Working as a Veterinarian or Veterinarian Technician

This sheet talks about some of the general exposures present in veterinary work settings and outlines some resources available to help create a safe work environment. This information is based on published research studies. It should not take the place of medical care and advice from your healthcare provider.

What types of hazards might be at my workplace?

In general, workplace hazards that veterinarians (vets) and veterinary technicians (vet techs) could include:

- anesthesia and waste gases
- X-rays / ionizing radiation
- medications
- pesticides
- cleaning agents and other chemicals
- accidents (bites, falls, needle sticks)
- infections from bites or scratches
- animal-transmitted diseases and parasites
- allergic reactions
- heavy lifting and physical strain
- shift work
- mental stress

Veterinary staff work in many different environments, and everyone may have different concerns about the hazards in their workplace. Remember that being around a potential hazard does not mean your exposure is high enough to

cause harm. There are also safety steps all workers can take to limit and reduce their exposure.

General Pregnancy Information:

Birth defects can happen in any pregnancy for different reasons. Out of all babies born each year, about 3 out of 100 (3%) will have a birth defect. We look at research studies to try to understand if a certain exposure might increase the chance of birth defects in a pregnancy. Also, miscarriage is common and can occur in any pregnancy for many different reasons.

Not all exposures increase the chance of birth defects. If an exposure can cause birth defects, it is most likely to do so during the first trimester (through week 13) of pregnancy. Dose (how much) of an exposure is also important to consider when evaluating workplace hazards. For more information on fetal development during pregnancy, please see the MotherToBaby fact sheet on critical periods of development at: https://mothertobaby.org/fact-sheets/critical-periods-development/.

I work around anesthetic agents. Can this harm my pregnancy?

Older studies, which were mostly done before the use of modern scavenging equipment (devices that collect anesthesia from the air to prevent its inhalation by staff), suggested that repeated exposure or exposure to high levels of inhaled anesthetics in an occupational setting might increase the chance of birth defects or miscarriage. However, occupational exposure to inhaled anesthetics with the use of scavenging equipment and proper techniques is not expected to increase the chance of miscarriage or birth defects.

Anesthetics can be given through injection, IV infusion, intubation, or mask inhalation. For each person, the risk of exposure to inhaled anesthesia will depend on the specific drugs used, how they are given, and the protective measures that are in place. Workers often face their highest chance of exposure during induction and recovery and when filling the vaporizer. Air monitoring can be done to evaluate staff exposure. The Occupational Safety & Health Administration (OSHA) has a document (https://www.osha.gov/waste-anesthetic-gases/workplace-exposures-guidelines) with detailed information on workplace controls and recommended exposure limits for anesthetic gases.

I am around our x-ray machine. Does this mean that I am exposed to radiation?

In veterinary work settings, ionizing radiation could also occur with use of radioactive isotopes and radiation therapy machines (for example, assisting in fluoroscopy procedures and I-131 treatments for hyperthyroid animals). Our MotherToBaby fact sheet on working around ionizing radiation has more information on working with x-ray machines: https://mothertobaby.org/fact-sheets/ionizing-radiation-workplace-pregnancy/.

Should I be worried about handling medications during pregnancy?

There are some medications that are considered unsafe to directly handle while pregnant without taking proper precautions. A list of some hazardous drugs can be found in Tables 1 and 2 (https://www.cdc.gov/niosh/docs/2016-161/default.html) of this document from the National Institute for Occupational Safety and Health (NIOSH).

Workers could be exposed to hazardous drugs while handling them during reconstitution, transfer between containers, spiking and unspiking IV containers, priming IV tubing, connecting or disconnecting syringes from injection ports, disposal, and/or with equipment maintenance. Handling body fluids of treated animals such as vomit and urine can expose you to medications. Exposure can also occur when stocking and storing hazardous drugs as surface contamination studies have shown that areas where the drugs were stored and handled were often contaminated.

Infertility, loss of pregnancy, birth defects, and poor fetal growth have been reported with handling exposure for some medications at work. However, most of these studies were among nurses who spent a lot of time around hazardous drugs. All employees handling medications should have training that covers ways to lower exposure to hazardous medications including opening, handling, administering, storing and disposal.

NIOSH has a document with tips to prevent occupational exposure to hazardous drugs (https://www.cdc.gov/niosh/docs/2023-130/default.html). If you handle hazardous medications, be sure to wear protective gear. When you are finished handling the drugs, clean the preparation area and wash your hands. Do not eat or drink in the area where these drugs are prepared or administered or when wearing contaminated gloves or other protective clothing.

Are there animal (zoonotic) or parasitic diseases that I should be concerned about?

A zoonotic disease is a disease that can be passed between animals and humans. Zoonotic diseases can be caused by viruses, bacteria, parasites, and fungi. Exposure can occur when people come into contact with the saliva, blood, urine, or feces of an infected animal, or when they are bitten by a tick or mosquito. When you are pregnant, your body can have a harder time fighting infections and you have a greater chance of developing serious complications from diseases. If you are pregnant or breastfeeding and think you have contracted a disease, illness, or parasite contact your healthcare provider.

Some of the diseases that vets and vet techs might be exposed to include Q Fever, Toxoplasmosis, Lymphocytic Choriomeningitis Virus, Rabies, Mites, Scabies, Brucellosis, Leptospirosis, *Chlamydophila psittaci*, Ringworm, Giardiasis and Helminths (worms). MotherToBaby has fact sheets on several of these exposures at: https://mothertobaby.org/fact-sheets/.

Veterinary staff who are pregnant and who are responsible for dealing with bodily fluids from the animals, such as cleaning cages, litter boxes, or feces from an infected animal, can consider passing this responsibility to another co-worker. However, all staff members should wear proper protective equipment such as thick disposable gloves, protective clothing, and a mask while handling sick animals and their samples regardless of whether they are pregnant or not. Proper hand washing is critical. Make sure you are up to date on all your immunizations.

The veterinary infection control committee of the National Association of State Public Health Veterinarians (NASPHV)has a document (http://nasphv.org/Documents/VeterinaryStandardPrecautions.pdf) that outlines protocols for the prevention of zoonotic disease.

How can I learn more about the pesticides and cleaning chemicals I work with?

Vet workers use strong cleaning chemicals to sterilize equipment and rooms and could be around pesticides. You can learn about the ingredients in the products that you use by looking at their Safety Data Sheets (SDS). The SDS should be made available in your workplace. These sheets will describe the proper way to use, store, and dispose of these chemicals. Proper workplace practices and precautions will limit your exposure to most of these products. Check to make sure that you are using the correct type of gloves and other personal protective equipment. Make sure the ventilation/air exchange in your workspace is working properly. An occupational health specialist or industrial hygienist can help make sure your worksite has the correct protection in place.

Can heavy lifting, strain or stress pose a risk for my pregnancy?

Vet workers have a physically demanding job that involves lifting and restraining animals and long periods of standing as well as long work hours. Ligaments (the tissue that connect bones) start to loosen throughout pregnancy, which makes them more prone to injury. People who are pregnant will be adjusting to a shifted center of gravity. This can make balancing more difficult.

Some studies suggest that prolonged standing during pregnancy is associated with lower birth weight (weighing less than 5 pounds, 8 ounces [2500 grams] at birth) or preterm labor and preterm delivery (birth before week 37). Some studies showing low birth weight are from developing countries, where poor nutrition and tougher working conditions may also affect the results. There are some published recommendations on occupational lifting related to pregnancy. Talk with your provider about your personal limits. Be sure to request training on proper lifting techniques to reduce chances of personal injury. Consider asking for help when you need to lift or restrain animals. If your job requires you to be on your feet for long periods of time, take regular short breaks of about 5-10 minutes every 2 hours.

How do I reduce job-related exposures?

MotherToBaby has a general fact sheet on working during pregnancy and breastfeeding (https://mothertobaby.org/fact-sheets/reproductive-hazards-workplace/) with ways to reduce potential chemical exposures. Your worksite should provide SDS on all chemicals and proper personal protection for all parts of your job. Be certain to use them, even when not pregnant or breastfeeding.

One of the most important steps you can take is to practice proper hand washing. Wash hands before and after each patient and after contact with any bodily substance or articles contaminated by them. Wash hands before eating or drinking; after cleaning animal cages or animal-care areas, after handling chemicals, and whenever hands are visibly soiled. The NASPHV created a Model Infection Control Plan for Veterinary Practices that outlines hand washing, use of gloves, sleeves, facial protection, and protective outerwear, along with animal-related injury prevention, protective

actions to use during veterinary procedures, and environmental controls. This plan is available at https://www.nasphv.org/documentsCompendiaVet.html

Who can I contact for more information?

If you have specific concerns regarding your worksite discuss them with your healthcare provider or call MotherToBaby with your questions. You or your employer can contact an industrial hygienist (https://aiha.org/public-resources/consultants-listing) to have your worksite evaluated for ways to keep all workers there as safe as possible. Small businesses can also contact OSHA's on-site consultation services to help determine whether there are hazards at their worksite: https://www.osha.gov/consultation.

Some additional web resources:

- American Veterinary Medical Association (AVMA): www.AVMA.org
- Centers for Disease Control and Prevention (CDC): https://www.cdc.gov/niosh/topics/veterinary/hazard.html
- National Association of State Public Health Veterinarians (NASPHV): www.nasphv.org
- National Institute for Occupational Safety and Health (NIOSH): https://www.cdc.gov/niosh /
- NIOSH – The Effects of Workplace Hazards on Female Reproductive Health: https://www.cdc.gov/niosh/docs/99-104/
- Occupational Safety and Health Administration (OSHA): https://www.osha.gov/SLTC/reproductivehazards/index.html
- Office of Women's Health at the US Food and Drug Administration (FDA): https://www.fda.gov/consumers/consumer-information-audience/women

Please click here for references

Working as a Veterinarian or Veterinarian Technician

This sheet is about exposure to vitamin B12 in pregnancy and while breastfeeding. This information is based on published research studies. It should not take the place of medical care and advice from your healthcare provider.

What is vitamin B12?

Vitamin B12 is an essential vitamin that is used by the body to keep your nerve and blood cells healthy and to help make DNA (genetic material created in your body). Essential vitamins are nutrients that the body cannot make, so people need to get them from other sources. Vitamin B12 can be found in animal products including meat, seafood, eggs, and dairy products. Cereals and nutritional yeast have vitamin B12 added to them. Vitamin B12 is also available as a dietary supplement, or as a prescription medication in the form of an injection (shot) or nasal spray. Vitamin B12 has also been called cobalamin.

Vitamin B12 deficiency (not having enough vitamin B12 in the body) can cause fatigue (feeling very tired), muscle weakness, pale or ashy skin, a racing heart, loss of appetite, weight loss, and numbness or tingling in the hands and feet. Not all people with a vitamin B12 deficiency will have symptoms. Sometimes, other health conditions or taking medications that interact with how vitamin B12 is absorbed can increase the chance of having symptoms.

If your healthcare provider has recommended taking vitamin B12, talk with them before making changes to how you take this supplement Your healthcare providers can talk with you about the benefits of maintaining your nutrient levels and the risks of low vitamin B12 during pregnancy.

Talk with your healthcare providers about all of the supplements and vitamins that you take. Have the bottles or photos of the labels with you so that all reported ingredients and their amounts can be reviewed.

How much vitamin B12 is needed in pregnancy?

The Recommended Dietary Allowance (RDA) is the average daily level of intake that is enough to meet the nutrient needs for most people. The Tolerable Upper Intake Level (UL) is the dose that people can start to have side effects. It is not recommended to take more than the RDA of vitamin B12 unless you are doing so under the care of your healthcare provider to treat a condition. There is currently no UL for vitamin B12, because vitamin B12 is not stored in the body in excess (extra) amounts. The RDA for females who are pregnant is 2.6 mcg of vitamin B12 a day.

Most people get enough vitamin B12 from their diet. When adding up how much vitamin B12 you are getting, remember to count amounts from foods, drinks, and from any supplements you are taking. There are resources available online that list amounts of vitamin B12 typically found in foods, such as the United States Department of Agriculture (USDA) National Nutrient Database, found here: https://www.nal.usda.gov/sites/default/files/page-files/Vitamin%20B-12.pdf. Diet, medications, and certain medical conditions can cause someone to have low levels of vitamin B12. Some people might need to take a vitamin B12 supplement. Be sure to talk with your healthcare providers about your specific nutritional needs before, during, and after pregnancy.

Can vitamin B12 make it harder for me to get pregnant?

Taking vitamin B12 at the RDA is not expected to make it harder to get pregnant. It is not known if having a vitamin B12 deficiency can make it harder to get pregnant.

Does vitamin B12 increase the chance of miscarriage?

Miscarriage is common and can occur in any pregnancy for many different reasons. Taking vitamin B12 at the RDA is not expected to increase the chance of miscarriage. Some studies reported that having low levels of vitamin B12 (less than 200-300 pg/mL in blood) was associated with an increased chance of miscarriage. Some of these studies combined multiple factors together, including other vitamins. As there can be many causes of miscarriage, it is hard to know if vitamin levels, health conditions, or other factors are the cause of a miscarriage.

Does vitamin B12 increase the chance of birth defects?

Birth defects can happen in any pregnancy for different reasons. Out of all babies born each year, about 3 out of 100 (3%) will have a birth defect. We look at research studies to try to understand if an exposure, like vitamin B12, might increase the chance of birth defects in a pregnancy. Taking vitamin B12 at the RDA is not expected to increase the chance of birth defects.

It is not known if having too little vitamin B12 can increase the chance of birth defects. Some studies report that having too little vitamin B12, or having lower metabolism (the body's processing) of vitamin B12 can increase the chance of neural tube defects (an opening in the spine or skull). Other studies have not reported the same results. Two studies have reported an increased chance of cleft lip and/or palate (an opening in the upper lip or the roof of the mouth) in babies born to women who were deficient in B12 during pregnancy.

Does vitamin B12 increase the chance of other pregnancy-related problems?

Taking vitamin B12 at the RDA is not expected to increase the chance of other pregnancy-related problems such as preterm delivery (birth before week 37) or low birth weight (weighing less than 5 pounds, 8 ounces [2500 grams] at birth).

Having a vitamin B12 deficiency (B12 levels below 148mol/L) or low vitamin B12 has been associated with preterm delivery. One study did not report an association between low or deficient vitamin B12 levels and birth weight.

Does vitamin B12 affect future behavior or learning for the child?

Taking vitamin B12 at the RDA is not expected to affect future behavior or learning for the child. It is not known if having a vitamin B deficiency can affect future behavior or learning for the child.

Breastfeeding and vitamin B12:

Vitamin B12 is a typical part of breast milk. If you are breastfeeding, continue to get the daily recommended daily allowance of vitamin B12 unless otherwise directed by a healthcare provider. The RDA for females who are breastfeeding is 2.8 mcg of vitamin B12 a day.

If a person who is breastfeeding is deficient in vitamin B12, the child may have an increased chance of having vitamin B12 deficiency if they are exclusively breastfed. Infants who are vitamin B12 deficient might experience low muscle tone, uncontrolled movements (tremors), anemia, and changes in skin and hair development.

Getting enough vitamin B12 while breastfeeding can help a child get enough vitamin B12. See the chart above to find the RDA for vitamin B12 for women who are breastfeeding. Also, talk to your healthcare provider and your baby's pediatrician about your specific nutritional needs before, during, and after breastfeeding. Be sure to talk to your healthcare provider about all your breastfeeding questions.

Does vitamin B12 affect fertility or increase the chance of birth defects?

Taking vitamin B12 at the RDA is not expected to affect men's fertility (ability to get a partner pregnant) or increase the chance of birth defects. Studies have not been done in humans to see if a vitamin B12 deficiency could affect men's fertility or increase the chance of birth defects. In general, exposures that fathers or sperm donors have are unlikely to increase risks to a pregnancy. For more information, please see the MotherToBaby fact sheet Paternal Exposures at https://mothertobaby.org/fact-sheets/paternal-exposures-pregnancy/.

Please click here for references.

Working as a Veterinarian or Veterinarian Technician

This sheet is about exposure to vitamin K in pregnancy and while breastfeeding. This information is based on published research studies. It should not take the place of medical care and advice from your healthcare provider.

What is vitamin K?

Vitamin K is an essential vitamin that is used by the body to help the blood clot (stick together) properly. Essential vitamins are nutrients that the body cannot make, so people need to get them from other sources. Vitamin K can be found in foods such as green leafy vegetables, vegetable oils, and some fruits. Vitamin K is also available as a dietary supplement or an injection (shot).

Vitamin K deficiency (very low levels of vitamin K in the body) can cause symptoms, such as bleeding more than usual or bruising easily. Not all people with a vitamin K deficiency will have symptoms. Sometimes, other health conditions or taking medications that interact with how vitamin K is absorbed can increase the chance of having serious symptoms.

Vitamin K comes in 7 forms, known as vitamins K1, K2, K3, K4, K5, K6, and K7. Vitamins K1 and K2 are natural forms of vitamin K. Vitamins K3, K4, K5, K6, and K7 are synthetic (lab-made) forms of vitamin K. Vitamin K3 (also called menadione) is no longer used in dietary supplements or fortified foods. The information in this sheet will apply to forms of vitamin K that are found in dietary supplements, fortified foods, or naturally occurring in other foods (all forms except for vitamin K3).

If you have been prescribed vitamin K by your healthcare providers, talk with them before making changes to how you take this supplement. Your healthcare providers can talk with you about the benefits of maintaining your nutrient levels and the risks of low vitamin K during pregnancy.

Talk with your healthcare providers about all supplements/vitamins that you take. Have the bottles or photos of the labels with you so that all reported ingredients and their amounts can be reviewed.

How much vitamin K is needed in pregnancy?

The Adequate Intake (AI) is the amount of vitamin K that people should aim to get each day. There have been no side effects reported in the general population with intake of vitamin K above the adequate intake level.

	Adequate Intake (AI)
Pregnant and age 14 to 18 years old	75 mcg / day

Pregnant and age 19 years or older	90 mcg / day
Breastfeeding and age 14 to 18 years old	75 mcg / day
Breastfeeding and age 19 years or older	90 mcg / day

Most people get enough vitamin K from their diet. When adding up how much vitamin K you are getting, remember to count amounts from foods, drinks, and from any supplements you are taking. There are resources available online that list amounts of vitamin K typically found in foods, such as the United States Department of Agriculture (USDA) National Nutrient Database, found here: https://nal.usda.gov/sites/default/files/page-files/Vitamin%20K.pdf. Factors like diet, medications, and certain medical conditions can cause someone to have low levels of vitamin K. Some people, including pregnant women, might need to take a vitamin K supplement. Be sure to talk with your healthcare providers about your specific nutritional needs before, during, and after pregnancy.

Can vitamin K make it harder for me to get pregnant?

Vitamin K at the adequate intake level is not expected to make it harder to get pregnant. It is not known if having a vitamin K deficiency can make it harder to get pregnant.

Does vitamin K increase the chance of miscarriage?

Miscarriage is common and can occur in any pregnancy for many different reasons. Vitamin K at the adequate intake level is not expected to increase the chance of miscarriage. Studies have not been done to see if having a vitamin K deficiency can increase the chance of miscarriage.

Does vitamin K increase the chance of birth defects?

Birth defects can happen in any pregnancy for different reasons. Out of all babies born each year, about 3 out of 100 (3%) will have a birth defect. We look at research studies to try to understand if an exposure, like vitamin K, might increase the chance of birth defects in a pregnancy. Vitamin K at the adequate intake level is not expected to increase the chance of birth defects.

In one collection of case reports, 14 infants whose mothers had vitamin K deficiency during pregnancy were reported to have poor development of the bones in the skull and changes in the way the brain formed. Case reports cannot provide enough information to know if vitamin K deficiency actually caused these findings. In some of these cases, vitamin K deficiency was caused by severe nausea and vomiting during pregnancy (called hyperemesis gravidarum). This makes it hard to know if the vitamin K deficiency or other factors, such as a health condition, caused the reported issues. For more information on nausea and vomiting of pregnancy, please see our fact sheet here: https://mothertobaby.org/fact-sheets/nausea-vomiting-pregnancy-nvp/.

Does vitamin K increase the chance of other pregnancy-related problems?

Vitamin K at the adequate intake level is not expected to increase the chance of other pregnancy-related problems such as preterm delivery (birth before week 37) or low birth weight (weighing less than 5 pounds, 8 ounces [2500 grams] at birth).

Having a vitamin K deficiency can increase the chance of hemorrhage (blood loss from a broken blood vessel) in the pregnant woman and intracranial (in the brain) hemorrhage in the fetus.

Does vitamin K affect future behavior or learning for the child?

Vitamin K at the adequate intake level is not expected to affect future behavior or learning for the child.

Studies have not been done to see if having a vitamin K deficiency alone can increase the chance of behavior or

learning issues for the child. Intracranial hemorrhages or issues with the skull or brain due to vitamin K deficiency could affect future behavior or learning for the child.

Breastfeeding and vitamin K:

Vitamin K is a typical part of breast milk. Breastfeeding women should continue to get the daily recommended adequate intake of vitamin K unless otherwise directed by a healthcare provider. The adequate intake level for breastfeeding is the same as pregnancy and can be found in the chart above.

Breastfeeding women should talk to their healthcare provider and their child's pediatrician about their specific nutritional needs before, during, and after breastfeeding. Be sure to talk to your healthcare provider about all your breastfeeding questions.

If a man takes vitamin K, could it affect fertility or increase the chance of birth defects?

Vitamin K at the adequate intake level is not expected to affect men's fertility or increase the chance of birth defects. Studies have not been done to see if a vitamin K deficiency could affect men's fertility (ability to get a woman pregnant) or increase the chance of birth defects. In general, exposures that fathers or sperm donors have are unlikely to increase risks to a pregnancy. For more information, please see the MotherToBaby fact sheet Paternal Exposures at https://mothertobaby.org/fact-sheets/paternal-exposures-pregnancy/.

Please click here for references.

Working as a Veterinarian or Veterinarian Technician

This sheet is about exposure to iron in pregnancy and while breastfeeding. This information is based on available research studies. It should not take the place of medical care and advice from your healthcare provider.

What is iron?

Iron is a mineral that carries oxygen in red blood cells (called hemoglobin). Iron is an essential nutrient (a nutrient that the body cannot make). This means that people need to get iron from their diet or supplements. Iron can be found in meat, seafood, white and kidney beans, lentils, peas, spinach, nuts, and dried fruits. Some cereals and breads have iron added to them. Iron is also available as a dietary supplement. Iron in dietary supplements can come in different forms.

Not having enough iron can lead to iron deficiency anemia. Iron deficiency can cause symptoms such as tiredness, lack of energy, less ability to fight off germs and infections, and problems with memory and concentration. The World Health Organization (WHO) recommends that women who are pregnant get enough iron throughout their entire pregnancy. There are some health conditions that affect the level of iron that people need. Be sure to talk to your healthcare provider about what amounts of iron are recommended for you.

If you take iron, talk with your healthcare providers before making changes to how you take your supplement. Your healthcare providers can talk with you about the benefits of maintaining your nutrient levels and the risks of low nutrients during pregnancy. Talk with your healthcare providers about all supplements/vitamins that you take. Have the bottles or photos of the labels with you so that all ingredients and their recommended daily levels can be reviewed.

How much iron do I need during pregnancy?

The Recommended Dietary Allowance (RDA) is the average daily level of intake that is enough to meet the nutrient needs for most people. The Tolerable Upper Intake Level (UL) is the dose that people can start to have side effects. It is not recommended to take more than the RDA of iron unless you are doing so under the care of your healthcare provider to treat a condition.

	Recommended daily allowance (RDA)	Upper limit (UL)
Pregnant and age 14 to 18 years old	27 mg	45 mg
Breastfeeding and age 14-18 years old	10 mg	45 mg
Pregnant and age 19 years or older	27 mg	45 mg
Breastfeeding and age 19 years or older	9 mg	45 mg

When looking at daily intake, remember to count amounts from foods, drinks, and supplements. There are resources available online that list amounts of iron typically found in foods, such as the USDA National Nutrient Database, found here: https://www.nal.usda.gov/sites/default/files/page-files/iron.pdf. Labels on supplements will list the amount of iron in the product. Be sure to talk with your healthcare providers about your specific nutritional needs before, during, and after pregnancy.

I take iron. Can it make it harder for me to get pregnant?

Taking iron at the RDA and staying below the UL is not expected to make it harder to get pregnant. It is not known if taking more than the UL of iron or taking iron below the RDA can make it harder to get pregnant. One study among women with infertility caused by problems with ovulation (when the ovary releases an egg) reported that taking iron supplements near or below the UL was associated with lower chances of developing ovulation infertility. It is not clear if the women in this study were taking iron supplements because their iron levels were low, or for other reasons not related to the infertility.

Does taking iron increase the chance of miscarriage?

Miscarriage is common and can occur in any pregnancy for many different reasons. Taking iron at the RDA and staying below the UL is not expected to increase the chance of miscarriage. There is no information on how an iron deficiency (having low levels of iron) might affect the chance of miscarriage in humans. An increased chance of miscarriage was reported in 2 studies of women who had iron intoxication (taking iron at levels 30 to 100 times more than the daily UL).

Does taking iron increase the chance of birth defects?

Birth defects can happen in any pregnancy for different reasons. Out of all babies born each year, about 3 out of 100 (3%) will have a birth defect. We look at research studies to try to understand if an exposure might increase the chance of birth defects in a pregnancy.

Taking iron at the RDA and staying below the UL is not expected to increase the chance of birth defects. There was no increased chance for birth defects reported in 6 studies with over 5,000 women taking iron at the RDA during pregnancy. One of these studies, which included 958 births, suggested that adequate levels of iron might have helped to lower the chance of birth defects.

Studies have not been done in humans to see if taking more than the UL of iron or taking iron below the RDA can increase the chance of birth defects.

Does taking iron in pregnancy increase the chance of other pregnancy-related problems?

Taking iron at the RDA and staying below the UL is not expected to increase the chance of other pregnancy-related problems, such as preterm delivery (birth before week 37) or low birth weight (weighing less than 5 pounds, 8 ounces [2500 grams] at birth).

It is not known if taking iron below the RDA during pregnancy increases the chance for pregnancy related problems. One study reported an increased chance for small for gestation age (birth weight lower than usual among infants of the same age) when the parent had low iron blood levels or anemia (problem where there is not enough red blood cells or hemoglobin). However, other studies did not report this same finding with low iron blood levels.

Studies have not been done in humans to see if taking more than the UL of iron can increase the chance of other pregnancy-related problems.

Does taking iron in pregnancy affect future behavior or learning for the child?

Taking iron at the RDA and staying below the UL is not expected to affect future behavior or learning for the child. Studies have not been done in humans to see if taking more than the UL of iron or taking iron below the RDA can increase the chance of behavior or learning issues for the child.

Breastfeeding while taking iron:

Iron is a typical part of breast milk. Women who are breastfeeding should continue to get the daily recommended amount of iron unless otherwise directed by their healthcare provider. The RDA for breastfeeding is different than pregnancy and can be found in the chart above. Women who are breastfeeding should talk to their healthcare provider about their specific nutritional needs before, during, and after breastfeeding. Be sure to talk to your healthcare

provider about all your breastfeeding questions.

If a man takes iron, could it affect fertility or increase the chance of birth defects?

Taking iron at the RDA and below the UL is not expected to affect a man's fertility (ability to get a woman pregnant) or increase the chance of birth defects. It is not known if taking more than the UL of iron or taking iron below the RDA can affect a man's fertility or increase the chance of birth defects. In 1 study, sperm motility (the ability for the sperm to "swim" to the egg) was lower in men with high levels of iron in their semen. Low sperm motility can make it harder to get a partner pregnant. One study is not enough to find a relationship between taking iron and male fertility. In general, exposures that men have are unlikely to increase risks to a pregnancy. For more information, please see the MotherToBaby fact sheet Paternal Exposures at https://mothertobaby.org/fact-sheets/paternal-exposures-pregnancy/.

Please click here for references.

Working as a Veterinarian or Veterinarian Technician

This sheet is about exposures for a dentist, dental assistant, or dental hygienist in a dental office setting. It also suggests some resources available to help create a safe work environment. This information should not take the place of medical care and advice from your healthcare providers and occupational safety officers.

What types of hazards might be at my workplace?

Some of the potential workplace hazards that dental workers might face include:

- Infectious diseases / bloodborne pathogens
- Laser/electrosurgery plumes
- Heavy metals (mercury)
- Nitrous oxide (waste anesthetic gases)

- Ionizing radiation (x-rays)
- Accidents (needle sticks, bites)
- Allergic reactions
- Physical strain
- Stress
- Chemicals (cleaning / disinfecting, dental sealants & tooth filling materials

MotherToBaby has fact sheets on some of these topics at https://mothertobaby.org/fact-sheets/.

Although you may work around a potential hazard, it does not mean that you are exposed to levels that would cause a problem. There are safety measures that workers can take to limit exposures.

Pregnancy information for all workers:

Miscarriage is common and can occur in any pregnancy for many different reasons. Birth defects can also happen in any pregnancy for different reasons. Out of all babies born each year, about 3 out of 100 (3%) will have a birth defect. We look at research studies to try to understand if an exposure can cause birth defects. If something can cause birth defects, it is most likely to do so during the first 13 weeks of pregnancy (1st trimester). How much you are exposed to (dose) also matters when looking at workplace risks. For more information on how a fetus develops during pregnancy, please see the MotherToBaby fact sheet on critical periods of development at: https://mothertobaby.org/fact-sheets/critical-periods-development/.

I work around nitrous oxide. Can this harm my pregnancy or my breastfeeding child?

If nitrous oxide is used properly, including the use of scavenging equipment and correct technique, then it is unlikely to increase the chance of miscarriage or birth defects. Also, nitrous oxide is not expected to get into breastmilk. Air monitoring can be done to evaluate staff exposure if there is a concern about air levels in the office. The Occupational Safety & Health Administration (OSHA) has a document (https://www.osha.gov/waste-anesthetic-gases/workplace-exposures-guidelines) with detailed information on workplace controls and recommended exposure limits for nitrous oxide. The American Dental Association (ADA) has a web page on working with nitrous oxide when pregnant https://www.ada.org/resources/ada-library/oral-health-topics/nitrous-oxide.

I am around our x-ray machine. Does this mean that I am exposed to radiation?

Properly maintained x-ray equipment that is used with proper technique does not expose dental personnel to x-rays. Also, the amount of radiation used in modern digital x-rays is lower than with older film-based x-ray equipment. Please see our MotherToBaby fact sheet on working around ionizing radiation for information on working with x-ray machines at: https://mothertobaby.org/fact-sheets/ionizing-radiation-workplace-pregnancy/.

If I am pregnant or breastfeeding, are there extra steps that I should take to prevent exposure to infectious diseases while working in a dental office?

Workers who are pregnant or breastfeeding should follow the same standard precautions established for all workers to prevent exposure to pathogens that can be spread by blood, saliva, or other body fluids. These precautions include proper hand washing and the use of protective equipment like gloves, face masks, and eye protection. The Centers for Disease Control and Prevention (CDC) has a document with guidelines for infection control in dental health care settings at https://www.cdc.gov/dental-infection-control/hcp/summary/index.html.

Make sure you are up to date on all recommended immunizations. Healthcare providers are considered at high risk for getting or spreading hepatitis B, Covid-19, influenza, measles, mumps, rubella, pertussis (whooping cough), and varicella (chickenpox). Discuss your personal health history with your healthcare provider to see if there are other vaccine recommendations. MotherToBaby has fact sheets on some of these topics at https://mothertobaby.org/fact-sheets/.

Are there concerns with exposure to mercury for dental workers?

Dental amalgam is a mixture of metals, consisting of elemental mercury (liquid mercury) and a powdered alloy composed of silver, tin, and/or copper. This mixture makes a strong, stable filling. Studies have not shown that this type of mercury exposure increases the chance of birth defects or other issues in children of dentists or their assistants.

Mercury can be used safely at work if proper precautions are followed. Because mercury vapor can be absorbed through the lungs and skin, everyone in the office should always use correct safety procedures when handling and disposing of dental amalgams. It is important to check with a safety officer or industrial hygienist to make sure you are using the right protective gear, and that safety systems like suction, air filters, and mercury traps are working. Studies show that workers in offices with poor safety practices have higher mercury levels in their blood. If you are worried about mercury exposure, talk with your healthcare providers about the possibility of having testing done to estimate your exposure levels.

What could be in the smoke that comes from drilling or using lasers?

Smoke plumes could contain fine particles of dust and gases. These are not well studied and there is a lack of standards and precise safety guidelines for this issue. Workers exposed to smoke plumes have reported irritation of the eye, nose and throat, and headache.

The American National Standards Institute (ANSI) recommends that there be administrative controls for laser use, including a laser safety officer (LSO). If your workplace LSO has identified specific exposures from laser use in your dental practice, or other exposures from drilling smoke have been identified and you feel that proper workplace protection was not working, contact MotherToBaby to learn more about your specific exposure.

How can I learn more about the chemicals with which I work?

Dental workers can learn about chemicals used at the worksite by looking at the product Safety Data Sheet (SDS). If you have questions or concerns about chemicals used at your worksite, contact a MotherToBaby specialist.

How do I reduce job-related exposures as a dentist, dental assistant, or dental hygienist?

Your work site should provide proper personal protection for all parts of your job. Be certain to use them correctly, even when not pregnant. Check to make sure that you are using the correct type of gloves and other personal protective equipment. Make sure the ventilation / air exchange in your workspace is working properly. Your work safety officer, LSO, and/or an industrial hygienist can help make sure your worksite has the correct protections in place.

One of the most important steps you can take is to practice proper hand washing. Wash hands before and after each patient and after contact with any bodily substance or articles contaminated by them. Wash hands before eating or drinking; after cleaning equipment and rooms; after handling chemicals; and whenever hands are visibly soiled.

MotherToBaby has a fact sheet on working during pregnancy and breastfeeding with general tips and resources available to help reduce potential chemical exposures (https://mothertobaby.org/fact-sheets/reproductive-hazards-workplace/).

If a man works in a dental office, can it affect his fertility or increase the chance of birth defects?

This has not been well studied. Available data does not suggest a significant link with reduced fertility (ability to make healthy sperm) or increased risk of birth defects in a partner's pregnancy. In general, exposures that men have are unlikely to increase risks to a pregnancy. For more information, please see the MotherToBaby fact sheet Paternal Exposures at https://mothertobaby.org/fact-sheets/paternal-exposures-pregnancy/.

Who can I contact for more information?

If you have specific concerns regarding your work site, discuss them with your healthcare providers or contact MotherToBaby with your specific exposures. In addition, talk with your employer about the option to hire an industrial hygienist (https://www.aiha.org/consultants-directory) or arrange for a Health Hazard Evaluation through the CDC's National Institute for Occupational Safety and Health (NIOSH) (https://www.cdc.gov/niosh/hhe/default.html) to have your work site evaluated for ways to keep all workers there as safe as possible.

Please click here for references.