Throwing Cold Water on Hot Tea… and Other Cancer Myths

Cancer cause and cure headlines can often be confusing or misleading.

March 28, 2019 By Tu Salud Staff

By Liz Highleyman (Science Editor, Smart + Strong)

One of the goals at our sister publication Cancer Health is to help readers make sense of the constant stream of cancer-related news, which is sometimes confusing or downright misleading. And apparently people would welcome a sort of Snopes for cancer. Two of our most popular articles are a debunking of a purported cancer cure (some activity in mice, but nowhere near ready for prime time) and a closer look at a possible cure for human papillomavirus (effective against HPV-related cervical precancer, but unclear if it's active against the virus itself).

In my HIV/AIDS work, we often see conspiracy myths, such as the idea that the government created the virus or that a cure exists but the pharmaceutical industry is suppressing it. In the cancer arena, myths or overblown claims usually involve either causes or potential cures.

Often causal claims arise from a grain of truth or from inconclusive research. There is much we still don't know about how cancer develops. It's often related to cell damage, whether from hereditary genetic mutations, exposure to environmental triggers or simply random DNA changes that accumulate over a lifetime. But it's difficult to trace a specific case of cancer to a particular risk factor.

Take the recent headlines about hot tea causing esophageal cancer. It makes sense that repeatedly burning cells in the esophagus could be harmful. But what does the news mean when it comes to your morning cup of Earl Grey or evening oolong?

As is often the case when cancer news hits the mainstream media, the tea study was touted in a press release, this one issued by the medical journal publisher Wiley.

The news concerned a prospective study done in Iran and published in the International Journal of Cancer Research. Farhad Islami, MD, PhD, of Teheran University and the American Cancer Society, and colleagues followed more than 50,000 people for a median of 10 years. During follow-up, 317 new cases of esophageal cancer were identified. People who drank 700 milliliters per day or more of tea at a temperature of 60°C or higher had a 90 percent greater risk of esophageal cancer. People who reported a preference for very hot tea and those who drank tea more quickly after

pouring it were more likely to develop this cancer.

In more typical American terms, that's at least three cups of tea at 140°F. According to the thermostat on my hot water kettle, 110°F is lukewarm, 135°F is a pleasant drinking temperature and 150°F is tongue-burningly hot. Water heated to boiling (212°F) cools down to drinking temperature within about 10 minutes, which would be faster if I added milk. Take-out coffee is reportedly served at around 180°F or less, as a result of the infamous 1994 case in which a woman sued McDonald's after she was severely burned by coffee served at up to 190°F.

A sustained temperature of 140°F is only likely if the water or brewed tea is kept on a heating element, such as a samovar. Past research found an increased risk of esophageal cancer associated with mate, a brewed beverage popular in South America that is traditionally consumed very hot using a metal straw.

In 2016, a working group for the World Health Organization's International Agency for Research on Cancer warned that drinking coffee, tea, mate or other very hot beverages—hotter than 65°C or about 149°F—is "probably carcinogenic to humans."

Commenting on the latest study, Islami remarked: "Many people enjoy drinking tea, coffee or other hot beverages. However, according to our report, drinking very hot tea can increase the risk of esophageal cancer, and it is therefore advisable to wait until hot beverages cool down before drinking."

Or, as a UK Daily Mail headline advised, "Put milk in your tea to fight off cancer."

Here's a roundup of this week's cancer news:

https://t.co/f9YzadQ8lU pic.twitter.com/uq0XtvUF2b

— Cancer Research UK (@CR_UK) March 23, 2019

Evaluating Cause and Cure Claims

When evaluating cancer claims, ask whether causal studies involve cells in a petri dish, mice or actual humans. Laboratory and animal studies can give useful clues but don't necessarily carry over to people. Also consider the amount of exposure. Are the rats being fed a larger amount of artificial sweeteners or being exposed to a higher level of electromagnetic radiation than would ever likely occur in real life?

Likewise with cure claims. A substance that kills cancer cells in the lab or shrinks tumors in mice may not work in humans. Or it may be too toxic. In fact, only around 10 percent of drug candidates that enter clinical trials after lab and animal studies ever complete the process and gain Food and Drug Administration approval, with an even lower success rate for cancer therapies, according to a

recent MIT study. Plus, cancers are highly variable and approved medications usually don't work for everyone or for all cancer types. Be wary of claims that something cures all types of cancer or does so without side effects.

The tea story provides a good example of how using relative risk instead of absolute risk can exaggerate the danger—though both are accurate. Which sounds scarier: "The risk doubled" or "the risk went from 1 in 10,000 to 2 in 10,000"? In this study, although the relative risk rose by 90 percent, a total of 317 cases of esophageal cancer among more than 50,000 people over 10 years is still a very low risk. Cancer Research UK offers a useful explanation of absolute versus relative risk here.

Incomplete understanding of statistics can have real-world ramifications, as seen in recent legal cases involving talc baby powder and RoundUp pesticide. Jury members may be swayed by sympathy for sick plaintiffs even if there's little evidence of a direct link between a product and specific cases of cancer. And, of course, pre-existing political biases about government or big corporations can have an influence.

Check out our slideshow on 5 Things That Cause Cancer...and 5 Things that Probably Don't. Some of the "don'ts" have been well studied with little or no evidence of an apparent link and others—like wearing bras—have no plausible biological mechanism. But the picture is less clear regarding radiation from cells phones and wireless headphones. We say "probably" because the science is always evolving.

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