

**RADIATION PROTECTION  
POLICY AND PROCEDURES  
NUMBER : 9**

**PATIENT PREGNANCY IN THERAPAUTIC PROCEDURE**

**Introduction**

Ionising radiations are used for treatment in oncology, endocrinology, dermatology and pain relief. In all women of reproductive capacity, the clinician requesting the therapeutic radiation dose should consider the possibility of pregnancy, both at time of prescription **and at the time that the dose is to be administered**. The final decision will rest with the prescribing radiotherapist or ARSAC license holder (*i.e. the IRMER practitioner*)

Local Rules will describe the necessary precautions for each type of procedure.

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**FETAL RISK ESTIMATES**

The following data is taken from Documents of the National Radiological Protection Board, Vol 4, No 4, 1993, Board Statement on Diagnostic Medical Exposures to Ionising Radiation During Pregnancy. In this document the NRPB states, "The Board does not consider it appropriate to draw up advice on the exposure of women who are, or may be pregnant to ionising radiation in the course of radiotherapy. However, the general principles outlined above apply and both the thresholds suggested for deterministic effects and the specific risk factors given for heritable disease and cancer induction may be used to assess the possible risks to the fetus arising from *in utero* irradiation in the course of radiotherapy."

**Table 1 - Estimates of threshold doses for deterministic effects following low LET in utero irradiation**

Age (weeks)	Minimal dose (Gy) for:		
	Lethality	Gross malformation	Mental retardation
0-1	No threshold at day 1? 0.1 thereafter	No threshold at day 1?	No effects observed to
2-5	0.25 - 0.5	0.2	about 8 weeks
5-7	0.5	0.5	
7-21	> 0.5	Very few observed	Weeks 8-15: no threshold?
			Weeks 16-25: threshold dose 0.6 - 0.7 Gy
To term	> 1.0	Very few observed	Weeks 25-term: no effects observed

[? indicates considerable uncertainty]

**Table 2 - Total risk of cancer up to age 15 years following *in utero* exposure (per Gray low LET)**

Cancer type	Fatal	Non-fatal	Total
Leukaemia	$1.25 \times 10^{-2}$	$1.25 \times 10^{-2}$	$2.5 \times 10^{-2}$
Other	$1.75 \times 10^{-2}$	$1.75 \times 10^{-2}$	$3.5 \times 10^{-2}$
Total	$3.0 \times 10^{-2}$	$3.0 \times 10^{-2}$	$6.0 \times 10^{-2}$

- For in utero exposure at 8-15 weeks it is estimated that 30 IQ points are lost per Gray.
- Risk of heritable effects estimated at  $2.4 \times 10^{-2}$  per Gray

**Table 3 - Natural Risks**

Heritable disease	$1 \times 10^{-2}$ to $6 \times 10^{-2}$
Fatal cancer to age 15 years	$7.7 \times 10^{-4}$
Lifetime cancer risk	$20 \times 10^{-2}$ to $25 \times 10^{-2}$