Karolinska Institutet

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Supporting work environment document

English translation, the Swedish version takes precedence.

Pregnant and nursing personnel in KI laboratories

The Work Environment Act states that the balance between work demands and individual conditions should primarily be achieved by adapting the work to the individual. Pregnancy and breastfeeding are often associated with specific work risks and requirements. The provisions AFS 2023:2 "Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar" state that employers must conduct an individual risk assessment of the work tasks and, if required, take preventive measures for employees or students who are pregnant, have given birth within the last 14 weeks, or are breastfeeding.

Given the high risks associated with early pregnancy, it is essential for the employer to conduct a general risk assessment before any employees become pregnant. Known risks or procedures that entail risks must be identified, documented, and communicated to affected employees and students of fertile age.

The individual risk assessment should be conducted by the employer in collaboration with the affected employee or student. If the risks are difficult to assess, it may be necessary to consult medical expertise or occupational health service. The risk assessment should include the complete risk profile of the individual, considering medical risk factors such as chronic diseases (e.g., diabetes) and previous pregnancy complications. These individual medical risk factors should be combined with established work risks to form the basis for the required preventive measures.

The employer must take immediate action if the risk assessment identifies a risk for the pregnant or breastfeeding employee. Any action that is practically possible and reasonable should be undertaken to eliminate the risk, starting with the following types of action, listed in order of priority:

1. adapt the work with technical protective measures or changes in procedures and work methods
2. change the organization of the work
3. temporary redeployment to other work tasks.

If none of the above actions can minimize the risks or are feasible, the employer may ultimately:

4. decide that the employee/student cannot remain at the work/studies during the pregnancy or breastfeeding period.

Adaptation of the work: Note that technical measures in the form of protective equipment may increase the workload. For example, protective clothing may increase heat load, gloves may reduce dexterity, and a protective mask may encumber respiratory and circulatory organs.

Organization: Work tasks or procedures that entail risks should be avoided during pregnancy or breastfeeding to eliminate risky exposure.

Redeployment: Pregnant employees are entitled to redeployment from work that involves the risk of ionizing radiation. Other risks that entitle pregnant employees to redeployment include threats and violence, exposure to noise that can impair hearing, risks of microbiological infection, infectious agents in blood, or exceeded hygienic limits for chemical substances.

If redeployment to safe work is not possible, Försäkringskassan will determine if the employee is entitled to pregnancy benefits.

Aspects to consider when performing a risk assessment for pregnant or breastfeeding employees

Karolinska Institute has developed tools in the form of templates for risk assessments (KLARA for chemicals, BARA for biological agents, etc.) to facilitate the risk assessment procedure. These tools should be utilized to ensure a comprehensive and effective assessment.

Important for the Risk Assessment

- Serious risks must be addressed immediately.
- Elevated risks should be investigated, planned actions to eliminate the risk including responsible person and completion dates should be documented in an action plan. This action plan must be followed and monitored by the responsible manager.

The following factors should be investigated:

1. Load ergonomic factors

a) A rest space must be available that is separate from the employee's workplace but within a close enough distance to avoid additional stress. This space should allow for temporary rest in a supine position.

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar

b) Are there manual lifts (15 kilos or more)? Ensure work levels and reaching distances are adjusted to the employee’s individual condition?

The load on the low back increases in pregnant women due to the displacement of the point of gravity as the belly grows. This requires special consideration for manual handling, as the load will be located far from the vertebral column. Ensure the work allows proper positions with a short moment arm, an erect upper body, and hands in front of the torso.

Is there tiring leg work, such as repeated climbs on a stool, prolonged squatting, or is one leg more often used as support?

Pregnancy increases blood circulation, putting additional strain on the legs. It is beneficial to provide options for shifting between standing and sitting work.

Is there prolonged or repeated work where the back is stooped forwards, backwards, or to the side, twisted, or stooped/twisted in combination?

The hormonal change in pregnant women cause reduced stability in the joints of the back and the pelvis. Exercise great caution for work involving joints in outer positions.

Is there a possibility to minimize strictly governed or restricted work to vary work positions and movements, and include short breaks as needed? It is important to allow pregnant employees short breaks as well as periods of recovery.

Is there enough functional work equipment that facilitates the work? Great physical strain can cause contractions in the uterus or uterine prolapse in women who have recently given birth.

Source: AFS 2023:10 Risker i arbetsmiljön

2. Psychosocial factors

a) When assessing risks for pregnant or breastfeeding employees, it's crucial to consider combined factors. High physical demands should be evaluated alongside psychological stressors like time pressure, high expectations, and intense concentration, as these can exacerbate the impact of physical strain. Additional factors such as limited flexibility and inadequate social support also play a significant role. Vibrations and unsuitable climate conditions further heighten the risk of physical strain-related issues.

b) Violence or threats pose a direct risk to pregnant women, potentially leading to miscarriage or harm to the unborn child. Strong psychological stress, irrespective of its origin, can also endanger the unborn child, particularly in the first trimester of pregnancy. Pregnant employees have the right to request relocation at their workplace.

Source: AFS 2023:1 Systematiskt arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar and AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar

3. Physical factors

a) In certain professions, higher exposure to electromagnetic fields than what is recommended as acceptable for the public may be permitted.

However, both the Work Environment Authority and the Radiation Safety Authority have established a precautionary principle stating that pregnant employees should not be exposed to levels higher than what is deemed acceptable for the public. Specific limit values are detailed in the provision AFS 2023:10 “Risker i arbetsmiljön”.

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar and AFS 2023:10 Risker i arbetsmiljön

b) During the later stages of pregnancy, regulating body temperature becomes more challenging, particularly when standing. Pregnancy naturally reduces heat resistance due to increased oxygen demand for the foetus, leading to higher oxygen consumption and a greater risk of exceeding the woman's circulatory capacity. Factors such as heat exposure must be carefully considered alongside physical workload, such as heavy lifting or prolonged standing. These factors can contribute to issues like swollen legs, varicose veins, and potentially serious conditions like blood clots or embolisms.

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar and AFS 2023:12 Utformning av arbetsplatser

c) Powerful shock and whole-body vibrations are considered to potentially increase the risks of bleeding, uterine contractions and miscarriage as well as premature birth.

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar and AFS 2023:10 Risker i arbetsmiljön

d) Pregnant women should avoid working in environments where noise levels exceed recommended limits that require ear protection, especially in the later stages of pregnancy. Excessive noise can lead to stress, fatigue, increased heart rate, elevated blood pressure, and the secretion of stress hormones, which can further strain the pregnant woman.

Noise affects the foetus differently depending on its frequency. High-frequency noise tends to be significantly dampened, while low-frequency

noise can potentially impair the hearing of the unborn child. Exposure to noise levels exceeding 85 dB(A) may increase the risk of growth disturbances, and high noise levels can elevate the risk of reduced placental circulation.

Pregnant women should be offered redeployment if there is exposure to noise levels in the range 75-80 dB(A), especially during the later stage of pregnancy. Additionally, low-frequency noise within the range 30-79 dB(A) in the frequency interval 20-200Hz must be avoided throughout the entire pregnancy as it may result in impaired hearing of the unborn child.

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar and AFS 2023:10 Risker i arbetsmiljön

e) Employers are required to inform female employees or students of childbearing age who are involved in work with ionizing radiation about the importance of promptly reporting their established pregnancy or ongoing breastfeeding.

There are inherent risks associated with such work during pregnancy or breastfeeding periods. If relocation of the pregnant employee is not feasible, employers must ensure that work is organized to keep the equivalent radiation dose to the foetus as low as reasonably achievable, never exceeding 1 millisievert (mSv) for the remainder of the pregnancy. However, any female employee or student who reports their pregnancy to their employer has the right to be reassigned to a different job that does not involve exposure levels exceeding the radiation dose limit applicable to the public.

During breastfeeding periods, measures must be taken to ensure that breastfeeding staff are not at risk of ingesting or being contaminated with radioactive substances. This precaution is necessary to prevent the child from being exposed to ionizing radiation, which could exceed the radiation dose limit applicable to the public.

Source: SFS 2018:396 Strålskyddslag (4 kap. 7-11 §§) and AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar

f) The floor must be sufficiently smooth, free of obstacles, irregularities, spills, waste or other foreign objects. Falls pose a risk of miscarriage or birth defects to pregnant employees.

g) An employee or student who is pregnant or has given birth within the last 14 weeks may be exempted from performing night work upon presenting a medical certificate indicating that such work would be harmful to her health or safety. Whenever feasible and reasonable, alternative daytime work should be offered to pregnant women.

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar and AFS 2023:15 Medicinska kontroller i arbetslivet

4. Infectious agents

Note: Pregnant employees and students must not be engaged in activities involving exposure to rubella or toxoplasma.

a) Infectious agents classified in risk groups 2-4 can cause illness and pose increased risks during pregnancy and breastfeeding. Employers must assess the potential exposure to such agents in the workplace.

Pregnant or breastfeeding employees must not engage in tasks that involve exposure to rubella or toxoplasma. Other infectious agents posing risks to pregnant and breastfeeding employees include parvovirus B19 (Erythema infectosum), tuberculosis, cytomegalovirus (CMV), hepatitis B, hepatitis C, herpes simplex, enterovirus, listeria, influenza, whooping cough, measles, varicella (chicken pox), HIV, and chlamydia psittaci. Additional microorganisms may also harm the foetus or newborn.

Therefore, conduct risk assessments also for handling microorganisms and infectious agents not described above. This includes work involving samples that may contain infectious agents, such as blood and other human specimen materials. Consider that the consequences for the embryo/foetus are often most severe during early pregnancy exposure. It's important to recognize that temporary high exposures, for example during an incident, can pose risks. In the risk assessment, the pregnant woman's concerns and fears should be taken into account, even if there are no documented cases of foetal harm for the organism in question. If

desired, the pregnant woman can seek advice from other experts, such as occupational health services or KI's Biosafety Committee, before contacting her immediate supervisor. Additionally, "INFPREG, Knowledge Centre for Infections during Pregnancy" provides specific information on known foetal or newborn damage after infection with various infectious agents. Further information is available on the Swedish Work Environment Authority's website.

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar, AFS 2023:10 Risker i arbetsmiljön and INFPREG, Kunskapscentrum för infektioner under graviditet

b) The employer may provide vaccinations against agents such as rubella, tuberculosis, hepatitis, whooping cough, measles, varicella, and seasonal influenza. It is essential that employees receive information regarding the benefits and risks of vaccination. Vaccines do not guarantee complete protection against infection, necessitating the adoption of additional protective measures. Detailed guidance on which vaccinations to avoid during pregnancy is available in the INFPREG knowledge database.

Source: AFS 2023:10 Risker i arbetsmiljön and INFPREG, Kunskapscentrum för infektioner under graviditet

5. Chemical substances

Note: Pregnant employees and students must not be engaged in activities involving exposure to lead.

Exposure to lead during pregnancy and breastfeeding can lead to impaired foetal growth and affect the child's central nervous system. The nervous system is most sensitive during its development, making it crucial to protect foetuses and breastfed infants. The lead exposure the mother has experienced earlier in life is significant from a risk perspective. Lead absorbed into the body during prolonged exposure is stored in the bones and can be released during pregnancy, affecting the foetus. Lead can also be released and excreted in breast milk during breastfeeding, potentially exposing the child to lead.

a) Information about the workplace chemicals is available in the KLARA product database. Evaluate the potential impacts of each chemical individually and in combination with others, as well as the associated risks of health issues and accidents.

For those who are pregnant or breastfeeding, special attention must be paid when working with CMR substances, specifically organotoxic substances, mercury and mercury compounds, carbon monoxide, and chemical substances that are harmful when absorbed through the skin.

When working with CMR substances that have the following risk phrases, it should be ensured that there is absolutely no risk of exposure for pregnant or breastfeeding employees:

H360 May damage fertility or the unborn child
H361 Suspected of damaging fertility or the unborn child
H362 May cause harm to breastfed children

Also, pay attention to chemicals marked with the following hazard pictograms. Work with such chemicals must always be risk-assessed, and the risk of exposure should be minimized for all categories of personnel.

For substances with occupational exposure limits, it is crucial to ensure that air concentrations in the workplace are below these limits with a significant margin of safety.

In animal experimentation, it is especially important to ensure that researchers submit risk assessments that encompass the entire experiment. This includes how animals will be handled throughout the experiment and the safe disposal of carcasses and cages.

During breastfeeding, it's important to consider that the child can come into contact with harmful substances through clothes or skin contaminated by substances the mother has been in contact with.

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar and AFS 2023:10 Risker i arbetsmiljön

b) The employer must ensure that the employees have sufficient knowledge of their work and its associated risks to prevent illness and accidents and achieve a satisfactory working environment. Cytostatic substances are examples of pharmaceuticals that are cytotoxic. Prolonged or exceptionally high exposure increases the risk of genetic damage and cancer. It is likely that the foetus can be affected during pregnancy, as well as the child during the breastfeeding period. Some cytostatic substances can be absorbed through the skin and affect entire organ systems. Several cytostatic substances are highly irritating or can cause tissue damage.

Even though pharmaceutical or chemical substances are prepared in ventilated hoods and by use of personal protective equipment, there remains a risk of low-level exposure for those who prepare and administer cytostatic substances. It's important to note that pharmaceuticals or their active degradation products can be excreted via faeces, urine, saliva, or blood for several days after the last treatment. Health risks can also arise from dust formed from dry contaminants, especially in animal research facilities when animals are transferred to new cages and when dirty cages and water bottles are transported to the dishwashing facility.

Care must also be taken when managing biological waste when there is a suspicion of the presence of concentrated pharmaceuticals or active degradation products. It may be appropriate to temporarily redeploy pregnant employees who handle cytostatic or cytotoxic pharmaceuticals. If pregnant employees must work with cytostatic substances, it is essential that adequate protective equipment (such as fume hoods, protective personal equipment, etc.) is fully functional and used optimally.

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar and AFS 2023:10 Risker i arbetsmiljön

c) The hygienic limit value is the highest acceptable average concentration of an air pollutant in the breathing air. When there is a suspicion of air pollution, exposure measurements should be conducted

(the supervisor can contact the occupational health service for help). In addition to the concentration of air pollutants, consideration should be given to the workload and the fact that certain substances can be absorbed through the skin. If exposure exceeds a limit value, relocation to other work should be considered.

Examples of pollutants that may occur in the breathing air include the use of anaesthetic gases in, for example, animal research facilities (see table below). Knowledge of the effects of newer anaesthetic agents is incomplete. As adverse effects on pregnancy cannot be completely excluded, exposure to anaesthetic gases for pregnant women should be minimized.

Substance	**CAS-number**	**Level limit value (NGV)[1]**		**Short time value (KTV)[2]**	
		ppm	**mg/m³**	**ppm**	**mg/m³**
Nitrous oxide	10024-97-2	100	180	500	900
Halotane	151-67-7	5	40	10	80
Enflurane	13838-16-9	10	80	20	150
Isoflurane	26675-46-7	10	75	20	150
Desflurane	57041-67-5	10	70	20	140
Sevoflurane	28523-86-6	10	80	20	170

Source: AFS 2023:2 Planering och organisering av arbetsmiljöarbete – grundläggande skyldigheter för dig med arbetsgivaransvar, AFS 2023:10 Risker i arbetsmiljön and AFS 2023:14 Gränsvärden för luftvägsexponering i arbetsmiljön

[1] **Level limit value** is the highest approved medium level (time medium level) of air pollution in inhaled air for exposure during a full workday.
[2] **Hygienic limit value** for exposure during a reference period of 15 minutes.