

## FACT SHEET – OCCUPATIONAL HEALTH AND SAFETY

### Exposure: Hot temperature conditions and extreme heat

**Vulnerable group:** Pregnant woman (considering stages of early pregnancy and advanced pregnancy)

#### 1. Basic description

A pregnancy lasts for about 280 days or 40 weeks after the onset of the last menstrual period (Mongelli et al., 1996). The WHO locates pregnant women into the vulnerable group. “Vulnerability is the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the impacts of disasters” (WHO, 2002). But also in the daily life pregnant women are more vulnerable than other groups since the health of the carried baby can be largely impacted by the health behaviour and lifestyle of the mother.

When looking at typical occupational risks for pregnant women, several potential hazards can be mentioned. These can include for example: biological hazards (such as working with kids or animals), chemical hazards (and thus working with substances that might be hazardous), night work, physical hazards (which include bending, heavy lifting, repetitive tasks, noise, temperature...) but also working with radiation or other types of waves that could be harmful (Henrotin J. et al., 2017).

Studies showed that the above mentioned hazards could be risky for pregnant women and thus they should be prudent about what type of work to do. Some studies mention that the risk of miscarriage as well as the risk of prematurity, low birthweight and pre-eclampsia could be complications caused by occupational risks and hazards (Bonzini M. et al, 2006).

When looking at mental health, psychosocial impacts have to be taken into account. Stress in the workplace can play a huge role and have effects on the unborn child and on the mother’s health. Also, the negative perceptions of pregnant women in the workplace that label them as “lazy” can cause a double burden of stress for them (Salihu H.M. et al., 2012).

As a legal regulation of occupational health and safety protection for pregnant women, in Germany the maternity protection act (German: Mutterschutzgesetz, abk.: MuSchG) exists. Some general statements that are included in the maternity protection act will be mentioned in the following. More specific regulations will not be mentioned here. §§4-6 MuSchG contains regulations about the allowed working time of pregnant employees. For example a maximum of 8.5 hours a day is allowed, as well as not more than 90 hours per double week, it’s not allowed to let women work more than usual or to let them work at night times or on Sundays or public holidays. Additionally, there has to be a rest time for at least 11 hours after each workday.

§§9-11 MuSchG contains regulations regarding working conditions that need to be provided for pregnant employees. According to that, companies have to conduct a risk assessment of the workplace to find out about potential physical and mental risk factors towards the health of mothers to be or her child. As soon as the employee informs the employer about her pregnancy the necessary protective measures have to be applied and there needs to be a discussion about further individual adjustments of the workplace. §11 MuSchG provides a list of prohibited activities and working conditions for pregnant women. Among these are activities by which the pregnant women get in contact with hazardous substances, or activities that include having contact with special infectious diseases the women isn’t protected against. Also, the mother has to be protected against

being exposed to physical influences (e.g. radiation, shocks, vibration, noise, heat, cold, wet) to an extent that it represents an irresponsible hazard for her or her child. Also any activities carried out for example in rooms with overpressure, oxygen-reduced atmosphere or in underground mining are not allowed. Furthermore, the employer must not allow to expose her to any working conditions in which she may be exposed to physical stress or mechanical influences (such as lifting, holding, moving or transporting loads by hand of more than 5kg or occasionally loads of more than 10kg by hand without mechanical aids, or often stretches, bends, crouches, or if accidents are likely to occur such as slipping and falling) to an extent that is an irresponsible risk for her or her child. In general an employer is also not allowed to make pregnant women work within the last six weeks prior to her delivery according to §3 (1) MuSchG.

## **2. Main impacts of extreme temperature and heat on human health**

Extreme temperature and heat have different impacts on health and it is associated with increased rates of mortality and morbidity. Healthy adults have mechanisms to regulate body temperature and deal with the increases in heat by maintaining an internal temperature within a narrow range around 37°C, independently of ambient temperature fluctuations (Hajat, 2010). Severe temperatures can cause heatstroke, heat exhaustion, heat syncope and heat cramps, which occur when the core body temperature exceeds 39.5°C and leads to multiple organ dysfunction. Heatstroke has a substantial case-mortality ratio, and progression to death can be very rapid, while in survivors, the permanent damage to organ systems can cause severe functional impairment and increase the risk of early mortality (Kovats, 2008). This factor can contribute to the exacerbation of pre-existing health conditions. In high-income countries, most heat-related deaths are likely to be from cardiovascular or respiratory causes (Hajat, 2010).

## **3. Main impacts of extreme temperature and heat on the health of pregnant women**

Health effects of extreme ambient temperature during pregnancy are of great public health interest. The potential association with preterm birth is particularly important given the high prevalence and deleterious consequences.

Extreme ambient temperature may have early, acute, as well as chronic effects on early delivery. Early pregnancy is generally a sensitive period to environmental hazards examples by heat/cold stress, these responses can disturb trophoblast invasion, the pituitary–adrenocortical–placental system, and uterine blood flow.

The early association with temperature suggests that there may be an impact on placental development. The heatwave was significantly associated with preterm birth. Both acute and chronic ambient temperature extremes may affect early delivery risk.

It is unclear whether extreme temperatures increase the risk of premature delivery. Extreme temperature is associated with adverse birth outcomes. A measure to prevent these adverse effects of temperature on pregnant women can be staying at home during a heatwave, as well as regulating the temperature at home using air conditioning or heating. Deviation from the usual environment likely is what drives temperature-related risk, and populations typically adapt to the usual climatic condition in their region. Example, individuals from cooler regions may experience heat stress at a lower temperature than individuals living in hotter regions.

#### 4. References

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