

DATA SHEET:

PLANNING PREGNANCIES

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© M. Rossol, October 10, 1995
(revised 12/18/07)

The most "creative" job anyone, male or female, can do is to produce a healthy, happy member of the next generation. This is not always easy. The National Institute of Environmental Health Science's research indicates that 5 to 10% of couples who want to have children are infertile, about half of all pregnancies are not successfully completed, 3-5% of newborns have major birth defects, and sperm counts may have declined in recent decades. Studies are underway to try to evaluate how much of these effects are caused by chemicals such as those we use on the job.

Most scenic artists try to avoid chemical exposures when they start planning a family. But just how hazardous our chemical products are to pregnant artists is unknown. A search of the literature produced not one study of scenic artist's reproductive problems. There are, however, studies of industrial workers who are exposed to the same chemicals that we use. For example, industrial painters, sign makers, and printers are all exposed to pigments and solvents. Workers in the textile industry are exposed to dyes and fabric dusts. Construction workers inhale wood dust, plaster and other dusts from building materials.

We can expect, then, that scenic artists and industrial workers using the same materials will experience the same reproductive problems. In fact, scenic artists may be at greater risk than industrial workers if they toil longer than eight hours a day, work without proper ventilation and protective gear, or, worst of all, work at home where intimate and prolonged exposure can occur.

CHEMICALS IN SCENIC ART PRODUCTS

A vast array of chemicals are used by scenic artists and costume workers. There are over 2000 dyes and about 300 pigments commercially available. Over 45 different metals are found in pigments, bronzing powders, welding, brazing and soldering alloys, and similar craft materials. Hundreds of chemical solvents can be used to thin hundreds of different natural and synthetic resins, oils and waxes in various paints, inks, varnishes, glues, adhesives, and fixatives. If we count the chemical additives in use to modify paints, plastic resin products, and these other products, then the numbers of chemicals scenic artists use may number nearly a hundred thousand.

Only a tiny fraction of these substances have been studied for reproductive effects. Workplaces that use untested chemicals essentially make pregnant women the experimental species. For example, a recent study showed one third of pregnant IBM computer chip workers miscarried after exposure to very small amounts of chemicals called glycol ethers. These same chemicals were first used in the 1970's and 1980's in many water-based printmaking inks, latex paints, liquid dyes, felt tip pens, and spray paints.

Today, those same products may still contain either those same glycol ethers or ones that are closely related to them. Until more is known, it is wise to avoid unnecessary exposure to these and many other materials. Two types of chemicals in particular should be avoided: solvents and metals.

SOLVENTS

The term "solvent" is applied to organic chemical liquids that dry faster than water that are used in products such as paints, inks, cleaners, paint strippers, aerosol sprays, marking pens, and the like. The solvent for which we have the most data is ethyl alcohol since we also drink it in alcoholic beverages. Alcohol consumption causes almost all types of adverse reproductive effects including:

Reduced male sex drive and performance	Birth defects
Reduced male and female fertility	Growth retardation and functional deficits in the fetus
Spontaneous abortion	Breast milk contamination

It doesn't matter whether alcohol or other solvents are absorbed into the body by drinking them or inhaling them. While it may take a number of drinks of alcohol to cause effects, it takes much less inhalation of other more toxic solvents to cause harm. Alcohol and all solvents have one common characteristics: they are narcotics. "Glue sniffers" have proven that they can get high--and even die--from inhaling vapors from any solvent-containing product: glue, gasoline, or spray paints.

When pregnant women are exposed, the narcotic effect may damage the fetus' nervous system. Damage from drinking alcohol during pregnancy ranged from minor learning difficulties to severe facial deformities and mental retardation depending on the amount to which the fetus was exposed. Now it seems likely that many solvents are capable of causing similar effects.

The first study showing a connection between solvents and birth defects in humans was published in the *Journal of the American Medical Association* in (March, 1999). The researchers studied Canadian women exposed to organic solvents who were employed as factory workers, laboratory technicians, artists or graphic designers, printing industry workers, chemists, painters, office workers, car cleaners, veterinary technicians, funeral home employees, carpenters and social workers. The authors claim the study indicates that "... women exposed occupationally to organic solvents had a 13-fold risk of major malformations....."

A second Canadian study was published in the *Archives of Pediatrics and Adolescent Medicine* in October, 2004. In this study, the children of 32 women exposed to solvents in various jobs such as graphic designers, hair stylists, an art conservator, and photo lab workers, were compared with children of women who did not work with solvents. The women were of the same ages, IQs, incomes, and life styles. The solvent exposures were not excessive and lasted between 1 and 40 hours per week for between 8 and 40 weeks during their pregnancies. The children were tested at between 3 and 9 years of age and the children of the solvent-exposed mothers were found to have poorer language, memory and attention skills and more hyperactivity and were more impulsive.

METALS

Metals and their compounds abound in scenic materials in pigments (cadmium red, chrome yellow, manganese blue, etc.), in enamels, bronzing powders, solders, and more. Metals can be considered either as "minerals" needed for health (e.g. zinc, calcium or iron) or as "heavy" or "toxic" metals which should be avoided (e.g. lead, cadmium, or arsenic). Actually, the toxicity of many metals lies in between these two extremes. For example, chrome and cobalt are needed by the body in tiny amounts, but they are toxic and possibly even cancer-causing in larger amounts.

MINERAL	RDIs*in milligrams
calcium	1000
phosphorus	1000
magnesium	400
zinc	15
manganese	2
copper	2
chromium**	0.12
molybdenum**	0.075
selenium**	0.07

Good reproductive health requires that we ingest a proper balance of only those metals needed by the body. This is impossible if we are supplementing our mineral intake with dusts and fumes from our studios and shops.

* FDA Reference Daily Intakes

** labels list these in micrograms

LEAD: A SPECIAL METAL. Lead is especially hazardous. It can interfere with almost every phase of male and female reproduction. Adverse effects from lead can occur even after the child is born. Children whose blood lead content is at levels previously thought safe (10 micrograms per deciliter - ug/dL) suffer a measurable loss of mental acuity. The younger the child, the more destructive lead is to mental function. And most vulnerable of all is the fetus.

Blood lead levels of 10 ug/dL are considered safe in adults. But if this adult is pregnant, the fetus has a blood lead that is roughly comparable. This does not mean that the child born to such a woman will be retarded. Instead, it means that children born to these women may be less intelligent than they would have had if they had not been affected by lead. Very high levels of lead, on the other hand, are associated with more severe brain damage and birth defects. Experts now recommend that pregnant women whose blood lead levels are 5 ug/dL or higher seek additional medical advice from occupational medical doctors or toxicologists.

OTHER CHEMICALS

There are many other chemicals used in scenic work which may have reproductive effects such as carbon monoxide which is emitted by vehicles and fork lifts in the shops. Intimate contact with organic chemical pigments and dyes should also be avoided. Many are chemically related to known carcinogens and a few are contaminated with highly toxic chemicals such as dioxins and PCBs. These contaminants are not only toxic, they also may affect reproduction by mimicking estrogen.

ESTROGENIC CHEMICALS.

Some chemicals mimic the effects of the female hormone estrogen. They have been shown to cause adverse male reproductive effects and birth defects in birds, fish and mammals. Now some experts think the chemicals humans are showing similar effects including:

- * the worldwide reduced sperm count;
- * a 3- to 4-fold increase in cancer of the testicles;
- * increases in male reproductive organ birth defects;
- * decline in the ratio of male to female births in the US, Canada and two other countries; and
- * premature breast development in girls aged 6 to 24 months.

According to some experts, male children are now conceived and born into a virtual "sea of estrogens." The chemicals also may be affecting women by increasing rates of breast and other cancers. Substances artists may encounter which either mimic estrogen or alter hormone function include:

- * Bisphenol A in some epoxy resins, other plastics, and in flame retardants.
- * Dioxins and PCBs which may contaminate some dyes and pigments such as phthalo blues and greens, diarylide or benzidine yellows and oranges, and dioxazine violet.
- * Nonyl phenol, octyl phenol and derivatives found in epoxy resins, some latex paints and detergents.
- * Tung oil found in many varnishes, coatings and inks.
- * Phthalate plasticizers found in oven-cured, polymer clays and other vinyl products.

PREGNANCY. During pregnancy, the fetus can sustain two types of damage from exposure to toxic substances 1) birth defects and 2) toxic effects.

BIRTH DEFECTS are caused by chemicals which alter the development of organs. This means birth defects only occur in the first three months of pregnancy as the organs are forming. For example, the drug Thalidomide affects the limbs only during formation. Once they are fully formed, the drug has no effect.

TOXIC EFFECTS are a kind of "poisoning" which can occur at any stage of pregnancy and even after birth. For example, lead can damage brain function at any time from early in conception even through adulthood. But it is the fetus that is most susceptible.

COMMON SENSE PRECAUTIONS.

Scenic artists can reduce their reproductive risk from toxic art materials by following some simple rules.

1. Know your materials. Read labels and obtain material safety data sheets on all products from the manufacturer to identify the hazardous ingredients in your products.
2. Get advice. Your personal physician may be a good source of information about chemicals, but the doctors who are most qualified to provide this information are Board Certified in Occupational Medicine or Toxicology. Other good sources are your Health and Safety Officer (212/777-0062) and the Pregnancy Environmental Hotline (617/466-8474).
3. Avoid exposure. If there is no FDA "reference daily intake" (RDI) for a chemical with which you work, don't let it get into your body. Only take those dietary supplements approved by your doctor.
4. Never set up a studio or work with scenic art materials or design material in living areas of your home. Small amounts of art and scenic art materials can contaminate the home environment and be a source of exposure for both you and the baby once it arrives.
5. Listen to your body and your mind. If a chemical makes you feel sick or "woozy" (e.g. a narcotic solvent), assume it is not good for your baby. But keep in always in mind: Chemicals in amounts whose effects your body can't detect can, nevertheless, damage the fetus.
6. Protect yourself. Wear gloves or use methods of working that keep products off of the skin. Never eat, smoke, drink, apply cosmetics, or do any hygiene tasks in the shop. Never spray, air brush, sand, work with dry powders, or use any material in a form that can be inhaled unless you have proper ventilation or protective equipment.
7. Ask your doctor about respiratory protection. Occupational physicians often do not recommended respirators for people with certain health problems (e.g. heart and lung deficiencies) or for pregnant women due to the increase breathing stress they cause. Local 829 will provide you with the medical certification and testing you need to properly use respiratory protection.
8. Avoid lead in any form. Never remove lead paint. It is against the law to remove lead paint unless you have been trained and certified in lead abatement work. Avoid lead pigments and lead-pigmented artist's paints. If you must use lead in some form, have regular blood lead tests. If you are pregnant and exposed to lead or have had lead exposure in the past, get a blood lead test. If your blood lead level is above 2 µg/dL (the level for unexposed adults), it is either because 1) you are still being exposed to lead or 2) lead stored in your bones from previous exposures is re-entering your blood. Some physicians increase calcium supplements in such patients to reduce the amount of lead taken up by the fetus.
9. Don't eat or drink from ceramicware or lead crystal glasses, cups, dinner ware, casseroles, or other items unless lab tests show that they do not leach lead **or any other metal** into food. Low-fired ware also may leach metals such as lead, cadmium, or boron into your food. Middle range, stoneware and porcelain may leach other metals such as barium and lithium into your food. Colored wares may leach colorant metals such as cadmium, cobalt, and manganese into food. Plates and containers for dry products are not a problem.
10. Keep children out of studios, shops, and away from toxic materials. Exposures to some toxic substances in childhood can affect the next generation.
11. Don't dwell on past chemical exposures or exposures in the present that are too small to be significant. What's done is done. Stress is not good for you or the baby either. If you feel worried and guilty: welcome to parenthood! Worry is about to become permanent.