Think globally about cancer

Cancer surveillance programs have reported a global downward trend in cancer mortality rates for most common tumor types. However, startling geographic inequalities exist, and some cancers continue to pose a challenge. Ensuring global access to high-quality diagnostic and treatment approaches is needed to make decreasing cancer deaths a more widespread trend.

In January, the American Cancer Society released the results of its yearly cancer surveillance analysis, which revealed a continuing decline in cancer mortality rates in the United States (*CA Cancer J. Clin.* **69**, 7–34, 2019). Results from the report were in line with trends described in the last CONCORD3 worldwide surveillance program, which included data on millions of patients across more than 70 countries between 2000 and 2014 and encompassed 18 different cancer types that represent 75% of the global cancer burden (*Lancet* **391**, P1023–1075, 2018). As compared with previous population-based surveillance studies by the CONCORD programme, coordinated by the London School of Hygiene & Tropical Medicine, global metrics for this last surveyed period show that the 5-year survival is highest in most common adult cancers, including colorectal cancer (50–70%) and breast cancer (70–85%). These survival rates are considered to be the fruits of increased awareness, improved screening and prevention programs and better treatments (such as the dramatic increase in survival in HER2-positive breast cancer patients since trastuzumab was introduced in 1998).

However, the CONCORD3 study also highlights the finding that improvements in survival rates for most of these common adult cancers are markedly different in high-income countries as compared with less affluent regions. The picture is similar for pediatric cancers. Survival rates for children diagnosed with brain cancer or acute lymphoblastic leukemia (ALL) are within 80% in countries such as Denmark, whereas these rates remain below 40% for pediatric patients with brain cancer in Brazil. Such huge differences can be attributed in part to inequalities in access to cutting-edge therapies — which can often be cost-prohibitive for the overall population or be unaffordable to some national healthcare systems — and to a shortage of population screening programs in areas with more limited resources. Recently announced initiatives are expected to help breach such disparities. These include the effort by the United States Agency for International Development (USAID) and US.National Academies of Science to implement cervical cancer prevention programs in sub-Saharan Africa, and the campaign launched by United Kingdom's National Health System to bring mobile lung screening units to most deprived regions in that country.

An equally relevant issue that needs to be solved before strategies to bridge these persistent survival inequalities can be put in place is the lack of surveillance data for a large number of lower-middle- and low-income countries. Recent advances in leveraging the wealth of data collected from mobile technologies and wearable sensors have the potential to deliver reliable health readouts in real-time that can be harnessed to fill some of these information gaps. Similarly, the fast-paced implementation of artificial intelligence approaches in healthcare is enabling improved screening and early cancer detection procedures at affordable costs. Some examples include the application of computer vision for identifying skin cancer from mole photographs, which can be taken using a smart-phone camera (*Nature* **542**, 115–118, 2017), and enhancement of the diagnostic accuracy of malignant of pulmonary nodules imaged in routine diagnostic chest scans (*Sci. Rep.* **7**, 46479, 2017). Applications of machine learning in the field of liquid biopsies allowing for early detection of pancreatic, ovarian and other cancers based on cell free circulating DNA analyses (*Nature* **563**, 579–583, 2018) also holds promise in democratizing early diagnosis at lower costs. Although these studies have been so far performed retrospectively, they describe sensitive and cost-efficient approaches that, if confirmed in prospective trials and adapted to cost-efficient interfaces, have the potential to optimize the clinical management of patients with cancer and improve outcomes at a global scale.

Institutional policies and research efforts by the biomedical community are helping to reduce mortality from most cancers. However, there are still some tumor types for which tilting the scales remains difficult, regardless of geographical location. For example, survival rates have stayed flat since the late 1990s for ovarian cancer (30–50%) and adult brain cancer (20–40%; and under 10% in the case of glioblastoma), and also remain low for pancreatic cancer (5–15%). These cancer types present a tough challenge for doctors and biomedical researchers alike — due in part to biological hurdles that prevent the delivery of effective therapies. Ovarian or pancreatic cancers are rarely caught early because of a lack of screening strategies and vague symptoms that only become prominent at advanced stages when tumors have spread or are refractory to treatments, and so the need for early detection approaches in these tumor types is most urgent.

With cancer diagnoses increasing globally each year, it is essential that campaigns for prevention and early cancer detection are implemented, especially in resource-limited countries where cancer has more drastic effects on patients. Granting equal access to affordable high-quality care should bridge the gaps in global cancer survival. With the advent of innovative cost-effective technologies and improved treatment approaches, the hope is that declining cancer mortality rates will reach all corners of the globe. ❐

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