

## **Rulemaking1CEm Resource**

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**Docket:** NRC-2015-0057

Linear No-Threshold Model and Standards for Protection Against Radiation

**Comment On:** NRC-2015-0057-0086

Linear No-Threshold Model and Standards for Protection Against Radiation; Extension of Comment Period

**Document:** NRC-2015-0057-DRAFT-0588

Comment on FR Doc # 2015-20722

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## Submitter Information

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## General Comment

See attached file(s)

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## Attachments

NRC should continue using the LNT model

I am against the NRC changing the basis of its “Standards for Protection Against Radiation” from the linear no-threshold (LNT) model of radiation protection to the radiation hormesis model. Furthermore, I suggest the NRC follows the 2007 ICRP 103 Recommendations including lowering the occupational exposure dose limits.

The reasons presented by the three petitioners for rejecting the LNT model lack scientific rigor; they just reflect a personal preference.

The first rule change petitioner, Dr. Marcus, claims that there is “vast literature” that “supports the concept of hormesis”, but the only article she cites to document such fact (Siegel et al. Does Imaging Technology Cause Cancer? Debunking the Linear No-Threshold Model of Radiation Carcinogenesis. *Technology in Cancer Research & Treatment* 1-8, 2015) uses only one source of data: that of the Japanese atomic bomb survivors. The paper reaches the conclusion that there must be hormesis by just changing the methodology used in extrapolating from high to low doses of radiation. There are, however, many papers that have studied radiation effects on humans from low dose exposures and thus, do not require any extrapolation. One of the most recent ones is Leurad et al. Ionising radiation and risk of death from leukaemia and lymphoma in radiation-monitored workers (INWORKS): an international cohort study. *Lancet Haematol* 2015. That paper shows positive associations between protracted low-dose radiation exposure and leukaemia in a cohort of 308,297 radiation- monitored workers in France, the UK and the USA; their mean cumulative red bone marrow dose in the tens of the mGy range. Statistics being what it is, it is not surprising that some results may be contradictory and, thus, research must continue. In the meantime regulatory agencies such as the NRC must protect the workers and the public, and at this stage even though no deleterious health effects have been demonstrated at doses below 100 mGy, neither have hormetic effects. To assume, as Siegel et al. do, that adaptive responses in the early earth to high levels of radioactivity are the precursors to adaptive responses today at low doses is pure speculation.

The second comment by Dr. Marcus, echoed by Dr. Mark L. Miller, the second rule change petitioner, is that the “[t]he costs of complying with these LNT based regulations are enormous” (Dr. Miller actually said “incalculable”). These are personal perspectives from the petitioners; neither of them provides documentation to support them, and thus, can be ignored. Any implementation of regulations has costs, changing regulations is also costly...

Dr. Miller introduces the concept of radiophobia, an issue expanded by Dr. Mohan Doss, the third rule change petitioner. Miller’s claim that “[l]ow-dose limits for the public perpetuates radiophobia” is interesting. The general public does not know about dose limits in regulations. The radiophobia has evolved from public awareness of the effects of the atomic bombs and from nuclear power plant accidents such as those of Chernobyl and Fukushima. Radiophobia has also been fueled by irresponsible newspaper articles that have made unfortunate human errors in the medical field into radiation nightmares.

Dr. Doss's claim that NRC regulations have prevented the use of low dose of radiation for treatment of benign conditions is false. NRC allows radiation research using human volunteers provided the project is vetted by an IRB, whose members may or may not approve it. The NRC website states "therapeutic doses may also be used to reduce pain or treat benign conditions. For example, intravascular brachytherapy uses radiation to treat clogged blood vessels." Many isotopes nowadays are used for pain management. Medical exposures are not subject to dose limitations and it is up to the treating clinicians to decide the benefit/risk ratio.

Finally, the request from Dr. Doss for "urgency of action on this petition" because "any potential future accident involving release of radioactive materials in the USA would likely result in panic evacuation because of the LNT" ... and that "recognition of a threshold dose by NRC would obviate the need for such panic evacuations, associated casualties, and economic harm" when radiation is released in the environment is totally unfounded. The radiophobia of the general public does not know nor does understand dose limits. And in an accident no one is to believe that there are "safe" thresholds. And even if people were to believe in them, how are they going to trust that the dose measurements are accurate? Isn't it safer to assume that any radiation may be harmful and that the dose levels chosen by the government for evacuation are based –among other factors– on comparisons with natural background radiation?

The NRC should not change the LNT model as the basis for its regulations until scientific findings yield a more accurate model to describe radiation effects vs. dose.