Croatian Civil Aviation Agency

INFORMATION SHEET

on pregnancy for female pilots, air traffic controllers and cabin crew

The duties of a female pilot, air traffic controller or cabin crew member can be demanding. The physiological changes caused by pregnancy can have significant safety implications in an operational aviation environment, especially if other medical conditions are present. In the case of pregnancy, aero-medical certification may be continued if a routine obstetric check-up indicates a normal pregnancy and if the aero-medical examiner (AME) considers that the pregnant woman is fit to continue exercising the privileges of the licence/certificate. Provided that all is well, the exercise of privileges may be continued until the end of:

- 26 weeks of pregnancy for female pilots, with the OML restriction (category 1 multi-crew restriction),
- 34 weeks for air traffic controllers and
- 16 weeks for cabin crew members.

If indicated by a comorbidity or complication, at the discretion of the AME and, where appropriate, the medical assessor of the licensing authority, another limitation may be entered in the certificate/report.

If a pregnant woman feels unwell or any of the following occur during the approved period, clinical advice should be sought from a gynaecologist and the AME should be contacted regarding aero-medical fitness:

1. Fainting or dizziness
2. Nausea or vomiting
3. Anaemia
4. Glycosuria or proteinuria (sugar or protein in the urine)
5. Urinary tract infection
6. Any type of vaginal bleeding (including "spotting")
7. Abdominal pain
8. High blood pressure
9. Change in mental well-being.

After the end of pregnancy, female pilots, air traffic controllers or cabin crew members may resume their privileges after recovery, as confirmed by a report from their specialist gynaecologist or general practitioner, in particular if there have been planned or unplanned procedures or complications, with which they report to the Aero-Medical Examiner (AME) who will assess their medical fitness to fly, with particular attention to potential problems and risks to mental well-being.
Applicants may provide a copy of this information sheet to their specialist doctor.

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Pregnancy is a normal event! How can it interfere with aviation safety?

Even the most normal of pregnancies leads to changes in the size and shape of the body. These changes have the potential to reduce physical agility and interfere with the ability to adopt some stances and postures that might be necessary during flight or pre-flight activities. A pregnant abdomen also has the potential to physically impede your ability to apply full back-stick control inputs in some situations. Pregnancy also has the potential to result in mood or cognitive changes. There is also the possibility of a pregnancy resulting in either an early miscarriage or, later on, in premature labour. These complications have the potential to result in unexpected and significant physical and mental/emotional impairment. The first and final thirds of a pregnancy are when the risk of miscarriage or premature labour is particularly elevated. Other possible complications of pregnancy (e.g. nausea, vomiting, and fatigue) also have the capacity to lead to physical and/or mental/emotional impairment or distraction.

Can I keep flying?

Early and late pregnancy are associated with an increased risk of potentially disabling complications such as miscarriage and premature birth. During late pregnancy, changes in body shape and size also have the greatest potential to interfere with your movement and agility. For these reasons, flying status is usually maintained during the low-risk mid-term period of an uncomplicated pregnancy (with restrictions on multi-crew passenger transport). Depending on the nature of any problems, the timeframe is likely to be reduced in the event of pregnancy complications.

Will I be able to return to flying after giving birth?

Unless there is a significant pregnancy complication or another health problem has arisen, you will likely be able to return to flying without restrictions approximately 6 weeks after giving birth.

Infertility treatment

The recommendation to ground a pilot during infertility treatment should be assessed on a case-by-case basis. The level of risk depends on both the type of treatment and medication used, as well as the individual. Some medications are not compatible with flying.

Incapacitation risk

Particularly during early pregnancy, the risk of incapacitation is increased due to the higher probability of miscarriage. In the general population, we know, approximately 15 percent of embryos will spontaneously abort during the first trimester. By the 11th or 12th week of pregnancy, the chances of miscarriage decrease to approximately 1-2%. More than half of all miscarriages are caused by a chromosomal abnormality in the fetus. Miscarriages may be a consequence of factors such as chronic diseases in the mother, exposure to chemicals (e.g. alcohol, tobacco, caffeine), ionizing radiation, infection, hormone problems, obesity, or individual problems with the placenta, cervix, or uterus. Stress may also be a contributing factor.

Extrauterine Pregnancy

Ectopic pregnancy, also known as tubal pregnancy, is a complication of pregnancy in which the embryo attaches outside the uterus. Most ectopic pregnancies occur in the fallopian tube. Unlike the uterus, which can expand with the growing fetus, the

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fallopian tube will stretch, rupture, and result in life-threatening internal bleeding. An ectopic pregnancy occurs in about 1-2% of all first-trimester pregnancies and is the most common cause of maternal death in the first trimester. The risk of death among those in the developed world is between 0.1 and 0.3 percent while in the developing world it is between 1-3%. Ectopic pregnancies are difficult to predict and diagnose, frequently presenting with an abrupt onset of incapacitating pain and life-threatening bleeding. Consequently, a sudden ruptured ectopic pregnancy (which constitutes an emergency) during a critical state of flight may result in both a medical and aviation emergency simultaneously. Due to the high risk of incapacitation with an ectopic pregnancy, an ultrasound examination should be performed at first six weeks of pregnancy.

Morning Sickness

Nausea or vomiting in early pregnancy may occur in 50-80 % of all pregnancies, particularly during the first trimester. The severity, periodicity, and duration of morning sickness typically varies from woman to woman. Morning sickness is not compatible with flying duties. Medication may ameliorate such symptoms; however, if morning sickness requires medication, it is an indication that the sickness is so severe that one should not be flying.

Hypotension (low blood pressure) and Syncope (loss of consciousness)

Blood pressure generally decreases in pregnancy. This is due in part to dehydration, but mainly because of hormonal effects on blood vessel relaxation. The relaxation of smooth muscles in blood vessel walls lowers the baseline blood pressure. In addition, about 25 percent of blood flow is directed to the uterus and placenta. This decreases systemic blood pressure, decreases G-tolerance, and increases the risk of grey-out, black-out, and syncope. Syncope is a transient loss of consciousness due to decreased blood flow to the brain, and usually resolves without lasting effects once blood flow is restored.

Hypotension is especially important to pilots exposed to G-forces as it increases the risk for G-LOC. G tolerances may differ significantly when pregnant; i.e. G tolerance may decrease when pregnant compared with the pilot's normal G tolerance (when she is not pregnant). However, it is important for a pregnant pilot to understand that these changes may vary throughout pregnancy and additionally may modify her ability to anticipate, recognise, and counter G-induced grey-out, black-out, or syncope. Pregnant pilots are generally restricted to low-G exposure aircraft for this reason.

Risks to mother and fetus

Anemia

Haemoglobin (and hematocrit) begins to fall between the third and fifth month and is lowest by the eighth month. This is primarily due to increased blood volume that results from an increase in plasma, the watery portion of the blood. This dilutes the oxygen-carrying red blood cells, causing the physiologic condition of anaemia. Increased iron requirements in pregnancy may further complicate anaemia. Usually, an adequate diet with supplementary iron and folic acid is necessary; however, this will be assessed on an individual basis by the woman's family doctor, Obstetrician and or AME; self-medication should be avoided without consultation. A Class 1 Medical may be temporarily suspended in the event of a pilot becoming anaemic and be reinstated following successful investigation and treatment of the same.

Dehydration

Pregnancy produces an increase in urine production, commonly contributing to dehydration. Dehydration results in lower blood pressure, which may cause lightheadedness, dizziness, visual disturbances, loss of consciousness, or adverse

consequences for the fetus. Lower blood pressure compromises blood flow to maternal and fetal tissue.

Hypoxia

It is known that Fetal Haemoglobin has a much higher affinity for oxygen than the mother's haemoglobin. Generally, it is believed that adequate fetal oxygenation occurs at altitudes under 10,000 feet. Normal cabin altitudes in pressurised aircraft can therefore be considered safe. If flight operations with supplemental oxygen are required, these should only be done after medical consultation. Changes occurring in the lungs, particularly during the third trimester, are medically relevant in the context of aviation. Hormonal changes affect pulmonary function by lowering the threshold of the respiratory centre to carbon dioxide, thereby influencing the respiratory rate. In addition, more fluid collects in the lungs of a pregnant woman, resulting in reduced residual lung volume. Other physiological changes during pregnancy lead to an increased oxygen demand and greater stress on the heart and lungs. For these reasons, a woman is more susceptible to the effects of hypoxia when she is pregnant.

Hypoxia may potentially cause fetal malformation, spontaneous abortion, or developmental disorders. It remains unclear how susceptible the fetus may be during transient and repeated hypoxic exposure.

Size of Abdomen

As the pregnancy progresses and the uterus expands, the girth of the abdomen may interfere with emergency egress and flight control manipulation. Abnormal flight (windshear, upset recoveries, engine loss, rapid depressurisation, wake turbulence, and other emergencies) may require full deflection of flight controls and may impose increased G-loads. Depending upon the nature of the rejection, force from an aborted takeoff may cause placental abruption.

Sleep

Often, a pregnant woman needs more sleep than normal due to the associated hormonal and physical changes of pregnancy. During the third trimester, pregnancy-related hormones (progesterone, estrogen, cortisol, and oxytocin) markedly affect sleep quality. Studies have shown that two-thirds of pregnant women suffer from sleep disorders; insomnia, restless leg syndrome, sleep apnea, nocturnal gastroesophageal

reflux, and nighttime urination are common. Sleep deprivation during pregnancy is associated with longer labor, higher cesarean rates, and higher levels of pro-inflammatory serum cytokines (linked to preterm labor and post-partum depression). Irregular airline schedules negatively impact circadian rhythms and contribute to chronic sleep deprivation. Sleep deprivation attributed to shift work has been linked to a higher incidence of miscarriages and can affect pilot performance.

Oedema, Deep Vein Thrombosis, and Pulmonary Embolism

The incidence of varicose veins is three times higher in women than in men. Due to the expanding uterus compressing the venous cava, the risk of oedema and blood clot formation increases substantially during pregnancy. Increased estrogen levels increase blood coagulation. Deep vein thrombosis and pulmonary embolism are among the most common serious vascular diseases that occur during pregnancy and

account for the greatest number of maternal deaths. Sitting for prolonged periods increases the risk of lower extremity oedema, thrombophlebitis, and deep vein thrombosis. Pilots, and especially pregnant pilots, should walk around every hour or two.

Cosmic Radiation

Cosmic radiation is linked to elevated numbers of chromosome aberrations, which

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may cause intellectual development disorders, developmental anomalies, congenital anomalies, growth restrictions, and Down Syndrome. These changes may also lead to miscarriage. According to current ICRP (International Commission of Radiation Protection) recommendations, the radiation exposure to the fetus should not generally exceed a limit of 1.0 mSv after declaring the pregnancy to the operator (the same limit applies to the general flying public and pregnant crew members). It should be noted that a flight crew member may have been exposed to some cosmic radiation prior to confirmation of pregnancy. The average annual radiation exposure for a pilot is between 2-5 mSv.

Cabin Air Quality

Although cabin air is normally of acceptable quality, fume events may cause the quality of cabin air to deteriorate. Fume events may pose a risk to passengers and crew in general, and this would include a pregnant woman and the unborn fetus.

Exposure to Viral Infections

Several viral diseases may cause birth defects. The Zika virus is a notable example. It is carried by mosquitoes and may result in microcephaly in the offspring of exposed women. Current recommendations advise pregnant women not to travel to areas where the Zika virus is present. Pregnant women should check the current and updated recommendations concerning Zika from health authorities. Pregnant women may have a more severe reaction to malaria than women who are not pregnant. Malaria can increase the risk for serious pregnancy complications, including, but not limited to, premature birth, miscarriage, and stillbirth. It is recommended that pregnant women should avoid travelling to areas where malaria transmission occurs.

Foodborne Illness

Pregnant women should follow the advice of local health authorities on what foods should be avoided due to the risk of foodborne illness.

Postpartum Depression

Postpartum depression (PPD) is a non-psychotic depression that women may experience shortly after childbirth. PPD is different from the “baby blues,” which begin within the first three or four days of giving birth, require no treatment, and improve within a few hours or up to 10-14 days. PPD is a deeper depression that lasts much longer. It usually starts within the first month after childbirth (although it can occur any time within the first year) and can last weeks to years. In more serious cases, it can develop into chronic episodes of depression. Apart from the fact that it happens soon after childbirth, PPD is clinically no different from a depressive episode that occurs at any other time in life. PPD symptoms are the same as in general depression and must meet the same criteria for diagnosis. Often, medical treatment is needed. A pilot has to be free of symptoms of depression, and any medication prescribed should be acceptable for use while flying before they return to duty.

Source:
ICAO Manual of Civil Aviation Medicine, 2012
IFALPA Human Performance Briefing Leaflet, Pregnancy and Flying, 18HUPBL02 5 December 2018
UK CAA Pregnancy Information Sheet October 2022 v2.1