

The IAEA and *Non-Communicable Diseases*

The Fight Against Non-Communicable Diseases

The International Atomic Energy Agency works to improve human health through the use of nuclear techniques. This includes the early detection, diagnosis and treatment of non-communicable diseases (NCDs), especially cancer and cardiovascular diseases, where nuclear techniques and their application remain a vital element of disease management.

For over 40 years, the IAEA has supported its Member States to build sustainable capacity in the use of radiation medicine. Providing education and training through its technical cooperation programme as well as through its human health programme, the IAEA has assisted more than 110 low and middle income (LMI) Member States address issues related to the management of cancer and other NCDs. It has helped Member States to establish diagnostic and radiotherapy services for cancer patients, and nuclear medicine services for the diagnosis of cardiovascular and other diseases. Additionally, the IAEA has been supporting the production of radioisotopes and radiopharmaceuticals, both of which are essential ingredients for practicing radiation and nuclear medicine.

Building Partnerships to Save Lives

The IAEA believes that the support of world leaders is crucial in the fight against NCDs across the developing world. Building upon this foundation, there must be sustained action at the highest levels in Member States, with support from the United Nations system, to enable developing countries to end the growing disparity in NCD survival rates between rich and poor, helping to save millions of lives in the process.

The IAEA and the World Health Organization (WHO) are working closely together to improve cancer control. In 2009, they strengthened their relationship by establishing a Joint Programme on Cancer Control. The main purpose of the Joint Programme is to coordinate activities and resources to provide evidence based and sustainable support to comprehensive cancer control programmes in LMI countries. This approach also provides a framework for enhancing collaboration to address NCDs.

Putting NCDs on the Global Health Agenda

There is a growing awareness among IAEA Member States about the magnitude of NCDs throughout the world and the increasing severity of these diseases in developing countries. The increased prevalence of chronic diseases in developing countries and the cost of treating NCDs contribute to a widening of the health care gap between rich and poor. Despite alarming trends, NCDs are not mentioned in the Millennium Development Goals (MDGs). One major challenge in the fight against NCDs is that their absence on the global health agenda leaves these diseases as a lower priority.



"Cancer should be acknowledged as a vital part of the global health agenda. World leaders should be made aware of the scale of the cancer crisis facing developing countries. We need systematic action at the highest level to end the deadly disparity in cancer survival rates between rich and poor countries, thereby helping to save millions of lives. The goal must be to promote effective cancer control that is integrated into national health-care systems throughout the developing world. The United Nations General Assembly's Summit on Non-Communicable Diseases in September provides an opportunity to focus the world's attention on cancer in developing countries. Let us make cancer control one of the good news stories of 2011."

– Dr. Margaret Chan, Director-General of WHO, and
Mr. Yukiya Amano, Director General of the IAEA,
Joint Op-Ed, February 2011



NCD Facts

Currently, chronic diseases claim more than 35 million lives each year and account for more than 60% of all deaths worldwide. This figure includes 16 million premature deaths of people under the age of 70. WHO projects that the burden of NCDs will continue to increase by a further 17 % over the next ten years, most markedly in LMI countries.



Behind the Science

Nuclear medicine and Diagnostic Imaging

Around 40 million nuclear medical examinations are conducted annually around the world using radiopharmaceuticals for diagnostic purposes. Highly sensitive diagnostic images, such as positron emission tomography (PET) and single photon emission computed tomography (SPECT), obtained using radiopharmaceuticals, help diagnose major disorders such as heart disease and cancer, enabling clinicians to administer the most appropriate treatment.

Furthermore, PET and SPECT combined with anatomical data obtained by magnetic resonance imaging (MRI) or computed tomography (CT), provide unique information that allow for more precise localization of cancer or cardiac abnormalities.

Radiotherapy or Radiation Oncology

Radiotherapy is an essential component in the treatment of cancer for both cure and palliation. It involves treating cancer by radiation through external beams or brachytherapy, or in vivo therapy using radiopharmaceuticals.

Alone, or together with surgery or chemotherapy, radiation therapy is recommended for more than half of cancer patients. In many instances, radiation therapy is used as a cost effective alternative to morphine to palliate cancer patients.

Dosimetry and Medical Radiation Physics

In radiotherapy, accurate dose measurement and delivery are critical for effectively treating patients. In diagnostic imaging, quality assurance processes permit accurate image generation with minimal radiation dose to patients and medical personnel.

The IAEA contributes to ensuring the safe and effective use of radiation in medicine by: providing dosimetry calibration services through the IAEA-WHO network of secondary standards dosimetry laboratories; conducting independent dosimetry audits for radiotherapy centres with WHO; and offering comprehensive clinical audits to radiation medicine facilities around the world.





Cancer Facts

In 2010, cancer killed nearly eight million people worldwide, while over 13 million new patients were diagnosed with the disease. Formerly considered more pervasive in affluent countries, cancer now places its heaviest burden on poor and disadvantaged populations. According to WHO, more than two thirds of cancer incidence and deaths occur in LMI countries. In some low income countries, fewer than 15% of breast and cervical cancer patients survive longer than five years following diagnosis. Conversely, these two diseases are both highly curable elsewhere in the world. By 2020, up to 15 million people worldwide will be diagnosed with cancer every year, with 70% of these new cases occurring in the developing world.

The IAEA's Role in the Fight against Cancer

Nuclear techniques are critical for the early detection and diagnosis of cancer. Often, they are the sole means of diagnosis and treatment, and are one of the most important and efficient methods for fighting cancer.

With the rising number of cancer cases in LMI countries, however, existing radiation medicine infrastructure and resources can cover only a small portion of the growing need. Currently, up to 70% of cancer patients have no access to radiotherapy. Moreover, due to a lack of early detection or screening services as well as other socioeconomic factors (including fear, stigma, and job and family demands), by the time cancer patients seek treatment, the disease has advanced in an estimated 80% of cases.

Expanding radiotherapy capacity alone is not enough to fight cancer. Interventions that focus on public education, early detection, diagnosis and other cancer treatment modalities are needed to increase survival and to ultimately alleviate the global burden of cancer.

With respect to NCDs, the burden posed by cancer warrants special attention due to its wide incidence and mortality rates, and the cost and complexity of its treatment, including surgery, radiotherapy and chemotherapy. Moreover, from an epidemiological point of view, cancer needs to be tackled in a variety of ways due to the fact that it affects the entire life span of populations; its causes (which go beyond the common risk factors for NCDs); its natural history (from early detection to treatment and palliative care); and its genetic complexity and heterogeneity.

In 2004, the IAEA established its Programme of Action for Cancer Therapy (PACT) to help fight cancer in its developing Member States. PACT stands as the IAEA's umbrella programme for combating cancer and builds upon existing experience in radiation medicine technology and expertise to enable LMI Member States to introduce, expand and improve their cancer care services and workforce. These serve as an essential element of a comprehensive and integrated national cancer control programme that includes prevention, early detection, diagnosis, treatment and palliative care. Through PACT, the IAEA has built partnerships within and among countries, and with UN and non-UN bodies, including WHO, the International Agency for Research on Cancer, the International Network for Cancer Treatment and Research, the Union for International Cancer Control, and many others.



The Role of Nuclear Technology in Fighting Heart Diseases

Individuals can reduce their risk of cardiovascular diseases (CVDs) by changes in lifestyle such as engaging in increased physical activity, avoiding tobacco use and choosing a healthy diet. However, these preventive measures are often insufficient and take time to have a clinical impact, while there are also other risk factors such as diabetes which are not totally under a patient's control.



Heart Disease Facts

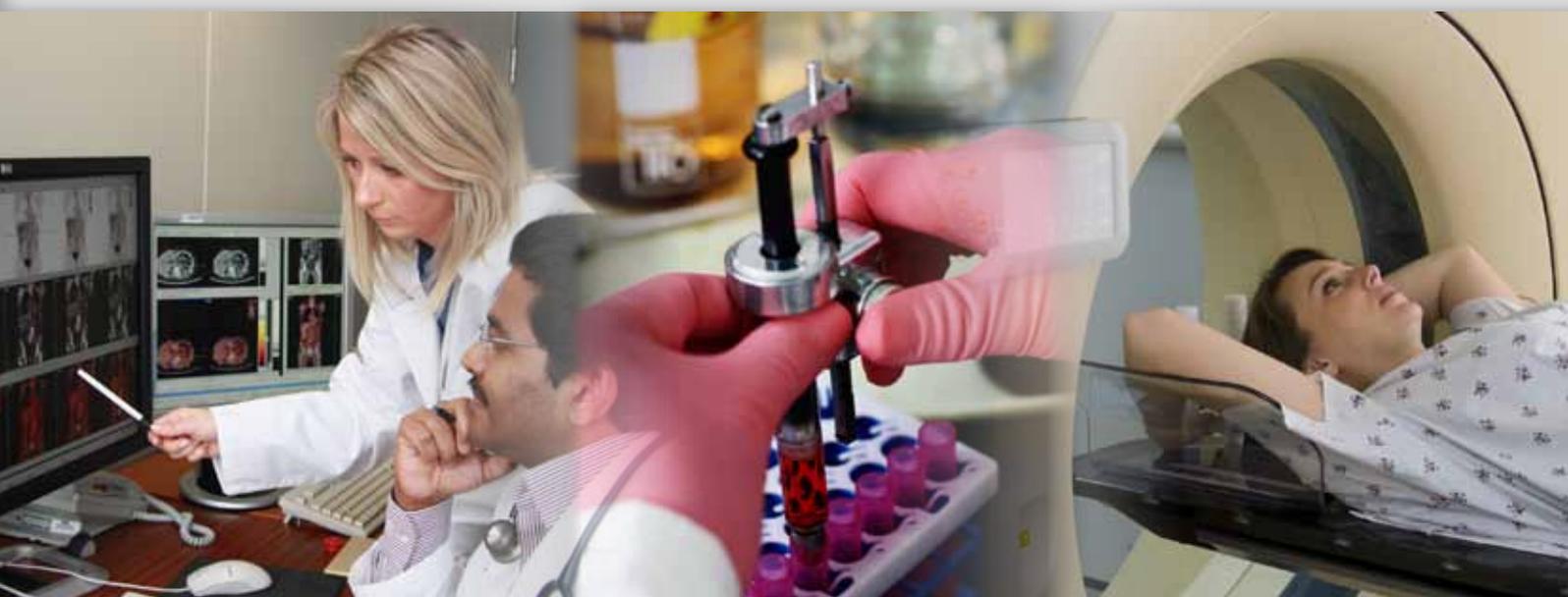
According to WHO, CVDs are the number one cause of death globally. Almost one third of all deaths are caused by CVDs, mainly by coronary artery disease (CAD).

LMI countries are disproportionately affected, since more than 80% of cardiac deaths take place in these countries and occur almost equally in men and women.

Given the current trend, it is expected that more than 23 million people will die from CVDs by 2030; CAD and strokes are projected to remain the main leading causes of death. The largest increase of mortality will occur in the eastern Mediterranean and in the south-east Asian regions.

Although still the most prevalent of all forms of CVDs, coronary artery disease has declined over the last few decades in developed countries due to the introduction of preventive strategies. These include nuclear cardiology procedures such as nuclear cardiac imaging and non-invasive cardiac imaging techniques, which provide the vital data enabling the clinician to take appropriate measures to prevent mortality and ensure improved health in such patients. Such interventions are cost-effective in several settings because they represent mostly outpatient investigations of moderate cost, high diagnostic accuracy and low risk.

The use of nuclear cardiology procedures varies widely from country to country. Economic status, availability of technology, human resources development, health system priorities, education, and awareness of the benefits of the technique are among some of the reasons behind this disparity. In the longer term, there is no doubt that nuclear cardiology is one of the essential health technologies required by many developing countries.





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