

## **Rulemaking1CEm Resource**

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**TITLE:** Linear No-Threshold Model and Standards for Protection Against Radiation

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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-0312

Comment on FR Doc # 2015-20722

## Submitter Information

**Name:** Edward Greisch

## General Comment

HORMESIS is the word you were looking for. Low Dose Effects  
 Anything below 0.25 Sv (25 rem=25,000 mrem) has no observable effects, but what about long-term effects (cancer, genetic damage)  
 Hiroshima/Nagasaki data reveals a strong correlation between radiation dose and incidence of cancer.  
 There is no controversy that high radiation dose can cause cancer.  
 But can this correlation be extrapolated to very low doses of radiation?

Hormesis

The BEIR-V linear no-threshold (LNT) extrapolation does not take credit for improved cell repair at low doses or the hormesis effect.

Hormesis is a biological process where cells react differently to small doses of otherwise harmful toxins. The stress of low dose exposure causes cells to "learn" (or evolve) to efficiently repair radiation damage. Possible effects of hormesis for low dose radiation Increased cell growth / fertility Reduction in cancer incidence Other effects, either toxic or beneficial.

Radiation standards do not take credit for hormesis.

University of Pittsburgh Nuclear Engineering Program

[https://dl.dropboxusercontent.com/u/119239051/Feinendegen-2012\\_Hormesis-by-LDR\\_Therapeutic-Nucl-Med....](https://dl.dropboxusercontent.com/u/119239051/Feinendegen-2012_Hormesis-by-LDR_Therapeutic-Nucl-Med....)

Therapeutic Nuclear Medicine Springer 2012 ISBN 978-3-540-36718-5

## Hormesis by Low Dose Radiation Effects: Low-Dose Cancer Risk Modeling Must Recognize Up-Regulation of Protection

Ludwig E. Feinendegen, Myron Pollycove, and Ronald D. Neumann

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2664640/#b81-drp-07-052>

Dose Response. 2009; 7(1): 52-89.

Published online Nov 10, 2008. doi: 10.2203/dose-response.08-024.Cuttler

PMCID: PMC2664640

Nuclear Energy and Health: And the Benefits of Low-Dose Radiation Hormesis

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This article has been cited by other articles in PMC.

Go to:Abstract

Energy needs worldwide are expected to increase for the foreseeable future, but fuel supplies are limited. Nuclear reactors could supply much of the energy demand in a safe, sustainable manner were it not for fear of potential releases of radioactivity. Such releases would likely deliver a low dose or dose rate of radiation, within the range of naturally occurring radiation, to which life is already accustomed.

Low dose radiation doesn't cause cancer, it helps prevent cancer.

<http://atomicinsights.com/low-dose-radiation-doesnt-cause-cancer-helps-prevent/>

Atomic bomb victims: dose versus leukemia cases

Dr. Jerry Cuttler published a letter to the editor of the Archives of Toxicology titled Leukemia incidence of 96,000 Hiroshima atomic bomb survivors is compelling evidence that the LNT model is wrong.

Here are the concluding paragraphs of the letter.

"The continued application of the invalid linear dose-response model for cancer risk assessment raises enormous fear about the safety of exposures to small doses of radiation (and chemicals). Linking low radiation to a "risk of health effects" and the emergency measures to mitigate exposure to low radiation levels has caused and continues to cause many premature deaths and enormous psychological suffering of large populations who received small radiation exposures. Ongoing use of this unscientific methodology is blocking nuclear energy projects and severely constraining vital applications of X-rays and radioisotopes in medicine.

It is time for the scientific community to urge the US National Academy of Science to recognize its error and abandon the politicized science it fostered in 1956."

The letter is short, pointed and important. Please read it and think about ways to take action on its recommendation to reevaluate the basis for radiation protection regulations.

Categories: Health Effects, hormesis, LNT

[http://atomicinsightscom.c.presscdn.com/wp-content/uploads/Cuttler-2014\\_-Leukemia-incidence-of-96000-Hiroshima-survivors\\_ArchToxicol.pdf](http://atomicinsightscom.c.presscdn.com/wp-content/uploads/Cuttler-2014_-Leukemia-incidence-of-96000-Hiroshima-survivors_ArchToxicol.pdf)

## Attachments

Nuclear Energy and Health- And the Benefits of Low-Dose Radiation Hormesis

hormesis graph

book Radiation and reason 3 by Wade Allison

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The attachment can be viewed at the following internet address:

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2664640/#b81-drp-07-052>