IAEA Activities in Nuclear Medicine

Rodolfo Núñez Miller

Nuclear Medicine and Diagnostic Imaging section
Division of Human Health
International Atomic Energy Agency, Vienna (Austria)
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.

"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:

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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.
Science & technology

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
Outline

1. Who we are
2. How we work
3. Challenges
4. Outreach
5. Technical Cooperation Program
Program tailored to the Needs of our Member States

- Needs of the MS
  - Country Programme Frameworks (CPFs)
  - 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://nucmmedicine.ieaa.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
Outline

1. Who we are
2. Program tailored for the Needs of our Member States
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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 mechanism of support

Aim: Improve health through MNDI

- Service
- Quality
- Education
- Research
Advice and Support – every step of the way

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

IAEA
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
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
Distance Assisted Training (DATOL) Online for Nuclear Medicine Professionals

- 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

IAEA & SNMMI Complimentary CT Webinar Series. CT Review: A guide for hybrid imaging analysis
July 24, 2013, 12:00 am EST (English)
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

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<tr>
<th>Conference</th>
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<th>MS Credits</th>
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<td>IPET 2007</td>
<td>350</td>
<td>69</td>
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<td>IPET 2011</td>
<td>370</td>
<td>78</td>
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<td>IMIC 2013</td>
<td>240</td>
<td>70</td>
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<td>IPET 2015</td>
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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)
Thank you