

organisation and economic determinants of health care, are deemed to increase inter-country variations in access to radiotherapy. The European Society for Radiotherapy and Oncology's Health Economics in Radiation Oncology (HERO) project³ was launched in 2011 with the overall aim of developing a knowledge base and a model for health economic evaluation of radiation treatments at the European level. The data collection and analyses accomplished so far have not only made explicit the huge variations in radiotherapy availability and related key parameters,^{4,5} but also shown that, even in Europe, the actual use of radiotherapy is substantially lower than the optimum use predicted from evidence-based estimates. Less than a fifth of included countries treat at least 80% of the optimum radiotherapy indications and about half remain substantially less than 70%.⁶

Part of this variation can surely be traced back to the differences in wealth among the countries—a higher gross national income typically translates into better resource coverage. But geographical impediments to access; the health-care financing structure of the country; patients' characteristics including age, comorbidity, socioeconomic status and personal opinion; and the physician's preferences, awareness, and knowledge all have roles in referral to, and acceptance of, radiotherapy.

Although education and clinical science dissemination are the foundations needed to empower the radiotherapy community to take up its full potential in the multidisciplinary oncology arena,

there is much more to be done. To achieve the goal of providing the right treatment to every patient, an even greater emphasis is needed on health services research. The European Society for Radiotherapy and Oncology is responding through its HERO project, which mainly helps European national radiotherapy societies to strengthen the profession in their respective countries. On a global level, we are happy to support the work of the GTFRCC, which enables countries worldwide to estimate the radiotherapy investments that are imperative to provide effective and efficient multidisciplinary cancer care.

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Radiotherapy in southeast Asia: room to grow

The Lancet Oncology Commission on global access to radiotherapy¹ is prescient work that should become required reading for all who have influence in national health-care systems. Despite nearly 120 years of effective use in cancer treatment and demonstrable cost-effectiveness,² the Commission's findings show that substantial numbers of patients with cancer are unable to access correct treatment because of inadequate radiotherapy resources. This deficit is clearly in evidence in many regions of the world, including southeast Asia, which covers roughly 4·3 million km², is home to 625 million people, and has a gross domestic product

of US\$2·5 trillion. Of the nations, two (Brunei and Singapore) are high-income countries, two (Malaysia and Thailand) are upper-middle-income countries, five (Burma, Indonesia, Laos, Philippines, and Vietnam) are lower-middle-income countries, and Cambodia is a low-income country.

Southeast Asia's gross domestic product has grown by 5–5·5% per year over the past 15 years.³ Central to sustained economic improvement is a stable political sphere with good governance. To bring about improvements in health care, including cancer care, strong governmental actions are needed to channel

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some of the fruits of economic growth towards the development, resourcing, and operationalisation of health-care plans. Furthermore, health-care plans must be supported by good plans and policies in general education and professional training, reliable infrastructure in transport and utilities, and a rational health-funding policy to ensure equitable access and sustainability. Each of these presents unique challenges to the region.

The needs and challenges for each country in southeast Asia are varied. Difficulties in access to radiotherapy centres are typical in a region where large rural populations exist. This issue is particularly obvious in Indonesia, which is an archipelago of roughly 17 500 islands, more than 900 of which are permanently inhabited. The country stretches more than 5000 km east to west, but the vast majority of its 24 radiotherapy centres are located in Sumatra and Java in the west.⁴ Expansion of capacity tends to occur in large cities, compounding this inequality. In parts of southeast Asia, frequent power-grid failures can lead to treatment interruptions and machine downtimes (particularly with linear accelerators, which need a stable supply of electricity), further complicating the issue of inadequate capacity and highlighting the need for improved infrastructure.⁵

In terms of increasing machine capacity, to achieve the widely accepted—albeit crudely estimated—figure of four megavoltage machines per 1 000 000 population, the region has a deficiency of about 2230 machines.

Governments need to spend their health budgets in such

a way that this deficit is reduced by investing in the most suitable equipment that gives the best outcomes at a population level. The priority must be to treat patients who would otherwise die because of inaccessibility to treatments that are too expensive either because of physical distance to a centre or because the high costs of buying unnecessarily advanced machines are transferred to the patient. In this regard, world bodies such as the International Atomic Energy Agency could issue guidance for a set of optimum specifications for equipment with the aim of helping governments in the region to set up cost-effective centres that address the particular issues of those countries.

Equipment availability and access are only parts of the equation. An adequate and trained workforce is also a challenge to recruit in this region. It would take years to train the additional 700 radiation oncologists, 500 radiation physicists, and 1800 radiation technologists required to run centres in southeast Asia safely and effectively. The difficulties of attracting and retaining capable staff are accentuated by a global demand for such personnel, and the poor salaries in the region. In small nations, such as Brunei, the small size of yearly cohorts of students makes the development of local education programmes not cost effective. Recruitment from out of country thus becomes the main solution. Although these issues seem intractable, there is hope that increasing wealth at the personal and national levels will generate improved awareness among the public and health-care leaders, leading ultimately to the development of more robust cancer services, including radiotherapy.

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