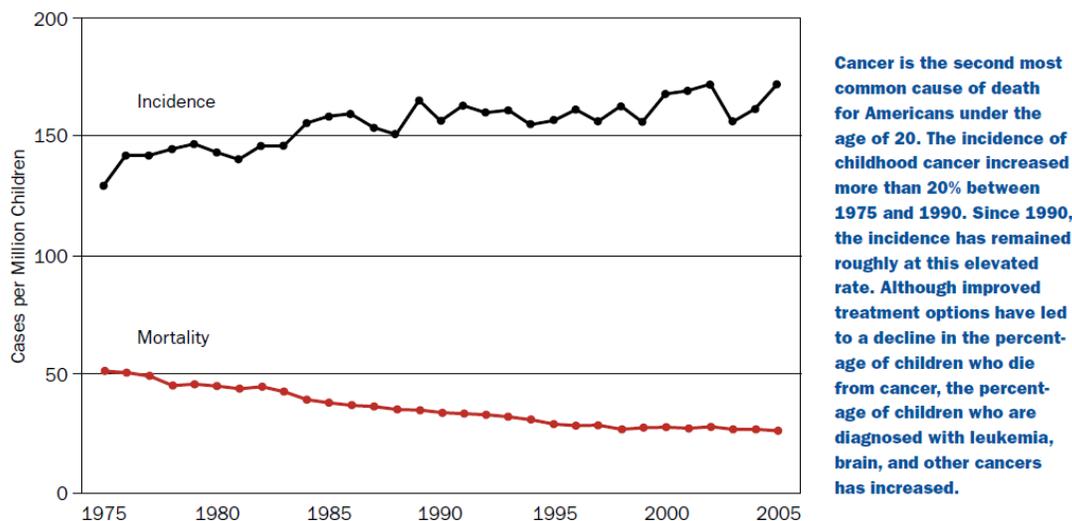
Chronic disease is responsible for four out of five deaths in the U.S. today, and the suffering of 133 million people per year. Asthma, developmental diseases such as birth defects or neurobehavioral disorders, degenerative neurological diseases such as Parkinson's and Alzheimer's, diabetes, and cancer are all chronic diseases. According to the U.S. Centers for Disease Control and Prevention (CDC), almost half of all Americans are living with chronic disease, which now accounts for 75% of U.S. health care costs.¹ Many chronic diseases are on the rise, and many are preventable. There is also increasing evidence that many of these illnesses may be linked to exposures in our environment.

Examples of chronic diseases and cancers that are on the rise include:

- Leukemia, brain cancer, and other childhood cancers, which have increased by more than 20% since 1975, even though – thanks to improved medical treatment – deaths from childhood cancers have mercifully decreased (see Figure 1 below).²
- Breast cancer rates went up by 40% between 1973 and 1998.³ While breast cancer rates have declined a bit recently, a woman's lifetime risk of breast cancer is now one in eight, up from one in ten in 1973.

- Asthma approximately doubled in prevalence between 1980 and 1995 and remains at the elevated rate.⁴
- Cryptorchidism (undescended testes) has increased 200% during the 1970's and 1980's.⁵
- Autism, the diagnosis of which has increased by more than 10-fold over the last 15 years.⁶

FIGURE 1 **Cancer Incidence and Mortality for Children Under 20**



Source: U.S. EPA. America's Children and the Environment. www.epa.gov/envirohealth/children
 Data: National Cancer Institute, Surveillance, Epidemiology and End Results Program

These nationwide statistics are alarming but national statistics don't do justice to the suffering experienced by affected individuals and communities. When I was a Clinical Fellow at Harvard in the mid-1990's, I learned of a major investigation into a childhood leukemia cluster in Woburn, Massachusetts. Twelve children in that small community developed leukemia over a period of ten years – an extraordinarily high rate of this rare disease. Did the state cancer registry identify this cluster of childhood leukemia, and link it to contamination of the water supply with the chemicals trichloroethylene and perchloroethylene? No. This cluster was discovered by mothers sitting with their children in the waiting room at the Dana Farber Cancer Center and recognizing other families from their neighborhood. Only later was it confirmed by scientists at Harvard and state agencies.

This Senate Committee held a field hearing in April of 2001 in the town of Fallon, Nevada, where from 1999 to 2001, 11 children were diagnosed with leukemia. Scientists calculated that a cluster of this magnitude would be expected to occur in the United States by chance about once every 22,000 years.⁷ There was significant local environmental contamination discovered, including elevated levels of radioactivity, tungsten and arsenic in the water supply or community. The Fallon case came more than a decade after the Woburn case. This time, surely the public health system identified the

problem? Unfortunately, no. Nevada didn't even have a functional cancer registry at that time. Again, it was families in the town that first brought the problem to public attention.

In the summer of 2001, the Senate EPW committee again held a field hearing, this time on Long Island New York, to investigate the elevated rates of breast cancer in that community.⁸ At that hearing, Senator Reid stated that "The time is long overdue for the Federal Government to craft an orderly approach for rapidly and effectively responding to the needs of communities for support and guidance in identifying and addressing disease clusters." (Transcript p.6) A full decade later, the time is even more overdue, and I am encouraged by Senators Boxer and Crapo's efforts to remedy this problem.

The last time I appeared before this committee, one year ago on March 17, 2010 at a hearing on children's health and the environment, Senator Bill Nelson came to the hearing to plead for help in the investigation into the causes of a childhood brain cancer cluster at The Acreage in Palm Beach County, Florida.

Although all of these high-profile cancer clusters were ultimately investigated, and various environmental problems were identified in most of the communities, the exact causes of all of these clusters were never fully understood. Disease clusters can be frustrating in that way. Scientists and researchers often have a hard time getting to the bottom of what's going on. Worse still, the well-known cancer clusters I have listed above are just the tip of the iceberg.

My colleagues and I just released an issue paper documenting 42 disease clusters in 13 states.⁹ It is attached as part of my testimony. We documented confirmed clusters of:

- Testicular cancer in Prairie Grove, Arkansas, including three cases in 14 year-old boys, in a town of only 2,500 people.
- Birth defects in Kettleman City, California, including twenty babies born over less than two years with birth defects, and four children born with birth defects so severe that they have since died, in this town of only 1,500 people.
- Amyotrophic Lateral Sclerosis (Lou Gehrig's disease) – a very rare disease - in Herculaneum, Missouri, a town affected by a major lead smelter and decades of pollution.
- Multiple sclerosis (MS) in Wellington, Ohio, where residents are three-times more likely to develop MS than in the rest of the country, a disease whose causes are unknown but are thought to involve a combination of genetic and environmental causes.
- Polycythemia Vera, a rare and severe blood disorder, with four cases occurring on one road in Eastern Pennsylvania.
- Birth defects in Dickson, Tennessee, a striking cluster that was identified by a non-profit organization called Birth Defect Research for Children, created by the mother of a child with birth defects, which gathers information about birth defects nationally, links families, and works with scientists to identify patterns that require investigation.
- Male breast cancer, childhood cancer, and birth defects in Camp Lejeune, North Carolina. More than 60 men who lived on that base have been diagnosed with

male breast cancer – an extraordinary and alarming finding which is almost impossible to occur by chance alone, and one which deserves urgent attention.

Environmental Causes of Cancer

Although it is difficult to conclusively prove what caused any specific disease cluster, we can gather invaluable clues and hints from these tragic events. The Woburn cluster, for example, provided a key clue linking trichloroethylene (TCE) with cancer in humans – something that has since been confirmed in multiple studies. The cluster in Fallon, Nevada also provided important scientific clues. Biological sampling in Fallon revealed community-wide exposure to tungsten with almost 80% of the participants having urinary tungsten levels above the 90th percentile in the National Health and Nutrition Examination Survey (NHANES). Tungsten was not previously thought to be carcinogenic, but had never been adequately studied. This same metal subsequently showed up at elevated levels in Chula Vista, Arizona, another community affected by a childhood leukemia cluster. Tungsten is now undergoing testing by the National Toxicology Program to better understand its potential health effects.¹⁰ Other disease clusters have historically revealed the cancer-causing properties of asbestos, the profound peripheral neuropathy caused by exposure to n-hexane, the complete wipe-out of sperm production from the pesticide DBCP (dibromochloropropane), and the liver cancers caused by vinyl chloride. All of these chemicals are now well-known to be human health hazards, and one of them – the pesticide DBCP – has been banned. All of the other chemicals I mentioned, which fall under the purview of the Toxic Substances Control Act (TSCA), are still in widespread use today.

There is good reason to believe that only a small fraction of the links between the environment and disease has been revealed to date. Although there has been much focus on the genetic causes of disease, the scientific consensus has shifted to the position that most diseases are primarily caused by a combination of genetic and environmental factors. For example, a study of nearly 45,000 twins published in the *New England Journal of Medicine* evaluated the relative importance of genetic and environmental factors in cancer.¹¹ If the cancers were primarily genetic, identical twins (which share the same genome) would have more similar cancer patterns than fraternal twins (which only share the genetics of any siblings). The bottom line of this study was that the vast majority of cancers are more environmental than genetic. Statistically significant genetic effects were only seen for three cancers -- prostate, colorectal, and breast. In the case of breast cancer, less than one-third of the risk was due to inherited factors (potential range 4-41%); that means that about 70% of the remaining risk of breast cancer is due to environmental factors. For other cancers, the environmental component was even larger. The same principle is true for most other diseases, where environment is turning out to be as important or more important than genetics.

Yet people keep citing a 30 year old paper from a British statistician that estimated that only 2 percent of cancers are environmental, and 4 percent are occupational.¹² That number was largely based on cancers from asbestos, and does not reflect the myriad other

environmental causes of cancer and other diseases, nor does it reflect the knowledge from newer studies such as the New England Journal of Medicine twin study cited above.

If you ask me to tell you exactly what percent of cancers, birth defects, or neurological disorders are due to environmental factors, it would be difficult. That's because there's a lot of work that still needs to be done to identify the list of specific environmental causes of cancer that go beyond the British statistician's narrow estimate and that add up to the 70 percent or more from the New England Journal of Medicine. Some of these factors are well-known (such as cigarette smoke), others are partially understood (such as the lists of carcinogens that occur naturally or that are in manmade substances)¹³, and others have yet to be discovered. In addition, because of the interactions between chemicals, as well as between chemicals and genes, the sum of causes will add up to more than 100 percent.¹⁴ The big problem is that the rates of some cancers – including childhood cancers – and other diseases, are rising, so we don't have the luxury of a lot of time. People are getting sick and suffering, so we need to move quickly and use whatever clues we can to understand what's going on.

The President's Cancer Panel released a landmark report in April 2010 entitled, "*Reducing Environmental Cancer Risk: What we can do now*".¹⁵ The report included the following statements:

Approximately 41 percent of Americans will be diagnosed with cancer at some point in their lives, and about 21 percent will die from cancer. The incidence of some cancers, including some most common among children, is increasing for unexplained reasons... A growing body of research documents myriad established and suspected environmental factors linked to genetic, immune, and endocrine dysfunction that can lead to cancer and other diseases.

Action is possible at several levels: conducting scientific research to enhance our understanding and by extension, our ability to prevent and respond to environmental carcinogens; enforcing existing policies and regulations that protect workers and the public; implementing policy and regulatory changes that support public health and reduce the burden of cancer; and taking personal action."

The same principles outlined above by the President's Cancer Panel also apply to other illnesses, including birth defects. According to Dr. John Harris, Program Chief of the California Birth Defects Monitoring Program:¹⁶

*The California Birth Defects Monitoring Program operates on 2 principles:
1) Most environmental chemicals have been insufficiently looked at, and most people are exposed to a mixture of toxins.
2) There's been a lot of mythology that birth defects are purely genetic, but that's not the case at all. We look at genetic-environmental interactions; genes needing to be triggered by an environmental factor.*

Learning lessons from the disease clusters in communities around the country allows for the possibility of some good emerging from something that is otherwise very bad. I'm sure that every parent of a child with cancer or a birth defect would do whatever they can to help – not only their own child – but also help prevent other parents and children from having to go through such an ordeal by identifying causes and preventing future disease.

Difficulties Identifying Environmental Carcinogens

Most of the chemicals in use today are not tested for their potential to cause cancer or other diseases. Of the approximately 85,000 chemicals on the market today, an estimated 62,000 were 'grandfathered' in without any testing requirements under the Toxic Substances Control Act (TSCA). In the case of new chemicals, most have not been tested for toxicity, since the EPA cannot require testing without specific reasons, so the vast majority of chemicals that are introduced onto the market have not been tested in the laboratory.

Since the days of the Nazis, there has been a consensus that it is unethical to intentionally dose humans with toxic chemicals, if the exposures may be harmful. So the advancement of the science of human disease relies on so-called "observational studies" – studies of people who are sick with a given disease, compared with those who are not; studies of people who are more highly exposed to certain contaminants, compared with those who are not. These studies are difficult, often expensive, and they take time. Sometimes they get mired in uncertainty because there are simply not enough people in a given group to generate statistically significant findings; sometimes there are simply too many things going on at once, and it's not possible to tease apart all the potential factors; sometimes nothing turns up in the testing because we aren't testing for the right thing.

When you think about it, it's amazing that any environmental carcinogens at all have been identified from observational studies. Those that have are usually due to one of the following three factors:

- 1) Workers or communities who have been exposed to high doses of a few chemicals for years, and have experienced elevated rates of disease (such as diesel exhaust, trichloroethylene, benzene, and methylene chloride);
- 2) The disease is very rare (such as mesothelioma and asbestos, angiosarcoma and vinyl chloride, clear cell carcinoma and diethylstilbesterol);
- 3) The chemical is very potent (such as tobacco smoke, radiation, 2-naphthylamine, and dioxin).

Even if uncertainties remain in the analysis of the clusters, they contribute valuable information to better understand and prevent cancer. And that new scientific information is invaluable for protecting public health and preventing future disease.

Solutions and Recommendations

Fortunately, there are some tools that can help improve the science of cluster investigations, and that can also help engage communities in coming to a better understanding of the causes of disease clusters.

First, there are new scientific tools, including the rapidly advancing science of biomonitoring that allows detection of numerous chemicals in the human body; rapid improvements in toxicogenomics and metabolomics, that allow researchers to discern the effects of chemicals on the genes and metabolic systems within the body; and improvements in screening of chemicals that will help improve detection of hazards before they come on the market, and will allow further evaluation of agents of possible concern in clusters.

Second, there is the potential for greatly improved coordination between agencies. To date, cluster investigations have frequently been conducted by county or state health departments with limited assistance, or by ATSDR which is expert at some aspects of this work but not others. Bringing agencies such as the EPA into the collaboration will be important to allow all areas of expertise to be brought to bear on the problem. Also, having a set of guidelines for cluster investigations will help to assure that all communities that truly need assistance will get the attention they need, and will help to focus the federal efforts where they will be most useful.

Third, there is an opportunity to bring community resources into these investigations in a more formal way. As I noted above, the people who detected the problem in Woburn, Massachusetts were the parents of children with leukemia. The people who identified the testicular toxicity of DBCP were workers who realized that none of them had been able to father children. The organization that identified the birth defect cluster in Dickson, Tennessee was a non-profit – Birth Defects Research for Children, Inc. In case after case, the clues to help solve these mysteries have resided in the knowledge and experience of the affected communities. So the creation of formal Community Advisory Committees will be critical to gathering better information and for better communication and resolution of these difficult problems.

Disease clusters demonstrate the need for:

1. Directing and funding federal agencies to swiftly assist state and local officials, and investigate community concerns about potential disease clusters and their causes. Good cluster investigations require the creation of consistent guidelines for a systematic and integrated approach to investigating disease clusters; improved coordination between various agencies at the federal, state, and local level; and local advisory committees that can help improve the outreach to and involvement of community members.
2. Reducing or eliminating known toxic releases into air, water, soil and food through strong science-based environmental controls and tough enforcement of those requirements; and
3. Requiring chemical manufacturers to ensure the safety of their products. Comprehensive chemical policy reform includes testing of all untested chemicals

in commerce, requiring manufacturers to prove safety, and the use of an approach that protects children and other vulnerable populations from cumulative risks.

I am thinking of the residents of Woburn, MA, Fallon, NV, Tallevast, FL, Dickson, TN, Midlothian, TX, Camp Lejeune, NC, Prairie Grove, AK, Midland, MI, Kettleman City and Carlsbad, CA, Millsboro, DE, Amelia, LA, Herculaneum, MO, Libby MT, Clyde, OH, Wilkes-Barre, PA, and many dozens of other towns across the country. These people have suffered through illness and uncertainty, hope and disappointment. They have fought for answers, and in most cases, have not received them. It's not too late for these communities and others like them. There's still an opportunity to improve and systematize our approach to disease clusters so these communities get the attention they need and maybe also the answers they seek.

¹ <http://www.cdc.gov/nccdphp/publications/index.htm>

² Tracey J. Woodruff, et al., *America's Children and the Environment*, (Washington, DC: U.S. Environmental Protection Agency, 2008).

³ Holly L. Howe, et al., "Annual Report to the Nation on the Status of Cancer (1973 through 1998), Featuring Cancers with Recent Increasing Trends," *Journal of the National Cancer Institute*, 93, no. 11 (June 2001): 824–42.

⁴ Tracey J. Woodruff, et al., "Trends in Environmentally Related Childhood Illnesses," *Pediatrics*, 113, no. 4 (April 2004): 1133–1140.

⁵ Leonard J. Paulozzi, "International Trends in Rates of Hypospadias and Cryptorchidism," *Environmental Health Perspectives*, 107, no. 4, (1999): 297–302.

⁶ National Institute of Mental Health, "NIMH's Response to New Autism Prevalence Estimate," <http://www.nimh.nih.gov/about/director/updates/2009/nimhs-response-tonew-autism-prevalence-estimate.shtml>. (November 4, 2009).

⁷ Craig Steinmaus, Meng Lu, Randall L Todd, and Allan H Smith. Probability estimates for the unique childhood leukemia cluster in Fallon, Nevada, and risks near other U.S. Military aviation facilities. *Environ Health Perspect*. 2004 May; 112(6): 766–771.

⁸ <http://www.gpo.gov/fdsys/pkg/CHRG-107shrg80650/pdf/CHRG-107shrg80650.pdf>

⁹ Kathleen Navarro, Sarah Janssen, Terry Nordbrock, Gina Solomon. Health Alert: Disease Clusters Spotlight the Need to Protect People from Toxic Chemicals. NRDC, New York, NY, 2011.

¹⁰ National Institute of Environmental Health Sciences. Tungsten and Selected Tungsten Compounds: Review of Toxicological Literature. Research Triangle Park, NC, 2003. http://ntp.niehs.nih.gov/ntp/htdocs/Chem_Background/ExSumPdf/tungsten.pdf

¹¹ Lichtenstein P, Holm NV, Verkasalo PK, Iliadou A, Kaprio J, Koskenvuo M, Pukkala E, Skytthe A, Hemminki K. Environmental and heritable factors in the causation of cancer--analyses of cohorts of twins from Sweden, Denmark, and Finland. *N Engl J Med*. 2000 Jul 13;343(2):78-85.

¹² Doll R, Peto R. The causes of cancer: quantitative estimates of avoidable risks of cancer in the United States today. *Journal of the National Cancer Institute*. 1981;66:1191-308.

¹³ International Agency for Research on Cancer. Monographs on the Evaluation of Carcinogenic Risks to Humans, <http://monographs.iarc.fr/>. National Toxicology Program Report on Carcinogens, ntp.niehs.nih.gov.

¹⁴ Clapp RW, Howe GK, Jacobs M. Environmental and Occupational Causes of Cancer Re-visited. *Journal of Public Health Policy* (2006) 27, 61–76.

¹⁵ President's Cancer Panel. Reducing Environmental Cancer Risk: What we can do now. National Cancer Institute, Washington DC, April 2010.

¹⁶ Dr. John Harris. Birth Defects: Environmental Science and Advocacy, Collaborative on Health and the Environment Webinar, July 15, 2003. http://www.healthandenvironment.org/partnership_calls/132

Stop disease
clusters.
Protect people.
Control toxic
chemicals.

Health Alert: Disease Clusters Spotlight the Need to Protect People from Toxic Chemicals



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NDCA

National Disease Clusters Alliance

www.clusteralliance.org

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About NRDC

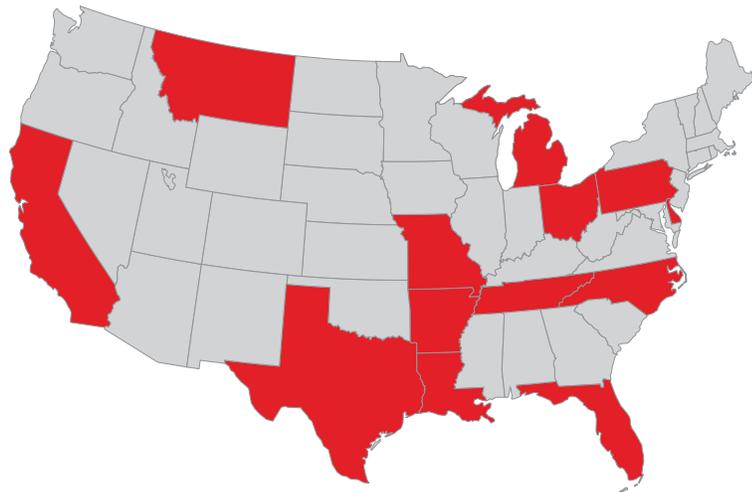
The Natural Resources Defense Council (NRDC) is an international nonprofit environmental organization with more than 1.3 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC has offices in New York City, Washington D.C., Los Angeles, San Francisco, Chicago, Livingston, Montana, and Beijing. Visit us at www.nrdc.org.

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Health Alert: Cancer Clusters, Disease, and the need to Protect People from Toxic Chemicals

An unusually large number of people sickened by a disease in a certain place and time is known as a 'disease cluster'. Clusters of cancer, birth defects, and other chronic illnesses have sometimes been linked to chemicals or other toxic pollutants in local communities, although these links can be controversial. There is a need for better documentation and investigation of disease clusters to identify and address possible causes. Meanwhile, toxic chemicals should be identified and controlled through reform of the Toxic Substances Control Act, so these chemicals don't pollute communities and sicken people.



Due to a lack of resources, the limited statistical power in doing investigations of small communities or rare diseases, and a lack of knowledge about exposures, it has been difficult for state and federal agencies to shed light on most disease clusters and their causes. There is a need for better documentation and investigation of disease clusters and their causes. Senators Barbara Boxer (D-CA) and Michael Crapo (R-ID), have introduced legislation that would address at least some of these problems, by ensuring that the Environmental Protection Agency and other federal agencies can, and will, provide the resources necessary for investigations and other support, where state-level expertise or resources are not available.

In the United States, the Toxic Substances Control Act (TSCA) is the primary law that ensures the safety of industrial chemicals used in commercial and consumer products by regulating their use, from manufacturing to eventual disposal. Unfortunately, because of major flaws in the law the regulation of toxic chemicals in the United States has been a failure. As a result, dangerous chemicals, including those known to cause cancer, birth defects, and learning and developmental disabilities are still used widely with few, if any, restrictions. These include many of the chemicals which have been linked to some disease clusters, including TCE, dioxins, and asbestos. Better testing and regulation of the thousands of toxic chemicals

that can come into our homes, our workplaces and our schools is critical for reducing the cancer and other chronic illnesses and disease that affect our communities.

An issue paper about disease clusters in particular states was developed by the Natural Resources Defense Council and the National Disease Cluster Alliance to inform people about disease clusters affecting communities across the country. All of these disease clusters have been confirmed or are currently undergoing an official investigation, though in most cases the cause of the cluster is unknown.

The disease clusters spotlighted in the factsheet series illustrate the need for:

1. Directing and funding federal agencies to swiftly assist state and local officials, and investigate community concerns about potential disease clusters and their causes;
2. Reducing or eliminating toxic releases into air, water, soil and food through stronger environmental controls and tough enforcement of those requirements; and
3. Requiring chemical manufacturers to ensure the safety of their products.

Methods

Thirteen states, Texas, California, Michigan, North Carolina, Pennsylvania, Florida, Ohio, Delaware, Louisiana, Montana, Tennessee, Missouri, and Arkansas, were chosen for analysis based on the occurrence of known clusters in the state, geographic diversity, or community concerns about a disease cluster in their area. From May 2010 to July 2010, clusters in each state were identified by searching the websites Google, Proquest, Pubmed, and Web of Science using the name of the state and the words "cluster", "cancer cluster", or "birth defects cluster" as search terms.

The criteria for inclusion in the search were:

1. The clusters occurred after 1976, when TSCA legislation was initially passed and was intended to regulate toxic chemicals.
2. The cluster was confirmed or is currently being investigated by a federal, state or local government agency. Clusters were also included if they were identified by academic researchers and published in a peer-reviewed journal. Sources for each of the described clusters are available on NRDC's website.

When possible, contaminants discussed in investigations and news reports are identified, though in most cases no definitive cause for the cluster has been identified. In addition, industries, hazardous waste sites, or other locations which were identified by community members as being of concern are also referenced in the cluster description.

All the fact sheets were externally peer-reviewed by scientists and community members in the National Disease Clusters Alliance.

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Protect people.
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Disease Clusters in Arkansas

An unusually large number of people sickened by a disease in a certain place and time is known as a 'disease cluster'. Clusters of cancer, birth defects, and other chronic illnesses have sometimes been linked to chemicals or other toxic pollutants in local communities, although these links can be controversial. There is a need for better documentation and investigation of disease clusters to identify and address possible causes. Meanwhile, toxic chemicals should be identified and controlled through reform of the Toxic Substances Control Act, so these chemicals don't pollute communities and sicken people.

Investigations of disease clusters are complex, expensive, and often inconclusive, partly due to limitations in scientific tools for investigating cause-and-effect in small populations. Preventing pollution is the best way to avoid creating additional disease clusters. Strategies for prevention include: (1) Directing and funding federal agencies to swiftly assist state and local officials, and investigate community concerns about potential disease clusters and their causes; (2) Reducing or eliminating toxic releases into air, water, soil and food through stronger environmental controls and tough enforcement of those requirements; and (3) Requiring chemical manufacturers to ensure the safety of their products.

Arkansas has suffered from at least one confirmed disease cluster. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION:
**PRAIRIE GROVE,
WASHINGTON COUNTY**

DISEASE:
Testicular cancer

LOCATION: **Prairie Grove,
Washington County**
DISEASE: **Testicular cancer**

In 2001, the Arkansas Department of Health identified a cluster of testicular cancer from 1997 to 2001; three of the cases were in 14-year-old boys. Though no cause was identified, the town of 2,500 people lies near a now-closed nuclear reactor, a low-level radioactive landfill, a poultry plant, and a manufacturer of poultry feed containing arsenic. Local residents were concerned that the poultry factories were contributing to the high rates of cancer and other health problems because arsenic-contaminated chicken manure was used as fertilizer and spread on fields beside schools and homes in Prairie Grove. In 2004, residents sued one of the poultry farms and the poultry feed manufacturer for spreading the contaminated manure throughout Prairie Grove. However, the court did not rule in favor of the residents and the true cause of the cluster has never been determined.

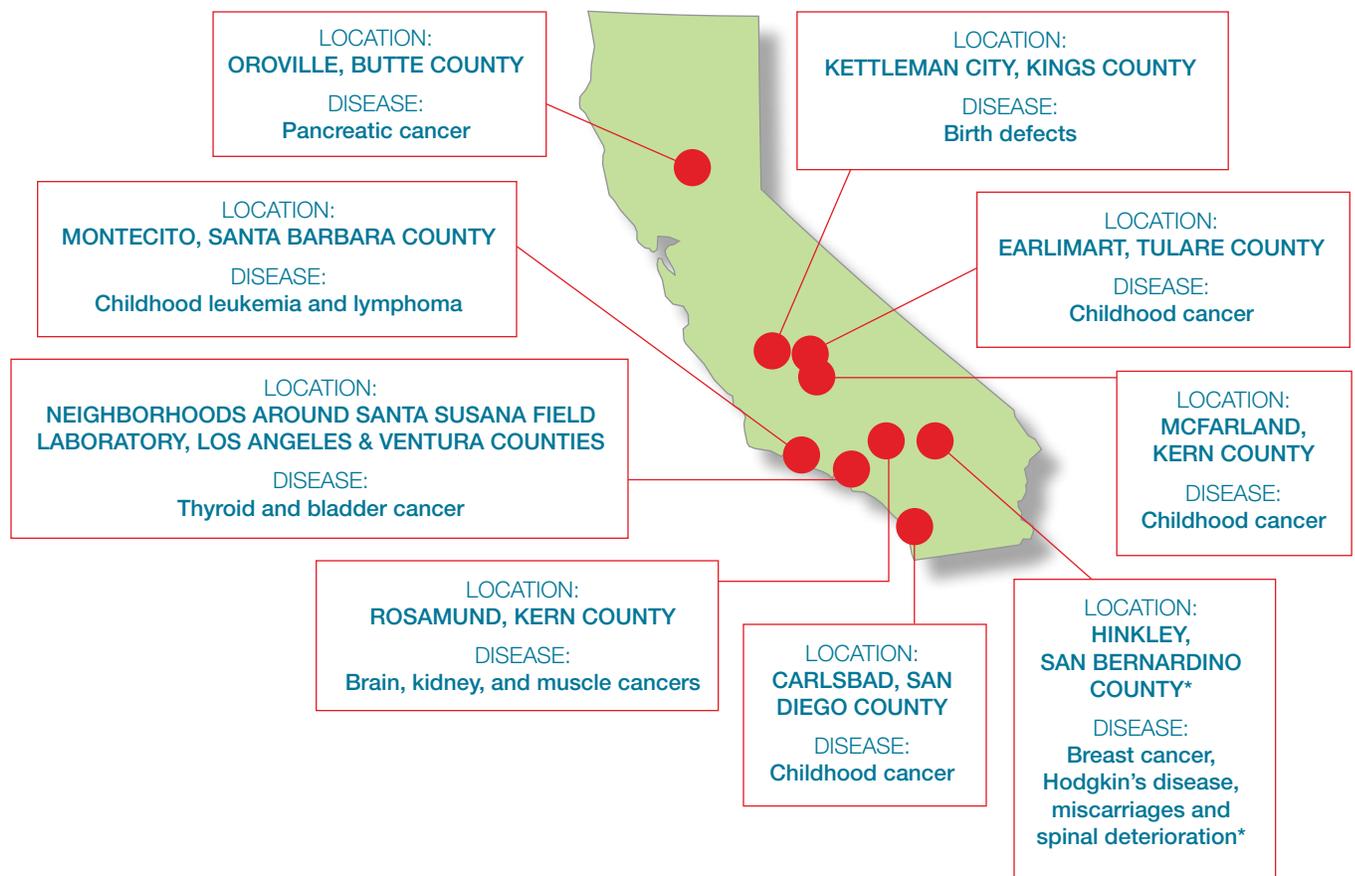
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Disease Clusters in California

An unusually large number of people sickened by a disease in a certain place and time is known as a 'disease cluster'. Clusters of cancer, birth defects, and other chronic illnesses have sometimes been linked to chemicals or other toxic pollutants in local communities, although these links can be controversial. There is a need for better documentation and investigation of disease clusters to identify and address possible causes. Meanwhile, toxic chemicals should be identified and controlled through reform of the Toxic Substances Control Act, so these chemicals don't pollute communities and sicken people.

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California has suffered from at least eight confirmed disease clusters. Most have afflicted children with cancers or birth defects. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties, including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION: Carlsbad, San Diego County

San Diego County health officials are currently investigating a possible childhood cancer cluster in Carlsbad. A community group, Carlsbad Cancer Connection, has identified homes built on pesticide-contaminated farmland and a nearby power plant as being potentially related to the cancer cluster.

LOCATION: Earlimart, Tulare County

The California Department of Health Services (DHS) concluded there was a cluster of childhood cancer cases diagnosed between 1986 and 1989 in Earlimart. All of the Earlimart children with cancer were from families of farm workers.

LOCATION: Kettleman City, Kings County

The California Department of Public Health identified a birth defects cluster in Kettleman City from 2007 to 2010. Children were born with cleft palates and other severe birth defects such as facial deformities, heart and brain problems, and limb defects. Four of those children have since died. Many residents blame the hazardous waste disposal facility, the largest in the western United States, that is just 3.5 miles southwest of town.

LOCATION: McFarland, Kern County

DHS confirmed that McFarland has suffered from a childhood cancer rate three to four times higher than normal. Prior to 1990, there was significant under reporting of the amount of restricted pesticide use, which may have included known cancer-causing compounds. This under reporting has stymied efforts to pinpoint environmental causes of this disease cluster.

LOCATION: Montecito, Santa Barbara County

DHS confirmed a cluster of childhood leukemia and lymphoma in Montecito from 1981 to 1988 at a rate 5 times higher than would be expected during an eight-year period in a city of its size. DHS has been unable to pinpoint a specific environmental cause. Community members were concerned about possible health effects from electromagnetic fields (EMF) levels coming from the transformer station near the elementary school and DHS did find elevated EMF at the school.

LOCATION: Oroville, Butte County

DISEASE: Pancreatic cancer

Oroville had a cluster of pancreatic cancers from 2004 to 2005, confirmed by researchers at the California Cancer Registry. A chemical explosion and fire that occurred in 1987 at the Koppers wood treatment facility in town has been investigated as a possible cause, as well as other Koppers facilities that have historically contaminated residential wells with pentachlorophenol and other toxic chemicals.

LOCATION: Rosamond, Kern County

The Kern County Health Department and DHS identified a cluster of childhood cancer in Rosamond. During the years 1975 to 1984, eight cases of childhood cancer occurred in Rosamond. Four of those cases were medulloblastoma (a rare type of brain cancer); two were rhabdomyosarcomas (a rare muscular cancer), one Hodgkin's lymphoma, and a Wilm's tumor (childhood kidney cancer). Although DHS identified several locations in Rosamond that were contaminated with dioxins, furans, and other chemicals that cause cancer, they did not identify how the children could have been in contact with these chemicals.

LOCATION: Neighborhoods around Santa Susana Field Laboratory, Los Angeles & Ventura Counties

A 1991 study by DHS confirmed a cluster of bladder cancers in areas in Los Angeles County closest to the Santa Susana Field Laboratory (SSFL) in nearby Ventura County. Additionally, a study performed by researchers at the University of Michigan found that risk of thyroid cancer was linked to distance from SSFL, a notorious source of widespread radioactive and chemical contamination. Currently, the California Department of Toxic Substances Control is overseeing an investigation and cleanup of contaminated soil and groundwater at the site.

*** LOCATION: Hinkley**

DISEASE: Breast cancer, Hodgkin's disease, miscarriages and spinal deterioration

In the case made famous by the film, Erin Brockovich, community members won a \$333 million settlement from Pacific Gas & Electric (PG&E) in 1996. Hexavalent chromium leached from PG&E ponds into the town's drinking water supply and community members experienced health effects, such as breast cancer, Hodgkin's disease, miscarriages and spinal deterioration. Although the California Cancer Registry has completed three studies and concluded that cancer rates were not elevated from 1988 to 2008, other state officials have noted that the population is too small for a cancer survey to yield meaningful results. This case is an example of why disease clusters are difficult to prove.

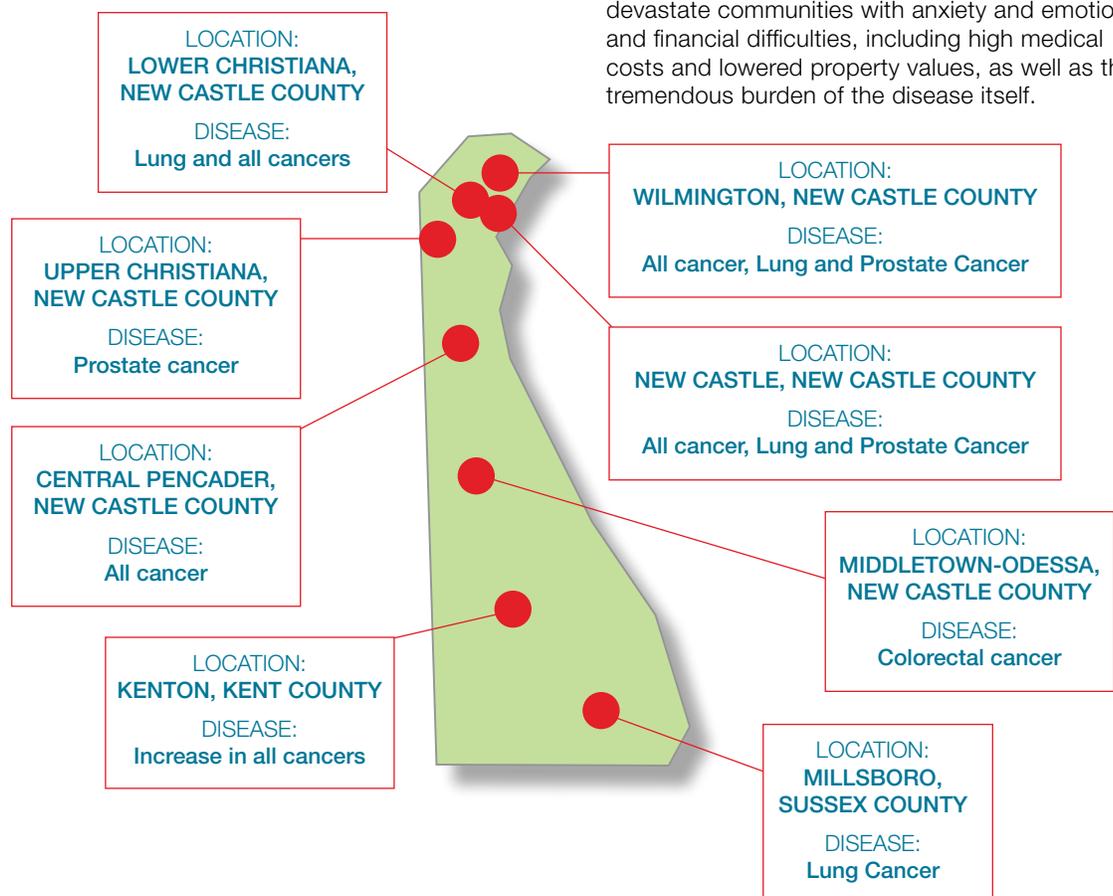
Stop disease clusters.
Protect people.
Control toxic chemicals.

Disease Clusters in Delaware

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Investigations of disease clusters are complex, expensive, and often inconclusive, partly due to limitations in scientific tools for investigating cause-and-effect in small populations. Preventing pollution is the best way to avoid creating additional disease clusters. Strategies for prevention include: (1) Directing and funding federal agencies to swiftly assist state and local officials, and investigate community concerns about potential disease clusters and their causes; (2) Reducing or eliminating toxic releases into air, water, soil and food through stronger environmental controls and tough enforcement of those requirements; and (3) Requiring chemical manufacturers to ensure the safety of their products.

In 2008, the Delaware Department of Health and Social Services published a unique report which identified eight cancer clusters in the state. This was the result of a sub-county level analysis of cancer registry data from the years 2000 through 2004. The analysis was limited to four types of cancer and all cancer cases only. This process is unique in that Delaware is required to release publicly the information from its cancer registry and only one of the clusters was brought to the attention of the state by concerned residents. Although environmental contaminants are often suspected and sometimes implicated, in this instance the investigation did not attempt to determine the cause of the disease clusters. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties, including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION: Lower Christiana, New Castle County

DISEASE: Lung and all cancers

State officials found that Lower Christiana had higher rates of all cancers and also identified a cluster of lung cancer with rates above the state average from 2000-2004. The state investigation did not include research into possible environmental causes of the cluster.

LOCATION: Upper Christiana, New Castle County

DISEASE: Prostate cancer

A cluster of prostate cancer in Upper Christiana was confirmed by state officials who found rates of this cancer were 45 percent higher than the state average from 2000 to 2004. State officials did not look for an environmental link to the increase in prostate cancer.

LOCATION: Central Pencader, New Castle County

DISEASE: All cancer

State officials found that Central Pencader had a higher rate of all types of cancer compared to the state average from 2000 to 2004. State health officials did not investigate any specific environmental link to the increase in cancer rates.

LOCATION: Middletown-Odessa, New Castle County

DISEASE: Colorectal cancer

State health officials found that there was a cluster of colorectal cancer from 2000 to 2004 in Middletown-Odessa where rates were 45 percent higher than the state average. The state investigation did not include research into possible environmental causes of the cluster.

LOCATION: Wilmington, New Castle County

DISEASE: All cancer, lung and prostate cancer

State officials reported that from 2000 to 2004 there were elevated rates of all cancer and, in particular, identified a cluster of lung and prostate cancer with rates in the area higher than the state average. The state investigation did not include research into possible environmental causes of the clusters.

LOCATION: New Castle, New Castle County

DISEASE: All cancer, lung and prostate cancer

From 2000 to 2004, state health officials discovered that New Castle had above average rates of all cancers and specifically identified clusters of lung and prostate cancer with rates higher than the state average. The state investigation did not include research into possible environmental causes of the clusters.

LOCATION: Kenton, Kent County

DISEASE: All cancer

The state health department found a higher rate of all types of cancer in Kenton from 2000 to 2004. The state investigation did not include research into possible environmental causes of the cluster.

LOCATION: Millsboro, Sussex County

DISEASE: Lung Cancer

State officials identified a cluster of lung cancer in Millsboro from 2000-2004. The state investigation did not include research into possible environmental causes of the clusters. However, the state investigation into possible disease clusters was prompted by local residents who were concerned about contamination at the nearby coal ash landfill operated by the Indian River Power Plant. Elevated levels of arsenic, chromium, and thallium in groundwater have been reported to be above federal primary drinking water standards. Arsenic is associated with increased risk of lung cancer.

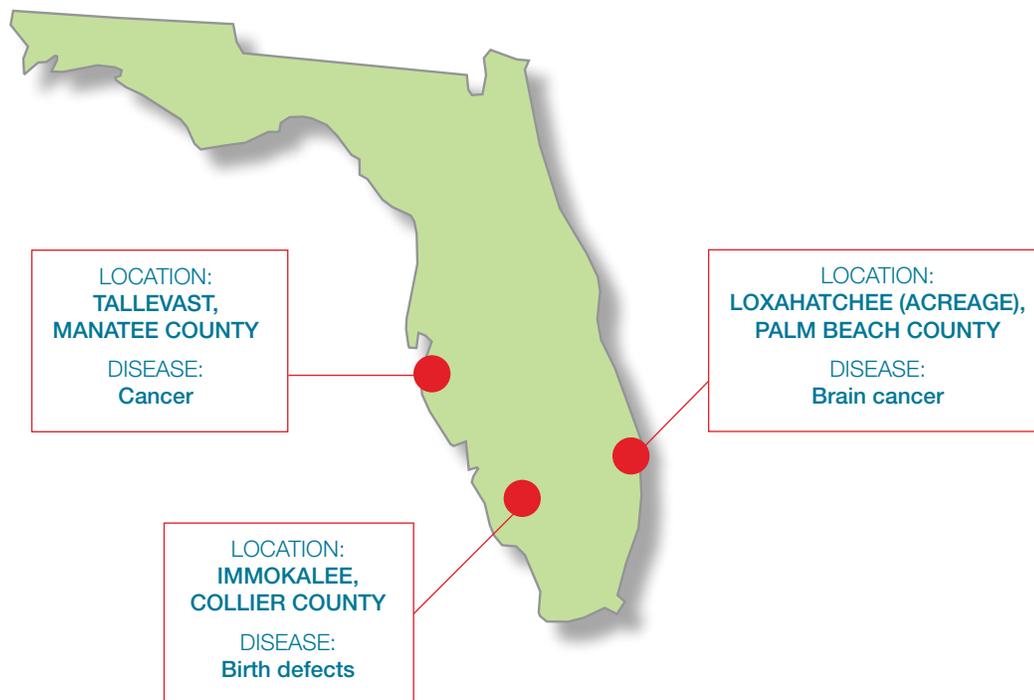
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Disease Clusters in Florida

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Florida has suffered from at least three confirmed disease clusters, two of which afflicted children. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties, including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION: Loxahatchee (Acreage), Palm Beach County

DISEASE: Brain cancer

The Florida Department of Health has confirmed a pediatric brain cancer cluster in a rural community called The Acreage. A community group has counted 18 children with brain cancer and 3 children with brain cysts since 1996. Some residents have blamed Pratt & Whitney, the rocket and jet engine company located nearby, which has been responsible for leaks and spills of chemicals, such as solvents and pesticides on its 7,000 acres for the last 30 years.

LOCATION: Immokalee, Collier County

DISEASE: Birth defects

In 2004, the National Institute of Occupational and Safety and Health and state health officials in North Carolina and Florida identified three women employed by AgMart who gave birth to children with birth defects during a seven week period. All six parents worked on the same tomato fields in North Carolina and Florida. Exposure to pesticides was a suspected cause. In 2005, the North Carolina Department of Agriculture and Consumer Services alleged that Ag Mart had 369 pesticide violations. These violations included (1) the use of six pesticides classified by the Environmental Protection Agency as among the most dangerous to workers and (2) applying a dangerous pesticide three times more often than allowed by law.

LOCATION: Tallevast, Manatee County

DISEASE: Cancer

In 2008, the Agency for Toxic Substances and Disease Registry determined that prior long-term use of groundwater for drinking and other household purposes in Tallevast, Florida was a public health hazard. Residents who drank the most highly contaminated groundwater every day for 42 years were more at risk for developing kidney cancer, liver cancer, leukemia, and lymphoma. From 1962 to 1996, the American Beryllium Company manufactured machine parts in the community. During the manufacturing process, cancer-causing solvents such as trichloroethylene were improperly disposed of, resulting in groundwater contamination.

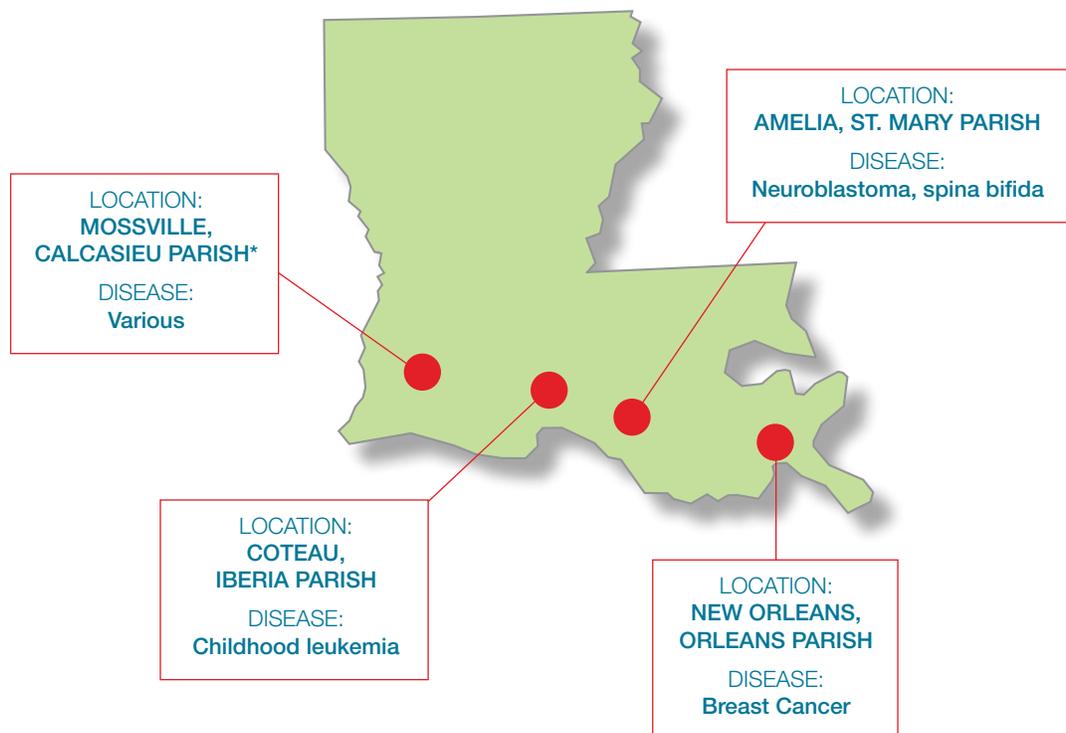
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Disease Clusters in Louisiana

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Louisiana has suffered from at least three confirmed disease clusters, two of which afflicted children. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION: New Orleans, Orleans Parish

DISEASE: Breast cancer

A cluster of breast cancer in an urban census tract at the Agricultural Street Landfill Superfund Site was identified by the Agency for Toxic Substances and Disease Registry (ATSDR) in 2003. The contaminated landfill was in operation between 1909 and 1962 and was the area's main dump for both residential and industrial waste. In 1976, the landfill was covered with a light layer of soil and sand, and redeveloped for residential use. Residents in the area began to discover trash only a few inches below the soil surface and in 1993 the site was designated as a hazardous waste site (Superfund). According to ATSDR, the site and the neighborhood is contaminated with metals, polyaromatic hydrocarbons (PAHs), volatile organic compounds, and pesticides. There is evidence that PAHs can increase the risk of developing breast cancer.

LOCATION: Amelia, St. Mary Parish

DISEASE: Neuroblastoma

Over the period of 1986 through 1987, a cluster of neuroblastoma, a type of brain cancer, was identified by researchers at Louisiana State University Medical School. City government and state health officials petitioned the Agency for Toxic Substances and Disease Registry to conduct a public health assessment of Marine Shale Processor (MSP) due to regulatory scrutiny and public concern over MSP's operations. In 1994, ATSDR concluded that there was evidence to suggest that adverse health outcomes in the community could be related to environmental exposures. However, there was insufficient data to link a hazardous waste incinerator at MSP to adverse health outcomes in the community. In 2006, MSP and its owner paid the state government a settlement of \$7 million for the closure and remediation of the site.

LOCATION: Coteau, Iberia Parish

DISEASE: Childhood leukemia

State health officials confirmed a cluster of childhood leukemia in the tiny community of Coteau after four children were diagnosed with leukemia. In 2000, the Louisiana Office of Public Health began conducting a case-control study of 40 children diagnosed with leukemia between 1983 and 1997 in the four-parish area of Lafayette, Vermilion, St. Martin, and Iberia to identify risk factors associated with childhood leukemia in the area. Due to the small size of the study state epidemiologists were not able to make any clear conclusions about environmental factors that may have caused the cluster of leukemia.

*** LOCATION: Mossville, Calcasieu Parish**

DISEASE: Various

A health survey by researchers at the University of Texas Medical Branch at Galveston in 1998 found that 91 percent of Mossville residents suffered from health problems, including a high incidence of ear, nose, and throat illnesses, central nervous system disturbances, cardiovascular problems, and increased skin, digestive, immune, and endocrine disorders.

Calcasieu Parish is the site of a large number of companies that produce petroleum-based chemicals, chlorinated hydrocarbon solvents, and other organic chemicals. In 1998, the Agency for Toxic Substances and Disease Registry (ATSDR) tested for dioxin in the blood of 28 Mossville residents and reported elevated levels.

The existence of a cluster was not confirmed by the ATSDR, however they only focused on cancer rates in the community and did not look at other health problems, including those investigated by the University of Texas researchers. The illnesses identified in Mossville are not tracked in any disease surveillance program, highlighting how difficult it is to identify clusters of these types of diseases, since there is no existing information against which to compare.

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Protect people.
Control toxic chemicals.**

Disease Clusters in Michigan

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Michigan has experienced at least one confirmed disease cluster spanning several different counties, and another is under investigation. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause.

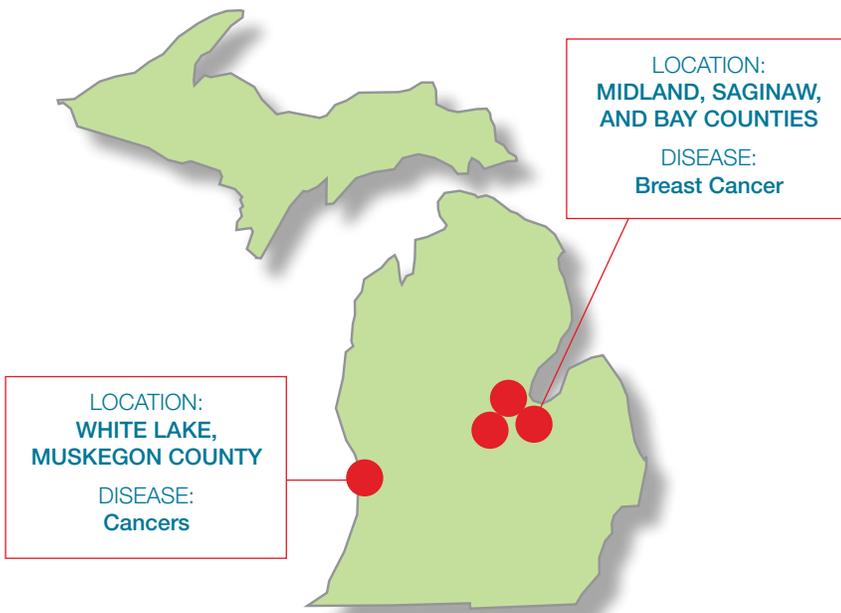
Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties, including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.

LOCATION: Midland, Saginaw, and Bay Counties
DISEASE: Breast Cancer

Researchers found a cluster of breast cancer in Midland, Saginaw, and Bay counties between 1985 and 2002. High levels of dioxins and other contaminants in soil and higher-than average body burdens of dioxins in local residents, particularly those who lived in the region prior to 1980, have also been found in the city of Midland and the Tittabawassee and Saginaw River floodplains in Michigan. A 2008 study found increased breast cancer incidence was spatially associated with dioxin contamination. Researchers believed that the source of dioxins in the river came from industrial processes at the Dow Chemical Company Midland plant.

LOCATION: White Lake, Muskegon County
DISEASE: Cancers

The White Lake area was listed as an area of concern by the Agency for Toxic Substances and Disease Registry in 2008, because 11 sites in the area were categorized as a "public health hazard" or an "indeterminate public health hazard." Seven of these eleven sites are on the EPA's National Priorities List of hazardous waste sites. The Muskegon County Health Department and concerned residents are currently investigating the number of people with cancer. Companies such as Hooker/Occidental Chemical, DuPont and the Whitehall Leather tannery have previously contaminated the White lake area with heavy metals and volatile organic compounds.



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Disease Clusters in Missouri

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Missouri has suffered from at least one confirmed disease cluster. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION:
**HERCULANEUM,
JEFFERSON COUNTY**

DISEASE:
**Amyotrophic Lateral
Sclerosis (ALS)**

LOCATION: **Herculaneum,
Jefferson County**
DISEASE: **Amyotrophic Lateral
Sclerosis (ALS)**

In 2007, the Missouri Department of Health and Senior Services (MDHSS) identified a cluster of Amyotrophic Lateral Sclerosis cases, a nervous system disorder also known as Lou Gehrig’s disease, around a lead smelter in Herculaneum. The MDHSS stated that the lead contamination in Herculaneum presented “a clear and present risk to public health”. MDHSS worked with the Missouri Department of Natural Resources on a settlement that resulted in the purchase of 160 homes by the company that operated the lead smelter due to lead contamination in 2002. The MDHSS reported that the lead smelter also produced pollutants such as zinc, lead, copper, chromium, and cadmium as part of the manufacturing process. Also, slag from the smelter has long been dumped in an enormous pile near the Missouri River.

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Disease Clusters in Montana

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Montana has suffered from at least one confirmed disease cluster. Although the environmental contaminant that caused this cluster is known, experts researching other disease clusters have generally been unable to pinpoint exact causes. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION:
**LIBBY,
LINCOLN COUNTY**
DISEASE:
Respiratory diseases

LOCATION: **Libby, Lincoln County**
DISEASE: **Respiratory diseases**

In 2008, the Agency for Toxic Substances and Disease Registry (ATSDR) identified a cluster of malignant and respiratory diseases from 1979 to 1998 in Libby, Montana. From the 1920's to 1990, vermiculite was mined in and near Libby, Montana and contaminated the entire community and surrounding area. The vermiculite was contaminated with tremolite asbestos, a known carcinogen and cause of non-malignant respiratory illness. Since 1999, the EPA has been working with the community to clean up contamination and reduce exposure.

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Disease Clusters in North Carolina

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North Carolina has suffered from at least two confirmed disease clusters. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause. Regardless of the cause, disease clusters can devastate

communities with anxiety and emotional and financial difficulties, including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.

LOCATION: Bynum, Chatham County

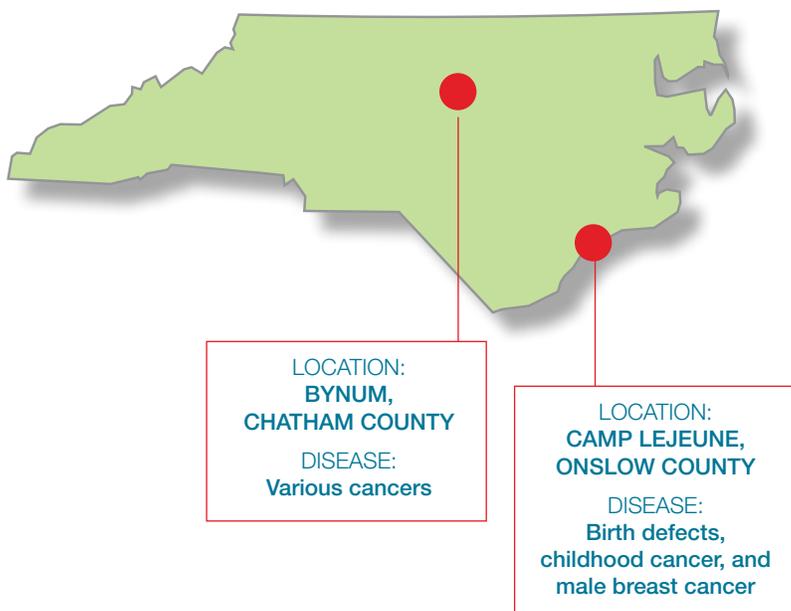
DISEASE: Various cancers

Researchers at The Johns Hopkins University found that Bynum residents had a disproportionately high death rate due to cancer associated with organic contaminants in their drinking water. Results indicated that the percentage of deaths involving cancer increased steadily to a high of 58 percent from 1980 to 1985. From 1947 to 1976, about two-thirds of the residents drank untreated water from the river. Water testing found a variety of pollutants, including carcinogens. Bynum is downstream from significant sources of industrial and agricultural contaminants.

LOCATION: Camp Lejeune, Onslow County

DISEASE: Birth defects, childhood cancer, and male breast cancer

For nearly 40 years, the groundwater at Camp Lejeune was contaminated with perchloroethylene from an off-base dry cleaner; with trichloroethylene from industrial solvents used on base; and with benzene from fuel tank leaks on the Marine Corps Base. The Agency for Toxic Substances and Disease Registry (ATSDR) is currently conducting a study on various birth defects, childhood leukemia and non-Hodgkin's lymphoma in children born to mothers who lived on base at Camp Lejeune any time during their pregnancies. Newspapers also reported that about 60 men who had lived on the base have been diagnosed with male breast cancer. ATSDR will also be conducting a health survey that will investigate the incidence of cancer and other diseases, including breast cancer, which is expected to begin in the spring of 2011.



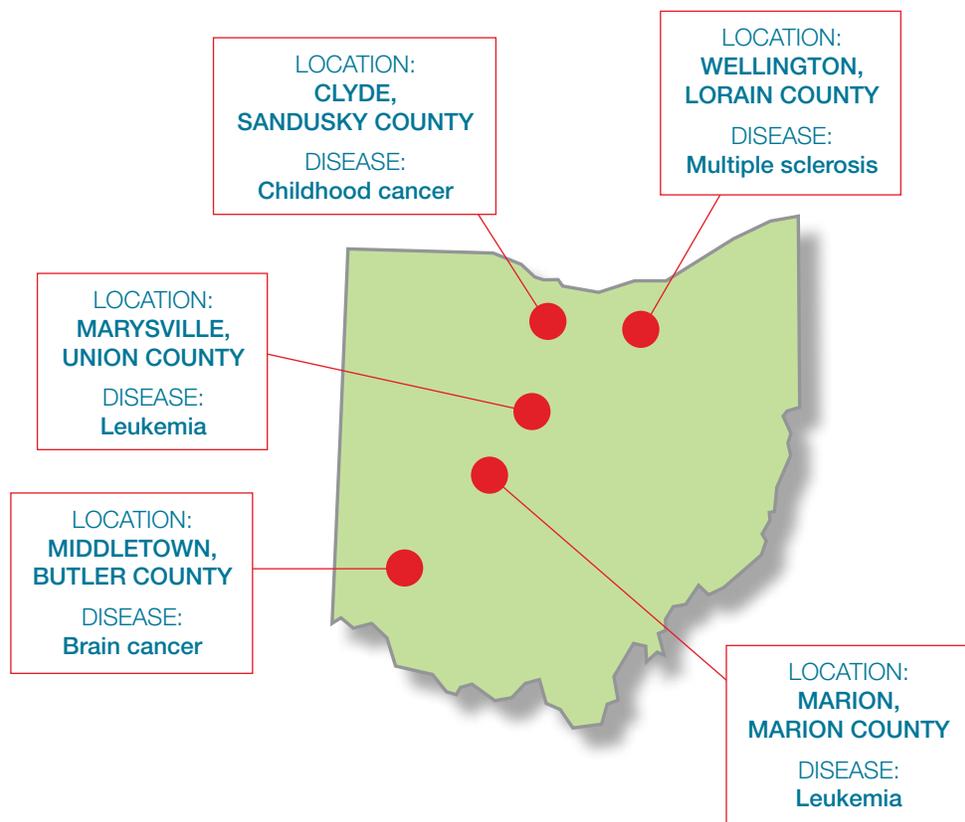
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Disease Clusters in Ohio

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Ohio has suffered from at least four confirmed disease clusters, two of which afflicted children, and another cluster is currently under investigation. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties, including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION: Clyde, Sandusky County

DISEASE: Childhood cancer

In 2009, the Ohio Department of Health (ODH) and Sandusky County Health Department confirmed a cancer cluster in the city of Clyde and Green Creek Township area. The analysis found brain and other central nervous system cancers to be the most common cancer types. State and local agencies are continuing to investigate the cause of the higher than expected number of childhood cancer diagnoses in the county.

LOCATION: Wellington, Lorain County

DISEASE: Multiple sclerosis

A 1998 study by state and local health departments found residents of Wellington were three times more likely to develop multiple sclerosis (MS) than the rest of the country. The Agency for Toxic Substances and Disease Registry found that there had been a release of chemical contaminants in the environment surrounding a former foundry, the LESCO facility, and the still operating Forest City Technologies plant. The LESCO facility was a distributor and formulator of fertilizer and Forest City Technologies manufactures seals and gaskets for the automotive industry. Although the causes of MS are unknown, the disease is believed to be caused by a combination of genetic and environmental factors.

LOCATION: Marysville, Union County

DISEASE: Leukemia

The ODH has preliminarily concluded that there was a cluster of leukemia cases in this small town. Between 1992 and 2001, eight boys and young men were diagnosed with leukemia, a number that is significantly higher than expected when compared to national rates for a town this size.

LOCATION: Marion, Marion County

DISEASE: Leukemia

In 1999, the ODH found a cluster of leukemia and esophageal cancer in Marion. River Valley High School was built in the early 1960's on top of an Army depot used for cleaning and repairs of vehicles and heavy machinery. The Ohio EPA discovered several carcinogenic substances at the site at dangerous levels. In 1997, the Army Corp of Engineers began investigating and cleaning up arsenic and lead at the former depot; they expect to complete all clean-up projects in June 2013.

LOCATION: Middletown, Butler County

DISEASE: Brain cancer

Since 2004, 11 people in Middletown have been diagnosed with glioblastoma, a type of brain cancer. The ODH is investigating this as a potential cancer cluster.

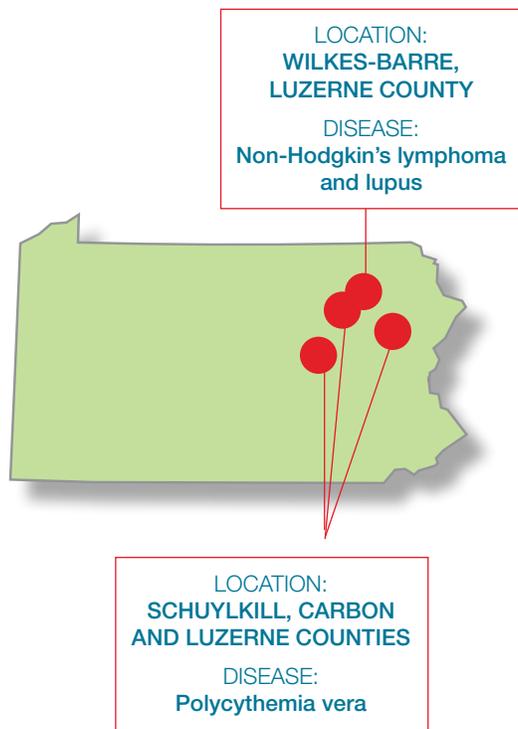
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Disease Clusters in Pennsylvania

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Pennsylvania has suffered from at least two confirmed disease clusters spanning several different counties. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties, including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION: Wilkes-Barre, Luzerne County

DISEASE: Non-Hodgkin's lymphoma and lupus

In 2004, researchers at Pennsylvania State University found health hazards associated with workplace exposure to trichloroethylene (TCE) at a Wilkes-Barre special education school in the school district's main administrative building. Twelve employees have been diagnosed with non-Hodgkin's lymphoma and lupus. The researchers found TCE exposures were 10,000 times higher than what the Environmental Protection Agency considers an acceptable cancer risk for someone working in the building for at least 10 years. TCE, a probable human carcinogen, was used by the staff to clean the two printing presses.

LOCATION: Schuylkill, Carbon and Luzerne Counties

DISEASE: Polycythemia vera

In 2008, the Agency for Toxic Substances and Disease Registry confirmed a cluster of polycythemia vera (PV) cases in Schuylkill, Luzerne, and Carbon counties. PV is a rare blood disorder in which the bone marrow makes too many red blood cells. Some residents blame their illness on a nearby coal-fired power plant and a recycling facility that accepted thousands of gallons of paint, sludge, waste oils, used solvents, PCBs, cyanide, pesticides, and many other known or suspected carcinogens.

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Disease Clusters in Tennessee

An unusually large number of people sickened by a disease in a certain place and time is known as a 'disease cluster'. Clusters of cancer, birth defects, and other chronic illnesses have sometimes been linked to chemicals or other toxic pollutants in local communities, although these links can be controversial. There is a need for better documentation and investigation of disease clusters to identify and address possible causes. Meanwhile, toxic chemicals should be identified and controlled through reform of the Toxic Substances Control Act, so these chemicals don't pollute communities and sicken people.

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Tennessee has suffered from at least one confirmed disease cluster which afflicted children. Environmental contaminants are implicated in this cluster. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties, including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION:
**DICKSON,
DICKSON COUNTY**

DISEASE:
Oral cleft birth defects

LOCATION: **Dickson, Dickson County** DISEASE: **Oral cleft birth defects**

A cluster of oral cleft (cleft lip and cleft palate) birth defects in Dickson, Tennessee from 1997 to 2000 was identified by the Centers for Disease Control and Prevention. The investigation revealed that in 1997, trichloroethylene (TCE) and toluene were found in a private well, public well, and in the public water supply. Both chemicals have been associated with causing birth defects. Prior to stringent landfill regulations and guidelines, containers of TCE were buried in the Dickson County landfill in Dickson. Additionally, according to the EPA's Toxic Release Inventory in 1997 Quebecor Printing released 1.4 million pounds of toluene into the air in Dickson.

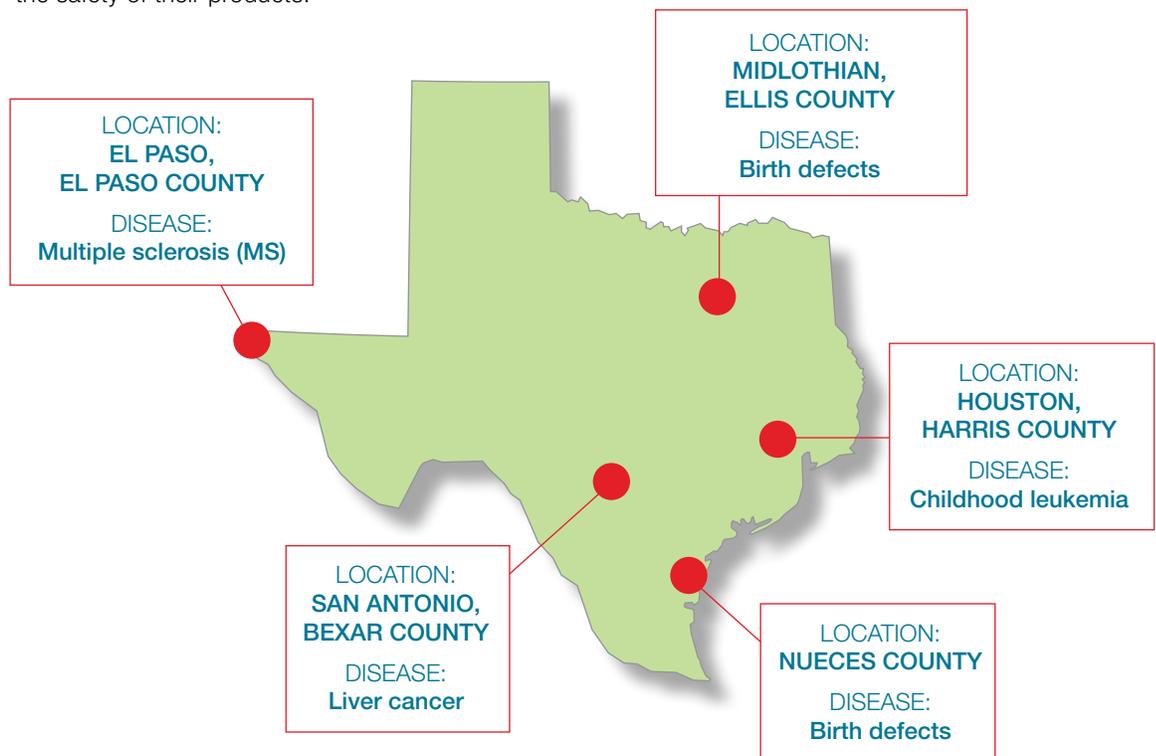
**Stop disease clusters.
Protect people.
Control toxic chemicals.**

Disease Clusters in Texas

An unusually large number of people sickened by a disease in a certain place and time is known as a 'disease cluster'. Clusters of cancer, birth defects, and other chronic illnesses have sometimes been linked to chemicals or other toxic pollutants in local communities, although these links can be controversial. There is a need for better documentation and investigation of disease clusters to identify and address possible causes. Meanwhile, toxic chemicals should be identified and controlled through reform of the Toxic Substances Control Act, so these chemicals don't pollute communities and sicken people.

Investigations of disease clusters are complex, expensive, and often inconclusive, partly due to limitations in scientific tools for investigating cause-and-effect in small populations. Preventing pollution is the best way to avoid creating additional disease clusters. Strategies for prevention include: (1) Directing and funding federal agencies to swiftly assist state and local officials, and investigate community concerns about potential disease clusters and their causes; (2) Reducing or eliminating toxic releases into air, water, soil and food through stronger environmental controls and tough enforcement of those requirements; and (3) Requiring chemical manufacturers to ensure the safety of their products.

Texas has suffered from at least five disease clusters confirmed by health authorities. Most have afflicted children with cancers or birth defects. Although environmental contaminants are implicated, experts have been unable to pinpoint an exact cause. Regardless of the cause, disease clusters can devastate communities with anxiety and emotional and financial difficulties, including high medical costs and lowered property values, as well as the tremendous burden of the disease itself.



LOCATION: El Paso, El Paso County

DISEASE: Multiple sclerosis (MS)

In 1996, the Agency for Toxic Substances and Disease Registry (ATSDR) and the Texas Department of State Health Services (TDSHS) found a two-fold increased risk of developing multiple sclerosis (MS) in people who had attended Mesita Elementary School in El Paso. The school is located one mile from an ASARCO smelter facility. Environmental sampling has shown elevated levels of lead, zinc, arsenic, cadmium, and SO₂ in many areas of El Paso. Although the causes of MS are unknown, the disease is believed to be caused by a combination of genetic and environmental factors.

LOCATION: Houston, Harris County

DISEASE: Childhood leukemia

Researchers from the University of Texas's School of Public Health found that children who live within two miles of the Houston Ship Channel have a 56 percent greater chance of getting leukemia than children living elsewhere. The elevated rates of childhood leukemia were found in census tracts with the highest benzene and 1,3-butadiene levels in the air. The Houston Ship Channel is the largest petrochemical complex in the United States and a Rice University study released in 2006 showed that Houston had the highest air concentration of benzene and 1,3-butadiene in the country. Benzene and 1,3-butadiene are known to be human carcinogens.

LOCATION: Midlothian, Ellis County

DISEASE: Birth defects

An investigation by TDSHS confirmed a cluster of Downs Syndrome in Ellis County from 1991 to 1994. Residents are concerned about air pollution from three cement plants and one steel-recycling mill and are also documenting birth defects in animals born in the area. The ATSDR is restarting a second health assessment after the first was criticized by academic scientists for using inadequate air monitoring information, discounting evidence showing that some airborne chemicals exceeded federal health standards, and disregarding residents' respiratory complaints. The health assessment is investigating the higher rates of health problems, including leukemia, birth defects and childhood total cancer and the high incidence of respiratory problems in Ellis County when compared to the rest of the state.

LOCATION: Nueces County

DISEASE: Birth defects

In 2006, the TDSHS found that Nueces County had a birth defect rate that was 84 percent higher than the rest of Texas. A follow-up study explored the relationship between the rate of birth defects and several industrial sites in the county. Researchers were not able to find a direct link to a particular site, but they found that mothers living near refineries and chemical plants had babies with high rates of life-threatening birth defects of the abdominal wall and diaphragm. Living near an old incinerator was linked to other serious birth defects such as narrow anal and intestinal canals or obstructed or narrow urinary tracts. Additionally, researchers found mothers living near a battery plant had higher rates of five different birth defects.

LOCATION: San Antonio, Bexar County

DISEASE: Liver cancer

Researchers at Southwest Texas State University found a cluster of liver cancer deaths in Bexar County and its adjacent counties using statewide cancer mortality data from 1990 through 1997. About 14 zip codes in San Antonio encompass a plume of polluted groundwater linked to Kelly Air Force Base. Local groups allege that the groundwater was polluted with waste containing benzene, perchloroethylene, and trichloroethylene, all known carcinogens. ATSDR is investigating and has stated that the community may have been exposed to higher levels of contaminants in the past.

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