

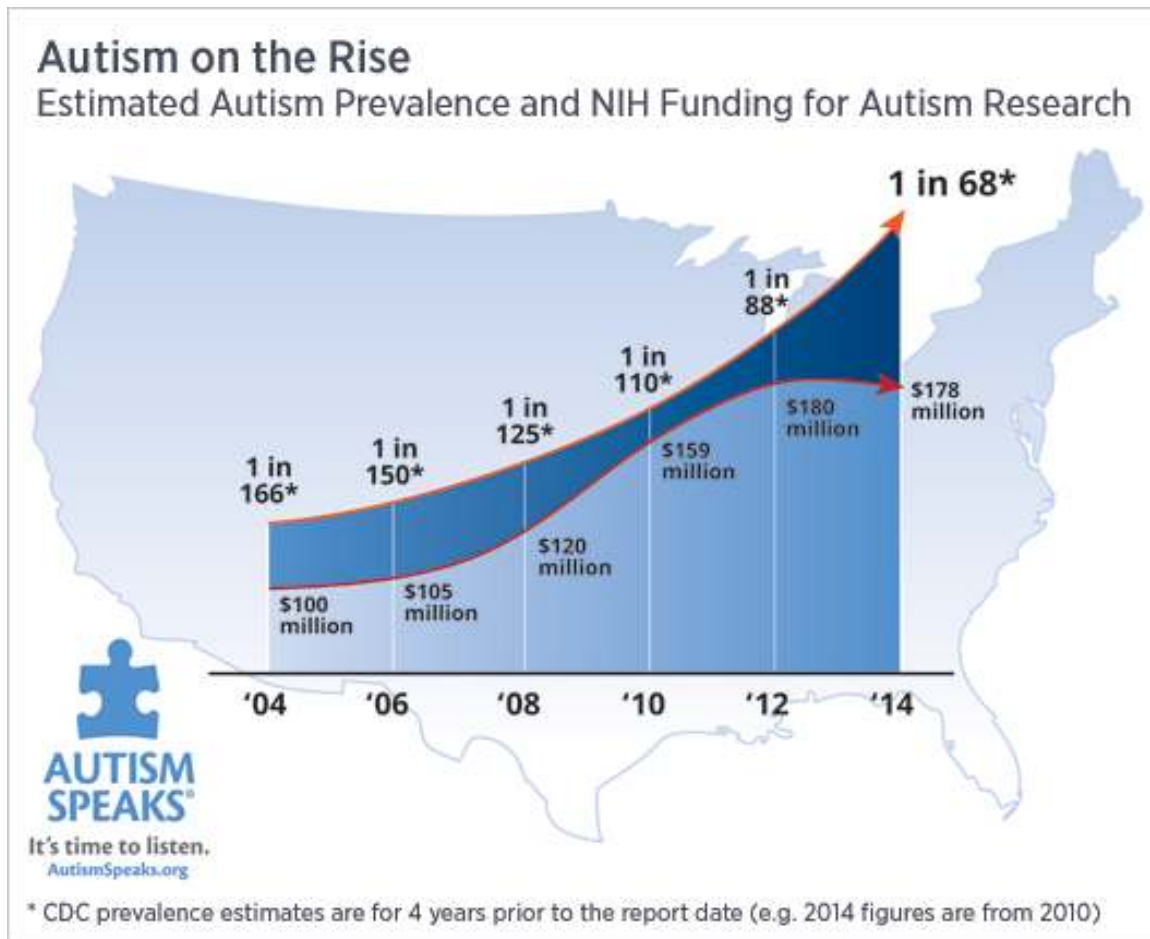
Environmental Links to Autism

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Abstract

Autism has been on the rise for 20 years now and the reason why is still unknown. It now affects 1 in every 68 children. This graph from autism speaks illustrates the disorder's dramatic increase.



This increase is so significant that there is undoubtedly something causing it. It's clear that biology and genetics are risk factors, but they don't explain the dramatic increase in numbers. There are a lot of theories out there, but one that has been studied recently and has scientific backing is air pollution exposure being linked to the development of autism. Studies have shown a correlation between pregnant women being exposed to toxic air pollution and their children being diagnosed with autism. With the highest levels of

exposure, the likelihood of having autism almost doubles. This is a relatively new theory but the results from these few studies seem promising. The environment and pollution may be negatively affecting people and their children more than anyone knows.

Body

Autism is a developmental disorder that negatively impacts a person's ability to interact socially and is characterized by abnormalities in verbal and nonverbal communication. In the past 20 years, the prevalence rate for autism has been on the rise. This is due to broadening the definition of the disorder and improvements in diagnosis. Though, that doesn't fully account for the increase. There aren't a lot of studies on the impact of air pollution on brain development, especially during pregnancy. Though, exposure to air pollution during pregnancy has been linked to a variety of negative birth outcomes.

Autism is a complex disorder. Susceptibility is determined by genetics, biological factors, and environmental factors. A link has been found between exposure to air pollution during pregnancy and children being diagnosed with autism. Though, this does not mean that all pregnant women who are exposed to air pollution are going to have a child with autism, and it also does not mean every child with autism was exposed to air pollution. Pollution may be a serious risk factor for autism that we never knew about until recently. This is a link that needs to be studied more. Researchers found this link through their research on particulate matter.

Particulate matter is a mix of droplets and particles in the air. Exhaust from vehicles and other combustion byproducts are high in fine particulate matter. This explains why fine particulate matter is more common in areas with busy roadways. Studies have shown that children born with the highest level of exposure to fine particulate matter are twice as likely to develop autism compared to children born with the lowest level of exposure. These studies are very useful because they show that environmental factors have an effect

on the likelihood of developing autism. This information can help health professionals come up with preventative measures to help stop the dramatic increase in autism diagnoses. Studies are adding more and more evidence to support that air pollution is a serious risk factor that needs to be considered. Most importantly, they show that the risk is most detrimental for women who are pregnant.

Example #1

This experiment studied the influence of exposure to traffic-related air pollution during pregnancy on the development of autism in Los Angeles, California. Data was taken from air monitoring stations and a land use regression (LUR) model was used to estimate exposures. Children who were born in Los Angeles, California, and who were diagnosed with Autism from 3-5 years of age during 1998-2009 were used for this experiment. 7,603 children with autism were linked to the nearest air monitoring station. It was found that there is a 12-15% relative increase in odds of autism related to ozone and particulate matter (Becerra, 2013).

This was a population-based case-control study. The diagnosis of Autism in these children was based on the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition*. There were 10 controls for each case in the population. Controls were children with no documentation of autism but who were born in the same time frame as the other children and also were born in Los Angeles. Using the nearest monitoring stations, the experimenters estimated the average of exposures during pregnancy. They adjusted for potential confounders including maternal age, place of birth, race/ethnicity, and education. The study found that there is a link between Autism and exposure to traffic pollutants during pregnancy (Becerra, 2013).

Example #2

New research from University of Pittsburgh shows a strong correlation between exposure to toxic air pollutants during pregnancy and the development of Autism in children. This study was designed because one in every 68 children in the U.S. is affected by Autism and it is continuing to increase. Southwestern Pennsylvania has been struggling with air pollution for a long time now. They are taking steps to cleaning up the air but it has been a slow process. This study shows a link between air pollution exposure during pregnancy and children developing autism. People in the area are starting to realize that they need to stop polluting and start cleaning up the air in order to help their children's health. It's the health department's job to make sure large industrial sources, which emit large amounts of air toxins are operating under the law (Pitt Study, 2014).

This study was a population-based case-control study that took place in six counties in southwestern Pennsylvania. The research found that exposure to chromium, cyanide, styrene, and other air pollutants during pregnancy and in early childhood increased the likelihood of that child being diagnosed with autism. Chromium is a heavy metal that can lead to air pollution. It typically comes from industrial processes, like hardening of steel. Styrene is used to produce plastics and paints but it also can result from combustion when vehicles burn gasoline. Cyanide can also be released with vehicle exhaust. This further shows the correlation between traffic air pollutants exposure during pregnancy and the development of autism. This study specifically showed that air toxins from industrial processes can increase the risk of autism. This is why there are laws on industry and how much pollution can be emitted into the air. These companies need to be compliant with the

law, because they are negatively affecting the health of people around them (Pitt Study, 2014).

Analysis

These studies have shown that the risk of autism in children dramatically increases when women have been exposed to high levels of air pollution during pregnancy. The correlation was strongest when the exposure happened during the third trimester. It's also been found that the greater the exposure the greater the risk is. This shows that it's not only genetics that determine the susceptibility. The environment also has serious risk factors. Toxic air pollutants are contributing to the autism epidemic and this is a serious concern. These findings show that we have a responsibility clean up our environment and clean up our air. More research needs to be done on this so that action can be taken. For years people have been coming up with theories on why certain children get autism and why certain children don't. It seems to be a mix of biology, genetics, and environment. If we can determine the exact environmental risk factors that make children more susceptible, then we may be able to stop this epidemic.

Conclusion

Autism has been a popular topic in the health community for years now due to it's drastic increase in diagnoses. Though, the large amount of new cases hasn't helped researchers find the cause. It's clear that genetics play a big part in the development of autism, but that doesn't explain it fully. There are many factors that attribute to a child developing autism, and it's proving difficult to find all of them. The theory that toxic air pollutants and fine particulate matter exposure during pregnancy, especially in the third trimester, is a new one but has scientific data that backs it up. These findings may help us

understand this disorder more, and come up with a plan of action to stop these dangerous exposures.

References

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