

## Obstetric Ultrasound Biological Effects and Safety

This guideline has been prepared and reviewed by the Diagnostic Imaging Committee and approved by the Executive and Council of the Society of Obstetricians and Gynaecologists of Canada.

### PRINCIPAL AUTHORS

Stephen Bly, PhD, Health Canada Radiation Protection Bureau, Ottawa ON

Michiel C. Van den Hof, MD, FRCSC, Halifax NS

### DIAGNOSTIC IMAGING COMMITTEE

Barbara Lewthwaite, MN, Winnipeg MB

Robert Gagnon, MD, FRCSC, London ON

Lucie Morin, MD, FRCSC, Montreal QC

Shia Salem, MD, FRCP, Canadian Association of Radiologists, Toronto ON

### Recommendations

1. Obstetric ultrasound should only be used when the potential medical benefit outweighs any theoretical or potential risk (II-2A).
2. Obstetric ultrasound should not be used for nonmedical reasons, such as sex determination, producing nonmedical photos or videos, or for commercial purposes (III-B).
3. Ultrasound exposure should be as low as reasonably achievable (ALARA) because of the potential for tissue heating when the thermal index exceeds 1. Exposure can be reduced through the use of output control and (or) by reducing the amount of time the beam is focused on one place (dwell time) (II-1A).
4. All diagnostic ultrasound devices should comply with the output display standards (MI and TI) (III-B).
5. When ultrasound is done for research or teaching purposes, exposed individuals should be informed if either the MI or TI are greater than 1 and how this exposure compares to that found in normal diagnostic practice (III-B).
6. While imaging the fetus in the first trimester, Doppler and colour Doppler should be avoided (III-B).

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### Abstract

**Objective:** To review the biological effects and safety of obstetric ultrasound.

**Outcome:** Outline the circumstances in which safety may be a concern with obstetric ultrasound.

**Evidence:** Medline was searched, and a review of a document on this subject published by Health Canada and of bibliographies from identified articles was conducted.

**Values:** Review by principal authors and the Diagnostic Imaging Committee of the SOGC. The level of evidence was judged as outlined by the Canadian Task Force on the Periodic Health Examination.

**Benefits, Harms, and Costs:** Obstetric ultrasound should only be done for medical reasons, and exposure should be kept as low as reasonably achievable (ALARA) because of the potential for tissue heating. Higher energy is of particular concern for pulsed Doppler, colour flow, first trimester ultrasound with a long transvesical path (> 5 cm), second or third trimester exams when bone is in the focal zone, as well as when scanning tissue with minimal perfusion (embryonic) or in patients who are febrile. Operators can minimize risk by limiting dwell time, limiting exposure to critical structures, and following equipment generated exposure information.

**Key Words:** Safety, bioeffects, ultrasound, obstetric, fetal, thermal index

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