

ECRR REPORT CHALLENGES ENTRENCHED RADIATION ASSUMPTIONS

A recently-released report claims that the radiation dose model of the International Commission on Radiological Protection (ICRP) is inadequate for internal irradiation, and proposes a new model. The report made headlines with its predictions of over 61 million deaths from cancer attributable to nuclear activities since 1945.

(583.5493) NIRS – The European Committee on Radiation Risk (ECRR) is an independent committee formed in 1997 after a meeting at the European Parliament to review the controversial issue of low-level radiation.

Shortly after it was set up, a meeting of the European Parliament's Scientific and Technological Options Assessment unit (STOA) considered evidence that low-level exposure to man-made radiation caused ill health and that models used by ICRP failed to predict these effects.

The ECRR was asked to come up with an alternative analysis.

The resulting report, *2003 Recommendations of the European Committee on Radiation Risk*, addresses not only the science behind the low-dose debate, but also the ethical basis for allowable radiation exposures.

The intellectual breadth and depth, and scientific inclusiveness of this report are a refreshing change from current radiation establishment tactics.

If society is ever to have a proper debate on the effects of low-doses and dose rates of ionizing radiation, it must challenge the very basis of radiation dose and risk assessment. This report does.

For its models, the ICRP uses ethical justifications which are based on overall societal benefit rather than individual benefit. This does not account for rights-based philosophies which are part of the UN declaration of human rights. Since any dose of radiation has a small probability of fatal harm, the ECRR argues, the "collective dose" should be employed for all practices and time scales dealing with avoidable radiation exposure.

Among inadequacies in the ICRP risk model, the ICRP makes assumptions that are based on a series of value judgments. Often the risk model runs counter to actual and epidemiological study results. Additionally, population dose is not accurate for each individual since it averages the effects of many people who are genetically variable.

Current ICRP risk models do not differentiate enough between radiation delivered externally and that delivered internally; a difference the report likens to "a man warming himself in front of a fire and a man eating a red hot coal."

Further, the ICRP risk model takes a high dose to a single cell and averages it over a larger tissue mass.

The ECRR accepts the ICRP's "linear no threshold" model for external irradiation. However, because of the complex mechanism of cells, the ECRR says that the current linear damage model is not suitable for internal irradiation. The linear model must, according to the committee, be superseded in favor of relationships that show much higher effects at low doses.

To help correct for these shortcomings, ECRR has developed mathematical terms that extend the risk model of the ICRP. They include two new weighting factors in the calculation of effective dose (for internal exposures) which address ionization density in time and space at the cellular level. Ionization densities vary by radiation type (alpha, beta or gamma).

The committee also makes weighting adjustments for certain types of radionuclides which undergo damaging transmutation; and they make enhancement weightings based on biological and biophysical aspects of certain exposures.

ECRR derives these weighting factors from studies showing harm from low-dose exposures.

The committee recommends:

- the total maximum permissible dose to members of the public from all human nuclear practices be not more than 0.1mSv and 5mSv for workers
- all new nuclear practices must be justified by considering the rights of all individuals.
- total consequences of radioactive discharge must be assessed for both direct and indirect effects on all living systems.
- radiation exposures must be kept as low as reasonably achievable using best available technology.

For more information, visit the committee website at www.euradcom.org.

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