

# World view



By Vinay Prasad

## Our best weapons against cancer are not magic bullets

**Better health and social policy would save more lives than sophisticated drugs.**

**E**arlier this month, the American Cancer Society announced its latest figures on cancer incidence and mortality (R. L. Siegel *et al. CA Cancer J. Clin.* 70, 7–30; 2020). These included the largest drop ever observed in national cancer statistics, which several media outlets seized on. Cancer death rates in the United States peaked in 1990, and in 2008–17 fell by about 1.5% per year. Between 2016 and 2017, the drop was slightly larger: 2.2%. This is undeniably good news.

But our optimism must be tempered by other measures of population health – particularly declining life expectancy.

The reason behind the large drop is a decrease in mortality for lung cancer – without lung cancer, the rate is still about 1.5%. Several reactions to the Cancer Society's news heralded advances in precision treatments. Yet much of the continued reduction in mortality is due to the lower incidence of lung cancer, or a reduction in new cases per year. And new drugs cannot cause that. The two major therapeutic advances for treating this cancer – genome-targeted therapies and immunotherapy – are currently approved for the worst-off individuals: those with advanced or metastatic disease.

Exciting technologies that uncover genetic drivers of cancer and unleash the immune system against it make headlines, but I think we must be careful not to give customized treatments too much credit, and I have been outspoken about my work to pin down the impact of these therapies. We would do better to focus on public-health strategies that are less glamorous.

My colleagues and I have estimated that, as of 2018, 8.33% of the US population with advanced cancer was eligible for genome-targeted therapy, up from 5.09% in 2006 (J. Marquart *et al. JAMA Oncol.* 4, 1093–1098; 2018). Another work found that people whose lung cancers are eligible for genome-targeted treatments and who receive them live, overall, about 30 weeks longer than those who are eligible and are not treated (G. Singal *et al. J. Am. Med. Assoc.* 321, 1391–1399; 2019). That benefit is real, but is unlikely to have altered mortality rates markedly across a population.

Similarly, immunotherapy – which expanded into the market in 2015 – might have had only limited effects on the drop in overall cancer mortality. The benefits for melanoma and for advanced and metastatic lung cancer are impressive, but so far affect relatively few people.

Much bigger drops in US cancer mortality would come from a fairer society. The American Cancer

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Society estimates that, in 2014, 59% of lung-cancer deaths observed in people aged 25–74 could have been averted by eliminating socio-economic disparities (R. L. Siegel *et al. CA Cancer J. Clin.* 68, 329–339; 2018).

What's more, US life expectancy has fallen for three straight years. The cause is largely diseases of despair: drug overdose, suicide and alcohol-related liver disease. And these kinds of risk factor cluster. People who die from using opiates are more likely to smoke, for instance. The American Cancer Society uses age-standardized populations to address concerns that a rise in untimely deaths could mask what would have been future cancer deaths and thus spuriously improve cancer death statistics, but it is hard to know exactly how factors behind declining life expectancy play into cancer mortality.

The data do make it clear that the majority of our most effective solutions will be found outside the cabinet of cutting-edge medicines. If we want to do all that we can to reduce the burden of cancer and to improve life expectancy, we must harness the tools of population statistics.

That means we need to create strategies to treat hypertension, end the use of tobacco products, dismantle policies that promote obesity and use of environmental carcinogens, encourage physical activity and reduce levels of carcinogens in the environment. In my cancer clinic, I often wish I had more effective drugs for the person in front of me. I, too, want sophisticated treatments that work. But what I really wish is that the person I'm treating did not have cancer at all.

Our public policy is a series of self-inflicted wounds. The current US administration has allowed loopholes that let the known carcinogen asbestos remain in use. It has failed to improve standards for airborne particulate pollution, clearly linked to higher rates of diseases and death. It reversed a decision to ban a pesticide, chlorpyrifos, associated with impaired childhood brain development, and atrazine, linked to leukaemia.

My deep frustration is this: it is hard to escape the conclusion that we, as a society, are not doing what it takes to maximize our health. We are prioritizing medications that cost US\$100,000 a year or more, and at the same time are loosening restrictions on environmental pollution. These policies have one thing in common: they enhance corporate profits. It will take a realignment of public policy to make sure that we pursue systems that instead prioritize health.

Public-health policies are not personalized to any individual, but can promote longevity for all of us, even if it will not make for feel-good stories about scientific breakthroughs or miraculous drugs. In this exciting age of precision medicine, we will reap the biggest gains by celebrating better health for everyone.