



## Diversity & Inclusion in Latin America: The Cuban Experience

Dr. Rodolfo Alfonso Laguardia  
2016

Higher Institute of Technologies and Applied Sciences  
(INTEC – Havana, Cuba)

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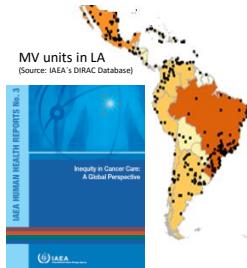
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 **Latin America**

- Part of North America (Mexico)
- Central America
- Caribbean (CUB, DOM, PUR)
- South America
- **Most languages spoken:** Spanish (64%) and Portuguese (33%)
- **Main colonization:** Spain and Portugal
- Inequities in equipment, accessibility and qualified human resources.




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 **Latin America**

- Influences of original cultures (Mexico, Guatemala, Peru, Bolivia, Paraguay)
- Similar idiosyncrasy, religion and cultural characteristics




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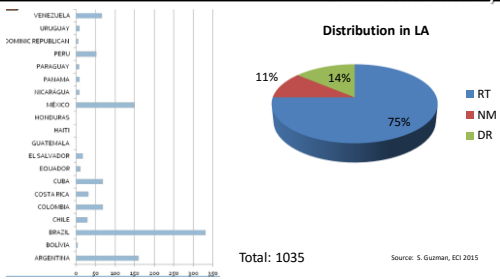
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### Medical Physics in LA: distribution by area



### Medical Physics in LA: organizations

- Latin American Society of Medical Physics (ALFIM)
- Established in 1984.
- Congress every 3 years
- Next congress: Córdoba, Argentina

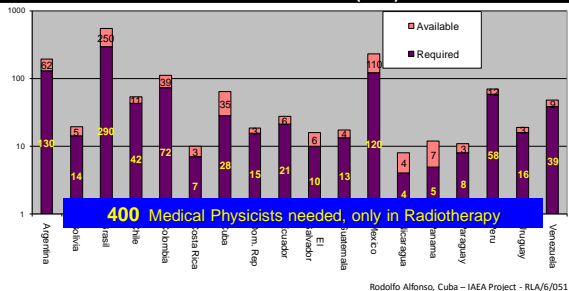


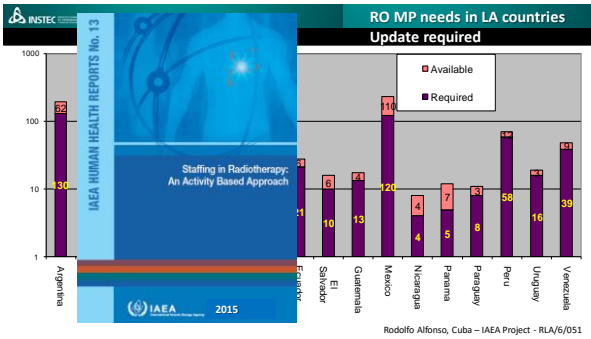
ARGENTINA	Argentinian Society of Medical Physics (SAFM)
BRASIL	Brazilian Association of Medical Physics (ABFM)
CHILE	Medical Physics Society of Chile (SOPMECH)
COLOMBIA	Colombian Association of Medical Physics and Radiation Protection (ACOPM/RP)
COSTA RICA	Physics Society
CUBA	Cuban Physics Society Medical Physics Section
MEXICO	Mexican Federation of Organizations for Medical Physics (FOMFOM)
PANAMA	Panamanian Association of Physicists in medicine
PARAGUAY	Paraguayen Society of Medical Physics
PERU	Peruvian Society of Medical Physics
VENEZUELA	Venezuelan Society of Medical Physics

Source: S. Guzman, ECI 2015



### RO MP needs in LA countries (2007)






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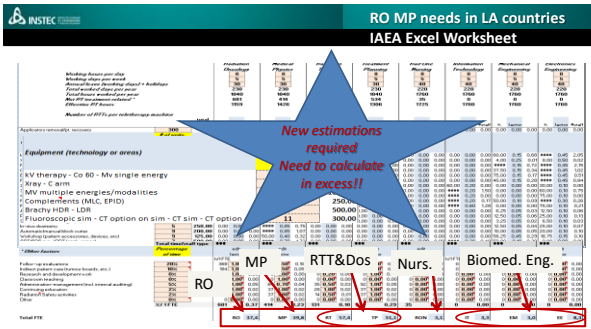
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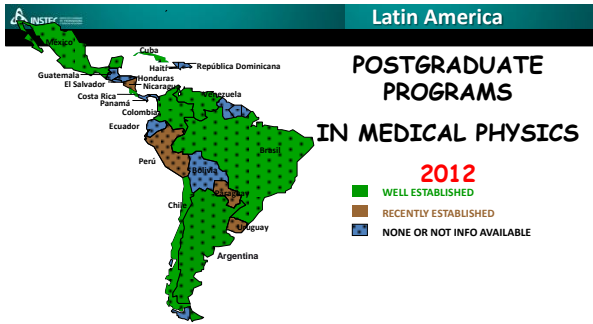
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**MP Education and Training in LA: Background**

- Regional MS program in MP (2000-2004)
  - IAEA Regional Cooperation Project ("ARCAL 50")
  - 2-year IAEA fellowships for 30 MPs from all LA countries
  - Support for expert missions (lecturers)
  - Several national MS-MP programs boosted up:
    - VEN (host), ARG, BRA, CUB, CHI, COL, COS, PER



**MAESTRIA EN FISICA MEDICA**

*Propuesta de proyecto elaborada por un panel de expertos durante una reunión celebrada en Viena, Abril 27-30, 1998.*

Revisión: Colombia, Cuba, Ecuador, El Salvador, Guatemala, Haití, Honduras, Nicaragua, Panamá, Perú, Uruguay, Venezuela, Chile

Secretaría Científica: Pedro Arángel



**OIEA**  
ORGANISMO INTERNACIONAL DE ENERGIA ATOMICA  
Mayo 1998

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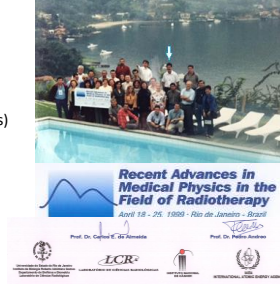
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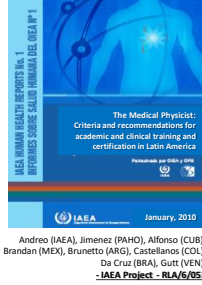
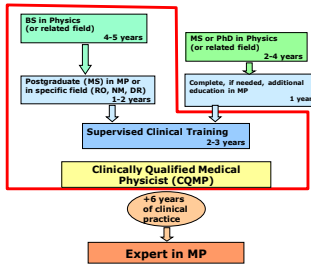
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**MP Education and Training in LA IAEA approach**




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The slide features a dark teal background with the IAEA logo at the top center. Below the logo, a white rectangular box contains the text "The Cuban Experience".

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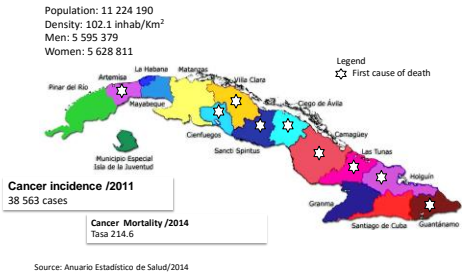
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INSTEC  **Cancer in Cuba**



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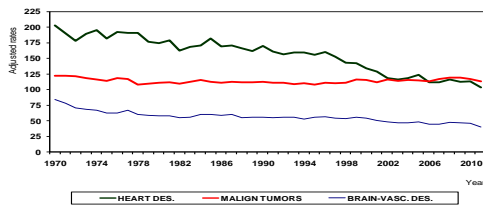
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INSTEC  **Main causes of death in CUBA**



Source: Ministry of Health, Cuba

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INSTEC  **RT services in CUBA**



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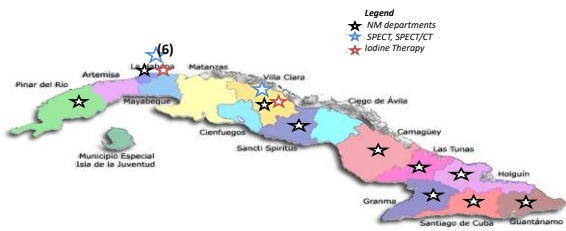
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INSTEC  **NM services in CUBA**




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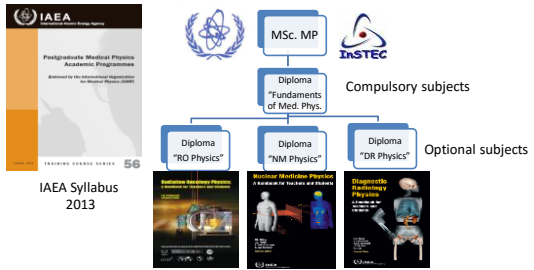
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INSTEC  **MP Education and Training: CUBA**  
Academic




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INSTEC  **MP Education and Training: CUBA**  
Clinical

- On-the-job training
- Required by Nuclear Regulatory Body for RO & NM.
- Not regularized yet by health authorities (MINSAP)
- **Expected output of new IAEA Technical Cooperation Project CUB/6/025 (2016-2018)**




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INTEC  **Certification of MP in Cuba**

- **Currently no professional certification exist**

 IAEA : provides fellowships for **on-the-job training** in specific topics of MP.

 InSTEC (Higher Institute of Technologies and Applied Sciences): provides academic training (BS, MS & PhD)

 CNSN (Cuban Nuclear Regulatory Body): licensing process (mandatory)

Source: Linares H, Alfonso R, MEDICAL PHYSICS INTERNATIONAL Journal, vol.3, No.1, 2015

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INTEC  **Requirement of MPs for Licensing RT departments**

**CNSN**  **CENTRO NACIONAL DE SEGURIDAD NUCLEAR**

**Guía de seguridad para la práctica de Radioterapia**

**Rev. 01/11**

**CNSN Resolución Nro.41/ 2011**

**SECCIÓN II**  
Requisitos a cumplir en los puestos de trabajo para obtener las licencias individuales

19. El personal que realiza la práctica de **Radioterapia** para obtener la Licencia Individual debe satisfacer los requisitos mínimos siguientes:

- c) **Físico Médico (MP)**
  - Formación básica: Graduado universitario con Licenciatura en Física, Física Nuclear, Ingeniería Nuclear o cualquier otra especialidad afín.
  - Formación especializada: Curso de especialización en Física Médica** y un curso técnico práctico en Protección y Seguridad Radiológica de al menos 80 horas.
  - Poseer al menos 6 meses de experiencia en el trabajo de un servicio de Radioterapia bajo la supervisión directa de un Físico Médico de Radioterapia licenciado por el CNSN.
  - Resultar apto en el examen médico de aptitud psicofísica para trabajar con radiaciones ionizantes.
- f) **Responsable de Protección Radiológica (RPO)**
  - Formación básica: Graduado de Nivel superior en Licenciatura en Física, Física Nuclear, Ingeniería Nuclear o especialidad afín.**
  - Formación especializada: curso técnico práctico en Protección y Seguridad Radiológica de al menos 80 horas.
  - Tener al menos 2 años de experiencia en la actividad y
  - Resultar apto en el examen médico de aptitud psicofísica para trabajar con radiaciones ionizantes.

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INTEC  **Requirement of MPs for Licensing NM departments**

**CNSN**  **CENTRO NACIONAL DE SEGURIDAD NUCLEAR**

**Guía de seguridad para la práctica de Medicina Nuclear**

**Rev. 01/11**

**CNSN Resolución Nro.40/ 2011**

**SECCIÓN III**  
Requisitos a cumplir en los puestos de trabajo para obtener las licencias individuales

18. El personal que realiza la práctica de **Medicina Nuclear** para obtener la Licencia Individual debe satisfacer los requisitos mínimos siguientes:

- c) **Físico Médico (MP)**
  - Formación básica: Licenciatura en Física, Ingeniería Nuclear, o especialidad afín.
  - Formación especializada: curso técnico práctico en Protección y Seguridad Radiológica de al menos 80 horas y **Curso de especialización en Física Médica**.
  - Tener al menos 6 meses de experiencia en la especialidad y
  - Resultar apto en el examen médico de aptitud psicofísica para trabajar con radiaciones ionizantes.
- f) **Responsable de Protección Radiológica (RPO)**
  - Formación básica: Graduado de Nivel superior en Licenciatura en Física, Física Nuclear, Ingeniería Nuclear o especialidad afín.**
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  - Tener al menos 2 años de experiencia en la actividad y
  - Resultar apto en el examen médico de aptitud psicofísica para trabajar con radiaciones ionizantes.

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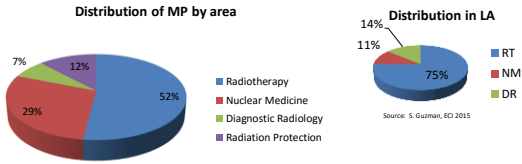
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**INSTEC** Cuba: Distribution of MP



Source: A. López, President, Cuban Society of Medical Physicists (personal communication, 2016)

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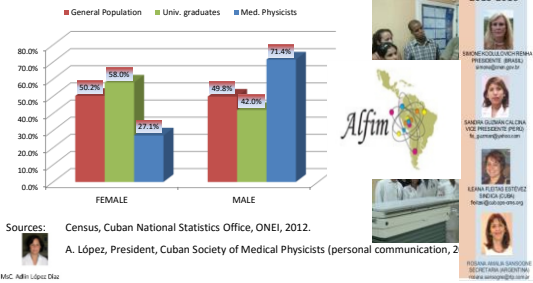
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**INSTEC** Cuba: Diversity by Gender




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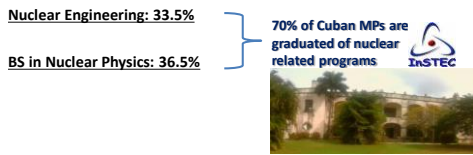
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**INSTEC** Source of Bachelorettes MP in CUBA




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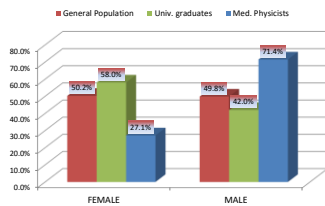
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**Cuba: Diversity by Gender**



Current students at InSTEC



**Women in Nuclear Careers:**  
 BS in Nucl. Phys: 24%  
 Nucl. Engineering: 30%

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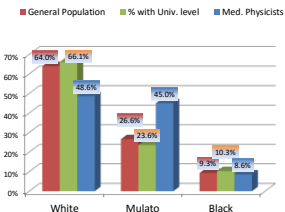
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**Cuba: Diversity by Color of Skin**



Sources: Galván González D.E., "La Población Cubana según el Color de la Piel" (Cuban Population according to Color of Skin) ONEI, February 2016.  
 A. López, President, Cuban Society of Medical Physicists (personal communication, 2016)

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**Cuban Cooperation in Medical Physics**

**Diversity helps faster and smoother integration to different environments and cultures**

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MP in Latin America:  
Unattractive profession?

- Lack of promotion of the medical physics (MP) profession
- There are no legal frameworks regulating the MP profession
- Inappropriate professional status and salary
- Few groups of MP with national and international renowned
- MP less recognized than other Physicist at the University
  - Medical Physics = Applied Physics, less status than theoretical or experimental physics
  - Medical Physics = “Technical work”
- Profession not recognized in the general medical environment

D. Venencia, AAPM Annual Meeting 2010

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Pres. Obama playing domino at the  
most popular Cuban TV show.  
March 23, 2016



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