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## A Review of the Thermal Effects During Pregnancy by Using Ultrasound: Doppler Mode

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### Abstract

Doppler ultrasound is used in obstetrics and gynecology fields to serve as the complement mode in the standard prenatal scan. It aids in investigating fetus blood flow in expectant mothers' wombs, usually those who come with pregnancy complications. In the conventional ultrasound beam, the heat produced by attenuation is distributed over the area. However, the Doppler ultrasound beam is focused at only one point. This leads the heat to accumulate at that particular area and hence there is an increase in the temperature. Heat is considered as a teratogen in pregnancy, whereby an increase in the fetal temperature can be fatal to the fetus. Studies have found that Doppler mode is associated with higher acoustic output as compared to the conventional two-dimensional (2D) ultrasound mode. Several studies done on animals have ruled out the evidence of Doppler ultrasound bioeffects. This narrative review only discusses the thermally induced effect of ultrasound by using Doppler mode. This study reviews prior studies with keywords such as Doppler ultrasound, bioeffects, heating effects, rabbit, and pregnancy. Earlier studies noted that the risk of thermal effects increased with the increase of exposure time. However, Doppler ultrasound wave inducing fetal hyperthermia is not the main reason for causing adverse neonatal outcomes without taking into account other external factors. Therefore, it is essential for the practitioners to adopt and adapt the concept of 'as low as reasonably achievable' (ALARA) to avoid any subtle adverse effects.

### Keywords

**Author Keywords:** Bioeffects; doppler; heating; newborns; Oryctolagus Cuniculus; prenatal; rabbits; thermal effects; ultrasound


**KeyWords Plus:** TERATOGENICITY; BIRTH

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