Stronger Together Weaker Apart

by Angela Leuker

For the IAEA collaboration is key in the global fight against cancer.

Cancer is a disease that strikes fear into hearts. Each year it claims the lives of millions of people around the world while the lives of millions more—family, friends, colleagues—are indirectly touched by the disease. According to the World Health Organization (WHO), as early as next year, 2010, cancer will have overtaken heart disease to become the number one cause of death worldwide.

Yet, behind the headlines, advances are being in made in the fight against cancer. In some of the world's industrialized nations, where cancer awareness, prevention, early detection and treatment interventions are advanced, long-term survival rates for cancers such as breast and prostate are reaching 85% or higher, and up to 60% of some cancers are cured.

Sadly that's not the case in many low-resource countries around the world. There, as health systems struggle to cope with the scourge of communicable diseases such as HIV/AIDS, tuberculosis and malaria, finding the resources to combat cancer remains a formidable challenge. The result: cancer awareness is often low, diagnosis late and treatment choices extremely limited or even unavailable.

"There's a huge disparity," says Werner Burkart, IAEA Deputy Director General and Head of the Department of Nuclear Sciences and Applications (NA). "If you take radiotherapy, which is a very effective tool in the treatment of cancer, current figures show that developing countries lack at least 7000 radiotherapy machines to address current needs. And more than 30 countries in Africa and Asia have no radiotherapy facilities at all."

At the same time, hard won advances in extending life expectancy mean that the number of cancer cases in low-income countries is likely to rise significantly, because the incidence of cancer increases with age. And as populations become more urbanized, they adopt lifestyles and behaviours associated with increased cancer risk. WHO predicts that by 2020 more than 70% of all cancer cases will be in the developing world.

An Agency-wide Response

The IAEA is best known for its activities as the world's 'nuclear watchdog', working to help prevent the spread of nuclear weapons and ensuring that nuclear power is used safely. But another, equally vital, part of the Agency's mandate is to foster the peaceful role of nuclear science and technology in tackling urgent needs in developing countries, such as poverty, disease and hunger. For decades, the IAEA has brought its expertise in radiation medicine and technology to the fight against cancer.

Today, as the global cancer threat intensifies, the Agency is responding in a concerted, multi-disciplinary effort. It incorporates the competencies and know-how of dedicated individuals working in fields such as human health and development. Work can range from overseeing the building of a cancer treatment centre, to developing guidelines to ensure the safe and effective application of radiation therapy, to assessing a country's cancer control needs. Very often this work is done in teams drawn from across the Agency. Such cross-departmental collaboration and backstopping ensures that the IAEA's efforts dovetail to achieve optimal results.

Money is a decisive issue in health care everywhere but especially so in developing countries. Although the initial outlay for radiotherapy equipment and training is high, it is very cost effective in the long term because a single machine can treat thousands of patients a year for as many as 20 years. The most common radiotherapy-treatable cancers are lung, breast, cervix, prostate and head and neck. In incurable cases, radiotherapy is also used palliatively to help relieve pain. But the Agency recognises that

More than 30 countries in Africa and Asia have no radiotherapy facilities at all.
(Photo: A.Leuker/IAEA)

radiation medicine alone cannot beat the cancer pandemic.

Programme of Action for Cancer Therapy

To maximize the benefits of the IAEA's cancer-related work, radiotherapy needs to be part of a broader, integrated approach addressing the whole spectrum of cancer care and control: cancer registration, prevention, early detection, diagnosis and treatment, and palliative care.

In 2004, the IAEA launched its Programme of Action for Cancer Therapy (PACT) to spearhead this approach. A specially designated programme within the Department of Nuclear Sciences and Applications, PACT works together with other international cancer organizations and Member States with the aim of building effective comprehensive cancer control systems based on WHO guidelines. Today it is successfully forming public-private partnerships, mobilizing funds and raising awareness so that low resource countries might more effectively address their cancer burden.

PACT currently focuses its efforts on six Model Demonstration Site (PMDS) countries (Albania, Nicaragua, Sri Lanka, Tanzania, Vietnam and Yemen) but its progress is such that more than 50 Member States have requested special '*im*PACT' Reviews. These are assessment missions conducted by teams of Agency and external experts aimed at identifying a country's specific cancer needs, the first step towards finding lasting solutions.

"PACT is the IAEA's umbrella programme for combating cancer. It represents the Agency's collaborative response to the global cancer crisis: working with international partners to help low- and middle-income countries integrate radiotherapy into comprehensive cancer control programmes," says Massoud Samiei, PACT Programme Head. "No single organization can combat the cancer epidemic on its own. Only by working together can we help save lives and spare the suffering of millions of men, women and children."

Technical Cooperation

Nearly 25% of the annual budget of the IAEA's Department of Technical Cooperation (TC) goes to Human Health projects. Of these, the lion's share is cancer related, mainly providing Member States with expertise, equipment and training to enhance cancer diagnosis and treatment facilities. At the end of 2008, TC had more than 140 such projects in progress around the world, ranging from the establishment of radiotherapy services to the introduction of advanced techniques for cancer diagnosis.

Usually Member States approach the Agency requesting help with a project proposal or concept. What follows is a collaboration tailored to suit the specific situation. A team including a Programme Management Officer from TC, a Technical Officer

from NA's Division of Human Health (NAHU), and a counterpart from the Member State normally will work together to design the project, defining specific objectives and producing a work plan of activities including performance indicators to measure the progress made during the life of the project. A TC project can last from two to four years and cost anything from US$ 100,000 to US$ one million, often on a cost-sharing basis where the counterpart institution provides additional funds to the IAEA to support some of the equipment required. This is a good indication of the country's commitment and strengthens the viability and sustainability of the project's expected outcomes.

"Establishing or upgrading a nuclear medicine or radiotherapy centre requires much more than infrastructure and equipment," says Sandra Steyskal, Programme Management Officer in TC's Europe Division. "In addition, TC projects aim to address the shortage of qualified human resources by providing opportunities for training via fellowships and support for continuous professional development. The global shortage of qualified health care professionals is highly relevant in radiation medicine which relies on complex technology requiring highly trained and qualified staff."

Human Health

Within the Agency's Division of Human Health, 60% of the work is cancer related. The activities of three of its four sections are directed specifically or in part towards helping Member States improve their cancer management strategies through the use of nuclear techniques.

Applied Radiation Biology and Radiotherapy (ARBR) aims to ensure that countries have safe, effective cancer treatment capabilities by helping them to introduce or expand radiotherapy capacity, establish sound codes of practice and apply advanced techniques.

For example, in 2008, the IAEA and the European Society for Therapeutic Radiology and Oncology (ESTRO) conducted a pilot training course on best practices in radiation oncology. Selected groups from eight European countries received instruction on how to create their own train-the-trainer courses for radiation therapy technologists in their respective countries.

"Requirements differ according to the country," says Eeva Salminen, ARBR Section Head. "Some needs are basic because the radiotherapy is used mostly to alleviate pain. But other countries are more advanced, so the Agency could be involved in upgrading radiotherapy facilities and techniques."

Again, in-house collaboration is key, supporting and exchanging information and know-how often across sections or departments. In 2007, for example, ARBR provided technical expertise on more than 100 TC projects. Currently, 132 projects require its expert support, together with that from other Human Health sections.

Dosimetry and Medical Radiation Physics (DMRP) works closely with ARBR. DMRP, which as been actively helping Member States since the 1960s, is responsible for the quality assurance of radiation used in medicine. The accurate measurement of radiation dosage is vital in applications such as radiation oncology, diagnostic radiology and nuclear medicine, for patient and health professional alike. DMRP also provides dosimetry calibration services to countries, using special devices to measure and make sure that the radiation beam is being used safely and accurately, according to IAEA guidelines.

Nuclear Medicine (NM) has the broader objective of ensuring that Member States have the capability and knowledge to effectively apply nuclear medicine techniques for the diagnosis and treatment of a range of serious health conditions, including cancer.

Carrying the fight forward

Today the IAEA, with its vast experience and knowledge of radiation medicine and technology, plays a pivotal role in helping low-resource countries engage with the growing cancer crisis. But only through collaborative work, both IAEA-wide and with relevant external agencies and organizations, can the battle be successfully waged.

In this the IAEA takes its lead from WHO, the foremost United Nations agency in terms of health. Earlier this year a Joint Programme for Cancer Control was formed between WHO and the IAEA aimed at optimising efforts, activities and resources. This landmark agreement offers better chances than ever before in global efforts to tackle the most pressing health issue of our time.

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