

Curso regional de técnicas avanzadas de imágenes diagnósticas en cardiopatía dilatada y el papel de la medicina nuclear en la evaluación de la enfermedad de Chagas



IAEA initiatives in nuclear medicine/cardiology & objectives of the Training Course

Diana Paez

Section of Nuclear Medicine and Diagnostic Imaging
Division of Human Health



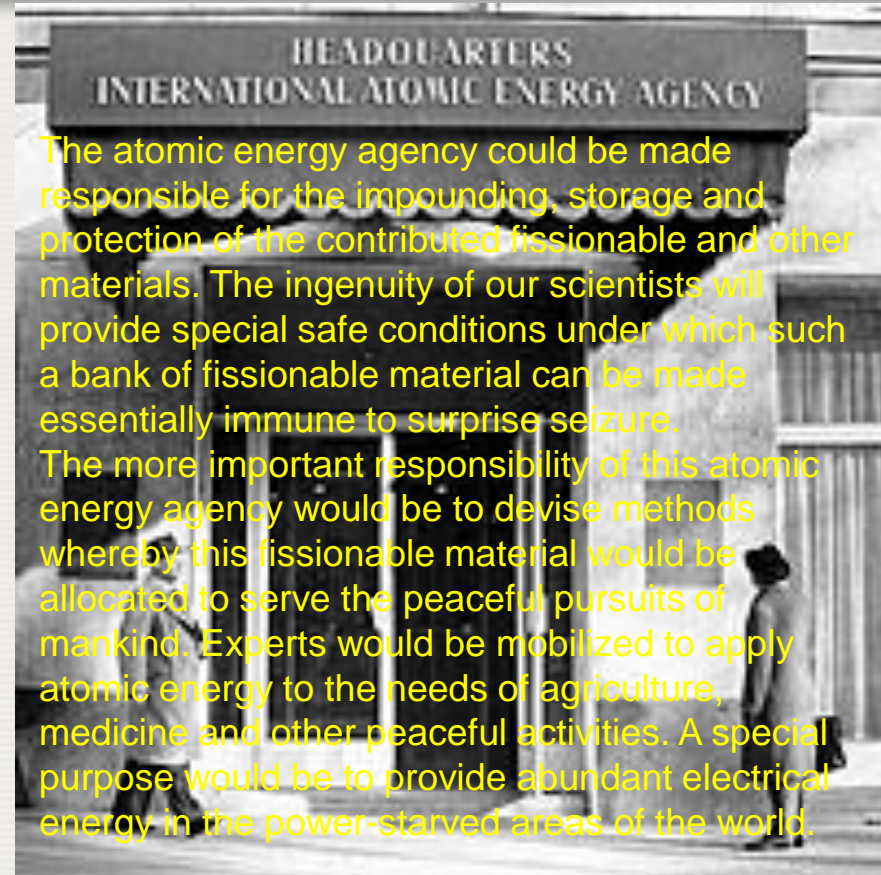
IAEA

International Atomic Energy Agency

Outline of the Presentation

- IAEA
- Division of Human Health
- Nuclear Medicine & Diagnostic Imaging Section
- Nuclear cardiology activities
- Objectives of current Expert Meeting
 - Who we are
 - What we do
 - How we deliver

- Is an independent intergovernmental, science and technology-based organization, in the UN family, that serves as the global focal point for nuclear cooperation;
- It was set up as the world's "Atoms for Peace" organization in 1957
- The Agency works with its Member States and multiple partners worldwide to promote safe, secure and peaceful use of nuclear technologies.



TO PROMOTE SAFE, SECURE AND PEACEFUL 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.



NUCLEAR APPLICATIONS in Health

A UNIQUE MANDATE OF THE UN SYSTEM

“The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, **health** and prosperity throughout the world”

Article II of the Statutes of IAEA



Atoms for Health



The following States are Members of the International Atomic Energy Agency:

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

IAEA 154 Member States

2012

UN 193 Member States In 2011



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".

What exactly does the IAEA do?

Mission: Maximizing the contribution of nuclear technology to society, while verifying its peaceful use

Three pillars:

- Verifies through its inspection system that States comply with their commitments, under the Non-Proliferation Treaty and other non-proliferation agreements, to use nuclear material and facilities only for peaceful purposes.

Safeguards & verification

technology for various peaceful purposes, including the generation of electricity, and facilitates the transfer of such technology and knowledge in a sustainable manner to developing MS

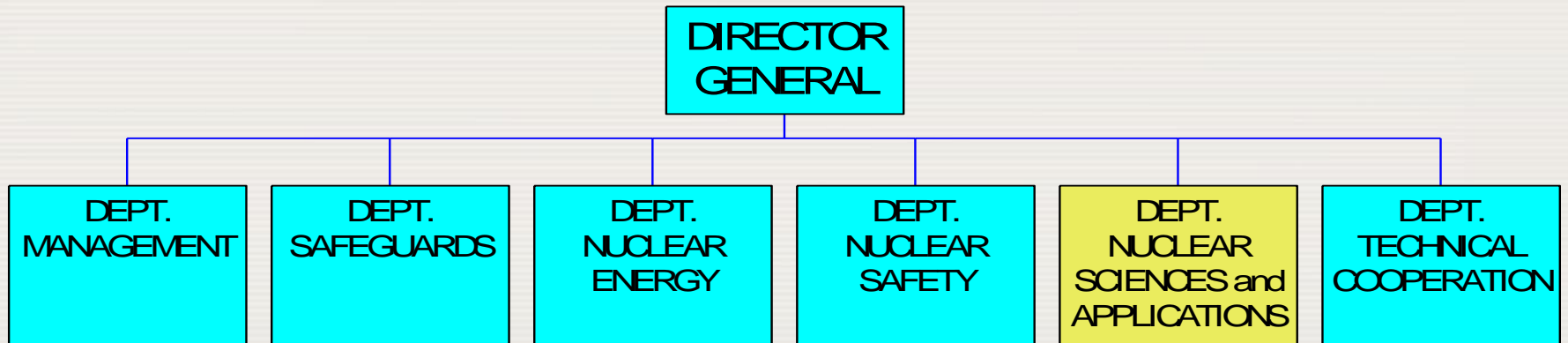
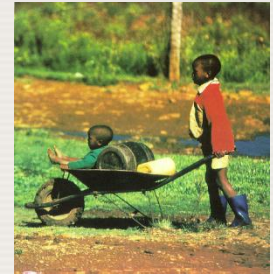
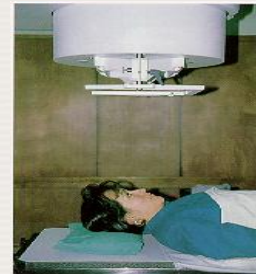
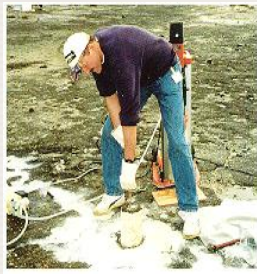
- Develops nuclear safety standards and, based on these standards, promotes the achievement and maintenance of high levels of safety in

near energy, as well as the health and the protection against ionizing radiation;

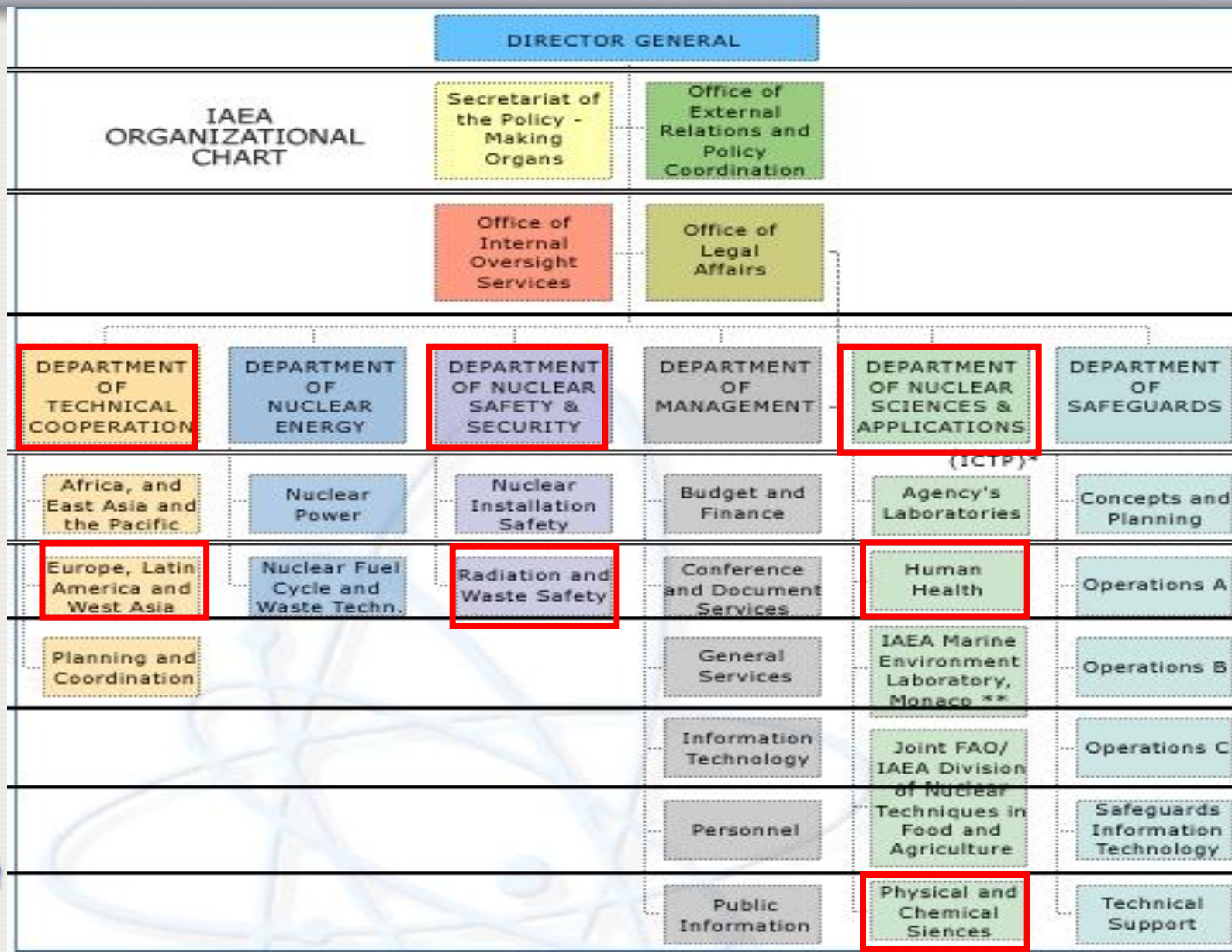
• Promotes the development of social and economic conditions for the effective use of nuclear science and technology



INTERNATIONAL ATOMIC ENERGY AGENCY



IAEA Organization chart



Division of Human Health (NAHU)

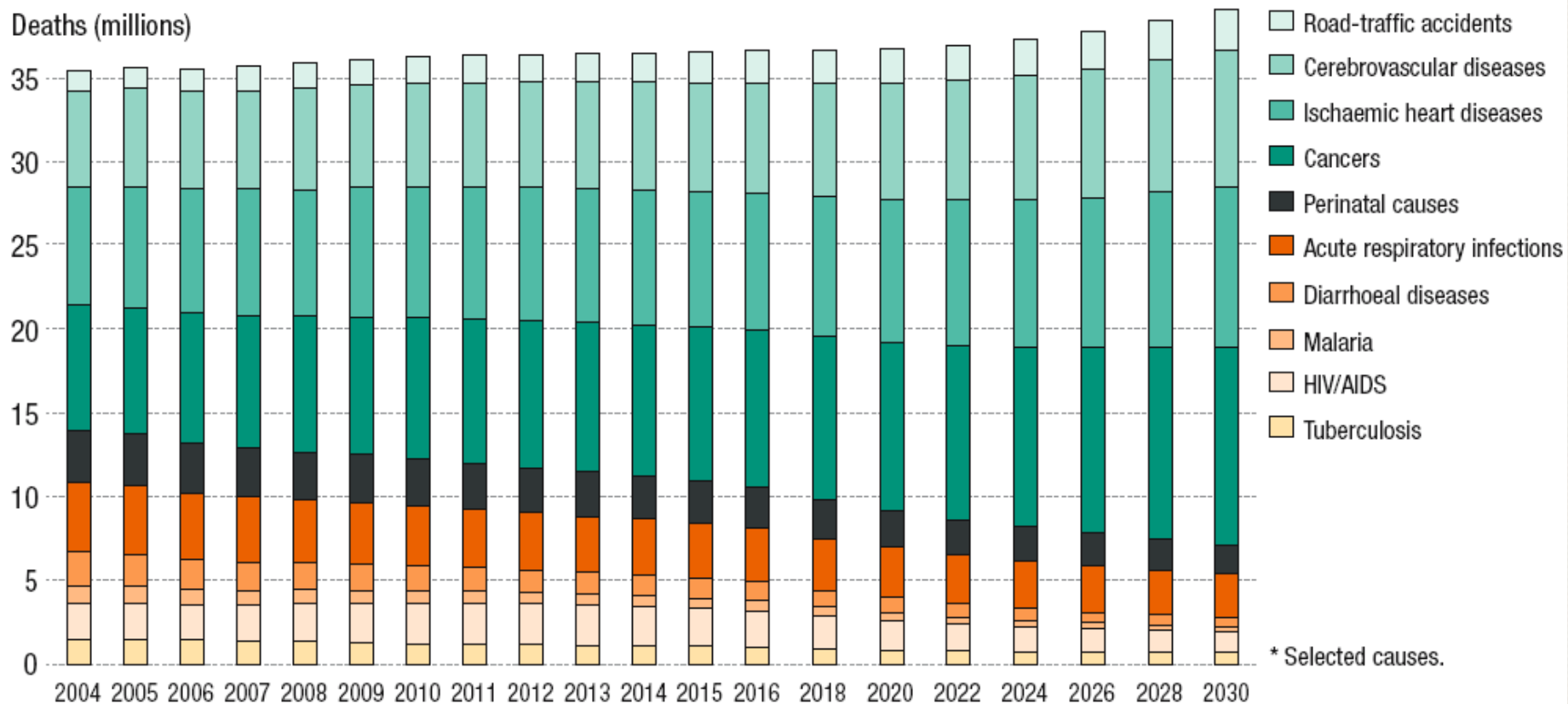
- **Objective:** to enhance the capabilities in Member States to address needs related to the prevention, diagnosis and treatment of health problems through the application of nuclear techniques:
 - NMDI (Nuclear Medicine & Diagnostic Imaging Section)
 - ARBR (Applied Radiation Biology & Radiotherapy Section)
 - DMRP (Dosimetry & Medical Radiation Physics Section)
 - NAHRES (Nutrition & Health related Environmental Studies Section)

WHO's world health report for 2008

- Urbanization, ageing and globalized lifestyle changes combine to make chronic and non-communicable diseases – including depression, diabetes, cardiovascular disease and cancers – and injuries increasingly important causes of morbidity and mortality
- There is a striking shift in distribution of death and disease from younger to older ages and from infectious, perinatal and maternal causes to non-communicable diseases

The World Health Report 2008

Figure 1.8 The shift towards noncommunicable diseases and accidents as causes of death*



IAEA - Division of Human Health (NAHU)

How we work

Capacity Building of MS

- Education
- Advice
- Awareness
- Human resource development
- Coordinated research (CRP)

Programmatic Activities (Regular Budget)

- Technology transfer

Technical Cooperation

Educational Initiatives of Nuclear Medicine & Diagnostic Imaging Section

How we deliver

- Consultant Meetings/ Technical Meetings
- Coordinated Reserach Projects (CRPs)
- International Symposia/Conferences
- Educational Resources

Awareness

Education

- **Goal:**

Capacity building in MS to accept, use & update knowledge about modern technology & its quality.

- **To achieve goal:**

National training course

Regional training course

Expert missions

Fellowship / Scientific visits

Publications

Human Health Campus

Distance Assisted Training



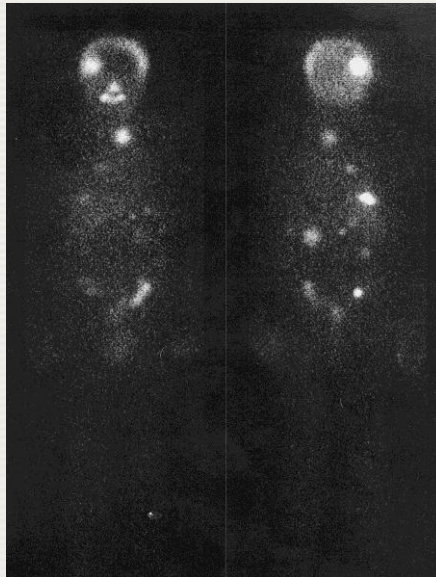
Major activities in Nuclear Medicine and Diagnostic Imaging

Mission: To enhance capabilities of Member States in Nuclear Medicine & Diagnostic Imaging through enhancing safety and quality of practice

Managing of chronic diseases with integrated diagnostic imaging modalities emphasizing infectious, cardiovascular and cancer



Cost-effective use of radiopharmaceuticals in therapy, neurology and paediatric diseases



Quality management in professional education and clinical practice

IAEA NUCLEUS For Nuclear Knowledge and Information

Home Nuclear Medicine Radiopharmacy Radiation Oncology Medical Physics Technologists Nutrition

Nuclear Medicine

- Cardiovascular Pulmonary
- Endocrinology
- Neurology
- Oncology
- Paediatrics
- Nephrology
- Other Systems/Organs
- Radionuclide Therapy
- Infection Inflammation and Musculoskeletal
- Nuclear Medicine Library
- Quality Practice
- Nuclear Medicine Links
- Nuclear Medicine News
- Nuclear Medicine Events

Shortcuts

News

Nuclear Medicine

- Cardiovascular Pulmonary
- Endocrinology
- Neurology
- Oncology
- Paediatrics
- Nephrology
- Infection Inflammation and Musculoskeletal
- Nuclear Medicine Links

Quality Management Audits in Nuclear Medicine Practices



Publications – Web based

The screenshot displays the IAEA Human Health Campus website. At the top, there is a navigation bar with the IAEA logo and the text 'IAEA Human Health Campus'. Below this, a secondary navigation bar lists various categories: Home, Nuclear Medicine, Radiopharmacy, Radiation Oncology, Medical Physics, Technologists, and Nutrition. A search bar is located on the right side of the page.

The main content area is divided into several sections:

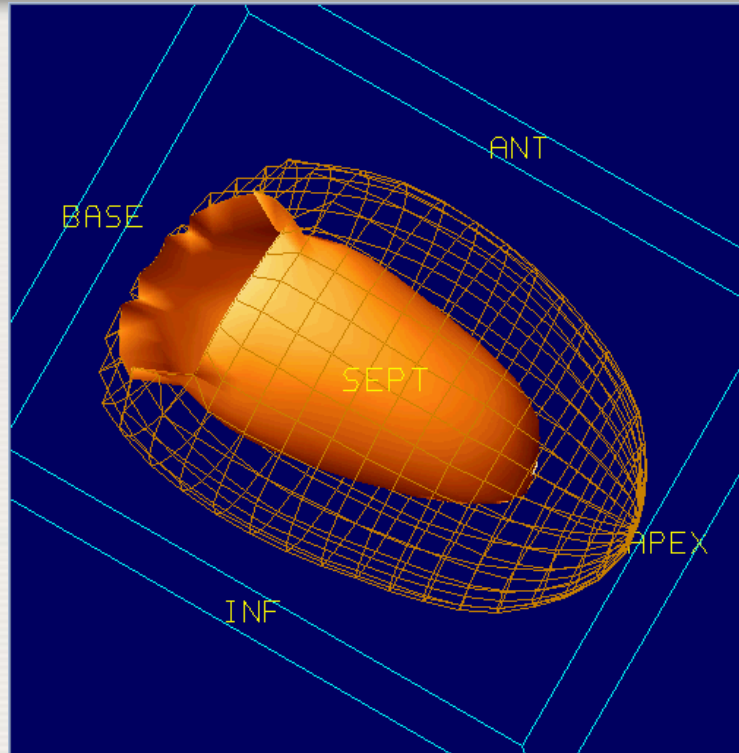
- IAEA Publications, Documents & Reports:** This section includes sub-sections for Scientific & Technical Publications, International Standards, Guides & Codes, IAEA Reports & Reviews, IAEA Documents & Conventions, and Magazines, Journals & Newsletters. Each sub-section provides a brief description and a link to more information.
- Resources and Learning for Health Professionals:** This section highlights the IAEA's role as a leading publisher in the nuclear field, offering scientific and technical publications covering fifteen subject areas.
- Shortcuts:** A sidebar on the left provides quick links to various sections of the website.
- In the Spotlight:** A featured message from the Director of Human Health, welcoming visitors to the Human Health Campus.
- What's New:** A section for the latest updates, including a virtual course in radiopharmacy.
- Latest Literature:** A list of recent publications, including articles on radiation dose and image quality, effective doses in radiology, and comparative dosimetry of dental CBCT devices.
- Latest News:** Updates on new training material for radiation protection in cardiology and a compilation of incidents.
- Upcoming Events:** Information about meetings on radiation protection in cardiology and meetings connected with IRPA 12.

The footer of the website contains copyright information for 2008 and a link to the IAEA website.

<http://www.iaea.org/Publications/index.html>



Nuclear Cardiology



- Standard of practice in cancer management in the last decade
- Role of Nuclear Cardiology
- Supporting activities and projects focused on implementing and strengthening nuclear cardiology

[Home](#)[Nuclear Medicine](#)[Radiopharmacy](#)[Radiation Oncology](#)[Medical Physics](#)[Technologists](#)[Nutrition](#)

Nuclear Medicine

[PET/CT Gallery](#)[e-Learning Module](#)[Oncology](#)[Cardiovascular and Pulmonary](#)[Endocrinology](#)[Neurology](#)[Paediatrics and Nephrourology](#)[Other Systems/Organs](#)[Infection Inflammation and Musculoskeletal](#)[Radionuclide Therapy](#)[Radioguided Surgery](#)[Quality Practice](#)[Nuclear Medicine Library](#)[Nuclear Medicine Links](#)[Nuclear Medicine Latest](#)[Nuclear Medicine Events](#)

Shortcuts

[Latest](#)[Events](#)[Links](#)[General Public Information](#)[Databases & Statistics](#)[IAEA Publications](#)

Nuclear Medicine

[PET/CT Gallery](#)[e-Learning Module](#)[International Conference IPET 2011](#)[Oncology](#)[Cardiovascular and Pulmonary](#)[Endocrinology](#)[Neurology](#)[Paediatrics and Nephrourology](#)[Other Systems/Organs](#)[Infection Inflammation and Musculoskeletal](#)[Radionuclide Therapy](#)[Radioguided Surgery](#)[Quality Practice](#)[Nuclear Medicine Library](#)[Nuclear Medicine Links](#)

After 100 years from the discovery of X-rays and half a century from the initial applications of radiotracers, nuclear medicine has become an integral part of medical practice. As the scope of imaging has broadened from anatomy to metabolism and function, and potential applications are increasingly expanding, virtually very few diagnoses can be made without the need of at least the simplest imaging procedure. Through case studies,



Nuclear Medicine

[PET/CT Gallery](#)[e-Learning Module](#)[Oncology](#)[Cardiovascular and Pulmonary](#)[Endocrinology](#)[Neurology](#)[Paediatrics and Nephrourology](#)[Other Systems/Organs](#)[Infection Inflammation and Musculoskeletal](#)[Radionuclide Therapy](#)[Radioguided Surgery](#)[Quality Practice](#)[Nuclear Medicine Library](#)[Nuclear Medicine Links](#)[Nuclear Medicine Latest](#)[Nuclear Medicine Events](#)[Shortcuts](#)

Cardiovascular and Pulmonary

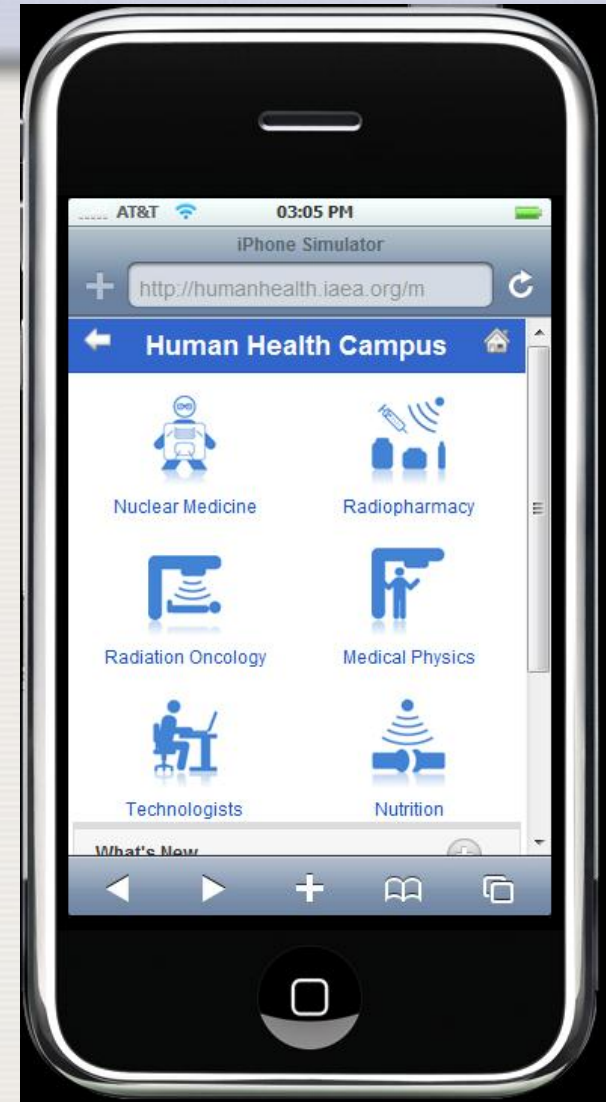
[Teaching Cases](#)[Lectures](#)[IAEA Training Courses and Meetings](#)[Guidelines and Literature](#)[Interpretation and Reporting](#)[IAEA Publications](#)

Nuclear Cardiology is a well established technique to assess myocardial perfusion and ventricular function, and its role as a non invasive methodology for the characterization of a variety of cardiac conditions, especially coronary artery disease (CAD) has been extensively evaluated and validated in clinical practice. Nuclear cardiology uses the so-called emission tomography imaging method (single-photon emission computed tomography or SPECT, and more recently positron emission tomography or PET) which renders three-dimensional images depicting the distribution of a radioactive compound in the heart which was previously administered intravenously at rest or during a stress test. Nuclear cardiology is one of the most commonly used procedures for detecting and determining the severity of CAD. It is sensitive, accurate, and cost-effective, and gives excellent prognostic information that is not provided by other diagnostic modalities, useful for patient management based on risk-stratification.

Pulmonary scintigraphy is extensively used for the evaluation of lung perfusion and ventilation, and has a principal role in the diagnosis of pulmonary embolism (PE). Despite recent advances in other imaging modalities such as CT pulmonary angiography, the radionuclide technique is considered to have superior sensitivity although with

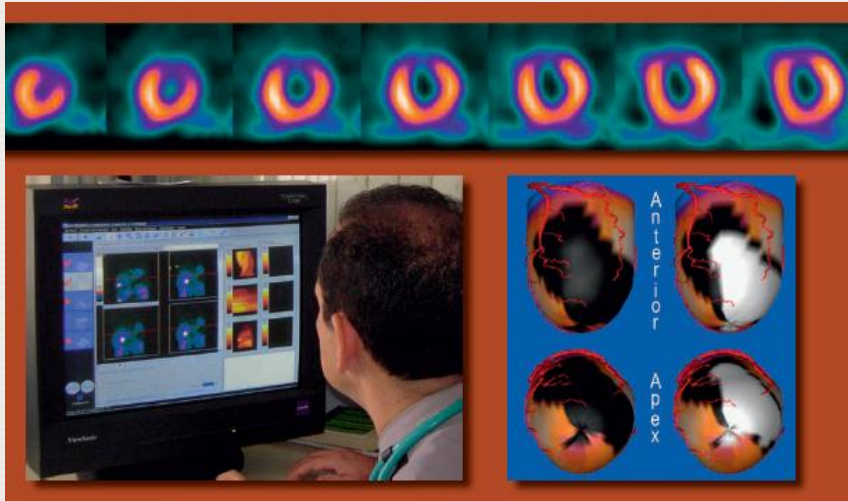
Aim is to support physicians in a structured manner

From Desktop to Mobile Technology



- Expand Learning Opportunities
- Platform for future real time M-Learning
- Lifelong learning experience

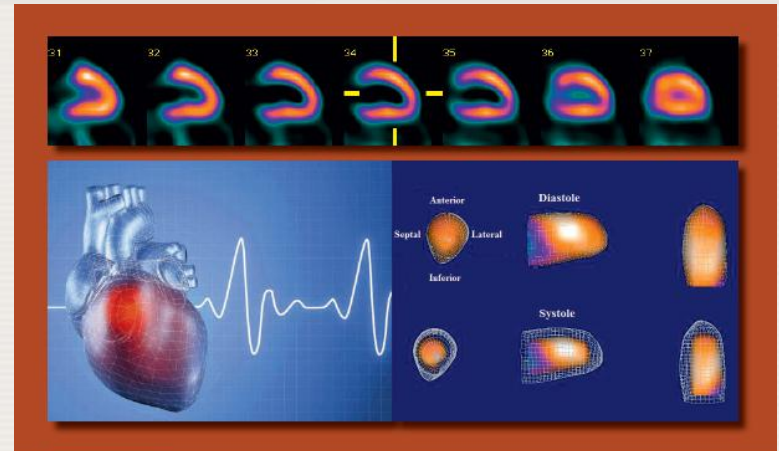
Nuclear Cardiology



IAEA HUMAN HEALTH SERIES

No. 18

**Nuclear Cardiology:
Its Role in Cost
Effective Care**



IAEA HUMAN HEALTH SERIES

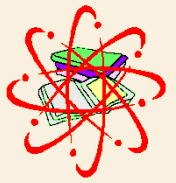
No. 23

**Nuclear Cardiology:
Guidance and
Recommendations
for Implementation in
Developing Countries**



IAEA
International Atomic Energy Agency

DAT – Distance Assisted Training



- ❖ 1990-1994 Project formulation and funding (AusAID / IAEA / RCA)
- ❖ 1994-1997 Development and pilot testing - Phase 1 (*basic*)
- ❖ 1999 IAEA Inter-regional project established (*Asia, Africa, Latin America*)
- ❖ 1999-2002 Development and pilot testing – Phase 2 (*advanced*)
- ❖ Implementation of training program
- ❖ 2003-2004 Editing and extension of materials (IAEA)
- ❖ 2005 IAEA international review and editing
- ❖ 2007- 2010 Development SPECT/CT, PET/CT (DAT Part 2)
Phase 3 - Development of website delivery - Pilot

Coordinated Research

- Technology transfer (new procedures/techniques implemented)
- Share of knowledge (scientists from developed/developing countries working together)
- Contributes towards the greater understanding or solution of a specific issue or problem
- Contributes to the wider objectives which have been set for the relevant Agency Programme or Project

Current CRPs

Cardiology

Assessment of LVEF in CAD by G-SPECT

Rest MPI in acute chest pain

MPI in asymptomatic diabetes

Myocardial SPECT imaging and CTA in CAD

NEW Educational Initiatives of Nuclear Medicine & Diagnostic Imaging Section

- Webinar
 - Web base seminar
 - In comfort of your hospital or home
 - No need to travel
 - Structure interactive training
 - No cost to participant
 - Through a partnership of *IAEA and SNM*

COMPLIMENTARY WEBINAR: 10 CT Cases of the Thorax, Abdomen, and Pelvis

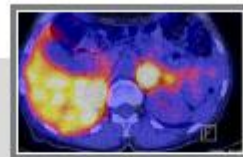


August 21, 2012 | 9:00pm PDT*

IAEA and SNMMI bring you a free webinar designed to increase Nuclear Medicine physicians' knowledge of cross sectional anatomy. Sundeep Nayak, MD, Adjunct Professor of Radiology at the University of California, San Francisco will review 10 CT cases of the thorax, abdomen and pelvis to increase interpretive skills when CT is performed in conjunction with PET and SPECT.

Normal anatomy and common pathological findings will be reviewed in a live, interactive case-based format that simulates clinical practice. Participants will be asked one question after each presentation using an audience response system that allows participants to evaluate their knowledge and diagnostic skills compared to their peers.

Register for this complimentary webinar & check corresponding date and time in your country: www.snmmi.org/iaeaweb

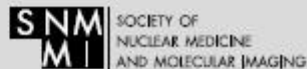


Learning Objectives:

- Understand normal cross sectional anatomy and common variants
 - Recognize common pathological findings
 - Increase interpretative skill when reading CT performed in conjunction with PET and SPECT
- ✓ No international calling fees
 - ✓ Check corresponding date and time of webinar in your country*
 - ✓ Limited registration available
 - ✓ View a sneak preview at www.snmmi.org/iaeaweb



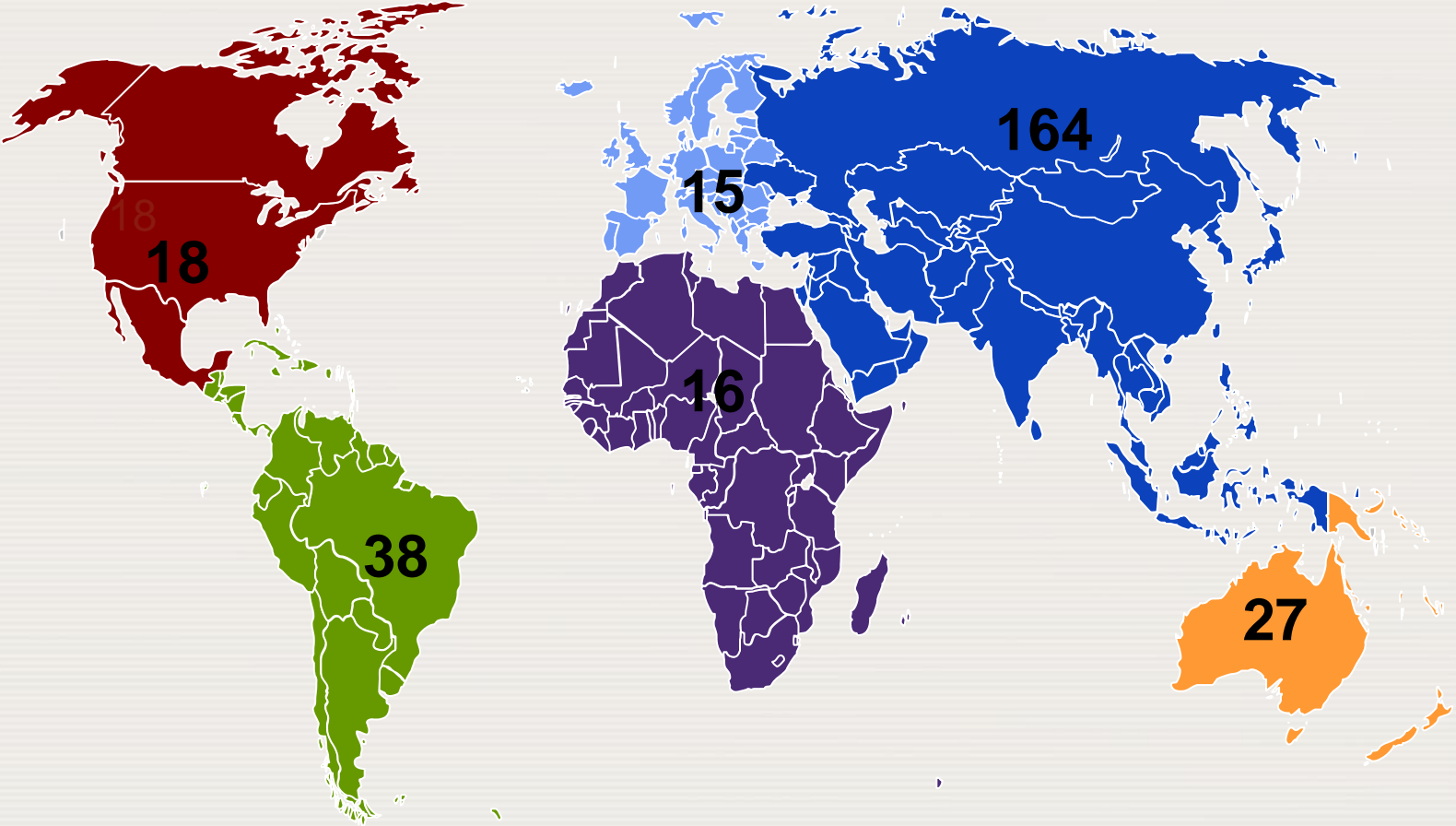
Offered as part of a joint educational series between:



Attendance according to Time zones



Participants/Continent



Enhancing Quality of Practice

Quality Management Audits in Nuclear Medicine Practices

Comprehensive audit



IAEA HUMAN HEALTH SERIES

No. 4

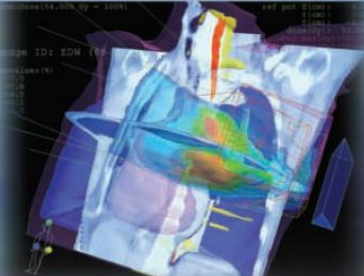
Comprehensive Clinical Audits of Diagnostic Radiology Practices: A Tool for Quality Improvement

Quality Assurance Audit for Diagnostic Radiology Improvement and Learning (QUAADRIL)



Comprehensive Audits of Radiotherapy Practices: A Tool for Quality Improvement

Quality Assurance Team for Radiation Oncology (QUATRO)



QA: one of the major projects of NAHU



Outreach



 **IAEA**
International Atomic Energy Agency
Atoms for Peace

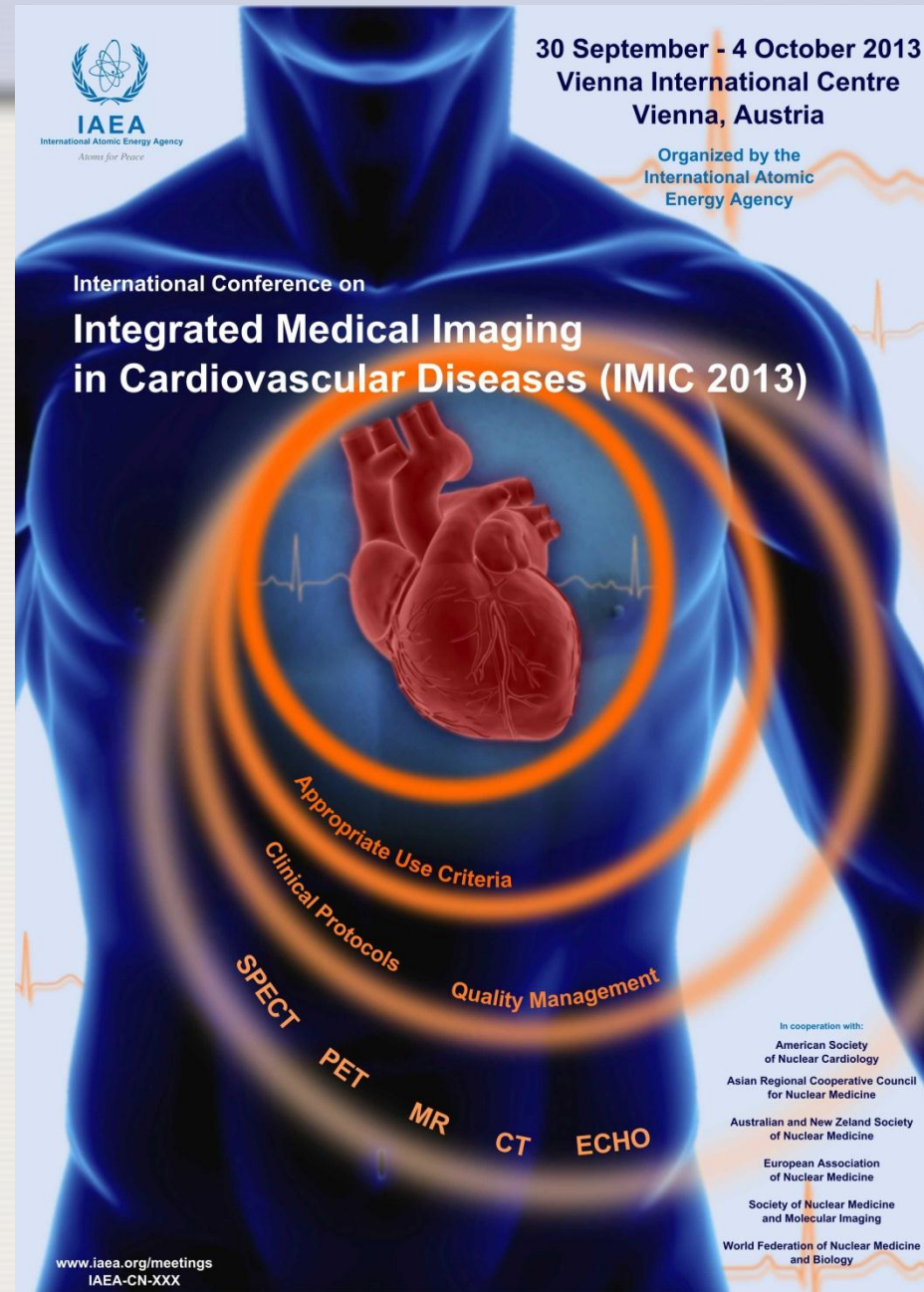
International
Conference on


**CLINICAL PET AND
MOLECULAR NUCLEAR
MEDICINE (IPET 2011)**

8–11 November 2011
Vienna, Austria

Organized by the
International Atomic
Energy Agency

350 participants
www.iaea.org/meetings
79 MSS



 **IAEA**
International Atomic Energy Agency
Atoms for Peace

30 September - 4 October 2013
Vienna International Centre
Vienna, Austria

Organized by the
International Atomic
Energy Agency

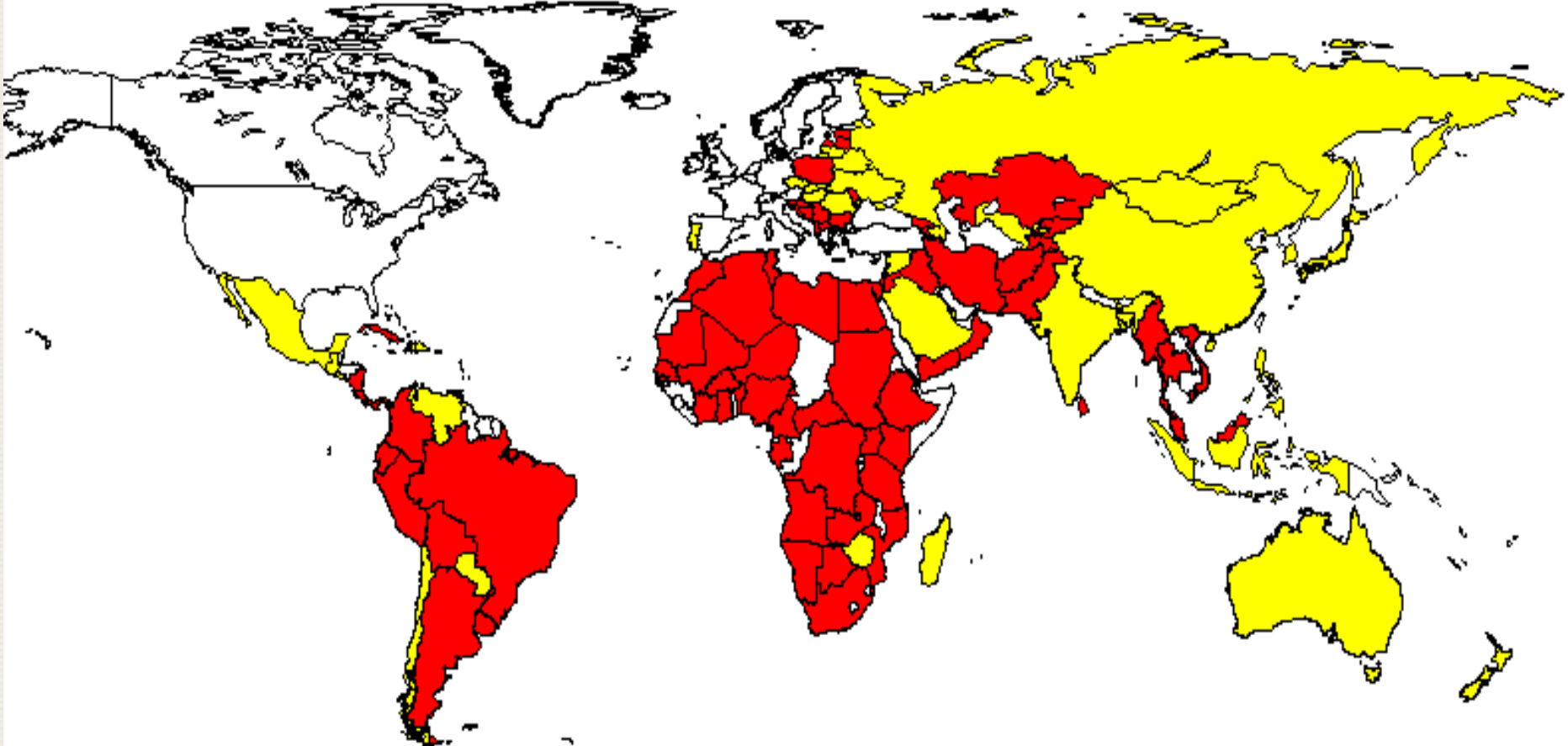
International Conference on
**Integrated Medical Imaging
in Cardiovascular Diseases (IMIC 2013)**

Appropriate Use Criteria
Clinical Protocols
Quality Management
SPECT PET MR CT ECHO

In cooperation with:
American Society
of Nuclear Cardiology
Asian Regional Cooperative Council
for Nuclear Medicine
Australian and New Zealand Society
of Nuclear Medicine
European Association
of Nuclear Medicine
Society of Nuclear Medicine
and Molecular Imaging
World Federation of Nuclear Medicine
and Biology

www.iaea.org/meetings
IAEA-CN-XXX

Technical Cooperation Program NMS



Cycle 2009-11
48 National
8 Regional

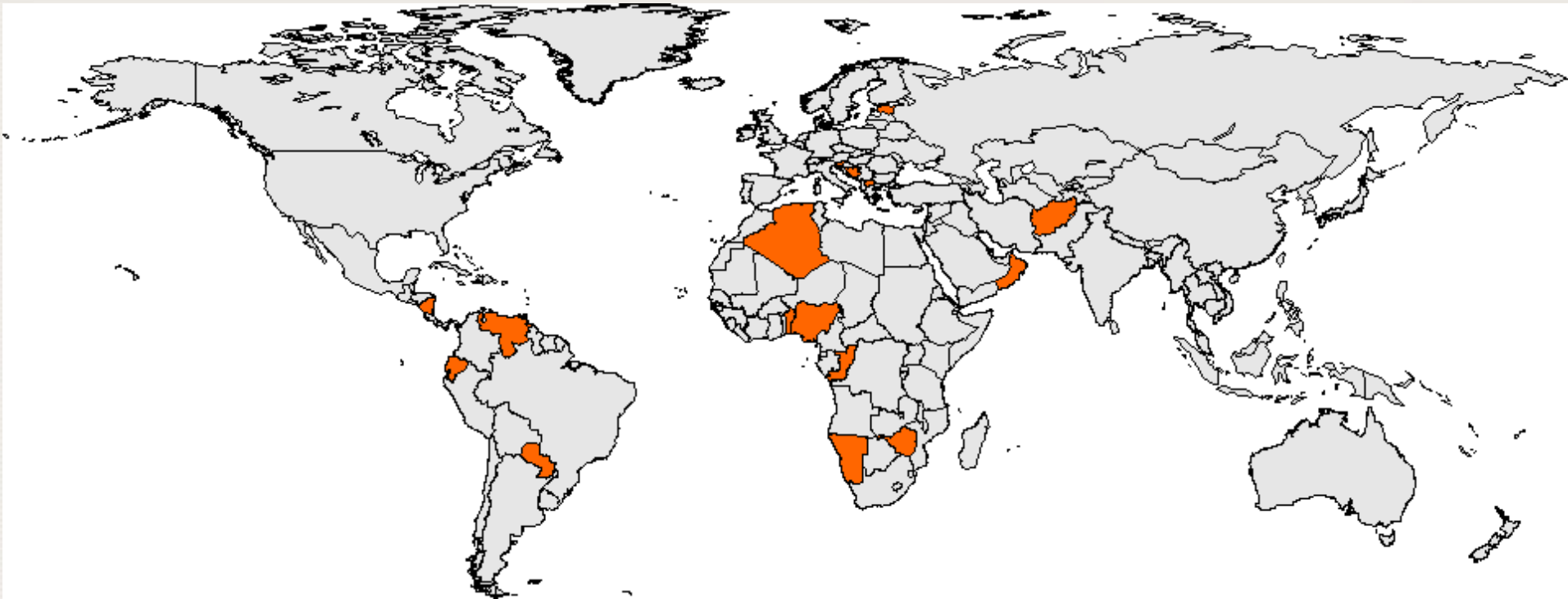
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Cycle 2012-13
19 National
7 Regional

=

67 Nat.
15 Reg.

National Projects Cardiology



Afghanistan, Algeria, Benin, Bosnia and Herzegovina, Ecuador, Estonia, Macedonia, Morocco, Namibia, Nicaragua, Niger, Oman, Republic of the Congo, Slovenia, Zimbabwe, Venezuela, Paraguay

Summary

- Objective is Capacity building
- Based on education principles
- Need based
- Complete development *versus* Skill enhancement

Sub-regional Meeting on the appropriate use of nuclear cardiology in dilated cardiomyopathy, with emphasis on Chagas disease.

Standardization of protocols and clinical applications

RLA6070

“Armonización de las técnicas de cardiología nuclear para tratar a los pacientes que sufren de insuficiencia cardíaca congestiva, haciendo énfasis en la cardiomiopatía de Chagas”

Objetivos del curso:

- **Mejorar el conocimiento sobre las técnicas diagnósticas de imagen disponibles para la evaluación de pacientes con falla cardíaca (FC), cardiomiopatía dilatada (CMD) y enfermedad de Chagas (EC), con énfasis en las técnicas de medicina nuclear.**
- **Contar con profesionales debidamente capacitados que puedan difundir los conocimientos adquiridos y establecer los procedimientos en sus respectivos centros/países para de esta manera mejorar la atención de los pacientes..**

Curso regional en cardiología nuclear: “Tecnología y técnicas para tecnólogos en medicina nuclear “

Arequipa, Perú - 11 a 15 de Marzo de 2013

