TO THE EDITOR: I applaud both the authors of the recent article by Siegel et al. "Subjecting Radiological Imaging to the Linear No-Threshold Hypothesis: A Non Sequitur of Non-Trivial Proportion" (1) and the JNM for publishing this important review in such a prominent journal. The authors condense an enormous amount of scientific data and rigorous interpretation into a relatively small space. I hope this paper will help slow the disheartening impact of radiophobia that is sweeping our country and reducing the quality and use of radiological imaging and consequently of medical care, as described so clearly in the article. The authors have raised the level of scientific discussion regarding the health effects of radiation. Any rebuttal to their cogent arguments needs to be on that same high scientific level. I think part of the wide acceptance of the linear, no threshold theory is the unfamiliarity of most people with the widespread biological phenomenon of the J-shaped curve, namely, that many things that are harmful at high doses are harmless, or even helpful, at low doses. The classic and best-studied example is that of alcohol on all-cause human mortality, nicely summarized in this figure modified from Di Castelnuovo et al (2006) (Reprinted with permission from (2)), a meta-analysis involving >1 million subjects. The data in the red circle in (A) are shown larger in (B), and clearly show the strikingly nonlinear relationship between alcohol and mortality at low doses. This is the equivalent to the area of contention in the radiation-cancer relationship (equivalent to several whole-body CT scans), for which there is no data—or rather, the data at such low radiation doses is so noisy that no reliable signal can be discerned above background. The data is much better for alcohol and shows a relationship that could never be predicted from the high-dose data.

REFERENCES

- 1. Siegel JA, Pennington CW, Sacks B. Subjecting Radiologic Imaging to the Linear No-Threshold Hypothesis: A Non Sequitur of Non-Trivial Proportion. *J Nucl Med* 2017 Jan;58(1):1-6.
- 2. Di Castelnuovo A et al, Alcohol dosing and total mortality in men and women: an updated meta-analysis of 34 prospective studies. Arch Intern Med. 2006 Dec 11-25;166(22):2437-45.

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