IAEA Activities in Nuclear Medicine

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Outline

1. Who we are
2. How we work
3. Challenges
4. Outreach
5. Technical Cooperation Program
"I am trying to change the widespread perception of the Agency as simply the world’s ‘nuclear watchdog’ because it does not do justice to our extensive activities in other areas, especially in nuclear energy, nuclear applications, and technical cooperation.

Yukiya Amano
Director General
IAEA
Scientific Forum 2010
Is an independent intergovernmental, science and technology-based organization, in the United Nations family

Serves as the global focal point for nuclear cooperation.
• It was set up as the world's "Atoms for Peace" organization in 1957 within the United Nations family.

• The Agency works with its Member States and multiple partners worldwide to promote safe, secure and peaceful use of nuclear technologies.

The atomic energy agency could be made responsible for the impounding, storage and protection of the contributed fissionable and other materials. The ingenuity of our scientists will provide special safe conditions under which such a bank of fissionable material can be made essentially immune to surprise seizure. The more important responsibility of this atomic energy agency would be to devise methods whereby this fissionable material would be allocated to serve the peaceful pursuits of mankind. Experts would be mobilized to apply atomic energy to the needs of agriculture, medicine and other peaceful activities. A special purpose would be to provide abundant electrical energy in the power-starved areas of the world.

"Atoms for Peace" was the title of a speech delivered by U.S. President Dwight D. Eisenhower to the UN General Assembly in New York City on December 8, 1953.
The following States are Members of the International Atomic Energy Agency:

AFGHANISTAN  
ALBANIA  
ALGERIA  
ANGOLA  
ARGENTINA  
ARMENIA  
AUSTRALIA  
AUSTRIA  
AZERBAIJAN  
BANGLADESH  
BELARUS  
BELGIUM  
BELIZE  
BENIN  
BOLIVIA  
BOSNIA AND HERZEGOVINA  
BOTSWANA  
BRAZIL  
BULGARIA  
BURKINA FASO  
CAMEROON  
CANADA  
CENTRAL AFRICAN REPUBLIC  
CHAD  
CHILE  
CHINA  
COLOMBIA  
COSTA RICA  
CÔTE D’IVOIRE  
CROATIA  
CUBA  
CYPRUS  
CZECH REPUBLIC  
DEMOCRATIC REPUBLIC OF THE CONGO  
DENMARK  
DOMINICAN REPUBLIC  
ECUADOR  
EGYPT  
EL SALVADOR  
ERITREA  
ESTONIA  
ETHIOPIA  
FINLAND  
FRANCE  
GABON  
GEORGIA  
GERMANY  
GHANA  
GREECE  
GUATEMALA  
HAITI  
HOLY SEE  
HONDURAS  
HUNGARY  
ICELAND  
INDIA  
INDONESIA  
IRAN, ISLAMIC REPUBLIC OF  
IRAQ  
IRELAND  
ISRAEL  
ITALY  
JAMAICA  
JAPAN  
JORDAN  
KENYA  
KENYA  
KORUA, REPUBLIC OF  
KUWAIT  
KYRGYZSTAN  
LATVIA  
LEBANON  
LIBERIA  
LIBYAN ARAB JAMAHIRIYA  
LIECHTENSTEIN  
LITHUANIA  
LUXEMBOURG  
MADAGASCAR  
MALAWI  
MALAYSIA  
MALI  
MALTA  
MARSHALL ISLANDS  
MAURITANIA  
MAURITIUS  
MEXICO  
MONACO  
MONGOLIA  
MONTENEGRO  
MOROCCO  
MOZAMBIQUE  
MYANMAR  
NAMIBIA  
NEPAL  
NETHERLANDS  
NEW ZEALAND  
NICARAGUA  
NIGER  
NIGERIA  
NORWAY  
PAKISTAN  
PALAU  
PANAMA  
PARAGUAY  
PERU  
PHILIPPINES  
POLAND  
PORTUGAL  
QATAR  
REPUBLIC OF MOLDOVA  
ROMANIA  
RUSSIAN FEDERATION  
SAUDI ARABIA  
SENEGAL  
SERBIA  
SEYCHELLES  
SIERRA LEONE  
SINGAPORE  
SLOVAKIA  
SLOVENIA  
SOUTH AFRICA  
SPAIN  
SRI LANKA  
SUDAN  
SWEDEN  
SWITZERLAND  
SYRIAN ARAB REPUBLIC  
TAJKISTAN  
THAILAND  
THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA  
TUNISIA  
TURKEY  
UGANDA  
UKRAINE  
UNITED ARAB EMIRATES  
UNITED KINGDOM OF  
GREAT BRITAIN AND NORTHERN IRELAND  
UNITED REPUBLIC OF TANZANIA  
UNITED STATES OF AMERICA  
URUGUAY  
UZBEKISTAN  
VENEZUELA  
VIETNAM  
YEMEN  
ZAMBIA  
ZIMBABWE

The Agency's Statute was approved on 23 October 1956 by the Conference on the Statute of the IAEA held at United Nations Headquarters, New York; it entered into force on 29 July 1957. The Headquarters of the Agency are situated in Vienna. Its principal objective is “to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world.”
ARTICLE II: Objectives

“The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world.
What exactly does the IAEA do?

Assists MS in the context of social and economic goals, in planning for and using nuclear science and technology for various peaceful purposes, including the generation of electricity, human health, environment, water, food and agriculture, production of radioisotopes.
Objective: to enhance the capabilities in Member States to address needs related to the prevention, diagnosis and treatment of health problems through the application of nuclear techniques:
To enhance capabilities of Member States in Nuclear Medicine & Diagnostic Imaging through enhancing safety and quality of practice
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Program tailored to the Needs of our Member States

- Needs of the MS
  - Country Programme Frameworks (CPFds)
  - IAEA’s NUclear Medicine DAtaBase (NUMDAB). Maintain updated information regarding the status of nuclear medicine practice around the world.

- UN reports
  - Global Action Plan for prevention and control of NCDs - WHO

- Advice from experts worldwide

NUMDAB: http://nucmedicine.iaea.org
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• Medical imaging technology has revolutionized health care over the past 30 years.
• Enables early diagnosis.
• Improves patient outcomes.
• Ranked by the New England Journal of Medicine as one of the top medical developments of the past millennium.
Shadows/Challenges

- Difficult to cope with training needs of the involved multidisciplinary team of professionals (physicians, medical physicists, radiographers, radiochemists).
- Lack of proper assessment of the impact of introducing novel high cost health technologies and their sustainability.
- High cost
  - Equipment
  - Increased health cost (If not appropriately used)
- Equitable access for all patients in all countries, not limited to wealthy individuals and countries
- Difficulty to comply the international standards in particular in LMIC due to the lack of adequate infrastructure, machinery, quality assurance culture, qualified human resources
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Mission: To enhance capabilities of Member States in Nuclear Medicine & Diagnostic Imaging through enhancing safety and quality of practice.
Programmatic Activities:
Focused on two Strategic Areas

- Diagnosis and therapy of non-communicable diseases (NCDs) using nuclear techniques
- Educational resources for use of nuclear techniques in human health
Enhancing human health

Four major mechanisms of support

Aim: Improve health through MNDI

Service
Quality
Education
Research
Well established function globally in providing technical guidance in the use of nuclear techniques
Section of NMDI
How we work - Service

Counselling in all stages of implementation

- Making the case
- Clinical Applications
- Quality Management
- Planning Setting up
- Safety Standards
- Research
On-going efforts by IAEA - QUALITY

- Quality is essential for effective delivery of health care,
- Goal is to assist our MS to improve the quality of the services they provide,
- QUANUM project: means to help MS to implement QM systems
  - Training professionals in QM
  - Quality check-list
  - Internal and external audits (EANM-EUMS)
  - Audit missions to MS -advise them on how to improve the quality of practice always considering the safety.

More than 20 audits in 17 countries
2013: revision and update

Way of bringing together researchers from both developing and industrialised countries to solve a problem of common interest.

- Participate in multinational research
- Improve routine clinical practice
- Provide answer to a relevant scientific question

Our research aims to expand knowledge and apply this knowledge to health service
Current CRPs

1. **Nuclear Cardiology:**
   - Nuclear Cardiology in CHF (Eco – MPI synchronism)
   - Myocardial SPECT imaging and CTA in CAD

2. **Oncology:**
   - FDG-PET in Paediatric Lymphoma
   - Radiation Therapy planning based on PET/CT in NSCLC
   - Sentinel lymph node in breast cancer, melanoma, H & N and pelvic cancers

3. **Others:**
   - Enhancing capacity in early diagnosis and detection of breast cancer through imaging
   - Evaluation of SPECT-CT, PET-CT and MR in spine pathology (infection- inflammation)
   - FDG - PET/CT in evaluation of MDR TB

4. **Planned:**
   - Neurodegenerative diseases
   - PET/CT in Solitary Pulmonary Nodule
   - Gated SPECT in planning of ischemia guided PCI in STEMI patients
Enhancing Capacity Building

Education

Goal: to contribute to capacity building in NMDI through effective education and training programmes based on sound educational principles

In order to develop competences in the professionals involved in the practice of NMDI through a lifelong learning process we organize.

- Seminars and workshops
- International, regional conferences (RTC, …)
- Teaching materials
- Technical and scientific publications
- Online trainings
On-going for the last 15 years, mainly focus on the training of technologists.

Three year competency-based online program that has

- >40 subjects delivered in 16 Modules, ~900 hours of study

Two parts

- Part 1: basic science conventional nuclear medicine,
- Part 2: SPECT, PET, CT and Cyclotrons

Certificate of achievement presented by professional societies, universities or hospitals (National recognition)

- + 800 trained technologists, + 25 countries
Online CT & PET/CT Training

• Cope with the training needs.
• Develop key competencies.
• Partnership with SNMMI - Lifelong learning program.
• 600 nuclear medicine physicians and radiologists in IAEA Member States worldwide.

Review of 200 - CT and PET/CT Cases online
Goal: To support the MS with information for strengthening and improving the quality of practices through the use of CME Materials

http://humanhealth.iaea.org
Improving the learning experiences through eLearning

Development of interactive eLearning modules

• Introduction of new interactive learning materials in the form of robust E-learning modules that enhance the self-directed learning experience.
• Has the potential to improve efficiency in education and expand educational opportunities in remote areas.
• A guide for hybrid imaging analysis
• CT lymph node schematic approach Head and Neck, Thorax, Abdomen and Pelvis

http://humanhealth.iaea.org
Aim is to support physicians in a structured manner
http://humanhealth.iaea.org

Human Health Campus is Mobile

http://humanhealth.iaea.org/m
IAEA Human Health Campus

- Constantly updated
- New materials developed and selected at regular basis
- Partnerships with professional organizations
Webinars, unlike webcasts, offer the opportunity of enhanced interaction with the learners facilitated through slide shows where the presenter guides and engages the audience using video and live streaming

- Monthly webinars in Spanish and English (French coming soon)
- In cooperation with major international organizations (SNMMI and ASNC)
- Series on: Nuclear cardiology and Computed Tomography
- Average of 300 participants per webinar worldwide
Conference and CME

For the first time in an IAEA conference, participants were awarded with 24 CME credits by EACNME, as an objective evidence of the professional competency development to keep professionals up-to-date and improve the quality of clinical practice.

CME for other educational initiatives
- Webinars
- Workshops

The EACCME is an institution of the European Union of Medical Specialists (UEMS)

Through an agreement between the European Union of Medical Specialists and the American Medical Association, physicians may convert EACCME credits to an equivalent number of AMA PRA Category 1 Credits.

IPET, 2007: 350 participants 69 MS
IPET 2011: 370 participants 78 MS
IMIC 2013: 240 participants, 70 MS
IPET 2015: November 2015
Scientific or Technical Publications

- Standard Operating Procedures for PET/CT - A practical approach for use in adult oncology
- Nuclear Cardiology: Guidance and Recommendations for Implementation in Developing Countries
- Practical Guidance on Peptide Receptor Radionuclide Therapy (PRRNT) in Neuroendocrine Tumours
- Appropriate use of FDG-PET for the Management of Cancer Patients
- Planning a Clinical PET Centre
- Quality Assurance for PET and PET/CT Systems
- A Guide to Clinical PET in Oncology: Improving Clinical Management of Cancer Patients
- Clinical Applications of SPECT/CT: New Hybrid Nuclear Medicine Imaging System
- The Role of PET/CT in Radiation Treatment Planning for Cancer Patient Treatment
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The Technical Cooperation Program

- Technical Cooperation Program is aimed at technology transfer to MSs
- Biannual cycle
- Proposals sent by MS
- Evaluated by TC and technical divisions
- Projects in Human Health accounts for more than 25% of the total TC budget
- Total budget allocated to support NMDI projects worldwide exceeds 3.5 Mil USD/year
Technical Cooperation projects:
Currently 60 national projects + 15 regional
New concepts (16-17 cycle) deadline May 31st, 2014
Focus on - Hybrid Modalities
PET/CT and SPECT/CT

- PET/CT has become the standard of practice in cancer management in the last decade
- Supporting activities and projects focused on implementing PET/CT: 1/3 of IAEA Member States have at least one PET centre and many others are in the planning phase. From 2009 to 2014: **Thirty projects in MS (close to 40%)** devoted to implementation of PET-CT
- From 2009 to 2014: **Seven projects in MS** devoted to implementation of SPECT/CT
- In 2013-14: First projects devoted to the establishing of a **Diagnostic Radiology Centre** in Afghanistan and Laos
Technical Cooperation activity

- Training (the last 50 years):
  - Nearly 2300 fellowships/scientific visits awarded
    - 11448 months (950 years)
  - Close to 290 Regional/Interregional Training Courses (typically 5 days each) on different topics related to NM in the last 20 years
    - in total 4758 participants
Technical Cooperation activity

• Procurement:
  • Nearly 60 new SPECT cameras provided to MSs in the last 10 years
  • Dose calibrators; Lead-shielded hoods; synthesis modules and treadmills among others.
  • Generators and cold kits (LDCs)
We Are Here To Help

- Technical Cooperation
- Human Health Campus
- QUANUM
- CRPs
- DAT
- NUMDAB
- Online Trainings
- Publications
- Webinars

IAEA
Thank you