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A Case of Residential Carcinogens

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ONE of the most common correspondences I get regards radon in the home. Folks will call and write with radon questions, and very usually describe their concern in terms like “freaked out” and almost always express “fear.”

Almost always, the person falsely believes that they are otherwise not exposed to occupational or environmental carcinogens and so “naturally focus on radon.”

And yet, it is this false assumption that one is not otherwise exposed to carcinogens that helps sky-rocket the radon issue far above the actual toxicological significance it truly poses; that and the perception of insidiousness created by the nature of being an invisible gas and imagery created by the exotic nature of radiation.

But in fact, virtually all residential occupants in Western Europe, North America (and the Antipodes) are exposed to known carcinogens on a daily basis.

For example, virtually EVERY house absolutely does have asbestos. Asbestos fibers, being as naturally occurring as radon, are ubiquitous in the ambient air around the globe.

As such, even for structures that were not built with asbestos containing materials, the occupant nevertheless is exposed to asbestos.

John Q Public is similarly awash in “occupational hazards.” With every breath he takes, he is inhaling a veritable soup of cancer causing chemicals including benzene, polyaromatic hydrocarbons, nickel, plutonium, cadmium, and mycotoxins. Every time he fuels the family car with gas, he is getting an extra large spike of benzene and other carcinogens. Every time he passes a road construction project he is getting extra exposures to chrysene, benzo- α -pyrene, anthracene, and phenanthrene.

Every household is chocker-block full of nasties including each of the above mentioned entities as well as noncarcinogenic toxic materials such as carbon monoxide, hydrogen sulfide, aliphatics, aromatics, hydrogen peroxide, and more.

Our lives are chocker-block full of radiation as well - as I sit here on this beautiful Friday morning, writing this, at my office computer at 9,000 feet elevation in the Colorado Rockies, along with all my friends and neighbors and tourists, I receive approximately 35 μ R of cosmic radiation – I’m enjoying a banana for breakfast (which contains about 40,000 pCi/g of radioactive K40), with my morning cup of coffee with cream (which contains about 1,200 pCi/l total alpha).

As you read this post, if you are a normal sized adult, YOU have been irradiating 4,400 Bq (120,000 pCi) of just K40, (that equates to about 4,400 radioactive disintegrations **per second**. And that’s just from the potassium in your body). At least 98% of those disintegrations are taking place within your cells and are potentially capable of altering the cell's DNA.

In fact, your own body irradiates your workmates and family members with ionizing radiation, at a rate that is just one fifth that the average US citizen receives from radon every year (when we express the exposure as “dose” in mrems per year). In fact, the person who will sit next to you today, (and who sat next to you on that train or bus or office or school when you were 12 years old) is/was also irradiating you!

Cosmic radiation pours down upon the Earth. Every second, some 2,000,000,000,000,000,000 high energy protons (each greater than one billion eVs) are incident upon the earth. A single high-energy proton may give rise to hundreds of millions of secondary particles including electrons, muons, photons and even neutrons.

This coming Sunday, the Denver Broncos will play the Indianapolis Colts at the location of the old “Mile High Stadium.” As fans watch the defeat of the Colts, they will receive approximately 60 μ R of cosmic radiation during the game. Those fans who fly in (and back) will be awarded an additional 30 μ Sv for their efforts.

So why focus on radon? (A question once eloquently pursued in depth by Bernie Cohen in Nature magazine). Answer: Because John Q Public has been the recipient of a marketing campaign about radon but nobody told him about all the other carcinogens to which he is



similarly exposed every second of every day of his life, and therefore, he naturally focuses on radon.

Carbon monoxide is in our homes and in the outdoor air you breath every second – yet, we are mostly unaffected since that high toxic invisible gas is present at a level that is below the toxicological “No observable adverse effect level” (NOAEL).

Asbestos is in our daily life at concentrations below the NOAEL; benzene is in our daily life at concentrations below the NOAEL; PAHs are in our daily life at concentrations below the NOAEL; as are mycotoxins, nickel, and an whole host of carcinogens. As is radon. Radon is present in our daily life at concentrations below the NOAEL (even at concentrations well above the EPA recommended action level of 4 pCi/L).

So why doesn't John Q Public test for benzene in his home and install a “benzene mitigation system” or test his home for asbestos and install an whole-house HEPA filtration system to keep the asbestos from the outside air from entering his home? Why is he concerned about radon at levels that are below the NOAEL, but not concerned about benzene or asbestos or PAHs or nickel or other carcinogens that are also present in his home at concentrations below the NOAEL?

Answer: Because there is no “benzene mitigation” industry (yet). Why is there a “radon mitigation industry”? Consider this: the U.S. EPA is a Civil Authority with a \$7.9 BILLION dollar budget and 15,200 employees (that is a lot of mouths to feed). Now, if, tomorrow, you were hired to run a large company with a \$7.9 US BILLION dollar budget and charged with ensuring pay-role was met for 15,200 employees, to what lengths would you go to protect your job, that company and its budget?

And what about the Tier-Two economy of the radon mitigation industry that you would personally impact if you ran the EPA? According to the SNM Committee On Radiobiological Effects Of Ionizing Radiation, the societal cost of testing and mitigation at the EPA recommended level was estimated at 44.5 **billion** dollars (1991), and that cost would rise to **101.2 billion** dollars if Civil Authorities lowered the action level to 2 pCi/liter. Even at the NCRP action level, 8 pCi/liter, the cost is estimated at approximately **15 billion dollars**.

If we look at Loss of Life Expectancy expressed in days, we see that for the average US male, merely being male vs. female results in a LLE of 2,800 days - radon is only 35 LLE days (if we use the wildly exaggerated EPA risks that are not supported by science); being unmarried vs. married is 2,000 LLE; even something as familiar as all deaths from falls is higher than the LLE for residential radon exposures.

In the final analysis, all human males are born with cancer – if we survive the onslaught of the years, we will ultimately die from prostate cancer that will aggressively metastasize; it is sort of God's “safety net” to catch the luckiest of those who would otherwise survive life. Most males simply succumb to death in a different manner before that happens.



I have two forms of cancer; one is quite innocuous, and the other a little more aggressive. This is one of the many prizes one is awarded for living a long life. In my case, although I have been a chemist and worked around powerful carcinogens for some 40 years, the cause of my cancer is probably due to the fact that I chose my grandparents unwisely.

Our Lord God, in His glory and magnificence, has endowed us with beautifully designed bodies, equipped with elegantly performing physiological systems. The incredible balance necessary to maneuver the delicate dance between life and death on a daily basis is a testimony to God's greatness and foresight. And yet, at some point, we are all called home, one way or another.

Pondering all this, tonight, I will have a glass of beer (800 pCi/L total alpha) and, hopefully, a cigar.

Perspective...Perspective...Perspective

