



In Uganda, families dealing with cancer find support from fellow patients in treatment clinics.

DEVELOPING WORLD

Global warning

Much of the world is ill-equipped to cope with its rising cancer burden and are pushing prevention and screening.

BY ERIC BENDER

In the villages outside Bangalore in southern India “there’s a lot of fear around cancer”, says social epidemiologist Suneeta Krishnan. “Women know other women who have breast cancer, or died of cervical cancer. They have little awareness that early detection can lead to good outcomes — and a feeling that they’d rather just not know, because they couldn’t afford treatment.”

The concerns noted by Krishnan, who works with RTI International’s Women’s Global Health Imperative in San Francisco, California, are common in the developing world, where prevalence of cancer is climbing rapidly. Experts are raising the alarm over an incoming tidal wave of diagnoses in low- and middle-income countries (LMICs) that will be met with health-care resources that are starkly limited at best.

Of the 14 million people diagnosed with cancer worldwide in 2012, more than 60% live in Africa, Asia and Central and South America, according to the *World Cancer Report 2014*; these regions also account for about 70% of the world’s 8 million cancer deaths¹.

Global cancer incidence is predicted to reach 25 million by 2032. The share of the burden borne by LMICs will almost certainly grow, say public-health experts, as populations expand, live longer and adopt the Western lifestyles that are associated with risks of numerous types of cancer (see ‘Driving demographics’). “As life expectancies go up, cancer goes up, and these countries are totally unprepared to deal with it,” says Mary Gospodarowicz, medical director of the Princess Margaret Cancer Centre in Toronto, Canada, and president of the Union for International Cancer Control (UICC) in Geneva, Switzerland.

Some nations have only a handful of oncologists, and doctors who leave to get trained in developed countries often stay abroad. Underlying these problems are severe limits on health-care funding. “Cancer care is a huge expenditure, and governments and private institutions universally are struggling to cover the costs,” says Corey Casper, co-director of the Uganda Cancer Institute/Hutchinson Center Cancer Alliance in Seattle, Washington.

The dearth of health-care resources in developing countries is compounded by fears and stigmas associated with cancer.

Public-awareness challenge number one is to dislodge the common conviction that cancer is an automatic death sentence.

In Latin American nations, women shy away from breast screening because they expect those diagnosed with cancer to die of the disease. “If they’ve only seen women die, they won’t run forward to getting a mammogram,” says Felicia Knaul, director of the Harvard Global Equity Initiative in Boston, Massachusetts.

Education campaigns must target not just patients or potential patients but also their families and the communities around them. One key is persuading men that the women in their families should get screened, because a wife, for example, may not feel free to take that step without her husband’s permission. “Men can be obstacles,” says Princess Dina Mired, director-general of the King Hussein Cancer Foundation in Amman. “We tell them that these are your daughters, your wives and your mothers, and you need to support them.”

In addition to calling for ramped-up access to screening, advocates around the world are also speaking up on the need for improved end-of-life pain control. “There is zero access to morphine in the poorest countries,” says Knaul. “The vast majority of cancer patients die in excruciating pain, and it isn’t really an issue of money.” Legal restrictions are often the cause; India is one of several countries that are thinking about easing constraints on the use of opiates in palliative care.

The successes of the global campaign against HIV/AIDS offer lessons. “Just as advocates acted up and spoke out on HIV, we need to act up and speak out on cancer and other chronic diseases,” says Knaul.

PREVENTION IS A PRIORITY

One-third of the deaths from cancer in LMICs are preventable, according to the World Health Organization (WHO). Measures to reduce exposure to carcinogens such as tobacco; boost vaccinations against infections that can cause cancer; and encourage healthy lifestyles that lower cancer risks can help to avert the rising tide of cancer in LMICs, says Gospodarowicz. “And if you can prevent a lot of cancers, hopefully you will have more resources to deal with the cancers that are not preventable.”

The WHO attributes just under one-quarter of global cancer deaths to tobacco, and the news on anti-smoking efforts is mixed. Encouragingly, 177 countries are implementing the WHO Framework Convention on Tobacco Control, says Hana Ross, head of international tobacco control research at the American Cancer Society in Atlanta, Georgia. The convention came into force in 2005 and offers a proven set of tools to reduce tobacco use, ranging from boosting health education and increasing taxation to establishing smoke-free zones and putting pictorial warnings on cigarette packages.

But putting the anti-smoking ideas into practice is another matter. “The battle is changing because of the strength of the tobacco companies, which can make it difficult to implement and enforce those provisions,” Ross says. In China, which has about 350 million smokers (including more than half of all males) and where the government owns the world’s largest tobacco firm, progress remains particularly difficult. Across Africa, as the population grows and people are increasingly targeted by marketing, “it’s going to be catastrophic”, she says.

Viral infections are another major contributor to cancer mortality. Up to 20% of cancer deaths in low-income countries arise from hepatitis viruses, which can cause liver cancer, or human papillomavirus (HPV), which is linked to cervical and other cancers. In recent progress against HPV, drug manufacturers are lowering the price of vaccines for low-income countries. Additionally, clinical trials have indicated that a single dose of HPV vaccine may offer the same level of protection against cervical cancer as the customary three doses², and is considerably easier to administer. Moreover, an unpublished phase III study showed that a Merck vaccine called V503 is effective against nine strains of HPV, with the potential to prevent about 90% of cervical cancers, as opposed to about 70% prevention from four strains covered by the company’s current vaccine, Gardasil.

UNIQUE CHARACTER

Some aspects of cancer in the developing world contradict conventional understanding of the disease, and researchers do not yet know why. Breast cancer provides an example. “Women in the developing world often get breast cancer at a much younger age and in a much more aggressive form than women in the developed world,” says Princess Dina. “These women marry early, have children early, breastfeed and probably don’t use birth control. Those are supposed to be factors that prevent against breast cancer, so why are they getting this kind of cancer?”

Another major puzzle is why the number of cancers that are driven by infections is so high in the developing world. Some causes are well-known, such as a dearth of the pap-smear tests widely used in the West to identify HPV-linked abnormalities before they develop into full-blown cancers. But others remain a mystery.

In one effort, the Uganda Cancer Institute/Hutchinson Center Cancer Alliance is studying how newborn babies acquire the infections that can lead to cancer. The work has found that viruses such as Epstein–Barr (associated with Burkitt’s lymphoma and other cancers) show up in almost all Ugandan children within the first two years of life and often can be detected for years afterwards, says Casper.

Cost-effective approaches to screening and diagnostics are also undergoing intense testing. For instance, a pilot programme in

Uganda, run by the non-profit organization Imaging the World in Naalya, has successfully trained local health workers to use rugged portable ultrasound machines to help detect breast cancer, according to Casper. Suspicious lumps are given fine-needle biopsies, which can be analysed by equipment that is already widespread in Africa for use in HIV care.

Elsewhere, work is examining the effectiveness of screening that can be done with locally available resources — such as visual inspections of the cervix after dabbing it with acetic acid. The approach is not as accurate as pap smears, but is much less expensive and demanding of expertise, and it means that abnormal cells can be immediately removed by cell-freezing methods. A randomized study³ of 150,000 Indian women indicated that the technique can cut cervical-cancer deaths by 31%.

Even if health care is available and affordable, front-line health-care workers in LMICs are often not properly trained to diagnose and treat cancer. And because of cultural norms, women in many countries may not permit a male doctor to examine them. As a result, the doctor may have no option but to make a diagnosis based on a woman’s description of her symptoms. This restriction is one of the reasons that a very high proportion of women arriving at major care centres already have advanced tumours that have never been examined by a health-care worker.

‘Twinning’ partnerships, in which health-care institutions in developed nations offer expertise to colleagues in developing countries,

offer a way to improve cancer care. The concept could also be applied within a country, with national and state centres working with smaller, local centres, Knaul suggests. Given proper training and supervision, it may be possible to complete certain drug treatments in the local centres, making cancer therapy practical for patients who live far from clinics. And the near ubiquity of mobile phones is making telemedicine more practical. “We have a mechanism to make sure patients don’t get lost in follow-up,” says Edward Trimble, director of the US National Cancer Institute’s Center for Global Health in Rockville, Maryland.

Trimble also points to promising early experiments using mobile phones to take images of tumours at remote locations and send them to oncology specialists. This approach could aid in diagnosing the eye cancer retinoblastoma, for example, and apps are being developed to help diagnose other types of cancer as well. “There aren’t any apps that have been shown to be 100% effective around the world, but this is an important area of research,” says Trimble.

SETTING GLOBAL GOALS

The worldwide conversation about cancer is changing, says Tezer Kutluk, a paediatric oncologist at Hacettepe University’s Faculty of Medicine in Ankara. Since it became the leading killer worldwide in 2011, “cancer is more and more on the agenda of LMICs, and its priority is increasing,” he says.

On a positive note, he adds, the WHO, governments, public and private institutions, and other stakeholders are learning to work together more efficiently on both cancer and other non-communicable diseases — one example being the UICC’s global public-awareness campaign held each year on World Cancer Day.

Given predictions of an incoming wave of cancer cases in LMICs and in view of the constraints on resources, “there’s a lot of controversy and a lot of effort right now to find the best buys for LMICs to invest in”, says Gospodarowicz. “You need to have all the pieces in the puzzle for cancer control.”

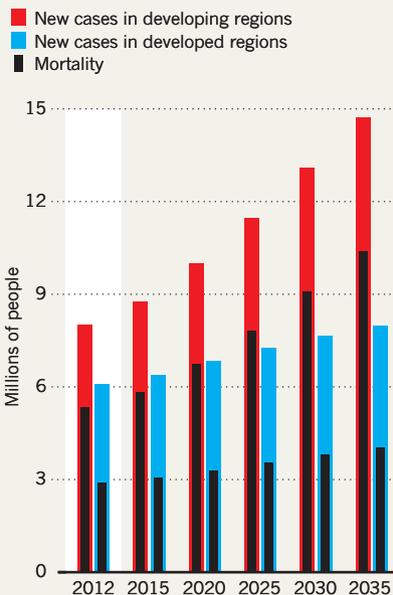
The quest to solve this puzzle, she says, is accelerating the demand for evidence of the most effective and efficient ways to control cancer — and the demand to share the results of that science globally. “The world is now thinking not just about developing new cancer drugs or X-ray machines or other technologies but about how to actually apply them,” she says. “That’s a very exciting development.” ■

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1. Stewart, B. W. & Wild, C. P. (eds) *World Cancer Report 2014* (IARC, 2014).
2. Safaeian, M. et al. *Cancer Prev. Res.* **6**, 1242–1250 (2013).
3. Shastri, S. S. et al. *J. Natl Cancer Inst.* **106**, dju009 (2014).

DRIVING DEMOGRAPHICS

The number of people who will develop and die from cancer is predicted to climb more steeply in developing countries than in developed nations as populations grow and age. Lifestyle changes, such as Westernization, are likely to boost the numbers further.



SOURCE: WHO