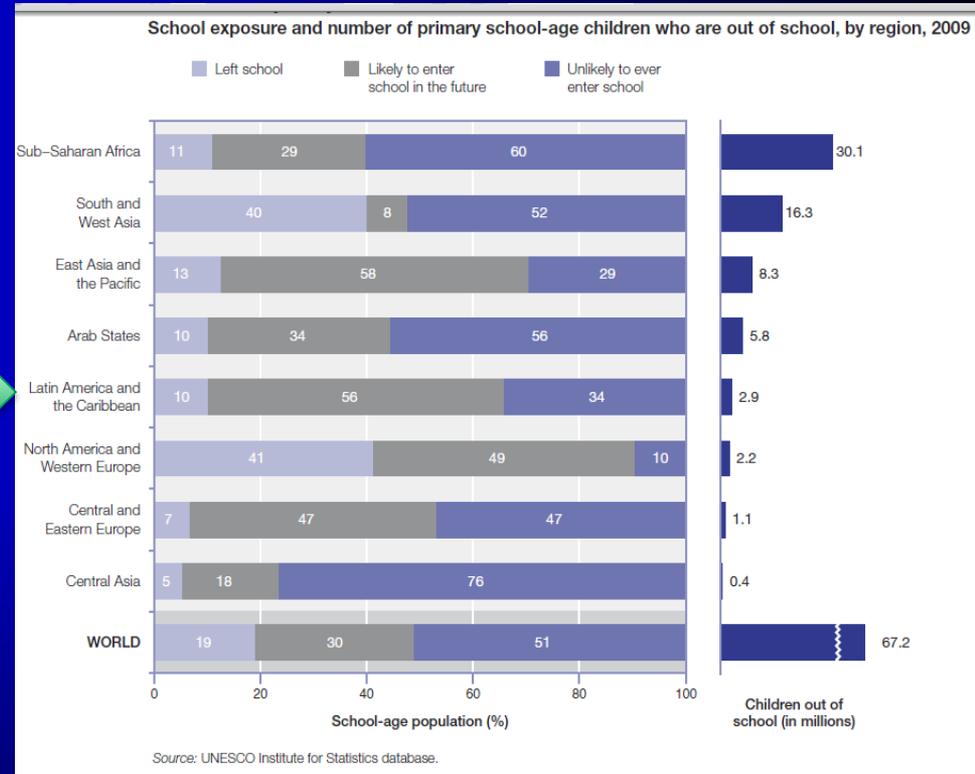


# The Role of MPE/QE/RPO

## Latin American Perspective

**Simone Kodlulovich**  
**ALFIM President**

# Introduction



## General Data:

- World Population: ~7 billions
- LA Population: ~ 600 millions (2010)
- Human Development Index (HDI):

Chile: 0.805  
 Haiti: 0.454  
 Norway: 0.943  
 EUA: 0.910

**Estimate of number of medical physicist in Latin America: 2007: 500 and 2012: ??????**  
 Question: How many do we really need to attend to the needs of all clinical institutions of the region??

Nº	Country or dependent	Population (2010)
1º	<u>Brazil</u> *	190,732,694
2º	<u>México</u> *	112,336,538
3º	<u>Colombia</u> *	46,115,000
4º	<u>Argentina</u> *	41,137,524
5º	<u>Peru</u> *	29,461,933
6º	<u>Venezuela</u> *	27,150,095
7º	<u>Chile</u>	19,890,000
8º	<u>Guatemala</u>	15,361,666
9º	<u>Ecuador</u>	14,306,876
10º	<u>Cuba</u> *	11,240,841
11º	<u>Bolivia</u>	10,426,154
12º	<u>Haiti</u>	10,085,214
13º	<u>Republican Dominican</u>	9,378,818
14º	<u>Honduras</u>	8,045,990
15º	<u>Paraguay</u>	6,460,000
16º	<u>El Salvador</u>	6,194,000
17º	<u>Nicaragua</u>	5,822,000
18º	<u>Costa Rica</u>	4,563,538
19º	<u>Puerto Rico</u>	3,725,789
20º	<u>Panamá</u> *	3,405,813
21º	<u>Uruguay</u>	3,356,584
22º	<u>Martinique</u>	402,000
23º	<u>Guadalupe</u>	404,000
24º	<u>Guyana Francesa</u>	229,000
25º	<u>San Martín</u>	37,163
26º	<u>San Bartolomé</u>	8,823
27º	<u>San Pedro y Miquelon</u>	6,290
	<b>Total</b>	<b>577,278,598</b>



# Current Situation in LAC

**\*Official Number of Medical Physics Associations in Latin America: 8**

Country	Number of Centers and Installed Base of Medical Radiation Equipment			Numbers of Medical Physicists		
	DR	RT	NM	DR	RT	NM
Argentina		120 centers; 200 treatment machines	300 centers, 300 cameras/scanners	20	120	20
Bolivia		5 centres	4 centres		5	
Brazil	100.000	280 centers; 300 treatment machines (AL, Cobalt, HDR, LDR, Gamma-knife, Radiosurgery)	330 centers; 350 SPCT, 50 PET/CT	55*	237* ABFM Certification	31*
Chile	10.000	53	90			
Colombia	15.000	46	47	14	50	5
Costa Rica		3	6 SPECT, <sup>131</sup> I, <sup>99m</sup> Tc, Ga -67	2	9	2
Cuba		9	9	9	35	25
Ecuador	~3000	12 centers; 21 treatment machines (Accelerators, Co-60, BQT)	9 centers, 11 SPECT, 2 PET/CT, 2 Cyclotron	0	9 (in RT-NM)	2
El Salvador						
Guatemala						
Haiti						
Honduras						
México	~16.000	83 centers: 112 treatment machines (47 Co, 65 linacs)	122, 15 PET scanners, 4 cyclotrons	27	110	12
Nicaragua	120*	1	1			
Panama		2 centres	5	1	9	0
Paraguay	1309	4 centres	4			
Peru	4095	18	27	3	30	6
Dominican Republic	~ 1200	9 centres/~22 equipment	14 centres/14 equipment	0	5	1
Uruguay	873	21	8 centers	0	6	0
Venezuela						

# Medical Physicist: Current Situation in LAC

- ▲ **Main activities:** clinical, academic or research
- ▲ **Education:** Undergraduate and post-grad degrees, residencies and continuing training courses.
- ▲ **Areas:** Radiation therapy, medical imaging, nuclear medicine, radiation protection in medicine
- ▲ **Certification process:** *Certification should be by examination, conducted by a country-specific, geographically regional or other designated MP certification board, but.... **What have we done so far????***

**Huge diversity in the region!!!!**

# Main Problems in LA:

## 1. Education and Training

- ▲ Qualified medical physicists: insufficient in number and level of qualification to attend to the academic, research and especially the clinical demand.
- ▲ In 2007, it was identified that we need approximately 100% more physicists in LA to cover the demand.
- ▲ The number of education programs has increased but is still insufficient for the demand

# Education

Country	University	
<b>ARGENTINA</b>	UNIVERSIDAD DE BUENOS AIRES	INSTITUTO BALSEIRO Y FUNDACIÓN ESCUELA DE MEDICINA NUCLEAR
<b>BRAZIL*</b>	UNIVERSIDADE DE SAO PAULO (Ribeirão Preto)	UNIVERSIDADE DO ESTADO DE RIO DE JANEIRO
<b>CHILE</b>	UNIVERSIDAD DE LA FRONTERA ( <b>Temuco</b> )	PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
<b>COLOMBIA*</b>	UNIVERSIDAD NACIONAL DE COLOMBIA	-
<b>COSTA RICA</b>	UNIVERSIDAD NACIONAL DE COSTA RICA	MAESTRÍA EN FÍSICA MÉDICA DE LA UNIVERSIDAD DE COSTA RICA
<b>CUBA</b>	INSTITUTO SUPERIOR DE CIENCIAS Y TECNOLOGÍAS NUCLEARES	-
<b>MEXICO</b>	UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO	UNIVERSIDAD AUTÓNOMA DEL ESTADO DE MÉXICO (Toluca)
<b>PERU</b>	UNIVERSIDAD NACIONAL DE INGENIERÍA	-

\* Master and PhD

# Other Courses

## ▲ ARGENTINA

INSTITUTO DE TECNOLOGÍA NUCLEAR DAN BENINSON

“Curso Física de la Radioterapia”

## ▲ BRAZIL

INSTITUTO DE RADIOPROTEÇÃO E DOSIMETRIA (CNEN)

“Mestrado em Radioproteção e Dosimetria”

## ▲ CHILE

UNIVERSIDAD DE CHILE

“Magister en Biofísica Médica”.

UNIVERSIDAD DE TARAPACÁ (Arica)

“Magíster Ciencias Radiológicas”

“Magíster Seguridad y Protección Radiológica”

## ▲ CUBA

INSTITUTO SUPERIOR DE CIENCIAS MÉDICAS

Diplomado en Física de la Radioterapia

Diplomado en Física de la Medicina Nuclear

# Main Problems in LA

## 2. EDUCATION

- ▲ **Lack of recognized institutions in some countries in order to provide formal education, training and clinical practice for all different specialties (RT, DR, NM, etc). Many countries have been developing high level courses but that is not the reality of the whole Region**
- ▲ **Guidelines:** to ensure that the minimum curriculum represents the current needs of medical physics - *Are they applied?*
- ▲ **Lack of a Commission on Accreditation of Medical Physics Educational Programs**

# America Latina: Education for Medical Physicists

1. Are these courses enough and appropriate?
2. Are all these courses “accredited” according to the international requirements?
3. What about clinical residencies?



# Main Problems in LA

## 3. Certification

***A Certified Medical Physicist is a medical physicist who has been certified by a national or international professional certification body to have the competence to practice independently in one or more sub-fields of medical physics.***

***However, most LA countries have not yet established a certification process!!!***

***There are differing requirements to certify or license the MP in the countries of LA.***

***In Brazil we have the process since 1979 and we are now implementing a re-certification program, but we still have to update and improve it according to the new recommendations.***

# Regulatory Bodies for Medical Physicists

- ▲ Ministry of Health
- ▲ Nuclear Regulatory Commission

*There are different criteria, legislation, and competencies  
for RT, NM and DR Physicists  
Sometimes resulting in conflicts!!!!*

# ALFIM Challenges

- **Implementation of the criteria, recommendations and certification in LA** (*IAEA Human Health Reports n1*)
- **Certification process:** to determine that the candidate's knowledge and fitness to practice clinical medical physics in a designated specialty.
- **Accreditation of institutions:** to recognise formal education and clinical training (appropriate evaluation still isn't available for course programs)
- **Code of Ethics:** to establish a code for MPE in the region

# Tendencies

- ▲ **Increasing installed base of radiation equipment**
- ▲ **Advancing technology x lack of specialists**
- ▲ **Non-qualified personnel carrying out medical physicist activities (deviation of function)**
- ▲ **Improving national legislation across the region**
- ▲ **Gradual recognition of the role of the MPE in hospitals**
- ▲ **Increasing numbers of medical physics researchers**

# Thank you

