

Reducing your Child's Risk of Schizophrenia – A Guide to Possible Risk Factors and Helpful Actions for Expecting Parents

Source: <http://www.schizophrenia.com>

Before you read this:

Although our understanding of schizophrenia has increased dramatically in the last fifty years, we still do not know exactly what causes it. Many researchers are coming to believe that schizophrenia results as a complex interaction between certain unknown susceptibility genes (which are inherited from blood relatives) and environmental factors that one may come into contact with before birth or during a lifetime.

Nothing can guarantee that an individual will or will not develop schizophrenia.

However, researchers have identified certain factors that seem to be correlated with schizophrenia. Although it is very difficult to determine whether these factors contribute to the disease, or are caused as a result of the disease, it may be prudent to take some precautions if you know you have a history of psychiatric disease in your family. None of the suggested actions below will harm you, and at the very least they will contribute to a generally more healthy life.

All of the identified factors below have supporting research studies associated with them (although nothing has been definitively proven with regards to the cause of schizophrenia). To access the research abstracts and news articles for each topic, please visit <http://www.schizophrenia.com/hypo.html>, and click on the hyperlink of the risk factor you are interested in.

Risk Factor: Maternal infections & Flu during pregnancy are associated with increased risk of schizophrenia

Recent studies have indicated that children who born to mothers who suffer from flu, viruses and other infections during pregnancy are at significantly increased risk of schizophrenia - up to 700% higher than children who are not exposed to flu/viruses during the first 13 weeks of pregnancy. A recent research study announced in August 2004 by Columbia University hypothesized that about 14% of schizophrenia cases seem to have been caused by influenza during pregnancy (*Arch Gen Psychiatry*. 2004; 61: 774-780).

The study indicated that Flu during the first trimester of pregnancy increased risk of developing schizophrenia in the child by approx. 700%, while flu during the third trimester increased schizophrenia risk for the child by 300%.

"This is the first time that this association has been shown using blood tests that confirmed influenza infection during pregnancy", lead author Dr. Alan S. Brown, from

Columbia University in New York, told Reuters Health. "It provides what I think is the strongest evidence to date linking (prenatal) influenza exposure with schizophrenia."

The findings reinforce recommendations that women of childbearing age be vaccinated against influenza, Brown continued. However, because the mechanism underlying the schizophrenia connection is unknown, "we may not want to give the vaccine during pregnancy," he said. Until more is known, "it's possible that vaccination (during pregnancy) could have a harmful effect."

What can you do?

The safest approach to pregnancy (with regard to avoiding schizophrenia) may be to get a flu vaccination *before* becoming pregnant. The annual vaccination shots typically become available in early Fall (Sept./October in North America) so October, November, December or January may be best for beginning a pregnancy if you want to minimize the risk of your child developing schizophrenia. Additionally, pregnant women may want to take extra efforts to avoid exposure to influenza and other viruses during pregnancy. Precautions such as regular washing of hands, staying well rested so that the immune system is strong, healthy eating, regularly taking prenatal vitamins, and avoidance of sick people might also be helpful.

Risk Factor: Older age of father increases risk of schizophrenia for the offspring

Recent studies have indicated that children who born to older fathers have a higher risk of schizophrenia. This may be due to the higher levels of DNA damage in the sperm of older men.

Researchers estimate that compared to a male fathering a child in his early 20's, there is double the chance of the child getting schizophrenia when the father is age 40, and triple the risk of schizophrenia when the father is age 50. The same issue is likely true for women - but because of the lower number of women having children after age 35 or 40 vs. men, the research would be expensive and has not (to our knowledge) been done.

What can you do?

For reduced risk of children with schizophrenia, men should have children while they are younger (under 40), rather than older. The same issue is likely true for women (because of DNA damage to eggs with increasing age) - but because of the lower number of women having children after age 40 vs. men, the research would be expensive and has not (to our knowledge) been done.

Risk factor: Winter and spring births (possibly associated with low sunlight exposure and lack of Vitamin D) are associated with a higher rate of schizophrenia

Studies have indicated that children who born during certain times of the year have a higher than normal incidence of schizophrenia.

According to an article in the New Scientist magazine, research suggests people who develop schizophrenia in Europe and North America are more likely to be born in the winter and early spring (February through April in the Northern Hemisphere) In other words, the subjects who were born during these months had a slightly higher than average rate of schizophrenia, while subjects born in October had a slightly lower than average rate. There seems to be about a 10% difference in risk of schizophrenia between the high (Winter and Spring) and low risk months of birth.

One possible reason for the association between winter/spring births and schizophrenia may be related to sunlight exposure. A lack of sunlight (for example, during the shorter days of winter) can lead to vitamin D deficiency, which scientists believe could alter the development of a child's brain in the mother's womb and after birth.

What can you do?

For reduced risk of schizophrenia, a mother may want to make sure that she gets the recommended dose of vitamin D on a regular basis before and during pregnancy. Vitamin D can be bought as an over-the-counter nutritional supplement, or it may be included in store-bought milk and orange juice (check the carton). Talk with your doctor about the recommended levels of Vitamin D.

A couple planning children may also want to try and schedule the birth for a time outside the "winter and spring" time frame (both of which have been implicated as times when higher than average number of people are born that later develop schizophrenia). Research suggests that the birth months that have the *lowest* risk of schizophrenia are July through November.

Risk Factor: Lead and other toxic substance exposures during pregnancy may triple risk of schizophrenia for the child.

Recent studies have indicated that children born to mothers who are exposed to toxic agents (such as the lead in gasoline and paint, or alcohol) during pregnancy are up to 300% more likely to develop schizophrenia.

Even small amounts of a damaging chemical at a crucial stage in fetal development can cause neurons in an infant's brain to commit suicide at accelerated rates. The new insight suggests that a single mechanism may lie at the heart of a wide spectrum of disorders, including fetal alcohol syndrome and schizophrenia. People exposed to high levels of

lead in the womb were 2-3 times more likely to develop schizophrenia or similar brain disorders later in life.

Although the link can't be confirmed without larger studies, the researcher points out that lead inhibits brain activity in exactly the same way as alcohol does. He believes cell suicide triggered by lead exposure is causing the schizophrenia.

Work from the two groups presented at the annual [AAAS](#) meeting in 2004 also raises the tantalising possibility of explaining how apparently unrelated risk factors, such as poor nutrition or infection during pregnancy, can lead to mental disorders. Susser speculates that these factors too may trigger cell suicide by slowing down the activity of neurons at a crucial time.

Adults absorb and retain very little lead from their diet, whereas children younger than age 2 can absorb and retain up to 25% of lead from their diet. Before the harmful effects of lead became known, it was widely used in such common products as gasoline, paints, water pipes, and cans (even food cans).

Children can get lead poisoning by chewing on objects coated with lead-based paint (such as cribs, toys, or windowsills). They may also play in or eat dirt that contains chips of leaded paint that have flaked off of a house.

What can you do?

Make extra efforts to avoid exposure to leaded gasoline and car exhaust fumes (from leaded gas/petrol or leaded paint, etc.) or similarly toxic chemicals and materials (including all alcohol) during pregnancy. Avoid other sources of lead - including leaded paint, or leaded paint dust, lead in drinking water due to old pipes, etc.

Avoid ALL alcoholic drinks during pregnancy - as research is showing that even small amounts of alcohol during pregnancy can damage the child's brain. Avoid anesthesia during pregnancy if possible. Read up on other possible toxins, and avoid them during pregnancy.

Products to avoid

- Lead paint (most common in houses 20-25 years old or older). Even though the sale of lead-based paint is now banned, the government estimates that some 24 million homes in the U.S. still contain potentially harmful levels of lead paint.
- Leaded gasoline fumes
- Some hair coloring products (example: Grecian Formula)

Testing your home and water supply for lead levels:

Homeowners face a bewildering array of lead-paint testing options, including do-it-yourself kits for \$10 or \$20 and pricey services that use X-ray devices and lab analysis.

These tests frequently get widely conflicting results, all the way from a clean bill of health to a stern warning to arrange a cleanup that could cost thousands of dollars.

If you choose the full-service option, bargain. The rep we spoke with one company they quoted us \$550 to dust-wipe eight rooms. But when we asked for a better price, he chopped off \$100. The big sticker shock, however, came when his report arrived a few days later. It said that almost half of the samples exceeded federal government guidelines and recommended hiring "a certified lead contractor to clean the apartment." We called the rep, who tried to reassure us this would cost "well south of \$10,000."

Experts suggest that that the do-it-yourself kits are like home pregnancy tests: not 100% accurate, but helpful for figuring out if you need to do more thorough testing.

Also - be sure to check the lead level of your water. Houses with older pipes frequently used lead, and the first rush of water that has been sitting in the pipes all night can have high levels of lead. See links below for testing labs and information.

Books on this topic:

1. [Turning Lead into Gold: How Heavy Metal Poisoning Can Affect Your Child and How to Prevent and Treat It](#) (Nancy Hallaway and Zigurts Strauts)
 2. [Maintaining a Lead Safe Home: A Do-It-Yourself Manual for Homeowners & Property Managers](#) (Dennis Livingston)
 3. [Lead Is a Silent Hazard](#) (Richard M. Stapleton)
 4. [Getting the Lead Out: The Complete Resource for Preventing and Coping with Lead Poisoning](#) (Irene Kessel, John T. O'Connor)
 5. [Lead Paint: The Silent Poisoning of America's Children](#) (Thomas Dowd, Sandra Dowd)
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Risk factor: X-ray and other radiation exposure during pregnancy may increase risk of schizophrenia in offspring

It's known that low doses of radiation can damage a person's DNA. Now Christoph Schmitz at the University of Aachen, Germany and his colleagues have shown for the first time that mice exposed to low doses of radiation in the womb develop lasting changes in the brain that don't appear until early adulthood (Neuroscience. 2005;130(4):935-48). The researchers think the study may provide important clues to the development of adult-onset mental diseases such as schizophrenia.

What can you do?

During pregnancy, avoid radiation exposure such as that from medical X-rays and intercontinental flights. You can ask an airline security employee for a hand- or wand-search instead of walking past the x-ray machine.

Risk Factor: Exposure to *T. gondii* (cat virus) during pregnancy may be associated with increased risk of schizophrenia in the offspring

Recent epidemiologic studies indicate that infectious agents may contribute to some cases of schizophrenia. In animals, infections with *Toxoplasma gondii* (*T. gondii*) can alter behavior and neurotransmitter function. In humans, acute infection with the cat virus *T. gondii* can produce psychotic symptoms similar to those displayed by persons with schizophrenia. Two other studies found that exposure to cats in childhood was a risk factor for the development of schizophrenia, but one that is nevertheless easily avoided.

Note: It seems from the research that this is a relatively low risk factor in schizophrenia, compared to other risk factors (such as street drug use).

What can you do?

Pregnant women may want to minimize exposure to the "*T. gondii*" virus (by avoiding exposure to cats), and test for the *T. gondii* virus prior to pregnancy. Consider some of the actions listed below (source: <http://www.fabcats.org/toxo.html>):

1. People in 'high risk' groups should not have contact with the cat's litter tray. Where possible, only non-pregnant and immunocompetent people (i.e. not those people with diseases or drug therapy suppressing their immune system) should handle cat litter trays (following all of the guidelines below).
2. Empty litter trays daily so that oocysts do not have sufficient time to sporulate (become infective) whilst in the litter tray.
3. Wear gloves when handling cat litter and wash hands thoroughly after cleaning the litter tray.
4. Use litter tray liners if possible and periodically clean the litter tray with detergent and scalding water (which kills oocysts) eg fill the litter tray with boiling water and leave for 5 - 10 minutes before emptying.
5. Dispose of cat litter safely. For example, seal it in a plastic bag before putting it with other household waste.
6. Cover children's sandpits when not in use to prevent cats using them as litter trays.
7. Feed only properly cooked food or commercial cat food to your cat to avoid infection.
8. Washing hands after contact with a cat (especially before eating) is a sensible hygiene precaution.
9. If very concerned, ask your vet to check your cat's *Toxoplasma* titre (antibody test for exposure to *T gondii*):
 - a. Cats with a positive titre have been infected in the past and will not be a source of infection in the future as they have completed their period of oocyst shedding.
 - b. Cats with a negative titre have not been infected with *T gondii* in the past and are likely to shed oocysts in their faeces for a short time if they become infected in the future. The risk of acquiring infection can be minimised by:

- Avoiding feeding raw meat to the cat to reduce the risk of *T gondii* infection (see point 7 above).
- Keeping the cat indoors to prevent hunting and access to intermediate hosts such as voles and mice

The additional measures below will hopefully reduce risk of *T. gondii* transmission from sources other than animals. They are also sensible routine hygiene precautions:

1. Gloves should be worn when gardening and hands thoroughly washed after contact with soil which may contain sporulated (infectious) oocysts.
2. Gloves should be worn when handling food to prevent exposure to oocysts and tissue cysts. Hands should always be washed thoroughly afterwards.
3. Fruit and vegetables should be thoroughly washed before eating to remove any oocysts present on their surface.
4. All food preparation surfaces and utensils should be cleaned with detergent in warm water before and after use to inactivate any tissue cysts.
5. Meat should be cooked to a minimum of 58oC for 10 minutes or 61oC for 4 minutes to kill the tissue cysts (Dubey et al 1990). Microwaving is not a safe way to kill tissue cysts as the heating is uneven. *T gondii* oocysts can remain infectious when stored in a refrigerator (4oC) for up to 54 months (Dubey 1998).
6. Freezing meat at -12oC to -20oC for three days kills tissue cysts as does curing or smoking (Dubey 1988, Lunden and Uggla 1992).
7. Gamma irradiated food is free from any risk of infection.
8. If drinking a non-mains water supply, boil or filter before drinking to remove oocysts.

Risk Factor: Use of painkillers during pregnancy is linked to an increased risk of schizophrenia in offspring

A 2004 study in the British Journal of Psychiatry showed that prenatal exposure to painkillers (the medical term is "analgesics" - such as Aspirin) is linked to as much as a 500% greater probability of the children developing schizophrenia in later life (Br J Psychiatry. 2004 Nov;185:366-71).

A recent news report (<http://www.telegraph.co.uk>, Oct 31 2004) also noted:

“To investigate the theory that prenatal exposure to analgesics might affect fetal neurodevelopment, leading to increased risk of schizophrenia in adulthood, the Copenhagen University team matched data from the Copenhagen Perinatal Cohort with information from the Danish Psychiatric Central Register.

Among a subset of 7999 individuals, 116 cases of schizophrenia were identified. Prenatal exposure to analgesics in the second trimester was associated with a nearly five-fold (almost 500%) increased risk of schizophrenia.

The association remained statistically significant after factoring a parental history of schizophrenia and other risk factors.

Holger Srensen and colleagues said that development of the cortical subplate reaches its peak in the second trimester, so the fetal brain might be particularly sensitive to a range of environmental influences in the womb at that time.

In their study they conclude that "Independent of a wide range of possible confounders, a significant association between second-trimester exposure to analgesics and increased risk of schizophrenia was observed." “

One possible explanation for this association - aside from aspirin directly being the precipitating cause - is the fact that women are more likely to take aspirin when they have caught the flu or another sort of virus. Flu exposure during pregnancy has also been shown to increase the risk for schizophrenia. The extent to which these two factors may be interrelated remains unclear, and more research is needed. At present, this particular risk factor only has one study associated with it.

What can you do?

To reduce the risk of children developing schizophrenia, mothers (especially couples who have any history of mental illness in the family) may want to make extra efforts to avoid painkiller medications during pregnancy. In fact, doctors generally recommend that pregnant women avoid all over-the-counter medications - unless specifically recommended by a doctor who knows that the person is pregnant.

Risk factor: High maternal stress during pregnancy is associated with increased risk for schizophrenia in the offspring

Research suggests that higher than normal stress levels experienced by the mother during pregnancy can increase the chances that the child will have schizophrenia later in life. There is contradictory information with regard to this schizophrenia risk factor; however, there does seem to be a consensus that increased maternal stress (which increases circulating levels of stress hormones such as CRH, ACTH, and cortisol) increases the general incidence of developmental delays or behavioral problems in offspring.

What can you do?

Women who are pregnant should try to take extra precautions to avoid highly stressful situations, and/or work with a counselor or therapist to find helpful ways to manage day-to-day stress.

Risk Factor: Pregnancy and delivery complications are associated with an increased risk of schizophrenia

Recent studies have indicated that children who born to mothers who have had "complications" during the pregnancy or during the delivery are at increased risk of schizophrenia. Obstetrical complications which are significantly associated with schizophrenia include: bleeding, diabetes, prematurity, fetal growth retardation, Rhesus incompatibility, preeclampsia and congenital malformations. In some studies, subjects with onset of schizophrenia before age 22 had a greater history of acute fetal distress (abnormal presentation at birth and complicated cesarean delivery).

Obstetrical complications may have a direct negative impact on fetal brain development, by depriving the brain cells of oxygen for an extended period of time. This research suggests that for infants carrying certain susceptibility genes, this general hypoxia (oxygen shortage) might translate into increased risk of developing schizophrenia.

Action: To reduce their children's risk, mothers may want to make extra efforts to avoid any possible delivery complications. The best way to do this is to get early and regular pre-natal care, and to be in the best possible hospital environment in case complications do occur.

One recent study suggested that drinking pomegranate juice during pregnancy (Pediatric Research, June 2005, 858-864) can help reduce fetal stress from low oxygen and decreased blood flow, both of which can result from obstetric complications. Another recent study preliminarily suggested that nitrous oxide treatment to low-weight babies can help increase oxygen circulation (New England Journal of Medicine, Volume 353:13-22), which can reduce brain cell damage.

Risk Factor: Infants born underweight at full-term may have increased risk for schizophrenia

Infants who are born at full-term but have "very low birth weight" may be at increased risk for developmental and neuropsychiatric disorders such as schizophrenia. A study from the British Journal of Psychiatry found that: "children born full term but weighing less than 5.5 lbs (almost 3% of the total sample) had a 50% increased risk of psychological distress in later life", independent of confounding factors such as lower childhood IQ. What kind of psychological distress was not clarified by the authors.

Another study of 246,655 subjects in Denmark (Am J Epidemiol. 2003 Aug 15;158(4):291-300) showed that subjects who later developed schizophrenia were more likely to have had low birth weight. Authors speculated several possible mechanisms that might link birth weight and schizophrenia, including: 1) genes that predispose someone to develop schizophrenia may be very close to (or even the same as) genes affecting intra-uterine growth; or 2) environmental factors such as prenatal toxin exposure, prenatal

complications resulting in reduced oxygen levels to the fetus, inadequate maternal nutrition, or prenatal infections may adversely influence growth and development of both the brain and the body of an infant.

Low birth weight may well be a reflection of other causal factors - for example, delayed fetal development due to genetics, prenatal exposure to alcohol, toxins, or infections, or poor prenatal nutrition. It is unclear at this point whether low birth weight can be a primary contributing factor to psychiatric symptoms, or whether it is secondary to other environmental insults.

What can you do?

Prospective mothers can help reduce the risk of having a low birth-weight infant by getting early and quality prenatal care, and making sure to get adequate nutrition during pregnancy (pre-natal vitamins may be helpful).

A new book featured on a CBS News segment entitled What to Expect: Eating Well When You're Expecting (Heidi Murkoff) highlights the nutritional benefits of six easy-to-find foods: DHA eggs, walnuts, mangoes, red pepper, quinoa, and ginger.

One recent study suggested that drinking pomegranate juice during pregnancy (Pediatric Research, June 2005, 858-864) can help reduce fetal stress from low oxygen and decreased blood flow, both of which can result from obstetric complications. Another recent study preliminarily suggested that nitrous oxide treatment to low-weight babies can help increase oxygen circulation (New England Journal of Medicine, Volume 353:13-22), which can reduce brain cell damage.

If the infant is born underweight, the parents may want to take extra care to enrich the nutritional, educational, and social environments of that child, which may effectively reduce the risk conferred by low fetal weight.

Risk Factor: Excessive body weight of a mother during delivery is associated with increased risk for schizophrenia in the child

Excess body weight (which is typically linked to poor dietary habits) in a pregnant mother has been linked with increased likelihood of the child developing schizophrenia. In a recent research report (Acta Psychiatr Scand. 2004 Oct;110(4):257-63), scientists found a 24% increase in the risk of the child developing schizophrenia for every a one-unit increase of BMI (Body Mass Index measurement) in early pregnancy, and a 19% increase in late pregnancy. These factors were found to contribute, in part, to an excess of obstetric complications (baby delivery complications) in individuals with schizophrenia. Poor maternal care during pregnancy and comparatively high maternal BMI especially at early pregnancy may cause a predisposition to schizophrenia in the offspring.

Reasons for this might include an increased likelihood of obstetric complications if the mother is excessively heavy, or treatment of conditions like hypertension (that tend to go along with high BMI) with diuretics during pregnancy, which can retard brain development. The study above (Acta Psychiatr Scand. 2004 Oct;110(4):257-63) which examined the link between higher maternal BMI and schizophrenia risk stated:

“...Complications such as pre-eclampsia, primary delivery by cesarean section, and infections are all known to be more prevalent in pregnant women with high prepregnant BMI, and there may be a similar biological basis for high BMI and occurrence of OCs [obstetric complications].”

What can you do?

Prospective mothers should get early and quality pre-natal care, monitor their weight gain, and take care of their body health during pregnancy. They might also want to avoid diuretic treatment for hypertension. The study quoted above also associated a higher rate of schizophrenia among subjects who had fewer antenatal (after birth) health care visits, so don't forget to take care of yourself after delivery as well.
