

GROWING DEMANDS TO FIGHT CANCER IN LOW- AND MIDDLE-INCOME COUNTRIES: THE RESPONSE FROM IAEA'S PROGRAMME OF ACTION FOR CANCER THERAPY (PACT)



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In this article, the authors review the key drivers for increasing demand for technical support on cancer control from low- and middle-income Member States to the UN system in general, and the IAEA in particular. It will further elaborate on IAEA's Programme of Action for Cancer Therapy's (PACT) main products and services and how they are having a positive impact on assessing national capacities and needs, supporting Member States in identifying key priority interventions and translating them into action through the IAEA Technical Cooperation Programme. This article will also address innovative approaches on distance learning and international collaboration to increase the quantity and quality of oncology-related human resources. The article will also share recent developments from the IAEA's Advisory Group on increasing Access to Radiotherapy Technology (AGaRT) and how the outputs generated are expected to facilitate the establishment of sustainable radiotherapy services in low- and middle-income countries. It will further provide an overview of existing coordination mechanisms within the UN system and with other global initiatives to address cancer control comprehensively and increase dedicated cancer control resources at the global level.

Historically, cancer has been a larger burden in developed countries than in developing countries. Due to demographic evolution and life expectancy improvements, cancer is currently affecting the lives of more and more people in low- and middle-income countries (LMICs). The International Agency for Research on Cancer (IARC) estimates that by 2030, over 21 million people will be diagnosed with cancer and 13 million will die from the disease every year – a huge contrast to the 7.4 million deaths attributed to cancer in 2004. It is projected that the increase in cancer incidence by 2030 (compared with 2012) will be greater in less developed regions (63%) than in more developed regions (26%) (1). Although the rates of cancer in LMICs remain lower than in industrialized countries, this rise of new cancer cases and deaths in LMICs should not be

underestimated especially given the positive results in mortality reduction that some countries have already achieved (2).

As a consequence of the epidemiological transition in LMICs and the rise of cancer and other noncommunicable diseases (NCDs), such as cardiovascular diseases, chronic respiratory diseases and diabetes, related incidence and mortality, governments agreed on a bold set of commitments to address the global burden and threat of NCDs as one of the major challenges for development in the twenty-first century at the UN high-level meeting of the General Assembly on the prevention and control of NCDs in 2011. The Political Declaration on NCDs generated at this high-level meeting acted as a key driver for global action on cancer and challenged governments to establish relevant

national policies and plans. Further drivers for raising awareness and global commitment to fight cancer in LMICs include the Global Action Plan for the Prevention and Control of NCDs 2013–2020, endorsed by the 66th World Health Assembly in May 2013, and the World Health Organization (WHO) Global Monitoring Framework, agreed by consensus at a formal meeting of WHO Member States in November 2012. The Global Action Plan establishes cost-effective and affordable interventions on NCDs, including cancer, – the “best buys” – for all Member States and the Global Monitoring Framework sets nine voluntary targets and 25 indicators to monitor the global action on NCDs.

These political declarations and high-level commitments are built on a decade of significant efforts from the international community, civil society and governments on building awareness on cancer control in LMICs. As a result, an increasing number of countries are approaching the UN system with requests for technical support to strengthen capacity in cancer control. WHO is the international agency within the UN system responsible for health and provides leadership and advice on the evidence-base for international action on prevention and control of NCDs, including cancer. Additional UN agencies have been actively involved in supporting LMICs. This is the case of the International Atomic Energy Agency (IAEA), that acts under its mandate to “accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world” (3). The IAEA approach is predicated on the fundamental role that radiation medicine plays in cancer diagnosis, treatment and palliative care.

The global efforts for building awareness on cancer prevention and control in LMICs – including civil society and government involvement in information and early detection campaigns – have led to higher demand for effective and quality cancer diagnosis and treatment services, in which the IAEA provides unique support and expertise.

The Programme of Action for Cancer Therapy (PACT)

The IAEA through its Technical Cooperation (TC) and Human Health (NAHU) Programmes has been providing support for the enhancement of radiation medicine capacity for cancer in LMICs for the past 40 years. Over the past four decades, the IAEA has delivered cancer-related assistance totalling more than US\$ 260 million to low- and middle-income Member States, with financial and in-kind support from Member States, donors and partners. The IAEA assistance has been primarily facilitated through the procurement of equipment and training the workforce in imaging diagnosis,

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nuclear medicine and radiotherapy. Currently, the IAEA supports over 130 projects in cancer diagnosis, management and treatment.

Building on the evidence that a substantial burden of cancer can be prevented and cancer mortality can be significantly decreased if the provision of adequate treatment services and early detection of cancers are addressed simultaneously, different approaches designed to actively prevent, cure or manage cancer have emerged. These approaches are best known as cancer control and range from prevention through early detection, diagnosis and treatment to palliative care.

In view of the above, the IAEA created the Programme of Action for Cancer Therapy (PACT) in 2004. PACT's objective is to build strategic partnerships with pre-eminent organizations, such as WHO, IARC and the Union of International Cancer Control (UICC) in order to leverage the effectiveness of radiation medicine services in LMICs by integrating them within a comprehensive cancer control approach. Through PACT, the IAEA is combining its expertise in radiation medicine with the experience of WHO and other international partners to deliver comprehensive cancer control to the places that need it most.

Assessing the need and targeting support to priority areas

WHO recommends that planning in cancer control should start with a needs assessment of all aspects of the cancer continuum in the country, in order to implement evidence-based strategies adapted to the country's specific context (4). In line with this principle, the IAEA through PACT offers its Member States a tool, known as integrated mission of PACT (imPACT Review), to assess the status of cancer control plans and activities and the readiness to develop and implement a long-term radiation medicine infrastructure and capacity-building plan (5).

The imPACT Review is a unique tool to deliver a comprehensive analysis of a country's capacity in cancer control, with multidisciplinary expertise in the areas of cancer control planning, cancer registration and information, prevention, early detection, diagnosis, treatment, palliative care, radiation safety and civil society's role in cancer control.

The imPACT Reviews are truly multi-stakeholder as well as multi-disciplinary missions. To date, IARC has been involved in more than 60% of all imPACT Review Missions and WHO (at regional and country levels) in more than 80%. While the IAEA provides expertise in radiation diagnostics, nuclear medicine, radiotherapy and radiation safety, the WHO and IARC nominate experts to cover the areas of cancer control planning, prevention, early detection and palliative care. Regional expertise is favoured to enable exchange of practical knowledge among professionals from similar resource settings and to promote linkages and potential partnerships between regional institutions. Other partners in this effort have included UICC and the United States National Cancer Institute (US–NCI), among others.

The missions are undertaken at the request of the Minister of Health and provide the Minister of Health with recommendations for strengthening a national cancer control programme. The mission's findings and recommendations of this joint needs-assessment assist countries, the IAEA, partners and potential donors to identify areas of support and specific projects to respond to these needs in an effective and coordinated manner. Within six months of receiving the imPACT Report, an official response from the Ministry of Health to the IAEA is usually received, endorsing the recommendations and/or requesting additional support for follow-up actions based on the mission's findings. The IAEA seeks to ensure that investments in radiation medicine are integrated within a comprehensive cancer control approach. Findings and recommendations of the imPACT Reviews inform future cancer-related technical cooperation projects.

Since the creation of PACT, national cancer control capacities and needs have been assessed in 70 countries through an imPACT Review (Fig. 1). Out of those, five countries received a preparatory PACT mission to cover a specific area(s) of the cancer control continuum. These missions are generally composed of an expert or a small expert team intended to support the national counterparts in the preparation for the imPACT Review. The imPACT Review expert team is usually composed of five medical and public health specialists covering different areas of cancer control. As of 2015 PACT is starting to offer an imPACT

Phase II Review to the countries which had an imPACT Review more than five years ago. The goal of the imPACT Phase II Review is to assess progress made since the first mission as well as to look at capacities and needs, especially in geographical areas which were not part of the original assessment.

Increasing human resources for cancer control

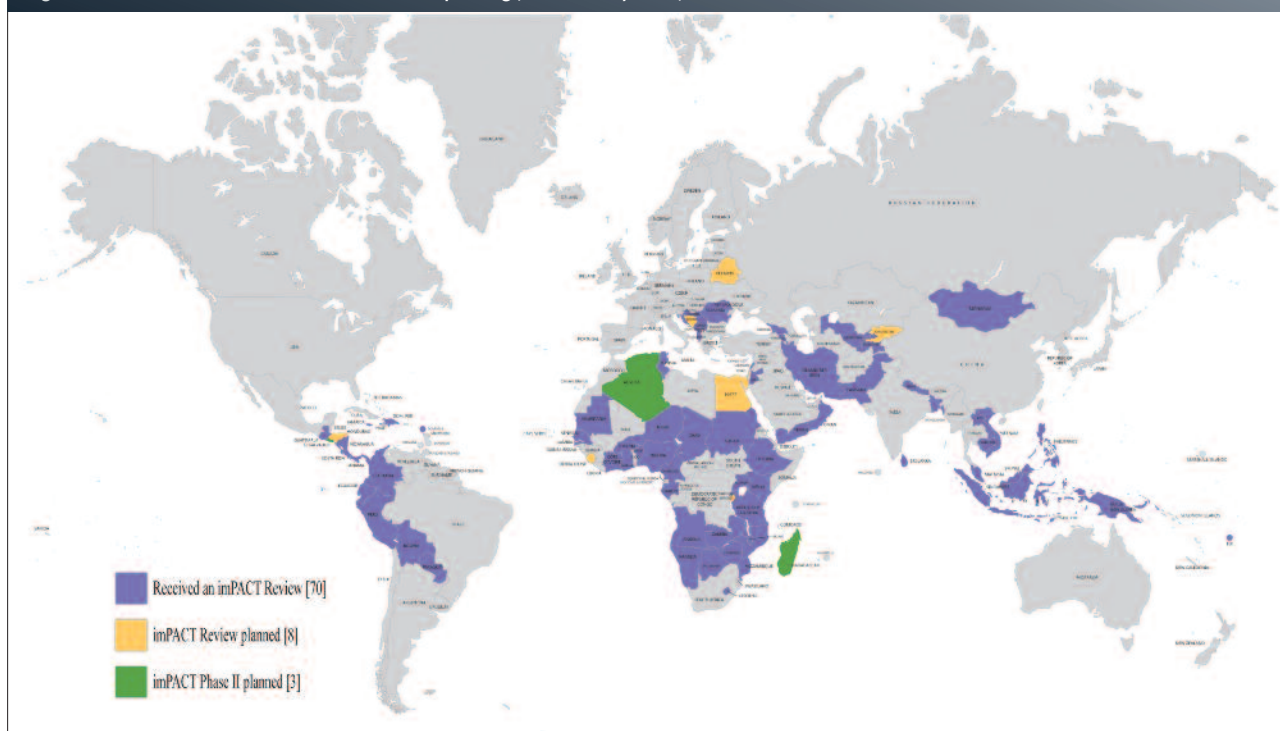
As is widely recognized, a critical barrier to providing cancer care in LMICs is the profound shortage of health professionals. According to WHO, 57 countries worldwide are experiencing a critical shortage of health professionals, including 36 in sub-Saharan Africa. In order to achieve sustainable cancer control capacity in developing countries, and in Africa in particular, it has been recognized there must be a dramatic surge in the number of professionals trained locally or regionally across the various areas of cancer control. Additionally, measures must be put in place to strengthen local recruitment and ensure retention of graduates from national training programmes.

Local capacities to train and mentor practitioners across many regions in Africa, Asia, Latin America and Europe are largely insufficient to ensure the implementation of sustainable cancer control programmes and counter the effects of medical migration, otherwise known as “brain-drain”. Combined with a lack of financial resources, the dearth of training opportunities has resulted in a deficiency of trained professionals in health care, which is often particularly acute in cancer diagnosis and treatment. This has significant implications for cancer patients requiring care in many LMICs, where oncology services are scarce or completely unavailable.

To address LMICs' cancer workforce shortage, PACT launched an initiative in 2010 to establish a Virtual University for Cancer Control (VUCCnet). Established in collaboration with WHO, IARC, UICC, US–NCI and the African Organisation for Research and Training in Cancer (AORTIC), the project seeks to support and enhance national programmes to build human resource capacity in cancer control. VUCCnet is building a web-based, e-learning platform to make educational materials more easily accessible for trainees; and is further aiming to establish training and mentorship networks.

In the pilot phase of the project, Ghana, Uganda, United Republic of Tanzania and Zambia comprise the initial cadre of first-phase countries. The Republic of South Africa and Egypt have agreed to operate as mentor countries to the project, as both have considerable educational capacity and can provide access to institutions focused on training cancer

Figure 1: imPACT Review Missions conducted and pending (as of January 2015)



professionals. A French-language segment of the project is expected to be launched at a later stage.

Since the project's inception, a number of milestones have been achieved. Three courses have been developed and uploaded to the e-learning platform, including "Cervical Cancer Prevention and Early Detection", "A Cancer Skills Package for Community Health Workers" and "Palliative Care". Since January 2014, 500 students across the pilot countries have accessed these courses on the VUCCnet platform. Additional courses are in development, and the initial full curriculum is anticipated to be comprised of 10 modules spanning the cancer control continuum.

In terms of governance, the six pilot countries have agreed to adopt an intergovernmental legal framework to establish VUCCnet as a standalone, Africa-based regional entity. Five of the states agreed to formally request the Government of Uganda to host the VUCCnet Secretariat. Uganda has indicated that it will support the implementation of the intergovernmental agreement across the six founding countries.

Upon completion of the first phase of the project and handover to the relevant countries, it is envisioned that VUCCnet will have a governance structure that will be implemented through coordination among participating countries within the region. This coordination mechanism is expected to provide an opportunity to harmonize regional policies for health-care credentials and facilitate

standardization of the path that aspiring African health professionals must take to reach certification.

In addition to the VUCCnet initiative, PACT is also active in providing and facilitating training for health professionals. In many cases, the human resource and training needs identified through the imPACT Review process have led to targeted and specific training for relevant professionals in LMICs. In collaboration with partners such as the Korea Institute of Radiological and Medical Sciences (KIRAMS) and the US-NCI partnerships, more than 150 health professionals from around the globe have received cancer-related training in LMICs through PACT. This falls under the broader framework of the IAEA's training programmes in the fields of cancer control, radiation oncology, nuclear medicine and dosimetry. Over the last ten years through its Technical Cooperation Programme, the IAEA has trained over 3000 fellows in these subjects.

Addressing shortages in radiotherapy technology through development of radiotherapy equipment packages for resource-constrained settings

The availability of efficient cancer treatment is a crucial element of any comprehensive national cancer control programme as an important proportion of the reduction in mortality is attributable to treatment alone. Radiotherapy has a key role in cancer treatment, either alone or in combination with the other major cancer treatment

modalities (surgery and chemotherapy), both for cure and palliation. Furthermore, radiotherapy is fundamental to the optimum management of many common cancers and is recommended for roughly 60% of the cancer patients as part of their treatment.

According to the IAEA estimates, currently there are over 30 countries in the world without a single radiotherapy service, most of these in sub-Saharan Africa. In some countries, even if radiotherapy services are available, they are insufficient to meet the level of need. In addition, economic, geographic and administrative barriers can further undermine timely and efficient treatment. Inadequate staffing, acquisition of unsuitable equipment, and poor equipment maintenance can also leave cancer patients without proper access to treatment.

To address the shortfall in radiotherapy technology in LMICs, PACT created the Advisory Group on increasing access to Radiation Therapy in LMICs (AGaRT) in 2009. AGaRT acts as a neutral facilitator to bring together radiotherapy users in LMICs and major radiotherapy equipment manufacturers, to encourage the dialogue that ensures that the unique radiotherapy service requirements of LMICs are met by the technology available.

Under the first five-year cycle of the AGaRT (2009–2014), the Group primarily focused on three major aspects of access to radiotherapy technology: affordability, sustainability and suitability.

Affordability

To make radiotherapy technology more accessible, AGaRT has been developing a basic radiotherapy equipment package for LMICs that can be sold and maintained at a lower cost, without sacrificing safety or quality. In autumn 2014, the main components of the package have been identified and incorporated into the guidelines for the IAEA Member States as a foundation for a basic radiotherapy clinic.

Sustainability

The AGaRT has recommended the development of provisions for “whole of life” support packages from radiotherapy technology suppliers that would ensure affordable functionality for the entire life cycle of equipment, thus increasing the sustainability of radiotherapy technology in LMICs. These provisions were reflected in the Long-Term Functionality Guidelines (LTFGs), adopted by the Group.

The LTFGs aim to support LMICs embarking on the process of establishing and/or expanding their radiotherapy

services. The document is therefore recommended by AGaRT to primarily assist policy-makers and practitioners involved in such projects. The guidelines envisage the development of sustainable practices of contracting the radiotherapy units; repatriation and re-supply of radioactive sources; as well as development of a regional expertise for radiotherapy unit repairs in low-resource settings.

These guidelines will encourage users to properly balance medical, technical and economic aspects when selecting equipment for a radiotherapy service, and challenge manufacturers to reduce the cost of machinery; to offer long-term, cost-effective contracts; and to provide suitable training for equipment use.

Suitability

Equitable access to radiotherapy services is hampered by mismatches between highly sophisticated technology and difficult resourcing conditions of LMICs. Through AGaRT, manufacturers and radiotherapy experts are reviewing possible options for developing high throughput technology appropriate to low-resource settings. It is expected that the recommendations of AGaRT will help manufacturers to gradually adjust their technological developments, financial strategies and service policies to address the needs of emerging markets in LMICs, while at the same time enabling LMICs to develop realistic plans for investments in radiotherapy over the longer term, taking into account key issues such as equipment choices, contracting and human resource requirements.

Mobilizing and increasing global resources for cancer control through advocacy and innovative financing

Despite all the progress in the fight against cancer, there is an enormous amount of work to be done. The cancer burden in LMICs continues to increase without adequate human and financial resources to manage it.

Global health experts have argued that the failure to include cancer and communicable diseases in the Millennium Development Goals (MDGs) has resulted in services for cancer and other NCDs being grossly underfunded. At some point cancer was at the periphery of global health priorities. This was exacerbated by the fact that the international aid architecture has been more attuned to communicable diseases, including tuberculosis, malaria and HIV/AIDS. Yet globally, cancer kills more than these three diseases combined (6).

To ease the suffering of those who are, and will be affected by cancer in LMICs, it could be useful to learn from

successful global health initiatives such as the fight against HIV/AIDS (7). While not suggesting there should be a mechanical application of the lessons learnt, there are however useful concepts that could be adapted for effective and sustainable responses to the increasing cancer epidemic in LMICs. This section will focus on two such concepts, namely, advocacy and innovative financing.

Advocacy

The UN General Assembly's 2001 Special Session on HIV/AIDS has been described as a catalytic moment for the global fight against HIV/AIDS. This historic event, which was the first time that the UN had convened a major meeting of world leaders to address a specific health issue, propelled HIV/AIDS to the forefront of global health. Entitled "Global Crisis – Global Action", participants at the Special Session endorsed a Declaration of Commitment on HIV/AIDS, which rallied the international community around the disease, prompting stronger national, regional and international political commitments at the highest level.

The 2001 UN General Assembly's Special Session also led to the creation of transformational initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria and the United States President's Emergency Plan for AIDS Relief (PEPFAR).

While one could argue that the UN organized a similar high-level meeting on NCDs in 2011, more needs to be done. It is only with strong political commitments at the highest level – both internationally and nationally – that the cancer crisis in LMICs will be able to move to the centre stage of the international global health debate. That is why advocacy initiatives such as the Forum of African First Ladies against Breast and Cervical Cancer, should be encouraged. Through its annual "Stop Cervical Cancer in Africa Conference" and "Global Summit on Women Cancers in Africa", the Forum has brought international attention to the cancer burden in Africa. This type of advocacy can be very effective since it can make the world rally round the emerging global cancer crisis just as it did with HIV/AIDS.

Innovative financing

The World Bank describes innovative funding as a process that "involves non-traditional applications of solidarity, public-private partnerships (PPPs) and catalytic mechanisms that (a) support fundraising by tapping new sources and engaging investors beyond the financial dimensions of transactions, as partners and stakeholders in development; or (b) deliver financial solutions to development problems on the ground" (8).

While it could be argued that innovative financing predates the discovery of HIV/AIDS, it is impossible to deny the fact that the international advocacy around the pandemic buttressed the need for innovative financing for health, as it would have been impossible to meet the exponential cost of treatment and prevention in LMICs. For instance, the Global Fund to Fight AIDS, Tuberculosis and Malaria leveraged the upsurge in the interest generated by private funders to create a new type of PPP that would fund the fight against the three diseases in LMICs (9).

Established in 2006 as the "International Drug Purchasing Facility", UNITAID uses innovative financing – "solidarity contributions" – to increase funding for greater access to treatments and diagnostics for HIV/AIDS, tuberculosis, malaria and more recently hepatitis C in LMICs. Approximately half of UNITAID's finances come from a levy on air tickets.

With its international financial backing, UNITAID supports programmes that are expressly designed to influence market dynamics of specific health products, accelerating their entry to markets, improving their quality and increasing their level of affordability through bulk procurement and/or advance purchase commitments. These activities help to shape the market for specific health products critically needed to fight HIV, TB, malaria and hepatitis C.

With the current challenging global economic and financial crisis, and in view of the high investment needed for cancer control, innovative financing is the way forward for the delivery of quality and timely care to cancer patients in LMICs.

Effective cancer treatment exists and comprehensive cancer control programmes have shown positive results in high-income countries. These initiatives can also work in LMICs too. Cancer should not be a "death sentence" as there are proven methods of prevention and cure. More than one third of cancers can be prevented and one third is curable if detected early and treated properly. What cancer patients in LMICs urgently need are the type of the high-level political commitment and financial ingenuity deployed to the fight against HIV/AIDS.

Conclusion

The international awareness and response to the growing cancer epidemic has been increasing. In the past ten years the IAEA, through PACT, has designed and implemented multiple tools and services aimed at helping Member States to address the cancer burden. Comprehensive analysis of country's capacity and needs in cancer control have given

the Member States a practical tool to assess the status of cancer control plans and activities and help develop and implement a long-term radiation medicine infrastructure and capacity-building plan. The VUCCnet project has provided a web-based, e-learning platform to make educational materials more easily accessible for trainees and health professionals from the African countries. The AGaRT has brought together radiation oncologists and medical physicists from LMICs and the radiotherapy equipment manufacturers to encourage dialogue to develop guidelines for safe, affordable and sustainable radiotherapy technology for LMICs. However, there is still much to be done. The IAEA is a key player in the global fight against cancer but its resources are limited. In order to ensure progress, broader and strengthened advocacy efforts have to be undertaken and innovative ways of financing cancer control have to be established. ●

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