CHEMICAL HAZARDS - WORKERS AND REPRODUCTIVE TOXICITY RISKS

1. PURPOSE AND SCOPE

The University of South Australia is committed to providing a healthy and safe workplace and study environment for all staff, students, contractors, volunteers and visitors. A range of work practices and activities conducted by the University could potentially expose workers to physical, biological and chemical hazards associated with reproductive health effects if not managed appropriately.

Workers at risk of exposure to significant reproductive hazards must be informed of the potential health risks to enable the implementation of suitable controls. This Guideline provides information on chemical hazards that may cause adverse effects to female and male workers sexual function and fertility, pregnancy, lactation and development of the offspring and the recommended actions to be implemented.

2. RESPONSIBILITIES

2.1 Workers

Staff and students who intend becoming pregnant, are pregnant or breastfeeding and are working with chemicals are encouraged to discuss their work environment and duties with their personal physician. Consider taking documented work practices/ procedures and chemical safety data sheets (SDS) with you when you consult your doctor. There is no requirement for staff and students to advise their supervisor or co-workers of their intention to become pregnant or pregnancy, however it is recommended staff and students inform their supervisor and/or campus WHS Consultant, as soon as possible after they become pregnant, on the understanding that the matter will be kept confidential. The University Midwifery Clinic can also be contacted for support.

Reproductive hazards can affect the male reproductive system and male workers could also be exposed to hazards in the workplace that could affect their partner's health, the health of a pregnancy or a child. As such, male workers must also be aware of the hazards and ensure suitable controls are implemented.

Workers must minimise their exposure to reproductive hazards by participating in or undertaking an assessment of risks from specific workplace hazards and, where required, implement the identified controls. If workers have an incident where they are exposed to a reproductive hazard, they should seek medical advice immediately, report it to their supervisor and log details of the incident using the online Hazard & Incident Reporting & Investigation System as soon as practicable after the incident.

2.2 Supervisors

Supervisors should be aware that workers are not required to inform the University of their reproductive status, and workers should not be coerced to reveal personal information. Once a supervisor is aware that a worker is pregnant, they must:

- review the risk assessments and Safe Operating Procedures, in consultation with the worker, for the activities undertaken by the pregnant worker and/or exposed to the pregnant worker within the workplace; and
- Where required, ensure modifications are made to the work environment or duties.

Supervisors may need to consider the impact to the pregnant worker of work conducted by others (i.e. shared work spaces). It is recommended that the campus WHS Consultant be contacted to assist with the risk assessment process

The supervisor must inform the worker that subject to the risk assessment, the worker may choose whether or not to work with the reproductive hazards without fear of this decision impacting on their employment. Whether the worker elects to continue working with the reproductive hazards, the supervisor must facilitate, in accordance with the risk assessment, the implementation of the required modifications to the work environment or duties.

Supervisors must consider the confidentiality of the information and must always seek permission from the worker prior to divulging the information to any other person. The University Midwifery Clinic can also be contacted for support.

3. IDENTIFIED RISKS AND CONTROLS

Reproductive hazards are substances or agents that may affect the reproductive health of women or men or the ability of couples to have healthy children. Some workplace exposure to hazardous chemicals can have higher risk for pregnant or breastfeeding workers than for other workers. A number of substances are known to cause reproductive problems - Mutagens (cause genetic changes e.g. chloroform), Teratogens (cause birth defects, e.g. xylene), Embryotoxins (cause embryo abnormalities e.g. benzene), Reproductive Toxins (effect reproduction, lactation, e.g. lead) - however many more are suspected to be reproductive hazards (refer to Appendix 1).

Workers may be exposed to reproductive hazards by breathing them in (inhalation), by contact with skin (dermal) and by swallowing them (ingestion). A worker can expose his/her family to these hazards by bringing them home from the workplace, for example, on his/her skin, hair, clothes, shoes, tools or car. Potential health effects include infertility, miscarriage, birth defects and developmental disorders in children. It is important to prevent these exposures using workplace engineering controls, proper work practices and good hygiene.

The first trimester is one of the most critical times for the foetus, because extensive development is taking place. Often a woman does not know that she is pregnant during this period. Individuals of childbearing potential are warned to be especially cautious when working with reproductive toxins. Pregnant women and women intending to become pregnant should seek advice from knowledgeable sources before working with the substances that are suspected to be reproductive hazards (refer to Appendix 1).

Reproductive hazards do not affect every worker or every pregnancy. Different exposures may affect the worker and/or foetus in different ways and the same exposure may have different effects depending on the timing. Exposures such as chemicals or medications can interfere with cell division and formation of organs in the foetus. Some exposures may damage the organs or produce a physical defect, while others delay normal growth and development.

Depending on the nature of the work and the associated risks, modified or alternative duties may be required to reduce the potential exposure to reproductive hazards. Supervisors and workers are required to use the chemical risk assessment process (WHS12) and the hierarchy of controls to eliminate, or where this is not possible, manage the risks to as low a level as is reasonably practicable. When conducting the risk assessment process, supervisors and workers must consider the following hierarchy of controls:

1. Elimination – Can the task or chemical be eliminated? Consider if they can be delayed until after the first trimester or for the duration of the pregnancy? Consider alternative work schedules (e.g. office work)?

2. Substitution - Is there another task or chemical that can be used? Can a liquid instead of a powder be purchased? In consultation with your supervisor, is there another worker who can help with the task/ step(s) that require the chemical that may be a reproductive hazard?

3. Isolation / Engineering – Can the fume cupboard/ ventilation system be used? Can a new piece of equipment be used?

4. Administration – Review all risk assessments and Safe Operating Procedures that will be conducted over the 9 months of the pregnancy. Are there any additional controls that can be included that were not considered when the documents were originally written? Ensure personal hygiene measures (i.e. washing hands) are always implemented.

5. Personal Protective Equipment – Consider wearing two pairs of gloves or long cuff gloves or a face shield. Always wear safety glasses, and laboratory coat.

Useful Links and Documents:

- University Midwifery Clinic
- UniSA Safety & Wellbeing website
- Safe Management of Chemicals Procedure
- Radiation Safety Manual
- WHS12 Chemical Process Risk Assessment and Control

Appendix 1: How to identify chemicals with reproductive hazards

Certain chemicals are known or suspected to harm foetuses or the reproductive health of adults and can be identified via the Safety Data Sheet (SDS) for the chemical. The table below details the SDS classification and labelling pictograms and hazard statements that identify reproductive hazards.

Classification		Labelling			
Hazard		Pictogram, code*	Signal word	Hazard Statement	
Class	Category			Code*	Text
Germ cell mutagenicity	Category 1A	 GHS08	Danger	H340	May cause genetic defects (5)
	Category 1B				
	Category 2		Warning	H341	Suspected of causing genetic defects (5)
Carcinogenicity	Category 1A		Danger	H350	May cause cancer (5)
	Category 1B				
	Category 2		Warning	H351	Suspected of causing cancer (5)
	(5) = State route of exposure if it is conclusively proven that no other routes of exposure cause the hazard.				
Reproductive toxicity	Category 1A	 GHS08	Danger	H360 (6)	May damage fertility or the unborn child.
				H360F (7)	May damage fertility.
				H360D (7)	May damage the unborn child
				H360FD (7)	May damage fertility. May damage the unborn child.
	Category 1B			H360Fd (7)	May damage fertility. Suspected of damaging the unborn child.
				H360Df (7)	May damage the unborn child. Suspected of damaging fertility.
	Category 2		Warning	H361 (6)	Suspected of damaging fertility or the unborn child.
				H361f (7)	Suspected of damaging fertility.
				H361d (7)	Suspected of damaging the unborn child.
				H361fd (7)	Suspected of damaging fertility. Suspected of damaging the unborn child.
	Additional category for effects on or via lactation	No Pictogram	No Signal Word	H362	May cause harm to breast-fed children.
	(6) = (state specific effect if known)(state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard). (7) F = Fertility, D= Development (lowercase f, d = suspected effect).				

Some examples of reproductive toxins are: endocrine disruptors (DDT, methoxychlor, diethylstilbestrol, lindane, heptachlor, some plant estrogens), anaesthetic gases, heavy metals (arsenic, cadmium, lead, mercury), aniline, benzene, carbon disulfide, chloroform, ethylene glycol monomethyl and ethyl ethers, polychlorinated biphenyls, formaldehyde, ethylene oxide, phenol, toluene, styrene, perchloroethylene, vinyl chloride, xylene, pesticides and formamide.

The risk of ionising radiation causing detriment to the foetus is higher than the risk to the worker and the normal dose limit for a worker is therefore reduced during pregnancy. For further information, refer to the Radiation Safety Manual.

Many chemicals/ substances have been identified as reproductive hazards for men. The table below (extract from Centre for Disease Control and Prevention) lists a number of these hazards and the observed effects.

Male Reproductive Hazards*				
	Observed effects			
Type of Exposure	**Lowered Number of Sperm**	**Abnormal Sperm Shape**	**Altered Sperm Shape**	**Altered hormones / Sexual Performance**
2,4-Dichlorophenoxy Acetic Acid (2,4-D)		X	X	
Bromine Vapor**	X	X	X	
Carbaryl (Sevin)		X		
Carbon Disulfide				X
Dibromochloropropane	X			
Ethylene Dibromide	X	X	X	
Ethylene Glycol Monoethyl Ether	X			
Kepone (When exposed to high levels)			X	
Lead	X	X	X	X
Mercury Vapor				X
Military Radar	X			
Perchloroethylene			X	
Toluenediamine and Dinitrotoluene	X			
Heat	X		X	
Welding		X	X	