

What is causing the autism epidemic  
– are we looking in all the wrong places?

By Caroline Rodgers 10-22-2010

# The Elephant in the Room

# The birth of an epidemic

Worldwide autism boom identified by the Environmental Protection Agency (EPA)

- Began with children born only 22 years ago in 1988-1989
- Based on data sets showing autism spikes in the U.S. and countries around the globe

# What could cause this epidemic?

- Vaccines?
- Genetics?
- Air pollution?
- Pesticides?
- Toxic chemicals?

***Timing of the worldwide autism boom suggests that whatever is causing autism must be the result of a specific change in prenatal exposure in countries around the world that has only increased in the last 22 years***

# Vaccines, considered

- A percentage of children develop normally until they regress into autism, which some parents believe was caused by vaccinations
- Numerous studies throughout the world do not support that vaccines – whether alone, in combination, or with thimerosal – cause autism
- Nonetheless, parental observations are valuable and will someday be explained

***Keep in mind: Non-participation in vaccine programs does not protect children from autism but puts public health at risk***

# Genetics: elusive answers

- Twin studies support the idea that autism is genetic, but researchers have been unable to identify a specific inherited “autism gene”
- Gene abnormalities associated with autism only apply to a small percentage of people with the disorder – and do not cause autism in all people with the same gene variations
- The gene pool does not change quickly, so genes alone cannot explain the rapid increase in autism that has occurred

# Air pollution has decreased

According to the World Health Organization, particulate air pollution in developed countries has decreased significantly since the 1970s, due to:

- Phasing out leaded gasoline
- Equipping cars with catalytic converters
- Use of cleaner fuels
- Reduction of chlorofluorocarbons (CFCs) and other ozone-depleting substances

*... But while air quality has been improving, the autism rate has only increased – especially in developed countries that now enjoy cleaner air*

# Pesticide usage does not explain autism increase

- Farm pesticide usage in the U.S. hit a low in 1988 – the changepoint year for the autism boom
- According to the Environmental Protection Agency, “pesticide usage can vary considerably from year to year depending on weather, pest outbreaks, crop acreage, and economic forces such as crop prices.”

*. . . But autism rates keep going up*

# Chemical exposure

- Nearly 85,000 chemicals are registered with the EPA for commercial use – most of which have no developmental toxicity information
- Some chemicals have been associated with diminished intelligence or ADHD in children
- A small number of chemicals such as thalidomide (already unavailable to women who are pregnant or wish to conceive), misoprostol (not used in the United States), the anti-epileptic drug valproic acid and the insecticide chlorpyrifos, have been implicated in causing autism

Source: Dr. Philip Landrigan  
July 16, 2010 IACC Full Committee Meeting



# Back to Square One

Because no single identified possible risk factor – whether vaccines, genetics, air pollution, pesticides or chemicals – can explain the increase in autism, most researchers believe that autism is caused by a complex interaction of genetics and environmental factors

# Official IACC statement

“As with many complex disorders, causation is generally thought to involve some forms of genetic risk interacting with some forms of non-genetic environmental exposure.”

– *2010 IACC Strategic Plan*

# Epigenetics: Genes & environment

The elegant and emerging science of epigenetics, in which DNA modifications change how RNA is read, seems to be leading the way to discovering autism's cause

## **BUT WAIT!**

*The EPA autism boom study found that autism increased rapidly at the same time in different countries around the world*

# Impossible odds

Because every country has different gene pools, air and water quality, building materials, fabrics, diets, environments, chemical exposures and pesticide levels . . .

***. . . It would take an impossible series of genetic and environmental coincidences to combine to cause such similar increases in autism at the same time in different cultures and locations around the globe***

# But what if one autism risk factor . . .

- . . . was in common use in all countries
- . . . had greatly increased in its exposure to pregnant women over the last 25 years
- . . . had been the subject of a World Health Organization symposium that determined exposure to it suggested it could cause neurological or behavioral issues in children?
- . . . in mice, had been proven to cause changes in brain formation consistent with those found in people with autism?

# What if this possible risk factor . . .

- . . . was approved for use by the Food and Drug Administration (FDA), but that approval was not based on safety considerations?
- . . . had safety features mandated by the FDA that were ignored or misunderstood by the majority of practitioners using it?
- . . . had almost no safety studies published in nearly 20 years – despite rapid changes in technology, gestational window of exposure and number of exposures?

# What is this possible risk factor?

*It is the elephant in the room*

# . . . It is prenatal ultrasound

- Ultrasound is in common use throughout the world, even in remote, rural regions of developing countries such as China where sex determination is important to expectant parents
- Ultrasound doubled in use over 10 years, according to trend reports in two countries
- Prenatal ultrasound was identified by the World Health Organization in 1982 as having the potential to cause “neurological, behavioral [and] developmental changes” in humans, based on animal studies



# Prenatal ultrasound . . .

- . . . caused changes in brain formation by disrupting neuronal migration in the offspring of pregnant mice , according to pioneering research at the Yale School of Medicine
- Although all ultrasound intensity limits are approved by the FDA, the Journal of Ultrasound in Medicine notes:

*"Unfortunately, these limits were not based on safety considerations. Rather, they were based on relative risk for regulatory decision-making purposes . . ."*

# Prenatal ultrasound machines . . .

. . . have safety indicators required by the FDA, but according to industry surveys, 70% or more of ultrasound practitioners:

- Could not locate the required safety indicators on their own machines
- Could not accurately explain how they worked

# Why we don't have answers regarding today's ultrasound use

- Since the FDA approved an allowable eightfold increase in acoustic output in the early '90s, only one prospective study has been undertaken. The study design did not expose fetuses to the first-trimester scans that are common today
- Only one study has investigated the relationship between prenatal ultrasound and autism – more are needed
- Meanwhile, grants for prenatal ultrasound safety studies have been repeatedly refused funding, guaranteeing a lack of recent, relevant scientific literature to guide doctors and patients

# Emerging evidence

Autism surveys and studies have found the following groups of women are at higher risk of bearing children with autism:

- Mothers who receive first-trimester care
- Mothers with higher educations
- Mothers with private health insurance
- Older mothers

***Only increased exposure to prenatal ultrasound can explain all of the above***

# More evidence

According to a Centers for Disease Control National Vital Statistics Report:

- In 1989, 48% of mothers who gave birth had at least one prenatal ultrasound
- By 1997, 64% of mothers had at least one ultrasound
- This statistical increase in the percentage of pregnant women exposed to ultrasound occurred at about the same time that produced the autism boom

# More research is needed

Considering . . .

1. Existing scientific evidence
2. Lack of safety measures in practice
3. Absence of other leading autism causes

***Prenatal ultrasound deserves the kind of attention, funding and research devoted to other possible autism risk factors***

# The good news

- If prenatal ultrasound is causing autism, it will be easy to reverse the trend by eliminating routine scans
- Preventing autism would free up resources to help those individuals currently living with autism

# The autism community is counting on you to lead the way

- You are the experts
- You have access to relevant data and connections within the autism research communities to seek answers
- As members of this task force, it is your mission to accelerate high quality research and scientific discovery to find out what is causing autism
- Only you can make sure that prenatal ultrasound does not remain the elephant in the room



# Start the conversation

*If prenatal  
ultrasound  
is causing  
autism,  
there is no  
time to lose*

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