

RulemakingComments Resource

From: O'Connor, Michael K., Ph.D. <mkoconnor@mayo.edu>
Sent: Thursday, August 06, 2015 3:24 PM
To: RulemakingComments Resource
Subject: [External_Sender] Re: Linear No-Threshold Model and Standards for Protection Against Radiation

Please find below my comments regarding Docket ID NRC–2015–0057 (Linear No-Threshold Model and Standards for Protection Against Radiation).

The Linear No-Threshold (LNT) hypothesis for the biological effects of low-levels of ionizing radiation has been in place since the mid-1950s. Most scientists acknowledge that at moderate to high doses (> 100 mSv), the LNT model provides a sound estimate of cancer risk. However at low doses I believe that this model fails to explain the findings in many well-designed animal and clinical studies.

Many proponents of the LNT model claim that that there are many studies that support the LNT theory. To this I would like to make 2 points. 1) The proponents of the LNT model are defending a theory – the LNT. If the LNT model is correct, then it should be able to explain the findings in all studies and not ones that are preferred by the proponents. As someone claiming that the LNT is unable to explain the findings at low doses, I have the luxury of picking any study I like (provided the science is sound) and determining if the findings are consistent with the LNT. If the findings are not consistent with LNT, and there are no apparent confounding factors, then there is a problem with the theory.

We know that the LNT seems to be unable to adequately explain all the findings when applied to doses below a certain threshold. This is analogous to Newtonian mechanics and Quantum mechanics. Newtonian mechanics works well at the macroscopic level but cannot explain behavior at the atomic level. Likewise, I would argue that LNT can explain the behavior of ionizing radiation at high doses, but fails to adequately explain the findings at low doses. Unlike other areas of physics or science, when a theory fails to explain the scientific data, the theory is revised and updated. For some reason, that usual pattern has not been followed in radiation research and we are left with a theory from the 1950's that is at odds with much of the more recent scientific literature on effects of low-dose ionizing radiation.

I believe sufficient evidence has developed since 1956 (particularly on the biologic side) to warrant a thorough review of the validity of the LNT and serious consideration given to other models on the biologic effects of ionizing radiation that better explain more recent data.

Thank you

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