

## **Bill Sacks' and Jeff Siegel's Response to Ansari's "Reply to 'the essential role of all scientists: critical evaluation not uncritical acceptance'" 12/2019**

We appreciate Dr. Ansari taking the time to reply to our letter [1], but we take issue with his pronouncement that "radiation protection practitioners are *ethically obligated* to practice the profession within the established guidelines [emphasis ours]." Clearly he addresses his ethical pronouncement toward those in the profession who believe that the established guidelines are factually incorrect, since those who believe they are factually correct need no such urgings and will simply follow what they believe is true. His reply [2] makes the lines of disagreement crystal clear, an important step toward framing the argument and hopefully helping the reader to come to her/his own conclusion.

First, to Dr. Ansari we "appear to be confused" over whether radiation scientists have a different role to play than radiation protection practitioners. Rather than being confused, we purposefully and resolutely advocate that, when there is a misalignment between the "established guidelines" and the underlying science, the ethical obligation of practitioners is to base their practice on the science and to endeavor mightily to bring the established guidelines in line with that science, not to quietly accede to, and parrot, the voices of authority who establish those guidelines [3].

Dr. Ansari likens his proposed "ethical obligation" to that of the medical profession. Would he advocate that, if the American Pediatric Society happened to claim, in the face of the preponderance of evidence, that vaccines are dangerous, it would be the ethical obligation of all pediatricians to withhold vaccinations from their patients? While this particular case is a hypothetical, the equivalent situation is far from hypothetical in the field of radiobiology.

We have published dozens of peer reviewed articles chronicling, highlighting and analyzing the voluminous evidence that low-dose radiation exposure is not only harmless but stimulates a protective biological response that leaves the recipient in better health than prior to the exposure, known as hormesis. For a small selection see the following references [3-10]. This overwhelming evidence, in the face of no valid evidence supporting low-dose harm, is not refuted, but rather ignored or dismissed by proponents of LNT. We say "no valid" evidence because there are a number of studies that purport to provide such evidence. But we have shown that they employ erroneous approaches that include, but are not confined to, such things as circular reasoning, misassignment of exposure dose, and reversal of causation [4].

Second, Dr. Ansari admits in his original opinion piece [11], which prompted our letter [1], not only that the LNT model "cannot adequately explain or predict health effects of low-dose radiation for all cancers, all individuals, or all exposure situations," but also that this is "universally agreed" to. While it is true that LNT is universally known to be scientifically erroneous and is therefore invalid for use in risk *assessment*, it is nevertheless promoted by the voices of authority for use in risk *management*. However, the false LNT construct leads to endangerment when the risk is not only nonexistent but negative; that is, when there is actual health benefit in the low-dose region. Such benefit has been demonstrated in countless ways and situations, but is not even considered possible by Drs. Ansari, Kleinhans, and Boice in their invited editorial in the same issue as Ansari's reply to our letter [12].

They say that in the low-dose region (<100 mSv), "...the probability of adverse health effects from these exposures is correspondingly very low. However, we cannot be certain quantitatively how low that possibility is – it is the difference between very low, extremely low, or potentially zero risk." And, "While large uncertainties exist, it should be acknowledged that these uncertainties have an *upper bound* as evident from well-documented epidemiological studies [emphasis ours]." But about a *lower bound* they say, "It is unreasonable to assume that risk of cancer from low doses of radiation suddenly dives to *zero* at doses below 100 mSv." They thus affirm a positive upper bound and imply that the only reasonable lower bound is zero. They thereby rule out negative risk *a priori*, without even *suggesting* the existence of evidence to support a lower boundary of zero, let alone providing any.

The problem of risk management in the face of a negative risk in the low-dose region is that by advocating further lowering of exposure below that level where the nadir of risk resides (that level of exposure at which risk is higher both above and below it), the risk actually increases rather than decreases. In the thinking of Dr. Ansari and his coauthors, we are unethical to point out this failure of risk management that endangers rather than protects.

The only justification for use of LNT for risk management or radiation protection, in addition to the nonscientific claims of mathematical simplicity and of practicality offered by Dr. Ansari (he says that the practices we advocate are "impractical" but gives no explanation or evidence of such), is the *precautionary principle*. This principle holds that it is better to err on what is presumed to be the safe side when there is uncertainty about the science. Since the advisory organizations deny the science, they are forced to resort to that principle.

But the precautionary principle is only applicable when the consequences (intended or unintended) of following it are less harmful than following the science, that is when the "safe side" is really safer than the alternative. This is manifestly untrue in this case, as the unintended consequence of denying low-dose harmlessness, let alone benefit, is widespread radiophobia. The latter is responsible, among other things, for

- refusal by many patients and their referring physicians to avail themselves or their children of medically indicated CT scans and other radiological studies,
- radiologists' occasionally lowering radiation doses below that required for accurate diagnostic quality,
- forced relocations of hundreds of thousands of people in the vicinity of nuclear power plant accidents – in the face of radiation dose rates that fail to reach even the natural background levels found in parts of the world where people suffer no untoward consequences, and
- numerous relocation-related suicides, heart attacks, strokes, and being shunned by others who have been led to believe that people exposed to radiation become radioactive and dangerous to be near.

The failure to follow the science and opt instead for what turns out to be a misapplication of the precautionary principle is not benign. Its side effects are far worse than even LNT would predict. Low-dose radiation exposure has no documented pathway to harm, while LNT/ALARA most assuredly do.

Finally, Dr. Ansari suggests that we merely *assume* that what he calls our interpretation of the “science,” which he puts in quotation marks suggesting his disdain, is correct and that we believe that “everyone who doesn’t agree with [us] *must be* wrong, biased, or *have an agenda* [emphases ours].” He charges that this alleged belief on our part is “hubris.” It is only incidental that those who ignore the preponderance of the evidence disagree with us. It is the ignoring of the evidence and not their incidental disagreement with which we take issue.

This charge is a common ad hominem ploy resorted to by those with a paucity of rational argument. We might just as easily respond that Dr. Ansari’s calling someone who disagrees with him guilty of hubris is itself hubris, or more colorfully chutzpah, but we won’t, because we reject all ad hominem arguments. They are a strong sign of a weak argument. The point is whether practitioners should follow or deny the preponderance of the evidence; that is, whether they should follow a scientific rather than seemingly “practical” approach.

The voices of authority – claiming the regulatory equivalent of the *droit de seigneur*, in this case the right to be considered correct merely by virtue of their powerful position rather than by a judgment of their advocated approach on the basis of scientific evidence – have a special responsibility to be correct about the science.

Dr. Ansari claims that we are irresponsible since in his view we are advocating “radiation protection practices that are not only impractical but are based on misrepresentation and mischaracterization of scientific literature.” Nothing could be further from the truth; it is the voices of authority that misrepresent and mischaracterize, first by one-sidedly assuming that low-dose radiation exposure cannot possibly result in a health benefit but must result in harm of some amount and second by ignoring the mountainous and growing evidence of hormesis [9]. This one-sided view by these voices of authority must be challenged and eventually rejected by all. Science is the only focal point that can attract consensus, or even near consensus, rather than the stark divisions – no matter how downplayed they are by Dr. Ansari – that obtain within the field of radiobiology.

The rapidly accelerating scientific findings on the hormetic effect of low-dose ionizing radiation notably includes the 2015 Nobel-earning work in chemistry by Lindahl, Modrich, and Sancar, who explored the mechanisms of DNA repair, a vital underpinning of the hormetic effect of low-dose radiation. But this is only the most prominently recognized effort in this vein. Such studies are legion and continually multiplying. The refusal to even acknowledge, let alone credit, this literature, not the refusal to follow the voices of authority into the cave, is the height of irresponsible ethical transgression.

## REFERENCES

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