



# Non-Ionizing Radiation & Children's Health

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PLATFORM PRESENTATION ☒

## Children And Medical Exposures (i.e. MRI)

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With the continuous development of improved soft tissue contrast, novel high resolution and functional scanning techniques, magnetic resonance (MR) diagnostic accuracy and usage is improving. The absence of ionizing radiation also makes MR imaging (MRI) an ideal diagnostic method. Potential adverse effects from RF fields, static and gradient magnetic fields, however, must still be avoided. The current MRI safety standard IEC 60601-2-33 defines exposure limits for the absorbed power averaged over the exposed body region of the patient. Limits for the peak spatial SAR averaged over 10g (psSAR10g) are only provided for local transmit coils but not for the most common volume coils. The limits for normal and first level modes are 2 W/kg and 4 W/kg, respectively, for whole-body SAR. The limit for head averaged SAR for both modes is 3.2 W/kg. For local transmit coils, the limits are 10 W/kg and 20 W/kg, respectively, for the trunk and 20 W/kg and 40 W/kg, respectively, for the extremities.

The latest research results have shown that psSAR10g can well exceed 100 W/kg in clinical practice. Although these values are well above the limits defined by ICNIRP and other organizations, the safe use of MRI over its relatively long history has demonstrated that these exposure levels are safe for MRI conditions (SAR distribution and MRI environment, i.e., body position and temperature). These conditions are currently being analyzed in the international research consortium MRI+ including thermal analysis. In this talk, the preliminary findings will be presented with special emphasis on the difference between children/fetus versus adult exposures. The special conditions associated with implants as well as other exposure scenarios, such as diathermia, hyperthermia, etc., will also be discussed.