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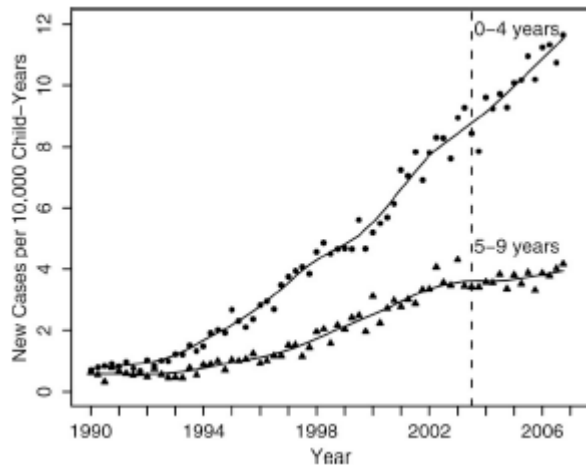
From Environmental Health News, January 2009

Autism epidemic not caused by shifts in diagnoses; environmental factors likely

Changes in doctors' diagnoses cannot explain the sevenfold increase in autism since 1990, a new California study shows. Environmental factors are probably to blame.

By Marla Cone
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Environmental Health News
January 9, 2009

California's sevenfold increase in autism cannot be explained by changes in doctors' diagnoses and most likely is due to environmental exposures, University of California scientists reported Thursday.



Epidemiology

Annual incidence rates of autism in California

The scientists who authored the new study advocate a nationwide shift in autism research to focus on potential factors in the environment that babies and fetuses are exposed to, including pesticides, viruses and chemicals in household products.

"It's time to start looking for the environmental culprits responsible for the remarkable increase in the rate of autism in California," said [Iva Hertz-Picciotto](#), an epidemiology professor at University of California, Davis who led the study.

Throughout the nation, the numbers of autistic children have increased dramatically over the past 15 years. Autistic children have problems communicating and interacting socially; the symptoms usually are evident by the time the child is a toddler.

More than 3,000 new cases of autism were reported in California in 2006, compared with 205 in 1990. In 1990, 6.2 of every 10,000 children born in the state were diagnosed with autism by the age of five, compared with 42.5 in 10,000 born in 2001, according to the [study](#), published in the journal *Epidemiology*. The numbers have continued to rise since then.

TABLE 1. Annual Numbers and Rates of New Cases of Autism in the California DDS System, 1990–2006, for Children Aged Below 5 Years

Year	No.	Rate	Population Estimate 0–4 Yrs
1990	205	0.8	2,534,451
1991	213	0.8	2,664,214
1992	266	1.0	2,752,513
1993	370	1.3	2,807,471
1994	519	1.8	2,829,617
1995	662	2.4	2,797,903
1996	816	3.0	2,726,617
1997	1029	3.9	2,635,231
1998	1189	4.7	2,557,813
1999	1227	4.9	2,499,258
2000	1403	5.6	2,491,907
2001	1817	7.3	2,503,706
2002	2022	8.0	2,527,918
2003	2221	8.6	2,574,005
2004	2482	9.5	2,621,554
2005	2757	10.4	2,663,441
2006	3011	11.2	2,678,019

Rates are per 10,000 person-years.

Epidemiology.

To nail down the causes, scientists must unravel a mystery: What in the environment has changed since the early 1990s that could account for such an enormous rise in the brain disorder?

For years, many medical officials have suspected that the trend is artificial--due to changes in diagnoses or migration patterns rather than a real rise in the disorder.

But the new study concludes that those factors cannot explain most of the increase in autism.

Hertz-Picciotto and Lora Delwiche of the UC Davis Department of Public Health Sciences analyzed 17 years of state data that tracks developmental disabilities, and used birth records and Census Bureau data to calculate the rate of autism and age of diagnosis.

The results: Migration to the state had no effect. And changes in how and when doctors diagnose the disorder and when state officials report it can explain less than half of the increase.

Dr. Bernard Weiss, a professor of environmental medicine and pediatrics at the University of Rochester Medical Center who was

“It’s time to start looking for the environmental culprits responsible

not involved in the new research, said the autism rate reported in the study "seems astonishing." He agreed that environmental causes should be getting more attention.

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...Irva Hertz-Picciotto

The California researchers concluded that doctors are diagnosing autism at a younger age because of increased awareness. But that change is responsible for only about a 24% increase in children reported to be autistic by the age of five, according to the report.

"A shift toward younger age at diagnosis was clear but not huge," the report says.

Also, a shift in doctors diagnosing milder cases explains another 56% increase. And changes in state reporting of the disorder could account for around a 120% increase.

Combined, Hertz-Picciotto said those factors "don't get us close" to the 600% to 700% increase in diagnosed cases.

That means the rest is unexplained and likely caused by something that pregnant women or infants are exposed to, or a combination of genetic and environmental factors.

"There's genetics and there's environment. And genetics don't change in such short periods of time," Hertz-Picciotto, a researcher at [UC Davis' M.I.N.D. Institute](#), a leading autism research facility, said in an interview Thursday.

Many researchers have theorized that a pregnant woman's exposure to chemical pollutants, particularly metals and pesticides, could be altering a developing baby's brain structure, triggering autism.

Many parent groups believe that childhood vaccines are responsible because they contained thimerosal, a mercury compound used as a preservative. But thimerosal was removed from most vaccines in 1999, and autism rates are still rising.

Dozens of chemicals in the environment are neurodevelopmental toxins, which means they alter how the brain grows. Mercury, polychlorinated biphenyls, lead, brominated flame retardants and pesticides are examples.

While exposure to some--such as PCBs--has declined in recent decades, others--including flame retardants used in furniture and electronics, and pyrethroid insecticides--have increased.

Mothers of autistic children were twice as likely to use pet flea shampoos, which contain organophosphates or pyrethroids, according to one study that has not yet been published. Another new study has found a link between autism and phthalates, which are compounds used in vinyl and cosmetics. Other household products such as antibacterial soaps also could have ingredients that harm the brain by changing immune systems, Hertz-Picciotto said.

In addition, fetuses and infants might be exposed to a fairly new infectious microbe, such as a virus or bacterium, that could be altering the immune system or brain structure. In the 1970s, autism rates increased due to the rubella virus.

The culprits, Hertz-Picciotto said, could be "in the microbial world and in the chemical world."

"I don't think there's going to be one smoking gun in this autism problem," she said. "It's such a big world out there and we know so little at this point."

But she added, scientists expect to develop "quite a few leads in a year or so."

The UC Davis researchers have been studying autistic children's exposure to flame retardants and pesticides to see if there is a connection. The results have not yet been published.

"If we're going to stop the rise in autism in California, we need to keep these studies going and expand them to the extent possible," Hertz-Picciotto said.

Funding for studying genetic causes of autism is 10 to 20 times higher than funding for environmental causes, she said. "It's very off-balance," she said.

Weiss agreed, saying that "excessive emphasis has been placed on genetics as a cause."

"The advances in molecular genetics have tended to obscure the principle that genes are always acting in and on a particular environment. This article, I think, will restore some balance to our thinking," he said.

Some issues related to whether the increase is merely a reporting artifact remain unresolved. There could be other, unknown issues involving diagnosis and reporting, scientists say.

The surge in autism is similar to the rise in childhood asthma, which has reached epidemic proportions for unexplained reasons. Medical officials originally thought that, too, might be due to increased reporting of the disease, but now they acknowledge that many more children are asthmatic than in the past. Experts suspect that environmental pollutants or immune changes could be responsible.

Autism has serious effects, not just on an individual child's health but on education, health care and the economy.

"Autism incidence in California shows no sign yet of plateauing," Hertz-Picciotto and Delwiche said in their study.

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