

Human Health

Using nuclear techniques to improve health around the world

With its wide range of activities and expertise in nuclear science and medicine, the IAEA is helping Member States use nuclear techniques to address important health problems that lie at the heart of the sustainable development challenge. IAEA services support the efforts of health care professionals and technologists, policy makers, regulators, universities and patients.

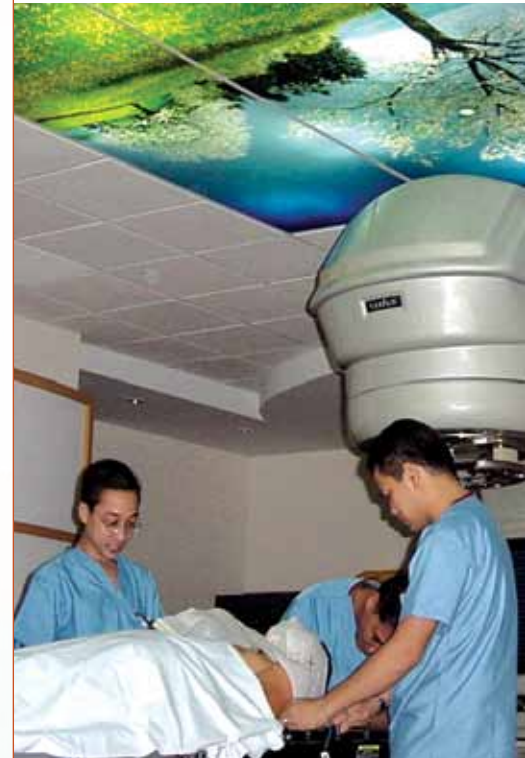
Eight Millennium Development Goals (MDGs) have been adopted by the international community as a foundation for global development activities. These goals aim to make significant steps to combat poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women. Human health MDGs focus on reducing child mortality, improving maternal health and combating HIV/AIDS, malaria and other diseases.

The International Atomic Energy Agency's Statute states that the IAEA shall seek to accelerate and enlarge the contribution of atomic energy for peace, health and prosperity throughout the world. The strategic goal of the IAEA's technical cooperation programme builds on this mandate, promoting tangible socioeconomic impact by contributing directly in a cost effective manner to the achievement of the major sustainable development priorities of each country.

Human Health is a development priority for all IAEA Member States

Poor health limits the potential of people everywhere, especially so in developing countries. In areas where food and clean water are hard to come by, disease prevention and cure may seem far out of reach. The IAEA's technical cooperation programme works to improve the health of people in developing countries around the world.

Cancer, malaria, tuberculosis, HIV/AIDS and malnutrition are major health concerns for developing countries. People affected by these illnesses often cannot continue to work or even to care for their families. Poor health feeds into the poverty cycle. Low income families have a higher rate of illness, illness leads to medical costs and often the loss of employment, which in turn thrusts families deeper into poverty.



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Technical
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Sustainable socioeconomic development is not possible if debilitating diseases are not controlled. The IAEA's human health activities carried out through the technical cooperation programme aim to provide developing countries with specialized skills and infrastructure to prevent, detect and cure major illnesses. They also support the planning and evaluation of nutrition programmes, as well as prioritizing the establishment of quality assurance programmes for radiation dosimetry and treatment of cancer.

- Half of the world's population is at risk of contracting ¹.
- Malaria decreases Gross Domestic Product (GDP) by as much as 1.3% in countries with high levels of transmission.
- The physical and economic burdens of tuberculosis (TB) illness, deaths, and loss of wages and productivity costs the global economy some US \$12 billion every year.
- According to WHO and UNAIDS estimates, by the end of 2008 33.4 million people were living with HIV, 2.7 million people became newly infected and 2.0 million died of AIDS, including 280 000 children.
- Treatment and health care costs related to HIV/AIDS consume household incomes, diminish people's ability to support, work and provide for their family, prevent economic gains in developing countries and keep communities in a cycle of poverty.
- Malnutrition contributes to 1 out of 2 deaths (53%) associated with infectious diseases among children under five in developing countries, and costs poor countries up to 3% of their yearly GDP.
- 1 out of 3 people in developing countries are affected by vitamin and mineral deficiencies, also known as 'hidden hunger', that leaves them more vulnerable to infection, birth defects and impaired development.
- The economic payback from investing US \$11.3 billion per year to reach the millennium targets for drinking water and sanitation by 2015 is estimated to be US \$ 84 billion.
- 1.3 million people die of malaria each year, 90% are children under five; better management of water resources reduces transmission of malaria and other vector-borne diseases.



Fighting cancer

According to the World Health Organization, cancer has become one of the leading causes of death worldwide. Of the estimated 11 million cancer deaths projected for 2030, more than 70% of all cancer deaths will occur in low- and middle-income countries. Fortunately, through prevention, early detection and treatment, a third of these cancer deaths could be avoided.

Funding for cancer control measures is a problem for many underdeveloped countries whose health systems are geared towards addressing communicable diseases but not chronic ones. Radiation therapy is a major part of cancer treatment, but requires trained specialists, hi-tech equipment and an established infrastructure. The IAEA promotes the safe and effective use of radiation therapy by providing assistance in the form of hospital radiotherapy machines, training for cancer control specialists, radiotherapy professionals and expert guidance for regulatory control over radioactive materials.

The IAEA's technical cooperation programme has addressed cancer care for over fifty years. As cancer has emerged as a major global health problem, the Programme of Action for Cancer Therapy (PACT) was created to enable developing countries to introduce, expand and improve cancer care within the context of a comprehensive cancer control programme.

Complementary joint PACT/technical cooperation (TC) projects provide comprehensive strategic national plans for cancer control using PACT core competencies and partners and the technical assistance expertise of TC. These projects provide support through an imPACT review: a multi-disciplinary and multi-stakeholder situational analysis tool for developing Member States carried out in close collaboration with the World Health Organization (WHO) and other international actors in cancer prevention and control.

¹ WHO, Fact Sheet No. 94, April 2010

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Controlling malaria and tuberculosis

Drug resistance is a growing challenge for the control of infectious diseases like malaria and TB. Although a variety of drugs have been used to control malaria, in many regions inconsistent or partial treatment has led to widespread drug resistance. Newer medications are being developed to treat drug-resistant strains, but are 10 times more costly. Multi-drug resistant TB is a major health issue for people in resource-poor countries, where the availability of second line drugs is limited and where the difficulty of detecting and treating patients infected with resistant strains allows continued transmission.

Effective control of malaria and TB depends on finding the correct drug treatment. Information on drug resistance helps countries to tailor intervention programmes, including the reintroduction of cheaper drugs once the level of resistance falls. Better national intervention programmes reduce mortality and increase economic efficiency and programme sustainability.

The IAEA has helped build capacity in Member States through projects that monitor drug efficacy and resistance, as well as through the reduction of anopheles mosquitoes using the radiation-based sterile insect technique.



Using nuclear medicine to diagnose and treat disease

Nuclear imaging techniques are widely used to diagnose disease. They allow clinicians to identify health issues earlier than is possible with other diagnostic methods. Early diagnosis of disease means a greater chance for successful treatment and prevents unnecessary suffering and expense associated with the treatment or palliative care that is required at more advanced stages of a disease. Timely disease diagnosis also reduces the patient's time away from work and family, cutting down on lost wages and productivity, and keeping families and communities intact.

Nuclear medicine can save lives, restore health, predict the cause of disease and alleviate suffering. Developing countries face several challenges when setting up nuclear medicine facilities and laboratories, such as the availability of adequate equipment, highly trained staff and a regular uninterrupted supply of radiopharmaceuticals.

TC projects in the field of nuclear medicine help developing countries to set up nuclear medicine capabilities in their own hospitals and laboratories to serve those in need, closer to home. IAEA projects also train selected personnel through medical physics programmes to provide Member States with trained staff able to provide quality diagnostic imaging and nuclear medicine services in their home countries in a safe and secure manner.



Addressing malnutrition

The effects of poor nutrition - whether visible or hidden - add to burdens on health care systems, and hinder social and economic development. On the one hand, overnutrition is associated with obesity, diabetes and heart diseases. More than a billion adults are overweight worldwide and face serious diet-related health problems. On the other hand, undernutrition and hunger lead to ten million child deaths in developing countries per year - about half of all child deaths worldwide.

Good nutrition depends not only on having enough food to eat, but also on having food with the proper amount of essential nutrients. Nutrition intervention programmes are among the best investments that developing countries can make to reduce poverty and improve economic growth.

TC provides assistance and training to Member States that wish to use nuclear techniques to address nutritional problems specific to their country. Nuclear science and technology are used to monitor and evaluate nutritional intervention programme effectiveness. The data acquired with these nuclear tools are used to review national policies and to set nutrition guidelines tailored to local conditions and needs.

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Information on micronutrients is used to develop enhanced foodstuffs and make more nourishing foods available to those people who need it most.

Ensuring quality in nuclear medicine, radiation oncology and diagnostic radiology

When using radiation science and technology to address human health challenges, quality assurance is of the highest importance. The IAEA supports quality audits in nuclear medicine, diagnostic radiology and radiation oncology through a combination of tools and guidance for self-auditing, as well carrying out external audits when requested.

QUANUM (Quality Assurance in Nuclear Medicine) supports internal and external clinical audits of nuclear medicine, and encourages the adoption of a culture of review in the institution by carrying out the audit. QUANUM is patient centred and outcome based.

QUAADRIL (Quality Assurance Audit for Diagnostic Radiology Improvement and Learning) supports primarily external clinical audits of diagnostic radiology practices, and concentrates on improving the quality of patient care, and the provision and organization of clinical services.

External evaluations of radiation oncology are provided through QUATRO (Quality Assurance Team for Radiation Oncology), emphasizing quality improvement through the comprehensive review of radiotherapy procedures, structure and process.

What the IAEA technical cooperation programme does

Training courses and workshops provided through the TC programme cover topics such as radioimmunoassay, radiotherapy, radiopharmaceutical production, nutritional analysis, and sterilization techniques for transplants and medical instruments.

TC projects assist Member States with training in the safe use of high doses of radiation for a number of medical purposes, from the sterilization of tissue to cardiology imaging, and from the use of radiation for the diagnosis of a large number of benign and malignant disorders to the treatment of diseases.

Expert assistance makes available on-the-spot training in a Member State by a recognized expert. Expert missions may be of a few months' duration or may extend to a whole year. When complex equipment is supplied to a country, the project usually includes the visit of an expert to train the staff in the operational and technical aspects of the instrument.

Training fellowships prepare local personnel to take over the responsibilities of healthcare in Member States. Fellows are sent abroad for comprehensive training to a suitable institution for periods ranging from a few months to several years.

Conferences, symposia and seminars are designed for exchange of ideas between scientists from various countries.

Equipment and materials provided by the IAEA are used to establish or enhance sustainable human health services in Member States.



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Partnerships

Technical cooperation projects involve collaboration between governments, IAEA partners and Member States, keeping in mind priority national developmental needs where the IAEA has a unique role to play, where nuclear technology has a comparative advantage or where the IAEA can add value to services from other development partners.

The IAEA strives to establish partnerships and working relationships through consultations and interactions with United Nations system organizations and other potential partners. Collaborative work ensures the coordination and optimization of complementary activities and informs relevant UN organizations of the developmental impacts of the TC programme. IAEA institutional partnerships include those with the World Health Organization, UNICEF, the International Agency for Research on Cancer (IARC) and the World Bank.

For more information, please visit:

www.iaea.org/technicalcooperation

