REPRODUCTIVE HAZARD GUIDELINES

SCOPE

University employees working with any hazardous agent or process must understand how to work safely to protect their health and use good procedures at all times to minimize potential exposures. The University of Washington strives to ensure a safe and healthy workplace for all workers by implementing environmental and occupational health and safety standards, including providing guidance for reproductive hazards.

WHO ARE THESE GUIDELINES FOR?

These guidelines inform employees, students, and volunteers about potential reproductive and developmental hazards, and advise on safe work conditions and practices in their work environment. The guidance addresses both female and male reproductive health risks, and contains details on identifying, evaluating, and reducing those workplace risks.

The Environmental Health & Safety Department (EH&S) is available to assist with evaluating risks and to advise on steps to reduce potential risks in the workplace. Examples of work environments where reproductive health hazards may be present includes research laboratories, facilities shops, art studios, teaching classrooms and laboratories, clinical training environments, and field research sites.

The guidance may also alert an individual about risks in the home environment, including risks associated with hobbies.

WHY REPRODUCTIVE HEALTH MATTERS AT WORK

Where you work, the types of tasks you do, and what materials you work with can affect your reproductive health or that of your family. Some agents or hazards can affect:

- Potential for men and women to conceive a child, including current and future fertility
- Embryo/fetal development during pregnancy
- Development of a child after birth
- Health of mother and/or child during breastfeeding

If a pregnancy is possible, you and your partner should be aware of hazards in your work area that may cause reproductive or developmental hazards prior to becoming pregnant. Both partners need to be conscious of these hazards before and during reproductive periods. They can then make informed decisions on precautionary measures to reduce potential risks.

Hazards may include exposure to chemical, biological, and radiological agents. Accounting for these hazards in your workplace may be challenging.

- You can carry chemicals home on your skin, hair, clothes, and shoes. Some of these can harm the health of children and other people in your household.
- Many chemicals in the workplace have not been tested to see if they can cause reproductive problems.
- Laws for workplace safety and health do not always protect your reproductive health and the health of your family.

Men: Your sexual function, sperm, or semen can be affected by workplace hazards. Some chemicals can concentrate in semen.

Women: If you are exposed to workplace hazards and are pregnant or breastfeeding, your baby can be exposed, too.

WHAT REPRODUCTIVE HAZARDS EXIST AT WORK AND THEIR POTENTIAL IMPACTS

Workplace hazards can lead to specific reproductive health problems, such as:

- Reduced fertility or infertility
- Erectile dysfunction
- Menstrual cycle and ovulatory disorders
- Women's health problems linked to sex hormone imbalance
- Miscarriage/spontaneous abortion
- Preterm labor
- Stillbirth
- Babies born too soon or too small
- Birth defects
- Child developmental disorders

Some of these health concerns are associated with individual chemicals or job tasks.

FEMALE FERTILITY

Female reproductive hazards can be chemical, physical, biological, or other workplace conditions that affect the reproductive health of women and their ability to become pregnant. Exposure to particular hazards may disrupt the balance between the brain, pituitary gland, and ovaries. This disruption can result in an imbalance of estrogen and progesterone, which leads to changes in menstrual cycle length and regularity, and ovulation. Exposures that may contribute to fertility problems include but are not limited to:

- High physical or emotional stress
- Pesticides
- Polychlorinated biphenyls (PCBs)
- Perchloroethylene

- Some organic solvents, such as Benzene, styrene, and toluene
- Cancer treatment drugs, including antineoplastic drugs
- Lead
- Ionizing radiation, including x-rays and gamma rays
- Nitrous oxide (N2O)
- Carbon disulfide (CS2)
- Jet fuel
- Shift work

MALE FERTILITY

Exposure to particular hazards may disrupt male fertility. This includes affecting the number and quality of sperm, sexual performance, and chromosomal damage. Exposures that may contribute to male fertility problems include but are not limited to:

- Dibromochloropropane (DBCP)
- Lead
- Carbon disulfide
- Carbaryl
- Cadmium
- Chlordecone
- Ethylene dibromide
- Heat

EMBRYO AND FETAL DEVELOPMENT

A fetus might be more vulnerable to some exposures because of its rapid growth and development, particularly early in the pregnancy when its organs are developing. Fetal exposures occur when the pregnant person is exposed. Some specific chemicals and biological agents have been associated with miscarriages or preterm labor. Maternal exposures that may contribute to prenatal development and health problems include but are not limited to:

- Thalidomide
- Phenol
- Listeria
- Cytomegalovirus (CMV)
- Toxoplasmosis
- B19 parvovirus
- Measles
- Rubella
- Syphilis

CHILD DEVELOPMENT AFTER BIRTH

Maternal exposures may also result in developmental issues after the child is born. These can appear as hyperactivity, short attention span, or reduced learning ability, and in severe cases, mental retardation, deafness, blindness, weakened immunity, or cancer. Maternal exposures that may contribute to childhood development and health problems include but are not limited to:

- Lead
- Carbon monoxide
- PCBs
- Mercury (organic or methylmercury)
- Ionizing radiation has caused cancer in some children whose mothers were exposed during pregnancy
- Cytomegalovirus (CMV)
- Rubella
- Hepatitis B
- Hepatitis C
- HIV

MOTHER AND CHILD HEALTH DURING BREASTFEEDING

While breastfeeding may provide many benefits, some chemicals can be expressed in breast milk when the mother is exposed at work. This can create health concerns for both mother and baby. Hazardous materials that can pass into breast milk include but are not limited to:

- Lead, mercury, and other heavy metals
- Organic solvents and volatile organic chemicals (such as dioxane, perchloroethylene, and bromochloroethane)
- PCBs
- Dichlorodiphenyltrichloroethane (DDT, an insecticide) and related chlorinated hydrocarbons
- Methylene chloride
- HIV
- Chemicals from smoke, fires, or tobacco
- Some radioactive chemicals used in hospitals for radiation therapy (such as Iodine-131)

Note that the lists above are not exhaustive. In addition, your exposure to something hazardous at work does not mean that you are certain to have these health problems. Although studies have found some workplace hazards affect the male and female reproductive systems, these effects do not necessarily occur in every worker.

HOW WORKERS ARE EXPOSED TO REPRODUCTIVE HAZARDS

There are chemical, biological, radiological, and physical hazards in the workplace that may affect reproductive health. Different hazards have different routes of exposure.

CHEMICAL EXPOSURES

There are four main ways chemicals can enter your body:

- **Inhalation**: Breathing in the chemical. The chemical can be in particulate or vapor/gas form.
- **Dermal**: Coming in direct contact with the skin, especially if your skin is chapped, irritated, or if you have an open wound. Chemicals can also enter through mucous membranes that are directly splashed, such as your eyes.
- **Ingestion**: Hand-to-mouth, often when the chemical is on your hands and then you eat, drink, or smoke.
- **Injection**: A chemical-loaded sharp pierces the skin, such as a syringe, razor blade, or cut glass.

Chemical exposures can cause health problems. Whether or not they cause health problems depends on:

- What the chemical is
- How the chemical enters the body
- How long or how often a person is exposed to the chemical
- How an individual's body reacts to the chemical

BIOLOGICAL EXPOSURES

The exposure routes for biological agents are the same as for chemical exposures, but additional considerations should be taken based on your work tasks:

- Research work with biohazardous agents may present an exposure risk with specific implications for individuals of reproductive age and/or pregnant individuals. Following the precautions detailed in your Biological Use Authorization (BUA) is essential.
- Those who work with or could come into contact with bloodborne pathogens (e.g., clinical staff, dental students, some janitorial staff) should be conscious of their exposure when planning to become or are pregnant.

Refer to the EH&S Biological Reproductive Hazards Focus Sheet for more detailed information on specific biohazardous agents that are considered reproductive hazards.

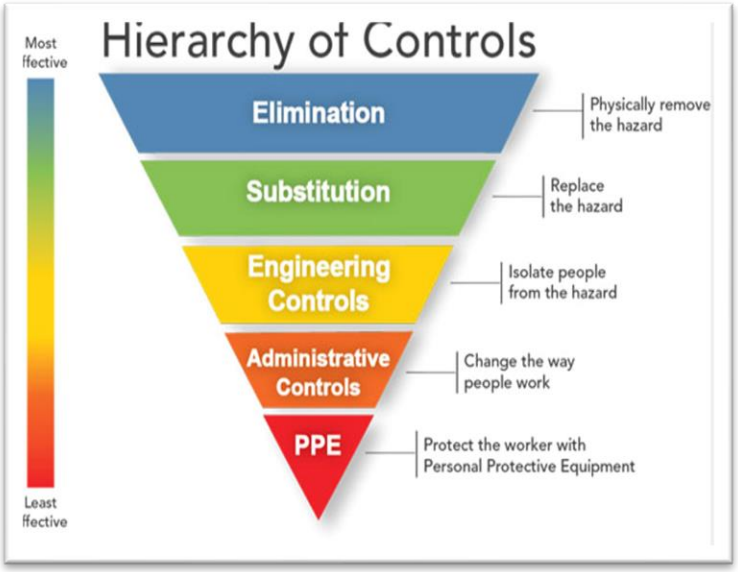
PHYSICAL AND RADIOLOGICAL EXPOSURES

Some job exposures are not chemical or biological, but they may affect your reproductive health. Some examples of these exposures are:

- Radiation (Refer to guidance on Occupational Radiation Exposure During Pregnancy)
- Loud noise
- Long working hours, shift work, or irregular work schedules
- Lifting, bending, and standing

HOW TO CONTROL EXPOSURE TO REPRODUCTIVE HAZARDS

Methods of controlling workplace hazards typically fall into the Hierarchy of Controls. It begins with eliminating or substituting the hazard but decreases in effectiveness as you progress towards personal protective equipment (PPE), which is the least effective. Below are examples of how these controls can be applied for reproductive health concerns.



1. **Substitution/elimination:** A pregnant health sciences student chooses to not participate in a gross anatomy class, which eliminates her exposure to formaldehyde. She works with her professors to find another method of learning the required materials.
2. **Engineering:** A researcher attempting to conceive designs their experiment so that all hazardous chemical handling, including chloroform, is done in a fume hood.
3. **Administrative:** A pregnant graduate student works with her supervisor to shift her job duties during the course of her pregnancy so that she does not have to perform the chemical handling portion of their project, which involves heavy metals such as lead and cadmium.
4. **Personal Protective Equipment (PPE):** A breastfeeding veterinary technician wears a respirator with organic vapor cartridges when anesthetizing animals with isoflurane.

STEPS WORKERS CAN TAKE TO GET HELP

STEP 1: INFORM YOURSELF

Learn about possible hazards in your workplace that could have an effect on your reproductive health. Share this information with your health care provider prior to work with potentially hazardous materials. As you complete this questionnaire, the following sources of information may be helpful:

a) Review the MyChem inventory of chemicals for your workplace, the BUAs for the biological materials you work with, and consider your work processes for other radiological or physical hazards.

b) Talk with your supervisor to see how risks for hazardous agents are assessed and mitigated.

c) Contact an EH&S Occupational Health Nurse at 206.221.7770 to discuss your work situation and resources to minimize exposures.

d) Make use of the Additional Resources listed below.

STEP 2: TALK TO YOUR HEALTH CARE PROVIDER AND YOUR SUPERVISOR

a) Using the information you have gathered, discuss your findings with your health care provider. Be sure that you understand your health care provider's assessment of potential risk and suggestions (if any) about possible modifications to reduce or eliminate risk.

b) Review your health care provider's concerns and recommendations with your immediate supervisor or departmental administrator. Together, you can begin to work on strategies and approaches that will permit any modifications necessary to minimize any reproductive risks.

c) Concerns about reproductive health generally do *not* require an employee to perform different job duties or take time off to avoid potential reproductive hazards. However, if your health care provider advises you to temporarily change job duties, or take a leave of absence, the University will consider such requests. In order to determine what action is most appropriate, the University may request that you provide a release from your health care provider to inform the University about medical circumstances that have resulted in the health care provider's recommendation.

d) If you decide to request a leave of absence from your job because of concerns about reproductive health, follow your department's normal leave request procedures. If you need to request a temporary or permanent change in job duties,

contact the UW Human Resources consultant or Academic Human Resources business partner who serves your department. Students may contact the Disability Resources for Students.

STEP 3: MINIMIZE EXPOSURES

While the following actions may already be part of your health and safety practices in your workplace, it's important to review these steps through the lens of your reproductive health concerns:

a) Change the process to eliminate use of the hazardous material or process.

b) Change the procedures to the smallest quantities needed or most dilute formulations needed.

c) Buy pre-mixed or pre-diluted formulations of chemicals.

d) Perform procedures with adequate ventilation that pulls the hazardous material away from you by:

- Using a properly operating fume hood
- Working in a biological safety cabinet (if this is appropriate for your work)
- Using another ventilation control system such as a swinging arm exhaust system or snorkel

  Note: Always check to make sure the ventilation system is operating properly before starting the procedure.

e) Follow laboratory, shop, and studio rules, such as "No food or drink in the laboratory."

f) Follow all steps in your standard operating procedures (SOPs).

g) Reduce the chance for spills by:

- Eliminating clutter
- Working on flat surfaces
- Mounting equipment firmly
- Carrying containers in tubs
- Making sure all containers are closed as soon as feasible
- Properly disposing of waste chemicals routinely to avoid accumulating large quantities

h) Avoid skin contact with hazardous materials.

i) Wash hands after removing gloves and before touching anything you may put in your mouth.

j) Wear appropriate PPE such as lab coats, liquid repellant aprons, chemical goggles, and impervious gloves.

Note: Thin latex or nitrile gloves are not impervious to some chemicals. Contact EH&S if you have questions about the selection of gloves or other PPE.

k) If precautions still seem to present an unacceptable risk, discuss with your supervisor whether those job tasks in which the potential reproductive risk is still of concern, despite appropriate protective measures, could be temporarily suspended and other tasks assigned instead.

CONTACTS

- EH&S: www.ehs.washington.edu/workplace-safety
- EH&S Occupational Health Nurse: 206.221.7770
- UW Human Resources: hr.uw.edu/
- Academic Human Resources: ap.washington.edu/ahr/
- Student Disability Services: depts.washington.edu/uwdrs

ADDITIONAL RESOURCES

- UW EH&S Biological Reproductive Hazards: https://www.ehs.washington.edu/system/files/resources/biological-reproductive-hazards.pdf
- NIOSH The Effects of Workplace Hazards on Female Reproductive Health: www.cdc.gov/niosh/docs/99-104/pdfs/99-104.pdf?id=10.26616/NIOSHPUB99104
- The National Toxicology Program Center for the Evaluation of Risks to Human Reproduction: ntp.niehs.nih.gov/pubhealth/hat/index.html
- CDC's Reproductive Health Information Source: www.cdc.gov/reproductivehealth/index.html